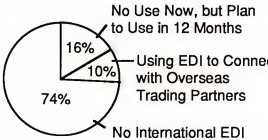
19. EDI (ED)

International EDI Usage



ED- 1 INPUT

Network versus Software Functionality

Function	User Site Software	Network
Store and forward	✓	✓
Translation	✓	✓
Interconnection		✓
Real-time EDI	✓	

ED- 2 INPUT

Network versus Software Functionality

Function	User Site Software	Network
Transaction data bases		✓
Media conversion		✓
EDI to fax, E-mail compliance checking	✓	✓

ED- 3 INPUT

Network versus Software Functionality

Function	User Site Software	Network
Control reports	✓	✓
Trading partner program		✓
Telecom expertise		✓

ED- 4 INPUT

Trends in EDI Software Offerings

- Migration of value-added network services to customer-site software
- Communication gateway/EDI server architecture
- Three-tiered market for message-switching software

ED- 5 INPUT

Trends in EDI Software Offerings

- Event-driven and real-time architectures
- EDI interfaces built into application programs
- Inexpensive translation software/turnkey solutions

ED- 6 INPUT

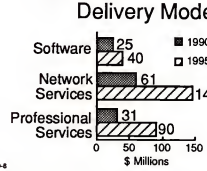
1/7/91

Trends in EDI Software Offerings

- New sources of EDI software
- Market consolidation
- EDI/EFT software
- Softness in midrange market
- Programming tools in translation software

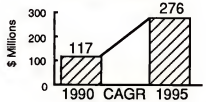
ED-7 INPUT

EDI Market Growth by Delivery Mode



ED-8 INPUT

The U.S. EDI Services and Software Market, 1990-1995



ED-9 INPUT

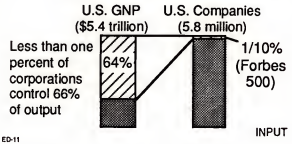
Breakout of Revenues for EDI Service Providers

Customer Base Percentile	Average Network Revenue ($)
80	2,000
15	10,000
5	18,000

Customer base as of mid-year 1990

ED-10 INPUT

Will a "Macro" 80-20 Rule Limit EDI Growth?



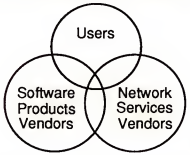
ED-11 INPUT

How to Read the EDI Input-Output Matrix

- Read down columns to see a sector's suppliers
- Read across rows to see a sector's customers

ED-12 INPUT

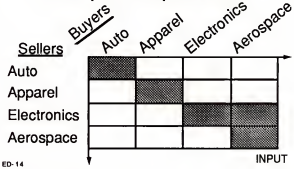
EDI Players Overlap



ED-13

INPUT

EDI Input-Output Matrix



ED-14

INPUT

Future Growth Opportunities of EDI

Opportunities	☑ Networks	■ Software Vendors	☐ Prof. Serv. Firms
Expanding number of EDI users	☑	■	☐
Expanding EDI trade relationships	☑		☐

ED-15

INPUT

Future Growth Opportunities of EDI

Opportunities	☑ Networks	■ Software Vendors	☐ Prof. Serv. Firms
Advanced services			
Data bases	☑		
Funds transfers	☑	■	
Graphics exchange	☑	■	

ED-16

INPUT

Future Growth Opportunities of EDI

Opportunities	☑ Networks	■ Software Vendors	☐ Prof. Serv. Firms
Advanced services			
Real-time EDI	☑	■	
EDI servers/gateways		■	

ED-17

INPUT

Future Growth Opportunities of EDI

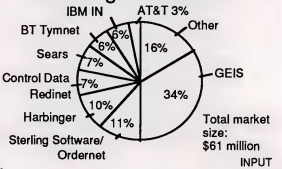
Opportunities	☑ Networks	■ Software Vendors	☐ Prof. Serv. Firms
Systems integration services	☑	■	☐
New EDI applications (vertical markets)	☑	■	☐

ED-18

INPUT

1/7/91

Leading EDI VANs



INPUT

ED-19

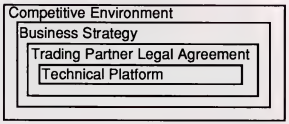
EDI Integration Tools and Technologies

- EDI software products
- Messaging systems and work group environments
- Automatic identification
- Data capture

INPUT

ED-20

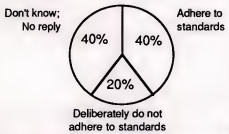
The Operational Context of EDI



INPUT

ED-21

Less Than Half of EDI Users Adhere to Standards



INPUT

ED-22

EDI Standards Issues/Trends

- Not accommodating business practices
- Incapable of characterizing products
- Evolution leads to errors
- Hierarchical design hard to process

INPUT

ED-22a

EDI Standards Issues/Trends

- Quick transaction sets
- People data formats
- Real-time EDI formats
- Redundant/unnecessary data elements
- Standards bodies not fast enough

INPUT

ED-22b

The Four Basic Transactions

- Logistical
- Balancing
- Quality
- Change

ED- 23

INPUT

Selected Strategic Impacts of EDI

- New products and services possible
- Corporate boundaries redefined
- Value chains restructured

ED- 24

INPUT

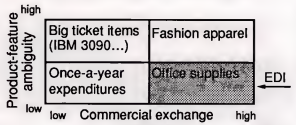
Selected Tactical Impacts of EDI

- Workflow and job description changes
- Accounting changes
- Control of company resources

ED- 25

INPUT

EDI Is for Repetitive Well-Defined Purchases



ED- 26

INPUT

Electronic Commerce

The New Foundation for Trade

ED- 27

INPUT

Electronic Commerce Definition

The end-to-end digital exchange of all information needed to conduct business

ED- 28

INPUT

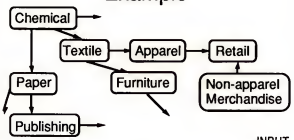
Electronic Commerce Examples

- ATMs and POS systems
- Computer reservation systems
- Electronic securities markets
- EDI use in retail distribution

ED- 29

INPUT

Trading Community Example



ED- 31

INPUT

Electronic Commerce

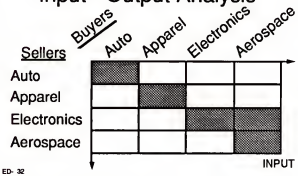
Trading Community

- A company, its trading partners, and the trading partners of its trading partners
- An expanded vertical market
- An external perspective

ED- 30

INPUT

Input - Output Analysis



ED- 32

INPUT

Electronic Commerce

Integration of Trading Communities: Example

- AgriData Resources Inc.
  - Farmers
  - Farm equip. mfgs., distributors
  - Veterinary supplies
  - Commodity markets
  - Weather news

ED- 33

INPUT

Electronic Commerce

Reorganization of Work

- Trading community wide
- Elimination of intermediaries
- Standardization of processes
- Alliances based on information technology

ED- 34

INPUT

Reorganization of Work

- Company wide
  - Automation-induced staff reductions
  - Outsourcing (e.g., data processing, customer service, telemarketing)
  - Distributed work groups

ED- 35 INPUT

Reorganization of Work Requirements

- Understand that work is accomplished through communication/transactions among people
- EC technologies change the possibilities/costs for these communications

ED- 36 INPUT

Tools for Applying Electronic Commerce

- Workflow analysis
- Transaction-cost analysis
- Input-output analysis

ED- 37 INPUT

Construction of Infrastructure

- Transcorporate participation (e.g., standards bodies, alliances, consortia)
- Competitive issues
- Financial issues

ED- 38 INPUT

Competitive Issues

- IS users become IS vendors
- Peripheral services become central profit centers (e.g., airline reservation, car financing)
- Key strategy: market dominance/ monopoly

ED- 39 INPUT

Financial Issues

- EC is a capital, not operations, expense
- Costs spread over whole trading communities, not single firm
- Early adopters often subsidize later adopters (e.g., EDI)

ED- 40 INPUT

Electronic Commerce

Driving Forces

- Speed—reduced cycle times
- Cost—reduced transaction costs
- Customer satisfaction
- Profit—new products leveraging existing expertise

ED- 41 INPUT

Electronic Commerce

Inhibiting Factors

- Technical incompatibilities
  - Conflicting standards
  - Proprietary systems
- Conflicting practices of different industries

ED-42 INPUT

Electronic Commerce

Inhibiting Factors

- Management's lack of awareness of EC possibilities
- Difficulty in protecting intellectual property and intangible assets
- Huge investment and risk
- Resistance to change

ED-43 INPUT

INPUT's Electronic Commerce Research Program

- Definition and framework
- Trading community analysis
- Integration issues
- Monthly newsletter
- Hotline

ED-44 INPUT

Trading Communities Studied

- Health care
- Travel and tourism
- Grocery/agribusiness
- Textile, apparel, retail

ED-45 INPUT

Trading Communities Studied

- Publishing, communications, education
- Federal government
- Transportation/international trade

ED-46 INPUT

Electronic Commerce

U.S. Health Care Trading Community

ED-47 INPUT

U.S. Health Care Trading Community

Players

Providers	Examples
Supplies	Pharmaceutical, grocery, chemical, etc.
Services	Doctors, distributors, hospitals, info. services

ED-48a INPUT

U.S. Health Care Trading Community

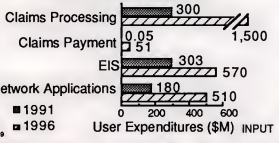
Players

Providers	Examples
Funds	Banks, insurers, patients, governments

ED-48b INPUT

U.S. Health Care Trading Community

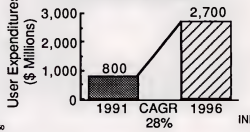
Electronic Commerce Services Markets



ED-49 INPUT

U.S. Health Care Trading Community

Electronic Commerce Services Markets



ED-50 INPUT

U.S. Health Care Trading Community

Electronic Commerce Issues

- Industry administrative costs
- Proliferation of service providers
- Government reform initiatives
- Industry reform initiatives

ED-51a INPUT

U.S. Health Care Trading Community

Electronic Commerce Issues

- Consolidation of supply channels
- Industry versus proprietary standards
  - Health care EDI corporation

INPUT

ED-51b

U.S. Health Care Trading Community

Electronic Commerce Future Trends

- Industry consolidation—suppliers and providers
- Industry specialization—providers
- More pervasive use of industry standards

INPUT

ED-52b

Definiton of Electronic Commerce

- Electronic commerce is the electronic, network-based coordination of material, people, and processes that facilitates commercial exchange

INPUT

ED-54

U.S. Health Care Trading Community

Electronic Commerce Future Trends

- Administrative costs reduced
  - Currently 24% or $160 billion
- Electronic commerce expenditures expand
  - Currently <1% of admin. costs

INPUT

ED-52a

Definition of EDI

- EDI is the application-to-application exchange of intercompany business data in structured, standard data formats

INPUT

ED-53

Electronic Commerce

Components

Component	Description
Organization	Trading communities
Network	Interorganization communications

INPUT

ED-55a

Electronic Commerce

Components

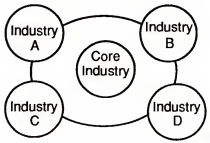
Component	Description
Interfaces	Translation processes Standards for interaction
New business processes	Electronic based

INPUT

ED-55b

Electronic Commerce

Trading Community

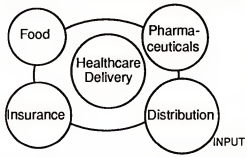


INPUT

ED-56

Electronic Commerce

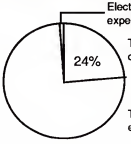
Healthcare Trading Community



INPUT

ED-57

Expenditures on Electronic Commerce Services: Health Care



Electronic commerce service expenditures - $800 million (<1%)

Total administrative costs - $162 billion

Total health care expenditures - $676 billion

INPUT

ED-58

Electronic Commerce

Effects and Dynamics

- Participation of many parties
- Business transaction becomes the focus
- Restructuring of industry processes
- Restructuring of trading community
- Users become vendors

INPUT

ED-59a

Electronic Commerce

Effects and Dynamics

- New economies of scale - community versus individual organization-based
- High risk for early adopters
- Unpredictable alliances

INPUT

ED-59b

Webster's Definition: Commerce

Commerce (1) social intercourse: dealings between individuals or groups in society: interchange of ideas, opinions, or sentiments: interrelationship, connection, or communication. (2) the exchange or buying and selling of commodities especially on a large scale and involving transportation from place to place.

INPUT

ED- 60

Industries Most Impacted by Electronic Commerce

- Communications: media, publishing, information providers, education
- Transportation and distribution
- Finance
- Healthcare
- Government (potential)

INPUT

ED- 61

Tools for Assessing EC Opportunities and Re-engineering Work

- Input-output analysis
- Speech-action analysis
- Transaction analysis
- Activity-based accounting
- Economics of network technologies

INPUT

ED- 62

Financing the Electronic Commerce Infrastructure

- Early adopters vs. later adopters
- Large hub users vs. small spoke users
- Third-party community systems integrators
- Trade groups
- Vendor perspectives (LINX vs. ACES)

INPUT

ED- 63

Community Efficiency

- Community revenue vs. EC cost
- Community revenue vs. GNP
- Community employment/ productivity changes
- Industry coordination factor

INPUT

ED- 64

Changes to the Enterprise

- Workflow re-engineering
- Faster cycle times
- Changed profit centers
- Changes in mgt. focus/company identity

INPUT

ED- 65a

Changes to the Enterprise

- Changes in accounting systems and definitions
- Change in use of management information

INPUT

ED- 65b

Changes to the Competitive Environment

- Product pricing
- Product changes (new and improved products)

INPUT

ED- 66b

Infrastructure Utilities

- Directories, data bases
- Message standards
- Other standards (operating systems)
- Classification systems: product, company location codes

INPUT

ED- 68

Changes to the Competitive Environment

- Elimination of intermediaries
- New outsourcing service options/niches
- Shifted transaction costs
- Users becoming vendors

INPUT

ED- 66a

Impacts of Electronic Commerce

- Changes to competitive environment
- Changes to the enterprise
- Community efficiency
- Financing the EC infrastructure

INPUT

ED- 67

Needed Electronic Commerce Services

- Infrastructure utilities
- System development tools
- Real time
- Payment services

INPUT

ED- 69a

Needed Electronic Commerce Services

- Community-wide solutions
- Information flow from consumer to producer

INPUT

ED- 69b

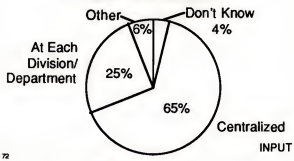
Industry Growth Projection—Selected Industries

	Projected Growth (12 Months)	
	Trading Partners (%)	EDI Expenditures (%)
Distribution	42	38
Banking	448	27

INPUT

ED- 70b

Most Common Location of EDI Translator



INPUT

ED- 72

Industry Growth Projection—Selected Industries

	Projected Growth (12 Months)	
	Trading Partners (%)	EDI Expenditures (%)
Discrete mfg.	15	(7)
Process mfg.	58	40
Transportation	46	39

INPUT

ED- 70a

Conditions Favoring EDI Use (Multiple Possible)

	Percent
Repetitive orders with major trading partners	68
Use only with those partners requesting it	30
Small dollar amounts	14
Other conditions (none > 5%)	25

INPUT

ED- 71

Top 5 EDI Applications

Application	EDI Users (%)
Purchasing	50
Sales/order entry	38
Accounts payable	35
Funds transfer	33
Traffic management	27

INPUT

ED- 73

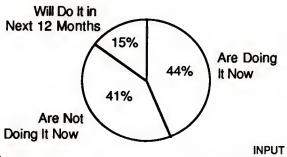
EDI Usage/Support, 1991 Average—Large Companies

	EDI Exp. ($000)	S + F	TPs	% of $ POs	Sat.
> $1 billion	479	16	432	28	3.6
Over $1 million- to $1 billion	132	7	58	10	3.3

INPUT

ED-74

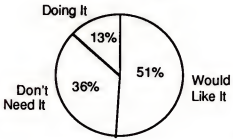
EDI/EFT



INPUT

ED-75

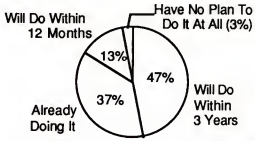
Real-Time EDI



INPUT

ED-76

International EDI



INPUT

ED-77

VAN Services Used With EDI

Type of Service	% Noted in User Survey
Basic service	67
Electronic mail	38
EFT	27
Trading partner implementation prog.	23

INPUT

ED-78a

VAN Services Used With EDI

Type of Service	% Noted in User Survey
On-line catalogs, data bases, directories	13
Other	25
None	8

INPUT

ED-78b

Forecast Changes in VAN Usage Patterns by EDI Users

INPUT

ED-79

EDI Message Traffic Perceived Changes

Change	Percent Noting
Increase in message traffic	41
Decrease in message traffic	7
No change in message traffic	52

INPUT

ED-80

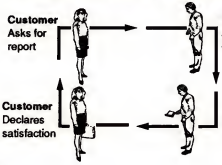
Most Common EDI Implementation Objectives

- Improve operational efficiency
- Reduce costs
- Attain or maintain competitive advantage
- Improve customer relationships
- EDI-related partnering improvements and customer requirements

INPUT

ED-81

The Basic Action Workflow



INPUT

ED-82

Transactions and the In-House/Outsourcing Decision

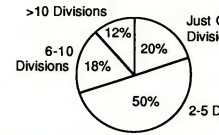
- The limit to the size of the firm is set where its costs of organizing a transaction become equal to the cost of carrying it out through the market. This determines what the firm buys, produces, and sells.

—R.H. Coase, Univ. of Chicago

INPUT

ED-83

Number of Internal Divisions Doing EDI



INPUT

ED-84

1990-1991 EDI Spending

(Companies with > $400 M in Annual Fees)

Attribute	1990	1991	% Change
Avg. expenditures on all EDI activity	$268,000	$321,000	20
Avg. number of trading partners	322	544	69
Avg. spending per trading partner	$832	$591	(29)

INPUT

ED- 85

EDI as a Customer Interface

- The average EDI user
  - Has 196 customers using EDI
  - Receives 22% of POs via EDI, which represents 32% of total dollar volume of all POs received

INPUT

ED- 86a

EDI as a Customer Interface

- The average EDI user
  - Would need to have approximately 450 customers before EDI submission would represent 50% of POs receive
  - At that level, the EDI POs would represent 73% of PO $ volume

INPUT

ED- 86b

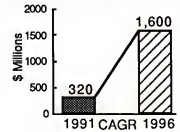
Issues of Electronic Commerce

- Integration
- Education
- Finance
- Alliances—"Coop-etition"
- Work and industry reorganization
- Monopoly and scale economies
- Accounting metrics

INPUT

ED- 87

U.S. Health Care EDI Software and Services



INPUT

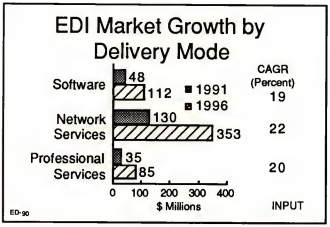
ED- 88

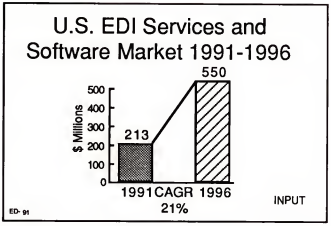
EDI Market Main Points

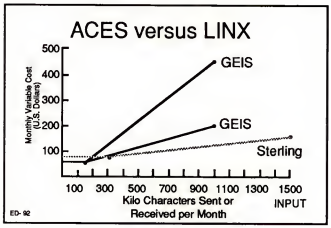
- Still solid growth
- Slowing in manufacturing
- New services
- New architecture needed?
- Diminishing/new VAN role
- Expand to "Electronic Commerce" perspective

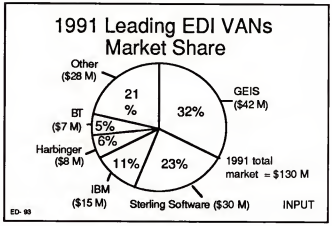
INPUT

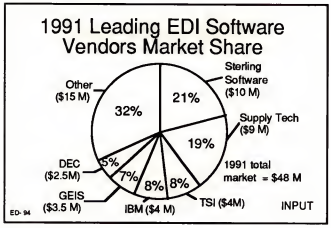
ED- 89


EDI Market Growth by Delivery Mode
CAGR (Percent)
Software
48
112
1991
1996
19
Network Services
130
353
22
Professional Services
35
85
20
0 100 200 300 400
$ Millions
INPUT
ED-90


U.S. EDI Services and Software Market 1991-1996
550
500
400
300
200
100
0
$ Millions
213
1991 CAGR 1996
21%
INPUT
ED-91


ACES versus LINX
500
400
300
200
100
Monthly Variable Cost (U.S. Dollars)
GEIS
GEIS
Sterling
100 300 500 700 900 1100 1300 1500
Kilo Characters Sent or Received per Month
INPUT
ED-92


1991 Leading EDI VANs Market Share
Other ($28 M)
21 %
GEIS ($42 M)
32%
BT ($7 M)
5%
Harbinger ($8 M)
6%
11%
23%
1991 total market = $130 M
IBM ($15 M)
Sterling Software ($30 M)
INPUT
ED-93


1991 Leading EDI Software Vendors Market Share
Other ($15 M)
32%
Sterling Software ($10 M)
21%
Supply Tech ($9 M)
19%
DEC ($2.5M)
5%
7%
8%
8%
1991 total market = $48 M
GEIS ($3.5 M)
IBM ($4 M)
TSI ($4M)
INPUT
ED-94


Mainstream EDI Markets
• Manufacturing
• Transportation
• Distribution
INPUT
ED-95

Specialized EDI Markets

- Health care
- Finance
- Government

INPUT

ED- 96

Emerging EDI Markets

- Travel and tourism
- Communications/media
- Education
- Construction

INPUT

ED- 97

Marketing EDI Success Factors

- Integration consulting and education
- Trading partner implementation programs
- Hub-spoke approach
- Software and network services

INPUT

ED- 98

Telephone Company Activity in EDI

- AT & T
- US Sprint
- MCI
- Bell Atlantic
- Bell South
- Ameritech
- Nynex
- GTE

INPUT

ED- 99

Electronic Commerce Examples

Agribusiness - ARI Network Services
Pharmaceuticals - Sterling Software
Insurance - IVANs
Retail - Sears, Wal-Mart
Transportation - (Port Systems)
Retail - Transnet

INPUT

ED- 100

Electronic Commerce Impacts

- Re-engineering value chains
- Re-engineering enterprises
- Community efficiency
- Financing the infrastructure
- Marketing the solution

INPUT

ED- 101

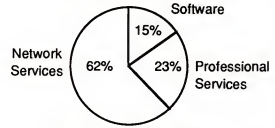
Requirements of Electronic Commerce

- System utilities
- Standards/classification systems
- Network services
- Community-wide solutions
- New accounting metrics

INPUT

ED- 102

European EDI Market Components, 1991

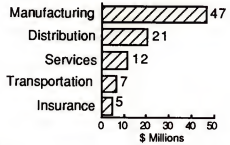


Total market = $100 million

INPUT

ED- 103

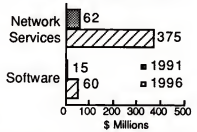
Leading European EDI Industries, 1991



INPUT

ED- 104

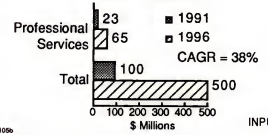
EDI Software and Services Market—Western Europe, 1991-1996



INPUT

ED-105a

EDI Software and Services Market—Western Europe, 1991-1996



INPUT

ED-105b

Distribution of Customer Revenues by Percentile for EDI Network Services

Customer Base Percentile	Average Annual Network Revenue ($)
85	2,000
14	11,000
1	60,000

INPUT

ED- 106

Grocery Electronic Commerce

Service	$ Millions
EDI	20
Card processing	510
Check authorization	200
Electronic marketing	100

INPUT

ED- 107a

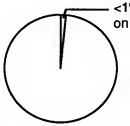
Grocery Electronic Commerce

Service	$ Millions
Product movement	450
Commodity markets	300
Other	200
Total	1,780

INPUT

ED- 107b

Expenditures on Electronic Commerce Services: Transportation



INPUT

ED- 108

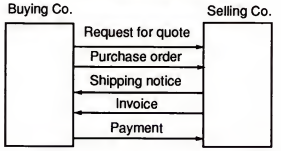
Electronic Commerce: Health Care

Application	$ Millions
EDI	17
Claims processing	300
Claims payment	<1
Electronic information services	303
Network applications	180
Total	800

INPUT

ED- 109

EDI Messages



INPUT

ED- 110

Electronic Commerce: The New Institutional Framework

- Monopoly
- Standardization
- Finance
- Ownership
- Marketing
- Education

INPUT

ED- 111

EDI Vendor Opportunities and Strategies

- Community solution/targeting
- Data bases and utilities
- Suite of software and services
- EFT, real time, international services

INPUT

ED- 112

Trends in EDI

- Consolidaton of vendors
- Price competition
- Growing diversity of EDI applications
- Users slow to integrate
- EDI architecture changing

INPUT

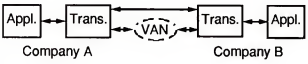
ED- 113

Expenditures on Electronic Commerce Services: Grocery

INPUT

ED- 114

The Different Kinds of Real-Time EDI



INPUT

ED-115

PC Software Markets

	1991 ($M)	90-91 Growth (%)
EDI	30	50
Workflow	120	-
Spreadsheet	950	35

INPUT

ED-116a

PC Software Markets

	1991 ($M)	90-91 Growth (%)
Data Base	400	15
Word Processing	1,100	24
Accounting	933	20

INPUT

ED-116b

3rd Party Network Markets

	1991 ($M)	CAGR 91-96 (%)
EDI	148	22
E-Mail	350	23
EDI/EFT	13	50

INPUT

ED-117

Electronic Commerce

The use of electronic systems to facilitate the many kinds of communications involved in a commercial transaction.

Doing business electronically

INPUT

ED-118

Ostensible EC Losers

- Paper manufacturers
- Printing companies
- U.S. postal service
- Postal meter manufacturers
- Forms printers
- Mints
- File cabinet manufacturers

INPUT

ED-119

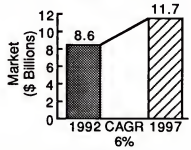
Ostensible EC Winners

- Telecommunications networks
- Credit card service vendors
- Software companies
- Media/intellectual property holders

INPUT

ED-120

U.S. EC Software and Service Market



INPUT

ED-121

Electronic Commerce Market

Key Industries

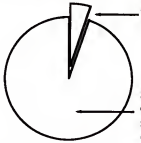
- Government
- Health care
- Transport/ Logistics
- Distribution
- Banking
- Manufacturing
- Media
- Travel/Tourism

INPUT

ED-122

Electronic Commerce Market

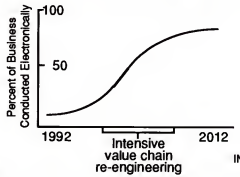
Effective versus Latent Value



ED-123

INPUT

Paperless Society—When?



ED-124

INPUT

Key Economic Trends

- Service sector biggest
- Power shift: manufacturing to dist., retail, service
- Confederations replace vertical integration
- Protracted economic dislocation
- Retrenchment of big government

ED-125

INPUT

Information Technology Drivers

- PC and LAN proliferation
- Facsimile: the bridge between paper and paperless
- Global telecom infrastructure
- Voice/data/video/image integration

ED-126

INPUT

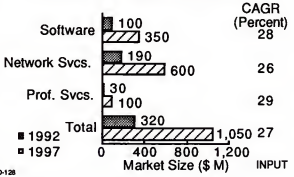
Electronic Commerce Technologies

- EDI
- POS
- EDI/EFT
- E-mail/Groupware
- Facsimile
- Electronic information services

ED-127

INPUT

U.S. EDI Market Growth



ED-128

INPUT

Grocery EC Services ($ M)

POS	Card processing	510
	Product movement	450
	Check authorization	200
	Electronic marketing	100
	Commodity markets	300
	EDI	20
	Other	200

INPUT

ED-129

Electronic Information Services

- Directories
- Product catalogs
- Market data
- Product information logistics
- On-line versus CD ROM

INPUT

ED-130

Electronic Commerce Technologies

- Automatic identification
- Computer-telephone integration
- Video
- Image

INPUT

ED-131

EC Services

- Professional services
  - Education
  - Systems integration
  - Community facilitation
- Network and processing services
- Outsourcing

INPUT

ED-132

EC Users

- Distribution: Wal-Mart
- Trans.: Cass Logistics, Maersk
- Gov't.: Customs, IRS, commissaries, CALS
- Mfg.: Texas Instruments
- Media: Donovan Data Systems, McGraw Hill

INPUT

ED-133

EC Vendors

- Still nascent industry
- Most established: GEIS, AT&T, BT, SSW, IBM, EDS
- Coming: FFMC, Amex, Intel, Motorola, Lotus, Microsoft, CATV, Publishers, Cellular

INPUT

ED-134

EC Opportunities

- Integrating internal and external networks
- Combining consumer and corporate EC
- Providing pricing, payment, and accounting services
- Providing global services

INPUT

ED-135

EC Threats

- Customer obliteration
- Customer/supplier becoming competitor
- Slow economy; lack of commerce

INPUT

ED-136

1997 EC Scenario

- EDI vendors consolidated
- EDI is component of broader offering
- User-vendor alliances
- Media and IS/IT industries coverage
- Virtual organizations; factory "servers"

INPUT

ED-137

Vendor Agenda

- Decide: Technology or solutions provider?
- Make alliances
- Acquire vertical market expertise

INPUT

ED-138

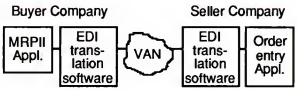
User Agenda

- Streamline workflow
- Do key competences; outsource the rest
- Buy on price
- Can you be an EC vendor?

INPUT

ED-139

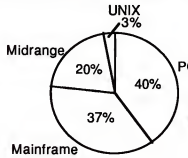
Components of EDI



INPUT

ED-140

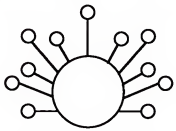
1992 EDI Software Market



ED-141

INPUT

EDI Usage Grows in a Hub and Spoke Pattern



ED-142

INPUT

Most Common EDI Applications

Application	Rank
Order entry	1
Accounts receivable	2
Purchasing	3
Accounts payable	4
Inventory	5

ED-143

INPUT

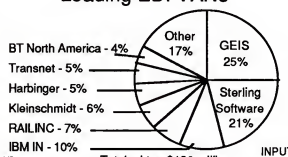
EDI Implementation Success Factors

- Executive charter
- Formal strategy
- Multidepartment task force
- EDI coordinator
- Close interaction with vendors

ED-144

INPUT

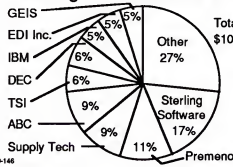
1992 Market Share Leading EDI VANs



ED-145

INPUT

1992 Market Share Leading EDI Software Vendors



ED-146

INPUT

EDI Professional Services

Vendor	1992 Revenues ($ M)
EDS	5.0
IBM Information Network	4.0
Price Waterhouse	2.5
Andersen Consulting	2.0
Other	16.5
Total	30.0

INPUT

ED-147

Case Study

- Allison Manufacturing
- Product: Sportswear
- Sales: $70 million
- EDI trading partners: 12 customers
- Sales volume by EDI: 12%
- EDI transactions: P.O., invoice
- PC software; 2 networks

INPUT

ED-148

X12 and EDIFACT Syntax

Interchange
Functional group
Message or transaction set
Segment
Data element

INPUT

ED-149

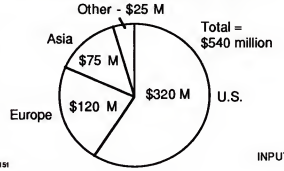
X12 and EDIFACT

- X12 is more widely used
- X12 has more working standards
- EDIFACT is more generic
- Industry and trading partner guidelines are key
- EDIFACT syntax used in X12 committee

INPUT

ED-150

Worldwide EDI Market, 1992



INPUT

ED-151

20. VERTICALS (VM)

Vertical Markets

VM-1

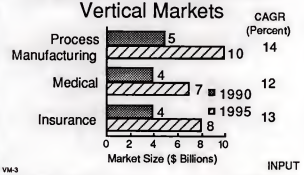
INPUT

Largest Information Services Vertical Markets

VM-2

INPUT

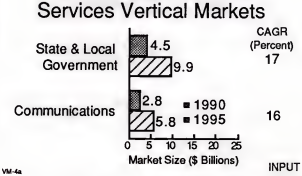
Largest Information Services Vertical Markets



VM-3

INPUT

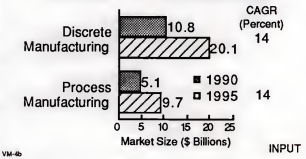
Fast-Growing Information Services Vertical Markets



VM-4a

INPUT

Fast-Growing Information Services Vertical Markets



VM-4b

INPUT

Discrete Manufacturing

VM-5

INPUT

3/8/91

Discrete Manufacturing Market Trends

- Restructuring of CAD/CAM industry
- "One-stop shopping"
- Slow adoption of CIM
- Inroads for EAI
- The constraints of a recession

INPUT

VM-129

Driving for IS Budgets

- Competitive pressures
- New hardware platforms
- From batch to on-line processing
- Integration

INPUT

VM-130

Discrete Manufacturing IS Budget Trends

- Modest, steady increases in budgets
- Software products favored
- Hardware spending constrained
- Major projects continued

INPUT

VM-131

Discrete Manufacturing Major IS Issues

- Lack of corporate information strategy
- Impact of reorganization
- Difficulty of implementing distributed processing
- Control and accountability in decentralized environment

INPUT

VM-132

Discrete Manufacturing New Information Technologies

- Cooperative processing
- Image processing
- Open Systems/UNIX
- CASE

INPUT

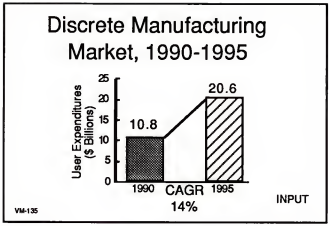
VM-133

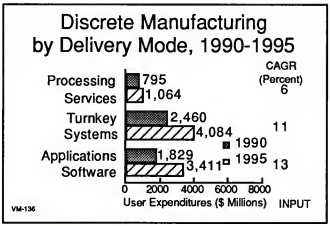
Discrete Manufacturing Growth Inhibitors

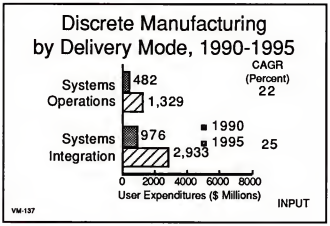
- Lack of integrated software
- More committee-based buying decisions
- Unfulfilled IS vendor promises
- More complex requirements
- Too many alternatives

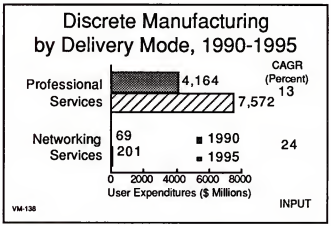
INPUT

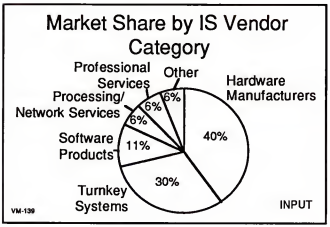
VM-134

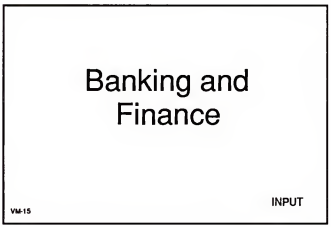

Discrete Manufacturing Market, 1990-1995
User Expenditures ($ Billions)
25
20
15
10
5
0
10.8
20.6
1990
CAGR 14%
1995
INPUT
VM-135


Discrete Manufacturing by Delivery Mode, 1990-1995
CAGR (Percent)
Processing Services
795
1,064
6
Turnkey Systems
2,460
4,084
11
Applications Software
1,829
3,411
1990
1995
13
0 2000 4000 6000 8000
User Expenditures ($ Millions)
INPUT
VM-136

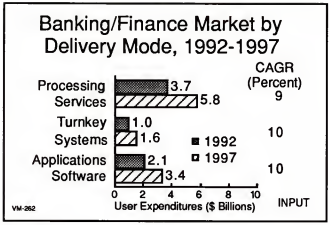

Discrete Manufacturing by Delivery Mode, 1990-1995
CAGR (Percent)
Systems Operations
482
1,329
22
Systems Integration
976
2,933
1990
1995
25
0 2000 4000 6000 8000
User Expenditures ($ Millions)
INPUT
VM-137

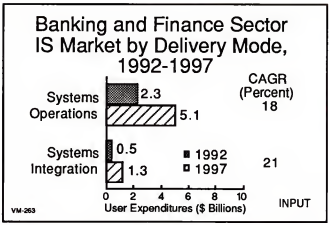

Discrete Manufacturing by Delivery Mode, 1990-1995
CAGR (Percent)
Professional Services
4,164
7,572
13
Networking Services
69
201
1990
1995
24
0 2000 4000 6000 8000
User Expenditures ($ Millions)
INPUT
VM-138

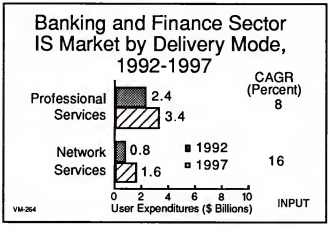

Market Share by IS Vendor Category
Professional Services
Other
Hardware Manufacturers
Processing/ Network Services
6%
6%
6%
40%
Software Products
11%
30%
Turnkey Systems
INPUT
VM-139

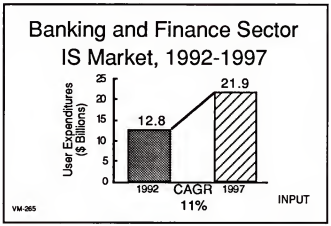

Banking and Finance
INPUT
VM-15

3/8/91









Banking/Finance Industry Trends—Examples

Extension into Multiple Lines of Business

Products/Services	Offered by:
Checking accounts	Banks
Deposit products	Thrifts
ATM cards	Credit unions

INPUT

VM-18a

Banking/Finance Industry Trends—Examples

Extension into Multiple Lines of Business

Products/Services	Offered by:
Credit cards	Brokers
Loans	Non-bank fin. svcs.
Insurance	Non-bank fin. svcs.

INPUT

VM-18b

2/8/92

Banking/Finance Industry Trends—Examples

Changing Outlook for Individual Products/Services

- Product creation/evolution proceeding at more rapid pace
- 24 hour/automated trading systems
- Increased demand for electronic information services

INPUT

VM-19

Banking/Finance Industry Trends—Vendor Impact

Extension into Multiple Lines of Business

- Good for systems operations, systems integration
- Mixed for software, processing services, turnkey, consulting

INPUT

VM-20

B/F Industry Trends Vendor Recommendations

Products/Services

- Develop modular, data base-oriented systems
- Develop platform-independent open systems

INPUT

VM-21

Banking and Finance Sector 1991/1992 Business Issues

- Recession impacts
- Mergers and acquisitions
- Regulatory concerns
- Profitability pressures on large banks
- Real estate slowdown

INPUT

VM-266

Banking and Finance Sector IS Challenges/Priorities

Segments	Challenges
Banks/Thrifts/ Credit Unions	Cost/benefit pressures Improved systems integration Imaging

INPUT

VM-267

Banking and Finance Sector IS Challenges/Priorities

Segments	Challenges
Brokerage	Trading technology Automated client interfaces Back-office cost control

INPUT

VM-268

2/8/92

State and Local Government

INPUT

VM-22

State and Local Government Major IS Issues

- Budgetary constraints
- Increasing IS solution demand
- Organizational issues
- Personnel availability
- Lack of plans

INPUT

VM-140

State and Local Government New Technology Plans

- 4GL and CASE
- Storage technology (image)
- Networking and connectivity
- Relational data bases
- Distributed processing

INPUT

VM-141

State and Local Government IS Management Objectives

- Upgrade hardware
- Increase software development capabilities

INPUT

VM-142

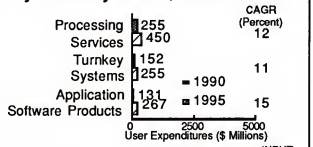
State and Local Government IS Management Objectives

- Increase project management capabilities
- Enhance networks
- Increase strategic planning

INPUT

VM-143

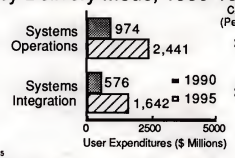
State and Local Government by Delivery Mode, 1990-1995



INPUT

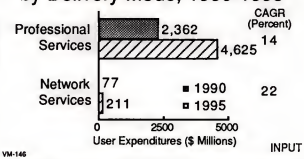
VM-144

State and Local Government by Delivery Mode, 1990-1995



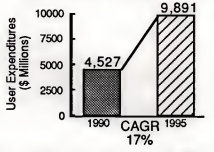
VM-145 INPUT

State and Local Government by Delivery Mode, 1990-1995



VM-146 INPUT

State and Local Government IS Market, 1990-1995



VM-147 INPUT

Federal Government

VM-28 INPUT

Federal Government Economic Events and Trends

- Trade imbalance
- Economic recession
- Cold War cessation
- Domestic problems
- Middle East crisis
- Budget deficit

VM-249 INPUT

Federal Government Technology Trends

- Expanded networks/LANs
- Improved graphics/imaging
- Advanced operating systems
- Artificial intelligence
- Enhanced microcomputers
- Advanced communications

VM-250 INPUT

Federal Government Key Agency Issues

- Planning and management
- Security and privacy
- Resource utilization
- Staff shortages
- Cost containment
- Micromanagement

INPUT

VM-251

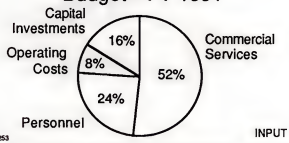
Federal Government Information Services Issues

- Transition from data orientation
- Changing acquisition methods
- Implications of standards
- Shakeout of markets
- Price versus technology

INPUT

VM-252

Federal Government Information Technology Budget—FY 1991



INPUT

VM-253

Applications Downsized to Microcomputers

Application	Rank
Accounting	1
Inventory	2
Financial	3

INPUT

VM-254

Applications Downsized to Microcomputers

Application	Rank
Management systems	4
Data entry	5
Information processing	6

INPUT

VM-255

Federal Government Objectives

- Voice-data integration
- Improved end-user support
- Increased software product applications
- Relational data bases

INPUT

VM-256

3/8/91

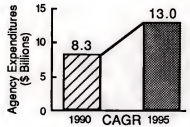
Federal Government Objectives

- Departmental information processing
- Transparent connectivity
- Decision support systems

INPUT

VM-257

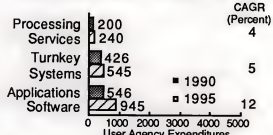
Federal Government IS Market, 1990-1995



INPUT

VM-258

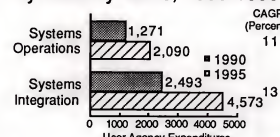
Federal Government IS Market by Delivery Mode, 1990-1995



INPUT

VM-259

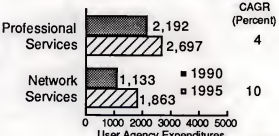
Federal Government IS Market by Delivery Mode, 1990-1995



INPUT

VM-260

Federal Government IS Market by Delivery Mode, 1990-1995



INPUT

VM-261

Medical

INPUT

VM-37

3/8/91

Medical Vendor Opportunities

- Integrated systems
- Clinical/laboratory applications
- Networking: physicians & hospitals
- Professional services

INPUT

VM-40

Medical Vendor Opportunities

- "Point of care" systems
- Skill nursing/health care systems
- Physicians: PC usage
- Prescription drug programs

INPUT

VM-41

Medical—Impacts of Business and Social Trends

- Rising percentage of uninsured
- Urban poverty and service needs
- Growing ranks of elderly
- Drives to control medical costs

INPUT

VM-148

Medical Information Systems: A Changing Role

- Focus on patient-care systems
- Shifting roles for systems in finances
- EDI for ordering and claims
- Issue: Needs versus funds to invest

INPUT

VM-149

Evolving Hospital Systems in the 1990s

- Decentralized departments and applications
- Still-born hospital information systems
- The integration challenge
- From financial to patient-care systems
- The efficiency drive

INPUT

VM-150

Opportunities in Patient-Care Systems

- Electronic charting
- Systems use by medical professionals
- Flexible electronic records access
- Networking multiple systems
- Mixing data, plots, and images

INPUT

VM-151

Hospitals: Business Requirements for IS

- Handle complex billing requirements
  - Government payors
  - Private insurers
  - Electronic billing
- Track HMO/PPO service contracts

INPUT

VM-152

Hospitals: Business Requirements for IS

- Improve clinical efficiency and effectiveness
- Integrate financial and clinical information
- Analyze service profitability
- Support hospital marketing

INPUT

VM-153

Medical—Driving Forces

- Cost accountability
- Reimbursement dynamics
- Patient-care systems
- Documenting outcomes
- Local and community networking
- Systems upgrading and integration
- Experience with outside solutions

INPUT

VM-154

Medical—Inhibiting Factors

- Departmental and old central systems
- Networking obstacles
- Limited in-house experience
- Costly, pioneering new technologies

INPUT

VM-155

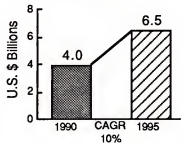
Medical—Inhibiting Factors

- Unproven benefits
- Professional-level resistance
- Expense constraints
- Competing capital investments

INPUT

VM-156

Medical IS Market 1990-1995

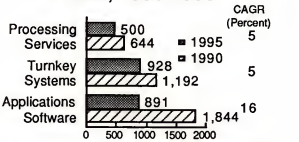


INPUT

VM-157

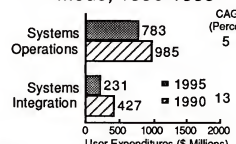
3/8/91

Medical IS Market by Delivery Mode, 1990-1995



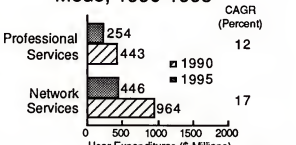
VM-158 INPUT

Medical IS Market by Delivery Mode, 1990-1995



VM-159 INPUT

Medical IS Market by Delivery Mode, 1990-1995



VM-160 INPUT

Education

VM-42 INPUT

General Education Industry Trends

- Flat to minimal growth in governmental spending
- Changing demographics of student populations
- Curriculum reform demands

VM-161 INPUT

Education Industry IS Trends

K-12

- Academic Courseware
  - Increased acceptance of CAI
  - Improved quality of CAI courseware
  - Continued limited availability of classroom computers

VM-162a INPUT

3/8/91

Education Industry IS Trends

- Administrative Applications
  - Teacher/classroom management systems
  - Districtwide record-keeping automation
  - PC-based administrative applications

INPUT

VM-162b

Education Industry IS Trends

Higher Education

- Academic Courseware
  - Slow grow in use of commercial CAI

INPUT

VM-163a

Education Industry IS Trends

Higher Education

- Academic Courseware
  - Expanding CAI development on campus
  - Creation of consortiums to expand CAI use

INPUT

VM-163b

Education Industry IS Trends

Higher Education

- Administrative Applications
  - Expansion of intra/intercampus networks
  - Experimentation with video classroom/offsite instruction

INPUT

VM-163c

Education Industry IS Trends

Academic Libraries

- Expanded use of on-line and CD ROM services
  - Interlibrary E-mail networks in place
  - National library catalog system developing

INPUT

VM-164a

Education Industry IS Trends

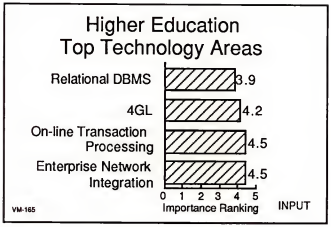
Academic Libraries

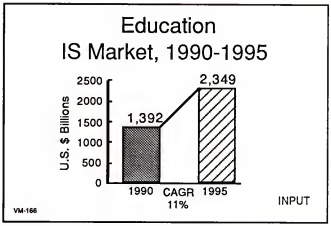
- Expanded use of on-line and CD ROM services
  - Experimentation with text management and retrieval technology

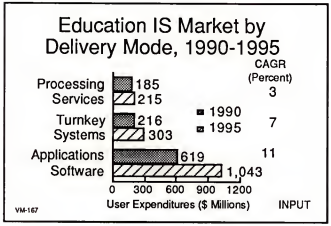
INPUT

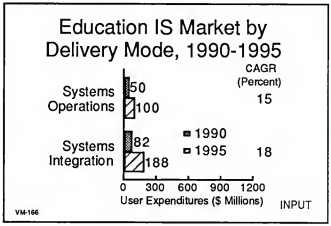
VM-164b

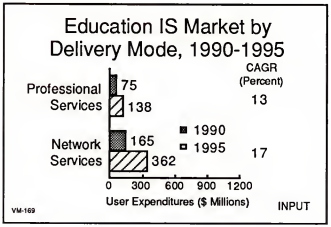
3/8/91

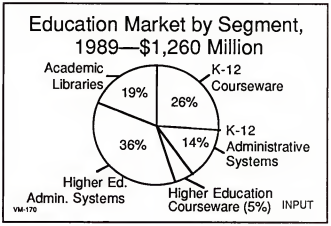

Higher Education
Top Technology Areas
Relational DBMS
4GL
On-line Transaction Processing
Enterprise Network Integration
3.9
4.2
4.5
4.5
0 1 2 3 4 5
Importance Ranking
VM-165
INPUT


Education
IS Market, 1990-1995
2500
2000
1500
1000
500
0
U.S. $ Billions
1,392
2,349
1990
CAGR
11%
1995
VM-166
INPUT


Education IS Market by
Delivery Mode, 1990-1995
CAGR
(Percent)
Processing Services
185
215
3
Turnkey Systems
216
303
7
Applications Software
619
1,043
11
1990
1995
0 300 600 900 1200
User Expenditures ($ Millions)
VM-167
INPUT


Education IS Market by
Delivery Mode, 1990-1995
CAGR
(Percent)
Systems Operations
50
100
15
Systems Integration
82
188
18
1990
1995
0 300 600 900 1200
User Expenditures ($ Millions)
VM-166
INPUT


Education IS Market by
Delivery Mode, 1990-1995
CAGR
(Percent)
Professional Services
75
138
13
Network Services
165
362
17
1990
1995
0 300 600 900 1200
User Expenditures ($ Millions)
VM-169
INPUT


Education Market by Segment,
1989—$1,260 Million
Academic Libraries
19%
K-12 Courseware
26%
K-12 Administrative Systems
14%
Higher Education Courseware (5%)
Higher Ed. Admin. Systems
36%
VM-170
INPUT

3/8/91

Trends—Higher Education

- Centralized IS control
- Integrated, networked solutions
- Standards for intercampus networking
- Spending on microcomputers in past, leading to connectivity needs

VM-43 INPUT

Trends—Higher Education

- User involvement in software development
- CAI/courseware development
  - EDUCOM
- Budgetary concerns

VM-44 INPUT

Driving Forces Higher Education

- Administrative applications
- Research applications
- Word processing (faculty/students)
- Intracampus networking

VM-45 INPUT

Transportation

VM-46 INPUT

Transportation Critical Future Applications

- On-board computing
- Consolidation center automation tie-in with on-board computing
- Moving operations to relational form
- Expert systems

VM-47 INPUT

Transportation Critical Future Applications

- Systems bridges/interfaces
- Networking integration
- Cost-reducing applications
- Image technology to save resources
- Building networks with customers and suppliers

VM-48 INPUT

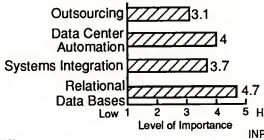
Transportation Critical Future Applications

- Reservation systems
- Revenue enhancement systems
- Hangar operations
- Marketing automation system
- Resource allocation

INPUT

VM-49

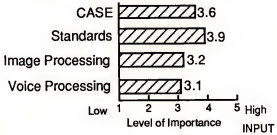
Transportation Ranking of IS Issues



INPUT

VM-50

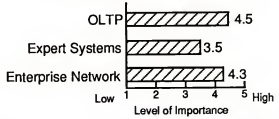
Transportation Ranking of IS Issues



INPUT

VM-51

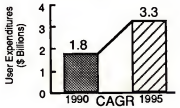
Transportation Ranking of IS Issues



INPUT

VM-52

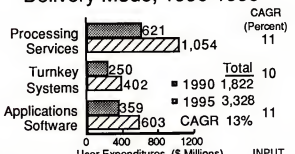
Transportation Market, 1990-1995



INPUT

VM-53

Transportation Market by Delivery Mode, 1990-1995

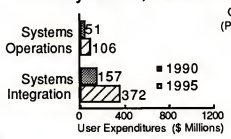


INPUT

VM-54

3/8/91

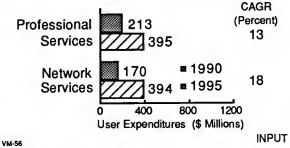
Transportation Market by Delivery Mode, 1990-1995



VM-55

INPUT

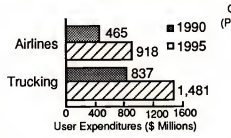
Transportation Market by Delivery Mode, 1990-1995



VM-56

INPUT

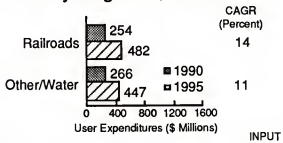
Transportation Market by Industry Segment, 1990-1995



VM-57

INPUT

Transportation Market by Industry Segment, 1990-1995



VM-58

INPUT

Insurance

VM-59

INPUT

Insurance Industry Segmentation

- Property and casualty carriers
- Life and health carriers
- Medicare/Medicaid processors
- Independent agents and brokerages

VM-60

INPUT

3/8/91

The Uncertain Outlook for National Health Insurance

- Rapid rise in uninsured Americans
- The Greying of America
- National health insurance uncertainties

INPUT

VM-61

Insurance Key Business Issues

- Changes in Life products
- Emphasis on customer service
- Periodic budget squeezes
- Foreign sales challenges

INPUT

VM-62

Insurance Key Business Issues

- Rate-setting and regulations
- Tax law changes
- National health insurance?

INPUT

VM-63

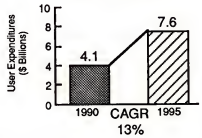
Insurance Sector IS Budget

- Strong central budget control
- Budget range: 3% to 4% of premium revenue
- Annual budget increases average 6%

INPUT

VM-64

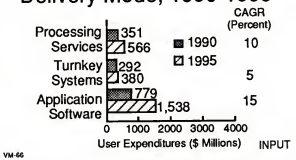
Insurance Market, 1990-1995



INPUT

VM-65

Insurance Market by Delivery Mode, 1990-1995

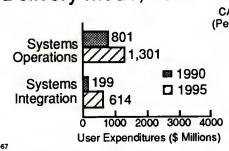


INPUT

VM-66

3/8/91

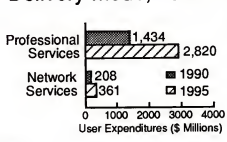
Insurance Market by Delivery Mode, 1990-1995



INPUT

VM-67

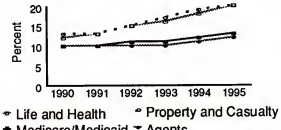
Insurance Market by Delivery Mode, 1990-1995



INPUT

VM-68

Insurance Sector Growth Rate by Segment



INPUT

VM-69

Insurance Sector Leading Vendors

- Policy Management Systems Corporation
- Equifax
- Electronic Data Systems

INPUT

VM-70

Insurance Sector Leading Vendors

- The Continuum Company
- Automatic Data Processing
- Agency Management Services

INPUT

VM-71

Business Services

INPUT

VM-72

Structure of Business Services Market

SIC Code	Services Category
65	Real Estate
73	Business Services
81	Legal Services

VM-73

INPUT

Structure of Business Services Market

SIC Code	Services Category
87	Engineering, Accounting, Research, Mgmt.
89	Miscellaneous Services

VM-74

INPUT

Business Services Sector Effects of Business Trends

Large Services Firms

- Overall expansion
- Increased competition
- Increased complexity

VM-75

INPUT

Business Services Sector Effects of Business Trends

Small Services Squeeze

- Potential contraction
- Potential for increase in local business
- Specialization

VM-76

INPUT

Business Services Issues Facing IS

- Integration
- Cost containment
- Productivity improvement for professionals

VM-77

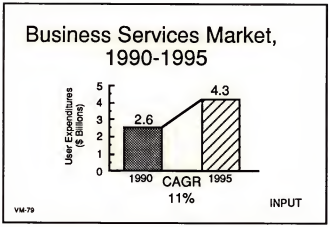
INPUT

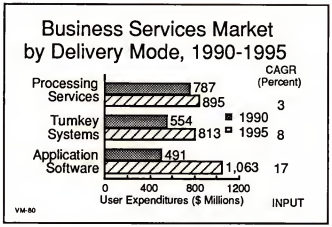
Business Services Issues Facing IS

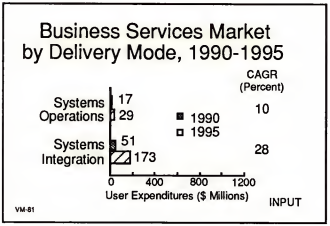
- User friendliness
- Understanding what users really need
- Software flexibility

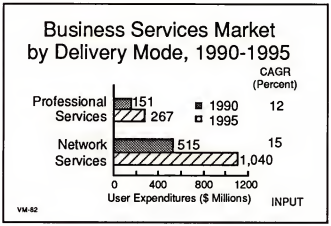
VM-78

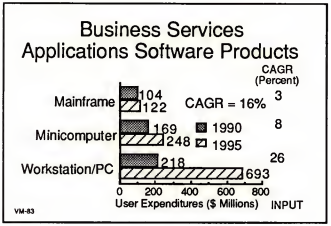
INPUT

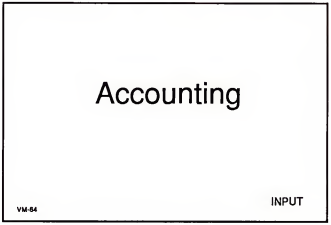

Business Services Market, 1990-1995
User Expenditures ($ Billions)
5
4
3
2
1
0
2.6
4.3
1990
CAGR 11%
1995
VM-79
INPUT


Business Services Market by Delivery Mode, 1990-1995
CAGR (Percent)
Processing Services
787
895
3
Turnkey Systems
554
813
1990
1995
8
Application Software
491
1,063
17
0
400
800
1200
User Expenditures ($ Millions)
VM-80
INPUT


Business Services Market by Delivery Mode, 1990-1995
CAGR (Percent)
Systems Operations
17
29
1990
1995
10
Systems Integration
51
173
28
0
400
800
1200
User Expenditures ($ Millions)
VM-81
INPUT


Business Services Market by Delivery Mode, 1990-1995
CAGR (Percent)
Professional Services
151
267
1990
1995
12
Network Services
515
1,040
15
0
400
800
1200
User Expenditures ($ Millions)
VM-82
INPUT


Business Services Applications Software Products
CAGR (Percent)
Mainframe
104
122
CAGR = 16%
3
Minicomputer
169
248
1990
1995
8
Workstation/PC
218
693
26
0
200
400
600
800
User Expenditures ($ Millions)
VM-83
INPUT


Accounting
VM-84
INPUT

3/8/91

Accounting Sector—Key Technology Trends

- Downsizing
- Workgroup computing and distributed applications
- RDBMS
- Graphical user interfaces

INPUT

VM-85

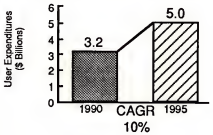
Accounting Sector Key Issues

- Immediate and accurate accounting information
- Need for flexibility and integration
- Support for multinational operations
- Decentralized accounting systems will gain appeal

INPUT

VM-86

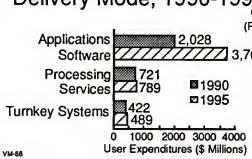
Accounting Cross-Industry Market, 1990-1995



INPUT

VM-87

Accounting Market by Delivery Mode, 1990-1995



INPUT

VM-88

Accounting Sector—Vendor Recommendations

- Expand service offerings
- Flexibility and integration of paramount importance
- Prepare for distributed architecture product offerings

INPUT

VM-89

Education and Training

INPUT

VM-90

Education and Training Sector—Key Technology Trends

- Graphical user interfaces
- Optical storage developments
- Multimedia

INPUT

VM-91

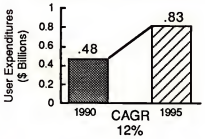
Education and Training Sector—Key Issues

- Broadening training requirements
- Responsibility shifting to corporations
- Interactive training beginning to take hold

INPUT

VM-92

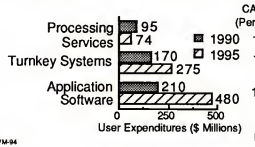
Education and Training Market, 1990-1995



INPUT

VM-93

Education and Training Market by Delivery Mode, 1990-1995



INPUT

VM-94

Education and Training Sector User Recommendations

- Ease of use
- Low initial cost
- Emphasize results
- Top-down support

INPUT

VM-95

Education and Training Sector Vendor Recommendations

- Initially a hard sell
- Emphasize simplicity
- Form alliances with computer vendors

INPUT

VM-96

3/8/91

Engineering and Scientific

VM-97

INPUT

Engineering and Scientific Sector—Key Technology Trends

- Shortage of engineers and scientists
- More use of application solutions across functions
- More application specialization/complexity

VM-98

INPUT

Engineering and Scientific Sector—Key Issues

- Provision of seamless link between data center and desktop
- Integration of design information into a common data base structure

VM-99

INPUT

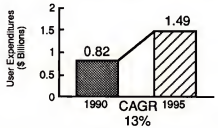
Engineering and Scientific Sector—Key Issues

- Data base management
- Software compatibility and portability

VM-100

INPUT

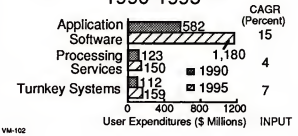
Engineering and Scientific Market, 1990-1995



VM-101

INPUT

Engineering and Scientific Market by Delivery Mode, 1990-1995



VM-102

INPUT

3/8/91

Engineering and Scientific Sector—Vendor Recommendations

- More emphasis on software sales
- Support of standard hardware
- Portable software
- Opportunities in GIS

INPUT

VM-103

Engineering and Scientific Sector—Vendor Recommendations

- Opportunities in systems integration
- Opportunities for increased processing services in selected industries
- Name recognition becoming more important

INPUT

VM-104

Human Resources

INPUT

VM-105

Human Resources Sector Key Technology Trends

- RDBMS and distributed processing
- Client/server architecture
- PC front-ends
- Executive information systems

INPUT

VM-106

Human Resources Sector Key Issues

- Keeping up with change
- More power to the employee
- Attracting and retaining highly skilled people

INPUT

VM-107

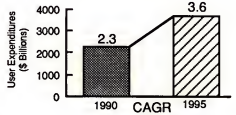
Human Resources Sector Key Issues

- Flexible benefits
- Provision of training and tracking of skill
- Shared HR function with line managers

INPUT

VM-108

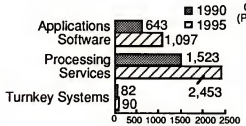
Human Resources Market, 1990-1995



VM-109

INPUT

Human Resources Market by Delivery Mode, 1990-1995



VM-110

INPUT

Human Resources Sector Vendor Recommendations

- New technology-based solutions
- Competition heating up at midrange and PC level
- Multinational system

VM-111

INPUT

Human Resources Sector Vendor Recommendations

- Integration
- Processing services enhancements
- Continual upgrades
- Small business market

VM-112

INPUT

Office Systems

VM-113

INPUT

Office Systems Sector Key Technology Trends

- More powerful desktop computing
- Widespread use of LANs
- Standard user interfaces

VM-114

INPUT

3/8/91

Office Systems Sector Key Issues

- Evolving definition of white collar worker
- Evolving definition of office

INPUT

VM-115

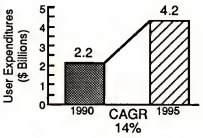
Office Systems Sector Key Issues

- Increasing requirement for adaptability
- Increasing need to improve office worker productivity

INPUT

VM-116

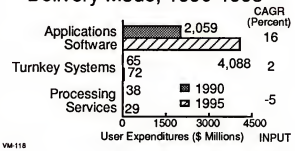
Office Systems Cross-Industry Market, 1990-1995



INPUT

VM-117

Office Systems Market by Delivery Mode, 1990-1995



INPUT

VM-118

Office Systems Sector Vendor Recommendations

IOS

- Ensure minicomputer's proper place
- Develop differentiation strategy
- Multiplatform strategy
- Unbundle software

INPUT

VM-119

Office Systems Sector Vendor Recommendations

IOS

- Emphasize integration with line of business software
- Emphasize effective hardware utilization
- Client-server questions

INPUT

VM-120

Office Systems Sector Vendor Recommendations

Word Processing

- One product vs. a multiple product strategy
- Emphasize multiplatform strategy, including UNIX

INPUT

VM-121

Office Systems Sector Vendor Recommendations

DTP

- Pursue international opportunities
- Diversify—scanning? imaging?

INPUT

VM-122

Planning and Analysis

INPUT

VM-123

Planning and Analysis Sector Key Technology Trends

- Electronic media/data bases
- RDBMS evolution
- Graphical user interfaces

INPUT

VM-124

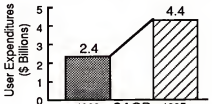
Planning and Analysis Sector—Key Issues

- Constantly changing conditions
- Time-critical management information needs

INPUT

VM-125

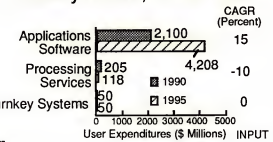
Planning and Analysis Market, 1990-1995



INPUT

VM-126

Planning and Analysis by Delivery Mode, 1990-1995



INPUT

VM-127

Planning and Analysis Sector Vendor Recommendations

- Broad product functionality
- Multipronged sales strategy
- More diverse user base

INPUT

VM-128

Process Manufacturing

INPUT

VM-171

Process Manufacturing Trends in Information Services

- Globalized data management
- Emphasis on plant optimization
- Decentralization of plant management
- Continued need for customization

INPUT

VM-172

Process Manufacturing Trends in Information Services

- Total solutions for process manufacturing
- Systems integrators targeting process manufacturing
- Customized CIM solutions offered

INPUT

VM-173

Process Manufacturing Major Issues in IS

- Impact of restructuring on IS strategy
- Magnitude of flux (mergers, acquisitions, restructuring)
- Integration of disparate levels of information systems

INPUT

VM-174

Process Manufacturing Major Issues in IS

- Lack of available application software products and turnkey systems
- Uniqueness of subindustries

INPUT

VM-175

Process Manufacturing Driving Forces

- Large size of information systems projects
- Integration requirements
- Relative strength of U.S. process manufacturing companies

INPUT

VM-176

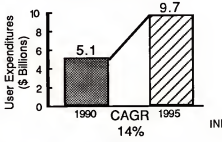
Process Manufacturing Growth Inhibitors

- Uniqueness of subindustries
- Fragmentation of existing information systems
- Decentralization of IS expenditure control

INPUT

VM-177

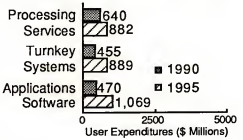
Process Manufacturing Market Information Services 1990-1995



INPUT

VM-178

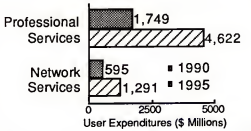
Process Manufacturing Market by Delivery Mode,1990-1995



INPUT

VM-179

Process Manufacturing Market by Delivery Mode,1990-1995

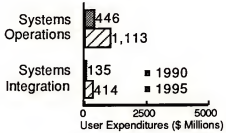


INPUT

VM-180

3/8/91

Process Manufacturing Market by Delivery Mode, 1990-1995



INPUT

VM-181

Process Manufacturing Recommendations for IS Vendors

- Relationships with customers—source of new applications
- Professional services support—independently or through alliance

INPUT

VM-182

Process Manufacturing Recommendations for IS Vendors

- Alliances with digital control systems vendors
- Plant information management application products

INPUT

VM-183

Process Manufacturing Recommendations for IS Vendors

- Focus on niche segments
- Support compound document capabilities

INPUT

VM-184

Process Manufacturing Recommendations for IS Vendors

- Customization through programming interface tools
- Develop alliances

INPUT

VM-185

Process Manufacturing Recommendations for IS Vendors

- Alliances with sales industry specialists
- Support network integration and interoperability

INPUT

VM-186

Utilities

INPUT

VM-187

Utilities
Information Systems Issues

- Data integrity
- IS as an investment versus an expense
- Corporate systems

INPUT

VM-188

Utilities
Information Systems Objectives

- Be the solution to, not the victim of, downsizing
- Gain attention/respect of top management

INPUT

VM-189

Utilities
Information Systems Objectives

- Fulfill corporate role while controlling end users
- Expand information systems to engineering/operations

INPUT

VM-190

Utilities
Driving Forces

- Regulation
  - Federal deregulation
  - State reregulation
- Competition
  - Marketing
  - Open access

INPUT

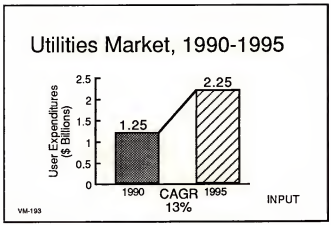
VM-191

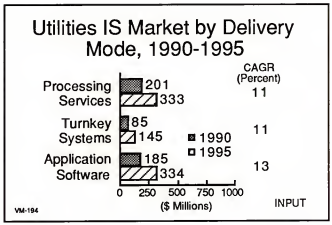
Utilities
Driving Forces

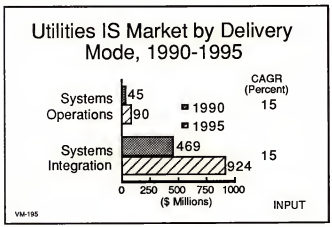
- Costs
  - Plant operations
  - Asset management

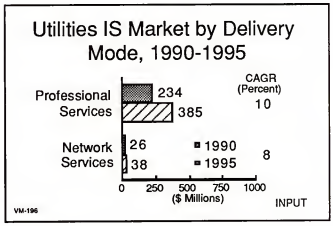
INPUT

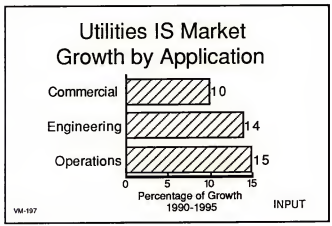
VM-192


Utilities Market, 1990-1995
User Expenditures ($ Billions)
2.5
2
1.5
1
0.5
0
1.25
2.25
1990
CAGR 13%
1995
INPUT
VM-193


Utilities IS Market by Delivery Mode, 1990-1995
CAGR (Percent)
Processing Services
201
333
11
Turnkey Systems
85
145
11
1990
1995
Application Software
185
334
13
0 250 500 750 1000
($ Millions)
INPUT
VM-194


Utilities IS Market by Delivery Mode, 1990-1995
CAGR (Percent)
Systems Operations
45
90
15
1990
1995
Systems Integration
469
924
15
0 250 500 750 1000
($ Millions)
INPUT
VM-195


Utilities IS Market by Delivery Mode, 1990-1995
CAGR (Percent)
Professional Services
234
385
10
Network Services
26
38
8
1990
1995
0 250 500 750 1000
($ Millions)
INPUT
VM-196


Utilities IS Market Growth by Application
Commercial
10
Engineering
14
Operations
15
0 5 10 15
Percentage of Growth 1990-1995
INPUT
VM-197


Telecommunications
INPUT
VM-198

3/8/91

Telecommunications Key Industry Issues

- Regulatory constraints
- LATA boundaries
- Service pricing
- Customer understanding
- Trade and competition

INPUT

VM-199

Telecommunications Key Business Trends

- Continued regulatory constraint
- Increasing rate reduction pressure
- Mergers and acquisitions
- Foreign investment
- Regulated/nonregulated business balance

INPUT

VM-200

Telecommunications Key Technology Trends

- Higher bandwidth
- ISDN services
- Information services
- Mobile communications

INPUT

VM-201

Telecommunications Key Technology Trends

- Network management
- Cable services
- VSAT services

INPUT

VM-202

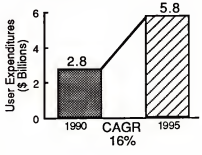
Telecommunications Information Systems Objectives

- Improve staff productivity
- Integrate operations systems
- Decentralize/distribute systems
- Flexible billing
- Tactical planning

INPUT

VM-203

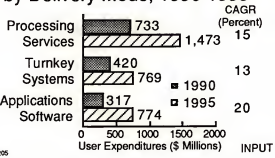
Telecommunications IS Market, 1990-1995



INPUT

VM-204

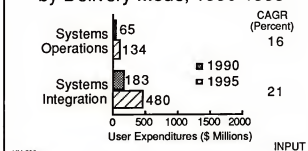
Telecommunications Market by Delivery Mode, 1990-1995



VM-205

INPUT

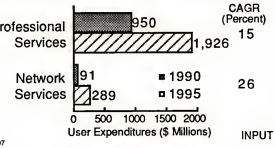
Telecommunications Market by Delivery Mode, 1990-1995



VM-206

INPUT

Telecommunications IS Market by Delivery Mode, 1990-1995



VM-207

INPUT

Telecommunications Driving Forces

- Deregulation
- Service/organization integration
- Flexible software
- Staff productivity
- Internal system support

VM-208

INPUT

Telecommunications Inhibiting Factors

- Regulatory constraints
- Unqualified customer needs
- Unresolved standards
- Continuing public pressure

VM-209

INPUT

Telecommunications Vendor Recommendations

- Focus on integration
- Understand the carrier's customer
- Emphasize carrier-to-customer linkages

VM-210

INPUT

Telecommunications Vendor Recommendations

- Flexible software is key
- Network management tools needed
- Understand the regulations

INPUT

VM-211

Wholesale Distribution

INPUT

VM-212

Wholesale Distribution Key Business Trends

- Increased service orientation
- Improved quality
- Economic slowdown
- Financing problems
- Rising transportation and other costs

INPUT

VM-213

Wholesale Distribution Key Business Trends

- Consolidation
- Globalization
- Systemization of business functions
- Restructuring of wholesale channels

INPUT

VM-214

Wholesale Distribution Key Technology Trends

- Network use
- On-line transaction processing
- Use of electronic information
- PC LAN use
- RDBMS
- Automation of warehouses

INPUT

VM-215

Key Issues of Large Wholesalers

- Improving quality of service
- Consolidating business units
- Discounting prices
- Pressure on margins
- Cost management

INPUT

VM-216

Key Issues of Midsized Wholesalers

- Cost containment/reduction
- Improving quality of service
- Consolidating business
- Pressure on margins
- Price competition

INPUT

VM-217

Key Issues of Small Wholesalers

- Cost reduction
- Pressure on margins
- Improving service
- Funding business improvement

INPUT

VM-218

Wholesale Distribution Key Business Issues Confronting I.S.

- IS contribution to quality
- Tight and contracting budgets
- Emphasis on customer services
- Consolidation of IS functions
- Network planning

INPUT

VM-219

Wholesale Distribution Key Future Technologies

- EDI
- CASE
- Expert systems
- Image processing
- ISDN
- CD ROM

INPUT

VM-220

Wholesale Distribution Driving Forces

- Improvement of order processing
- On-time delivery
- Pre-sales and post-sales service
- Access to product and customer information

INPUT

VM-221

Wholesale Distribution Driving Forces

- Network upgrading/integration
- Linkage to clients and suppliers
- Consolidation/integration of application
- Improvement in inventory and warehouse functions

INPUT

VM-222

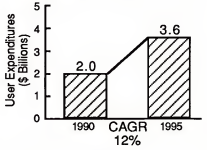
Wholesale Distribution Inhibiting Factors

- Economic downturn
- Tight margins
- Lack of funding
- Uncertain business plans
- Technology presently in use

INPUT

VM-223

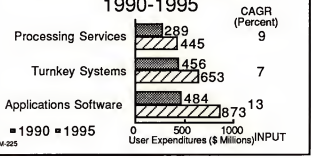
Wholesale Distribution Market, 1990-1995



INPUT

VM-224

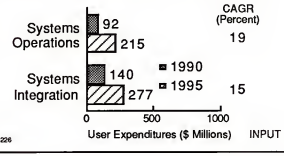
Wholesale Distribution Market by Delivery Mode 1990-1995



INPUT

VM-225

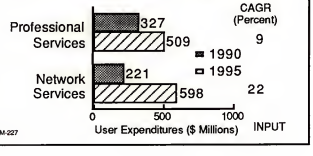
Wholesale Distribution Market by Delivery Mode 1990-1995



INPUT

VM-226

Wholesale Distribution Market by Delivery Mode 1990-1995



INPUT

VM-227

Retail Distribution

INPUT

VM-228

3/8/91

Retail Distribution
Key Business Trends

- Economic slowdown
- Financing problems
- Rising costs
- Consolidation
- Increased service orientation

INPUT

VM-229

Retail Distribution
Key Business Trends

- Heightened competitiveness
- Trend to specialty stores
- Use of data to target opportunities
- Globalization

INPUT

VM-230

Retail Distribution
Key Technology Trends

- Card transactions
- PC-based POS
- Use of POS data
- Automated sales analysis
- EDI

INPUT

VM-231

Retail Distribution
Key Technology Trends

- Merchandising systems
- Electronic marketing
- Outsourcing
- Use of technology to combat shrinkage
- Inventory automation

INPUT

VM-232

Retail Distribution
Priority Application Areas

- POS
- Sales and customer buying analysis
- Merchandise management
- EDI

INPUT

VM-233

Retail Distribution
Priority Application Areas

- Inventory control
- Executive information systems
- Purchasing

INPUT

VM-234

Retail Distribution—Outlook for Selected Technologies

- EDI
- CASE
- CD ROM
- Bar Code

INPUT

VM-235

Retail Distribution—Outlook for Selected Technologies

- Expert Systems
- Image Processing
- ISDN

INPUT

VM-236

Retail Distribution IS Budgets

- Strong central budget control is common
- Budget range: 0.8 - 1.8% of revenue
- Annual budget increases average 3%

INPUT

VM-237

Retail Distribution Driving Forces

- Cost reduction
- Increased revenue on goods stocked
- Increased collection and analysis of sales data
- Consolidation

INPUT

VM-238

Retail Distribution Driving Forces

- Integrated applications
- Use of RDBMS
- Improved use of IS
- Network upgrading/integration

INPUT

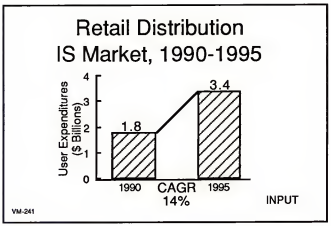
VM-239

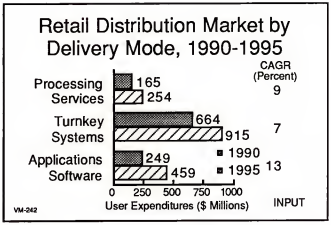
Retail Distribution Inhibiting Factors

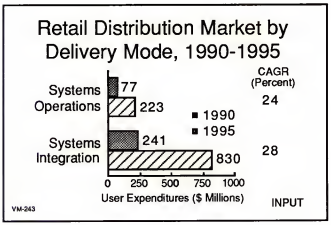
- Economic downturn
- Falling margins
- Lack of funding
- Uncertain business plans
- Shortages of IS technical skills
- Technology presently in use

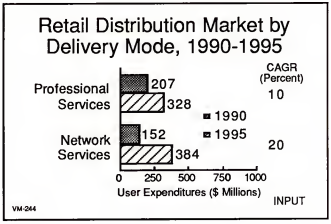
INPUT

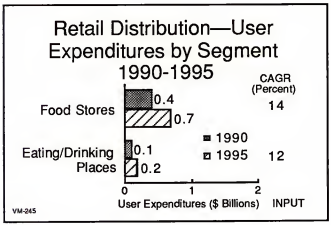
VM-240

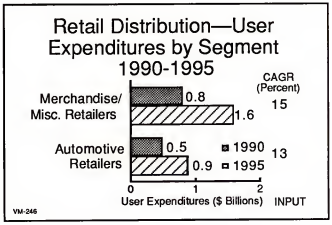

Retail Distribution
IS Market, 1990-1995
User Expenditures ($ Billions)
4
3
2
1
0
1.8
3.4
1990
CAGR
14%
1995
INPUT
VM-241


Retail Distribution Market by
Delivery Mode, 1990-1995
CAGR
(Percent)
Processing
Services
165
254
9
Turnkey
Systems
664
915
7
Applications
Software
249
459
1990
1995
13
0 250 500 750 1000
User Expenditures ($ Millions)
INPUT
VM-242

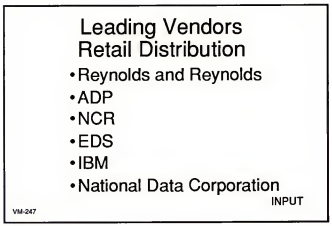

Retail Distribution Market by
Delivery Mode, 1990-1995
CAGR
(Percent)
Systems
Operations
77
223
24
1990
1995
Systems
Integration
241
830
28
0 250 500 750 1000
User Expenditures ($ Millions)
INPUT
VM-243


Retail Distribution Market by
Delivery Mode, 1990-1995
CAGR
(Percent)
Professional
Services
207
328
10
1990
1995
Network
Services
152
384
20
0 250 500 750 1000
User Expenditures ($ Millions)
INPUT
VM-244


Retail Distribution—User
Expenditures by Segment
1990-1995
CAGR
(Percent)
Food Stores
0.4
0.7
14
1990
1995
Eating/Drinking
Places
0.1
0.2
12
0
1
2
User Expenditures ($ Billions)
INPUT
VM-245


Retail Distribution—User
Expenditures by Segment
1990-1995
CAGR
(Percent)
Merchandise/
Misc. Retailers
0.8
1.6
15
Automotive
Retailers
0.5
0.9
1990
1995
13
0
1
2
User Expenditures ($ Billions)
INPUT
VM-246

3/8/91


Leading Vendors
Retail Distribution
•Reynolds and Reynolds
•ADP
•NCR
•EDS
•IBM
•National Data Corporation
INPUT
VM-247


Retail Distribution
Key Technological Challenges
for Users
•Upgrading POS systems
•Collecting sales data
•Upgrading older technology
•Implementing EDI
•Upgrading network capabilities
INPUT
VM-248

Federal Government Economic Events and Trends

- Trade imbalance
- Economic recession
- Cold War cessation
- Domestic problems
- Middle East crisis
- Budget deficit

INPUT

VM-249

Federal Government Technology Trends

- Expanded networks/LANs
- Improved graphics/imaging
- Advanced operating systems
- Artificial intelligence
- Enhanced microcomputers
- Advanced communications

INPUT

VM-250

Federal Government Key Agency Issues

- Planning and management
- Security and privacy
- Resource utilization
- Staff shortages
- Cost containment
- Micromanagement

INPUT

VM-251

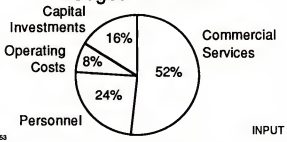
Federal Government Information Services Issues

- Transition from data orientation
- Changing acquisition methods
- Implications of standards
- Shakeout of markets
- Price versus technology

INPUT

VM-252

Federal Government Information Technology Budget—FY 1991



INPUT

VM-253

Applications Downsized to Microcomputers

Application	Rank
Accounting	1
Inventory	2
Financial	3

INPUT

VM-254

Applications Downsized to Microcomputers

Application	Rank
Management systems	4
Data entry	5
Information processing	6

INPUT

VM-255

Federal Government Objectives

- Voice-data integration
- Improved end-user support
- Increased software product applications
- Relational data bases

INPUT

VM-256

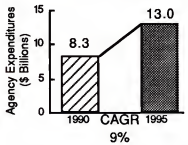
Federal Government Objectives

- Departmental information processing
- Transparent connectivity
- Decision support systems

INPUT

VM-257

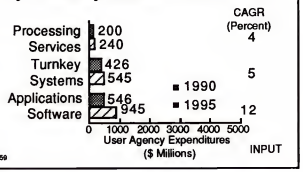
Federal Government IS Market, 1990-1995



INPUT

VM-258

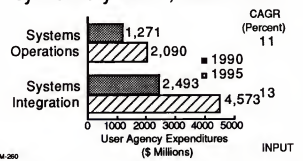
Federal Government IS Market by Delivery Mode, 1990-1995



INPUT

VM-259

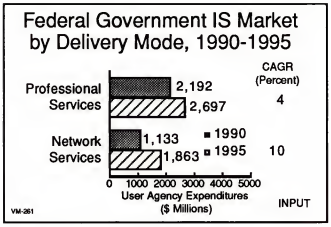
Federal Government IS Market by Delivery Mode, 1990-1995

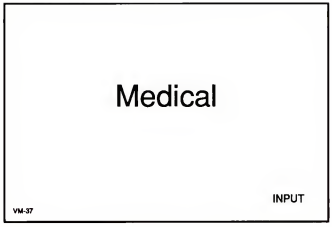


INPUT

VM-260

4/30/92


Federal Government IS Market
by Delivery Mode, 1990-1995
CAGR
(Percent)
Professional
Services
2,192
2,697
4
Network
Services
1,133
1,863
1990
1995
10
0 1000 2000 3000 4000 5000
User Agency Expenditures
($ Millions)
INPUT
VM-261


Medical
INPUT
VM-37

22. Competition

(CO)

Competitive Trends

CO-1 INPUT

Vendor Activities Demonstrate 1990s Trends

- Andersen Consulting
- Computer Associates
- Computer Sciences
- Electronic Data Systems

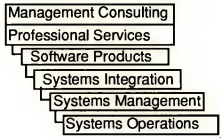
CO-2 INPUT

Vendor Activities Demonstrate 1990s Trends

- Microsoft
- Oracle
- Digital Equipment
- IBM
- Japanese vendors

CO-3 INPUT

Andersen Consulting Services Evolution



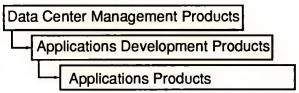
CO-4 INPUT

Computer Associates

- Largest software product vendor
- Consolidation in systems software products
- Strategy—growth by acquisition
- Developing architecture
- Porting products to DEC and others
- Establishing alliances
- Emphasize continuing revenue streams

CO-5 INPUT

Computer Associates



CO-6 INPUT

Computer Associates

- Resources allocated to
  - Future integration plans
  - Customer support for current products

CO-7 INPUT

Computer Sciences Corp

- Continues strong in federal markets
  - Primarily professional services/SI
- Resurgent interest in commercial markets
  - Health and insurance
  - Tax and credit
  - Professional services/SI

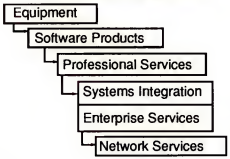
CO-8 INPUT

Computer Sciences Corp

- Acquisitions key to commercial activities
  - Index
  - Computer Partners

CO-9 INPUT

Digital Equipment



CO-11 INPUT

EDS

- Industry leader in systems operations
- Aiming for very large accounts
- Industry-oriented
  - Finance
  - Insurance
  - State and local government
  - Banking

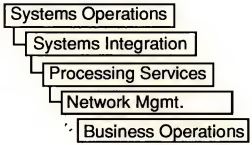
CO-12 INPUT

EDS

- Broad range of systems: IBM, DEC, HP
- Ownership position in HDS
- Strong network capability
- Global

CO-13 INPUT

EDS



CO-14a

INPUT

EDS Services Profile
1989 Revenue Distribution

	Distribution (%)
Systems management	78
Systems integration	11
Development	9
Consultative	2

CO-14b

INPUT

IBM Services
Commercial Evolution

- Application software division
- IBM Network
- Systems integration division
- Applications solutions line of business
- Information systems services division
- Consulting practices and operations

CO-15

INPUT

IBM

Fundamental changes

1. Sales incentives for services
2. Willingness to provide systems operations services

CO-16

INPUT

IBM National Services Division

- Will provide systems operations for customers
- 30,000 people
- Works with IBM's SID and INS operations

CO-17

INPUT

IBM National Services Division

- Provides all "operations support" functions
  - Data center design and building
  - Remote, "Lights-out" data center operations
  - HW/SW/network maintenance

CO-18a

INPUT

IBM National Services Division

- Provides all "operations support" functions
  - Disaster recovery
  - End-user software support
  - Systems operations studies
  - Conversion services

CO-18b INPUT

IBM Investments in Software/Services Firms

- Worldwide scope
  - 19 in U.S.
  - 24 in Europe
  - 20 in Far East
- Leverage for IBM greater than percent of equity indicates

CO-19 INPUT

IBM Investments in Software/Services Firms

- Investments will continue
- Pressure on other equipment manufacturers
- Pressure on software vendors by-passed by IBM

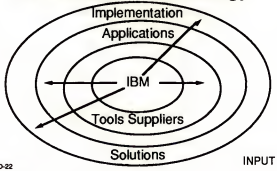
CO-20 INPUT

IBM Investments in Software/Services Firms

- Enhances SAA as de-facto standard
- Ensures continuing flow of new SAA-compliant applications
- Dilutes impact of UNIX, other industry standards on IBM's heartland

CO-21 INPUT

IBM Investment Strategy



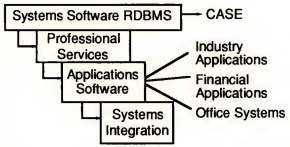
CO-22 INPUT

IBM Partners in Professional Services

Company	Activity
CTG	AD/Cycle
CAP Gemini America	AD/Cycle
G.E. Consulting	AD/Cycle
Computer Power Group	AD/Cycle
AMS	Marketing

CO-23 INPUT

Oracle



CO-24 INPUT

Aerospace Subsidiaries

- Tried the "Computer Utility" route
- Have enjoyed limited success

CO-25a INPUT

Aerospace Subsidiaries

Successes

1. Government
   - BCS
   - Grumman
   - MMDS
2. Specialized areas
   - TRW

CO-25b INPUT

Aerospace Companies

- Litton Computer Services
- Provides "computer utility" processing services
  - $30M revenues
  - "Packaged" pricing
  - Emphasis in Los Angeles

CO-26 INPUT

European Companies

- CAP Gemini Sogetti (CAP-SESA) is parent of CAP GEMINI AMERICA (CGA)
  - Close to $1 billion in 1989
  - Focus on professional services

CO-27a INPUT

European Companies

- Aggressive acquirer
- Will not attack operations market directly
  - Provide support services
  - Emphasizes development market

CO-27b INPUT

European Companies

- Hoskyns:
  - Very successful in FM
  - Good "computer utility" model
  - Avoided industry specialization

CO-28a INPUT

European Companies

- Thorn-EMI
  - Also successful in processing utility
- SD-Scicon, GSI, Sema-Cap, others
- PTTs becoming more aggressive

CO-28b INPUT

Japanese Vendors

- Large companies already exist
- Close scrutiny of U.S., European markets
- Cautious approach to investment

CO-29a INPUT

Japanese Vendors

- Alliances likely to come first
- Entering markets with Japanese clients
- Usually part of corporate family
- Attacking secondary markets

CO-29b INPUT

Japanese Companies

- NT&T Data Services
  - Primary market government
  - SI/Systems operations
- Many VAN companies (500)

CO-30 INPUT

Summing It Up

- Broadening product strategies
- Emphasis on "solution" niches
- Focus on quality and service

Accomplished through:

- Self-funded expansion
- Consolidation—partnering/ acquisitions

CO-31 INPUT

IBM—Market Perceptions

- Inertia—tradition/size
- Product vs. services orientation
- False starts in solution selling
- Organizational positioning
- Lack of vertical focus—business solutions
- Aversion to risk

IBM—The Positive Points

- A revenue leader in every market
- Immense resources
  - Human
  - Financial
- Worldwide geographic coverage
- Reputation for quality

IBM—Recommendations

- Organize for rapid response
- Position as a solution provider
- Refine the art of the deal
- Target the market
  - Cross-industry
  - Vertical

Vendor Direction

Vendor Direction—EDS

- Services based on technology and execution
  - Systems operations
  - Systems integration
  - Business operation
- Vertical focus—large companies

Vendor Directions Computer Associates

- Slowdown in acquisitions
- CA90s—framework for development
- Major emphasis on UNIX

Vendor Directions
Microsoft

- Windows vs. OS/2
- Attention to UNIX
- Alliances beyond IBM
- Focus on LANs
- Professional services offerings

INPUT

CO-38

Vendor Directions
Andersen Consulting

- Services based on technology
  - Systems integration
  - Application management
  - Systems operations
- Software focus—CASE plus applications

INPUT

CO-39

Competition

INPUT

CO-40

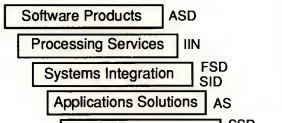
EDS

- Industry leader
- Full range of information services
- Shared resources SO focus
- Vertical industry organization
- Aggressive growth strategy
- Leverage GM experience/resources

INPUT

CO-41

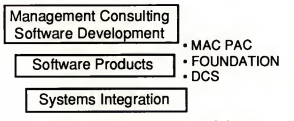
IBM



INPUT

CO-42

Andersen Consulting



INPUT

CO-43

Systematics

- Finance industry specialist
- Integrated financial software
- Primarily dedicated equipment near client site
- Focus on medium and small banks

CO-44 INPUT

The New IBM

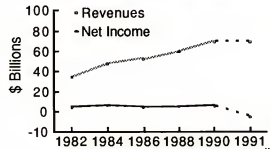
CO-45 INPUT

The New IBM

- Performance
- What is different?
- What may follow?

CO-46 INPUT

IBM Financial Performance



CO-47 INPUT

IBM Performance

Category	5-Yr. Growth Rate (%)
Processors	6
PCs/Workstations	25
Peripherals	5
Software	16
Services	12

CO-48 INPUT

IBM Performance

What used to work doesn't work now

CO-49 INPUT

IBM Performance Strategies No Longer Work

- Wait-and-see strategy
  - 4-year plus cycles
  - Enter established markets
- Average technology—high price

INPUT

CO-50

IBM Performance Strategies No Longer Work

- Conflicting proprietary products
  - Too many—10,000
- Overpower with service
  - On-site intelligence
- Favoring the whole versus the parts

INPUT

CO-51

The New IBM—Leveraging Underutilized Assets

- Underlying technology
- Manufacturing strengths
- Financial strengths
- Pure research

INPUT

CO-52

The New IBM—Organizational Experimentation

- Minority investments
- Multiple reorganizations
- Re-enter processing/network services market
- Original PC launch
- Systems integration division

INPUT

CO-53

The New IBM The Restructure

- New business units
- 10% fewer employees
- More organizational complication
- Beginning decentralization of control
- Promise of more change

INPUT

CO-54

The New IBM More Business Units

- Storage products business
- Pennant Systems Company (printer products)
- Further separation of PC business
- ISSC Division
- ???

INPUT

CO-55

The New IBM Organizational Complication

- Increased internal competition
  - Sales
  - Products
  - Services

CO-56

INPUT

The New IBM Organizational Complication

- Increased pressure on the customer
  - Product conflicts
  - Increased choices
  - Decreased support
- More minority investments

CO-57

INPUT

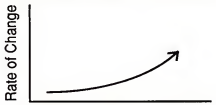
The New IBM Decentralization of Control

- Investment authority
- Sales organization measurement
  - Profits versus units
- Smaller central staffs
- Promise of more change

CO-58

INPUT

The New IBM Evolution versus Revolution



CO-59

INPUT

The New IBM What May Follow?

- SAA includes non-proprietary technologies
- Competing sales forces
  - Captive to IBM
  - Noncaptive—VARs and OEMs

CO-60

INPUT

The New IBM What May Follow?

- Competing technologies
  - OS/2 and UNIX
  - AS/400 and RISC
  - Client/server at all levels
- Even less service and support

CO-61

INPUT

The New IBM
What May Follow?

- Licensing of Technology
  - Apple—future UNIX operating system
  - Seimens—chip technology
  - Bull—processor technology
  - Wang—applications software

INPUT

CO-62

The New IBM
Where IBM Can Grow

	Rev. ($B)	Market ($B)	Share (%)
Mainframes	12.0	20	60
Minicomputers	3.5	25	<15
PCs	14.0	50	25
Software	10.0	60	15
Services	5.0	60	<10

INPUT

CO-63

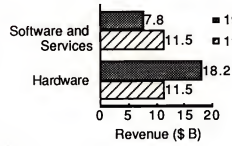
The New IBM
Success Indicators

- Sale of technology to vendors
- Learning to compete with itself
- Success in selling to end user
- Success managing business units

INPUT

CO-64

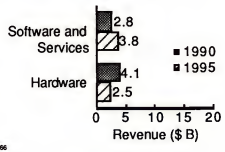
IBM—Europe



INPUT

CO-65

DEC—Europe



INPUT

CO-66

IBM in 2001

- Directly competing sales forces
- Directly competing divisions
- Directly competing technology
- Significant revenue from other vendors
- Less revenue growth, more income growth

INPUT

CO-67

IBM in 2001

More Than 1 Company!!

CO-68

INPUT

M & I Data Services

Heritage	Processing services
Focus	Banking industry
Strength	Full suite of specialized banking applications
Direction	Increase integration—IBS software sales

CO-69

INPUT

EDS

- 1992 revenues - $8.2 billion
- 71,000 employees
- Outsourcing market leader
- Large accounts focus

INPUT

CO-70

EDS

- Targeted markets
  - Manufacturing
  - Financial
  - Government
  - Insurance
  - Health care

INPUT

CO-71

IBM

- 1992 revenues - $65 billion
- 301,000 employees
- World information technology leader

INPUT

CO-72

IBM

- Targeted markets
  - Federal government
  - Banking
  - Manufacturing
  - State and local government
- More autonomy for divisions
- Staff reduction continues

INPUT

CO-73

Andersen Consulting

- 1992 CY revenues - $2.7 billion
- 26,700 professionals
- Shift emphasis to front end consulting

INPUT

CO-74

Andersen Consulting

- Targeted markets
  - Manufacturing
  - Health
  - Energy
  - Consumer products

INPUT

CO-75

Systematics

- 1992 revenues - $500 million
- 5,700 employees
- 20+ years in finance/banking
- 1,000 banking clients (30 countries)
- Subsidiary of Alltel

INPUT

CO-76

Systematics

- Targeted markets
  - Commercial banks
  - Saving and loans
  - Credit unions
  - Cellular phone companies

INPUT

CO-77

Computer Sciences Corporation

- 1992 revenues - $2.1 billion
- 26,500 professionals
- Strong acquisition activity
- Shift emphasis to commercial

INPUT

CO-78

Computer Sciences Corporation 1992* Revenue Distribution

Delivery Mode	Revenue ($M)
Systems Integration	570
Professional Services	719
Outsourcing	824

INPUT

CO-79

Computer Sciences Corporation

- Targeted markets
  - Federal market leader
- Resurgent interest in
  - Health care
  - Distribution (logistics)
  - Insurance

INPUT

CO-80

23. SUMMARY & CONCLUSIONS
(SC)

Summary and Conclusions

INPUT

SC-1a

Conclusions

INPUT

SC-1b

Environment for Information Services in Year 2000

- Worldwide network infrastructure in place (ISDN)
  - -Voice
  - -Data
  - -Text
  - -Graphics

INPUT

SC-2

Environment for Information Services in Year 2000

- Simultaneous language translation/transmission
- Active home/consumer use of videotex, data base access

INPUT

SC-3

Environment for Information Services in Year 2000

- Image processing is routine
- Portable, desktop computers used by all professional/clerical/ managerial workers
- Standards in place for OS, graphical interfaces

INPUT

SC-4

Environment for Information Services in Year 2000

- Fewer hardware vendors
- Solutions delivered, not products
- Software customized by nonprogrammers

INPUT

SC-5

Conclusions

- Alliances/mergers necessary
- Customer requirements becoming more sophisticated
- Customers applying professional buying
- 'Federated' IS requires complex selling

INPUT

SC-6a

Conclusions

- Selling process is key
  - Solutions-oriented
  - Professional

INPUT

SC-6b

Conclusions

- Shorter lifecycle calls for fast response
- People skills/retention are key
- Internationalism to increase
- Technology creates opportunities

INPUT

SC-7

Conclusions

- Services (people) will be the key
  - -Recruiting - Motivation
  - -Compensation - Training
- Targeted, disciplined marketing
- Have platforms that serve all markets
- Develop 'critical mass' in target markets
- Seek leverage from standards

INPUT

SC-8a

Conclusions

- Double-digit annual growth for all vendors
- no longer "automatic"
- Worldwide markets offer real opportunities

INPUT

SC-8b

Conclusions

- All vendors need partners
- Consolidation will continue
- Standards play key role
- Users want solutions

INPUT

SC-8c

Recommendations to Vendors

- Focus on marketing
- Establish and protect account base
- Expand scope of services to customers

INPUT

SC-9

Recommendations to Vendors

- Deliver complete solutions
- Be aware of standards, leverage them
- Develop multiplatform solutions
- Consider international markets

INPUT

SC-10

Opportunity for 1990s

- Attack in-house budgets
- Opportunity $75-100 billion/year in U.S.

INPUT

SC-11

Available Information Services Revenue, 1989-1994

INPUT

SC-12

Conclusions

- Overall market remains vital
- Outsourcing to grow
- Opportunities will require targeted marketing and support
- Breadth of services/products enhances market position

INPUT

SC-13

Conclusions

"Time—
The next source of competitive advantage"
- HBR July/August 1988

- Attack opportunities
- Adjust to the requirements

INPUT

SC-14

U.S. Information Services Industry

Conclusions

- Slower growth for 1991-1996
  - Slow rebound 1991-1992
  - Market growth 10% to 15% per year
    - 1991—less than 10%
    - 1996—15%
  - Maturity in some sectors

SC-15 INPUT

U.S. Information Services Industry

Conclusions

- Outsourcing will be the bright spot
  - Functions versus projects
  - Long-term agreements
  - Increased reliance on vendor
  - Increased risk for vendor

SC-16b INPUT

U.S. Information Services Industry

Conclusions

- Vendor characteristics will change
  - Product vendors become services vendors
  - Primary vendors become secondary contractors

SC-16 INPUT

U.S. Information Services Industry

Conclusions

- Outsourcing will be the bright spot
  - Services versus products
  - Solutions versus systems
  - Primary versus secondary vendors

SC-16a INPUT

U.S. Information Services Industry

Conclusions

- Influence of large vendors will grow
  - Partnerships/Alliances
  - Minority investments
  - Account control through services

SC-17 INPUT

U.S. Information Services Industry

Conclusions

- Buying characteristics are changing
  - General manager becomes primary buyer
  - IS becomes the internal consultant
  - Solution versus technology
  - Decisions become larger

SC-20 INPUT

U.S. Information Services Industry

Conclusions

- US market will become internationalized
  - Standards influence increases
  - Foreign vendors grow in size
  - Buyers ask for worldwide support

SC-21 INPUT

24. CUSTOMER SERVICES
(CS)

Customer Service Program

Annual Presentation

CS- 1 INPUT

Agenda

- Overview
- Review of traditional customer services
- Assessment of nontraditional opportunities

CS- 2 INPUT

1990 INPUT Research Base

User Research	Respondents
Large Systems	97
Midrange Systems	109
PC/Workstations	53
IMO Users	35

CS- 3 INPUT

1990 INPUT Research Base

Vendor Research	Respondents
Large Systems	5
Midrange Systems	7
PC/Workstations	5
IMO Vendors	30

CS- 4 INPUT

Traditional Services: Analysis

- Definitions
- Growth/requirements
- Vendor shares
- Independent maintenance
- Issues
- Conclusions

CS- 5 INPUT

Definitions

CS- 6 INPUT

Traditional Services

- Hardware/microcode oriented
  - Diagnosis/repair
  - Pre-failure identification

CS- 7 INPUT

Traditional Services

- Manufacturers/IMOs
  - Large systems
  - Midrange systems
  - PC/workstations
- Ancillary services

CS- 8 INPUT

Ancillary Services

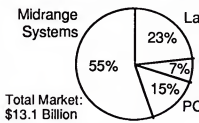
- Preinstallation planning
- Installation/deinstallation
- Maintenance training
- Related to traditional services

CS- 9 INPUT

Growth/ Requirements

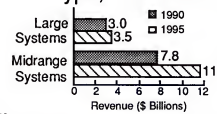
CS- 10 INPUT

1989 U.S. Customer Service Market by Product Type



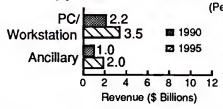
CS- 11 INPUT

U. S. Customer Service Market Growth by Product Type, 1990-1995



CS- 12 INPUT

U. S. Customer Service Market Growth by Product Type, 1990-1995



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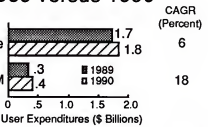
CS-13

On-Site and Depot Markets, 1989 versus 1990



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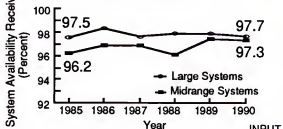
CS-14

System Availability Trends, 1985-1990



INPUT

CS-15

Customer Service Revenue Growth: Opposing Factors

- IBM price umbrella
- Need to increase overall profitability
- Installed base growth

INPUT

CS-16

Customer Service Revenue Growth: Opposing Factors

- Inflation
- Increased availability need
- New services

INPUT

CS-17

Customer Service Revenue Growth: Opposing Factors

- TPM competition
- Cost of ownership
- Equipment retirement
- Customer resistance
- Increased availability

INPUT

CS-18

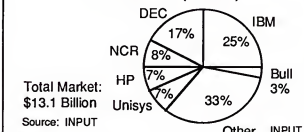
1/21/91

Vendor Shares

CS-19

INPUT

Leading U.S. Service Providers (1989)



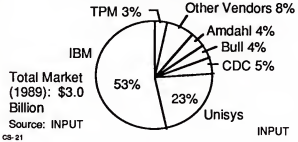
Total Market: $13.1 Billion

Source: INPUT

CS-20

INPUT

Leading Large System Service Vendors

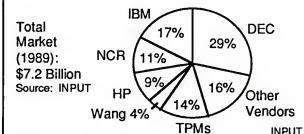


Source: INPUT

CS-21

INPUT

Leading Midrange Service Vendors

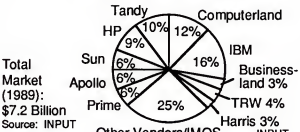


Source: INPUT

CS-22

INPUT

Leading PC/Workstation Service Vendors

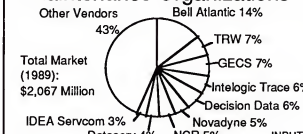


Source: INPUT

CS-23

INPUT

Top Independent Maintenance Organizations

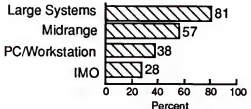


CS-24

INPUT

1/21/91

Combined Market Share of Top Three Service Vendors



CS-25 INPUT

Independent Maintenance Organizations (IMO)

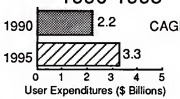
CS-26 INPUT

IMO vs. TPM

- "Third-party maintenance" virtually universal
- Independence is critical issue

CS-27 INPUT

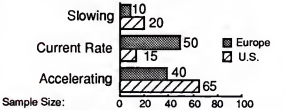
U.S. Independent Maintenance Market, 1990-1995



Source: INPUT

CS-28 INPUT

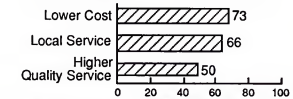
Independent Vendor Growth Predictions



Sample Size: Europe = 30, U.S. = 25
Note: Numbers rounded

CS-29 INPUT

Why Users Chose Independent Maintenance

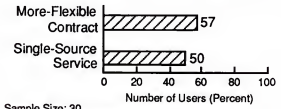


Sample Size: 30
Note: Multiple responses allowed

CS-30 INPUT

1/21/91

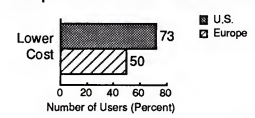
Why Users Chose Independent Maintenance



Sample Size: 30
Note: Multiple responses allowed

CS-31 INPUT

Why Users Chose Independent Maintenance



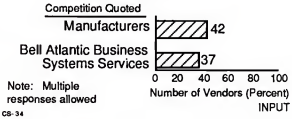
CS-32 INPUT

Independent Maintenance Market Inhibitors

- Limited price sensitivity
- Independent's software support credibility
- Fear of equipment vendor reaction

CS-33 INPUT

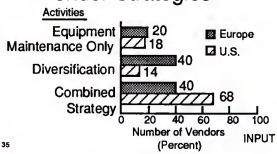
Independent Maintenance Primary Sources of Competition



Note: Multiple responses allowed

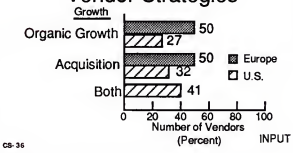
CS-34 INPUT

Leading Independent Vendor Strategies



CS-35 INPUT

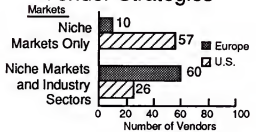
Leading Independent Vendor Strategies



CS-36 INPUT

1/21/91

Leading Independent Vendor Strategies



CS-37 INPUT

Independent Vendor Strengths, U.S.

1. Price
2. Quality/reliable service
3. Technical knowledge
4. Responsive to user needs
5. Coverage—single service

CS-38 INPUT

Independent Vendor Weaknesses, U.S.

- Spare parts
- Knowledge of system advances

CS-39 INPUT

Independent Vendor Strengths, Europe

1. Responsiveness
2. Provision of multivendor service
3. Availability of independent and unbiased advice

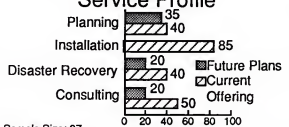
CS-40 INPUT

Independent Vendor Weaknesses, Europe

- Software support credibility
- Risk of overexposure
- Larger companies run risk of losing user friendliness
- Lack of intimate product knowledge

CS-41 INPUT

U.S. Independent Vendor: Service Profile

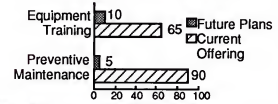


Sample Size: 27
Note: Numbers rounded

CS-42 INPUT

1/21/91

Leading U.S. Independent Vendor: Service Profile



Sample Size: 27
Note: Numbers rounded

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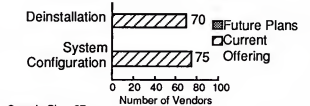
CS-43

Leading U.S. Independent Vendor: Service Profile



Sample Size: 27
Note: Numbers rounded

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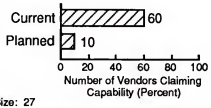
CS-44

U.S. Independent Vendor Systems Software Support



Sample Size: 27
Note: Numbers rounded

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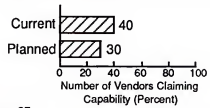
CS-45

U.S. Independent Vendor Applications Software Support



Sample Size: 27
Note: Numbers rounded

INPUT

CS-46

Vendor Reaction to Independents' Success

- Competitive response
  - Pricing flexibility
  - Price discounting
  - Warranties
  - Bundling
  - Special contracts

INPUT

CS-47

Vendor Reaction to Independents' Success

- Service initiatives
  - Single-source/multivendor
  - Integrated solutions
  - Software support

INPUT

CS-48

Vendor Reaction to Independents' Success

- Cooperative partnerships
- Restrictive practices
  - Parts
  - Documentation
  - Diagnostic software

CS-49 INPUT

Issues

- IBM
- Single-source service
- Remote monitoring
- Recession

CS-50 INPUT

IBM: Dissolution of NSD

- First, planning/financial to area marketing staff
- Midyear: service management report directly to branch/area

CS-51 INPUT

IBM: Dissolution of NSD

- Part of move to decentralize all services—occurred earlier with professional services

CS-52 INPUT

Other IBM Activities

- Field upgrades for ES9000
- Partial integration of field service with manufacturing
- FastService: troubleshooting for in-house applications

CS-53 INPUT

Single-Source Service

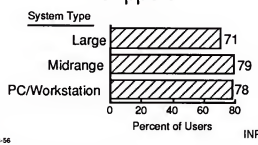
CS-54 INPUT

Single-Source Service

- User receptivity
- Technical issue
- Partnership vs. competition
- Pricing

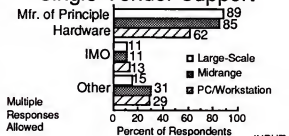
CS-55 INPUT

Interest in Single-Vendor Support



CS-56 INPUT

Preferred Source of Single-Vendor Support



CS-57 INPUT

Single-Source Technical Issues

- Expanded hardware/software knowledge base
- Problem/solution data base
- Help desk/problem tracking

CS-58 INPUT

DEC: Single-Source Service

- Centralized, transparent help desk
- Problem identification and referral
- Software partner oriented
- DEC or partner can be focal point
- Good reception by software partners

CS-59 INPUT

Single-Source Service: Strategic Issues

- Offensive vs. defensive
- Gain/retain partner
  - Hardware
  - Systems software
  - Applications

CS-60 INPUT

Single-Source Service: Strategic Issues

- Protect installed base
- Add value, raise prices

CS-61 INPUT

Remote Monitoring

- Technical aspects
- Competitive advantage
- Opportunities

CS-62 INPUT

Monitoring: Technical

- Device-resident
- Parameter-driven
- Problem "footprints"
- Expert system/data base

CS-63 INPUT

Monitoring: Competitive Advantage

- Real customer benefits
- Perceived customer benefits
- Expert system software (medium)
- "Footprint" data base (high)

CS-64 INPUT

Monitoring: Opportunities

- Manufacturers—build walls against third parties
- Partnerships/alliances
  - Between third parties
  - Manufacturers—others
- Extend technology to software

CS-65 INPUT

Recession Impact

CS-66 INPUT

Impact of the Recession on Vendors and IMOs

Impact	Percentage of Vendors and IMOs
Negative	30
Positive	10
Both	30

CS-67 INPUT

Budgetary Measures in Relation to Economic Downturn

Measure	Percentage of Respondents
Personnel Cut Backs	40
Overtime Reduction	10

CS-68 INPUT

Budgetary Measures in Relation to Economic Downturn

Measure	Percentage of Respondents
Hiring Freeze	30
Reduce/Tighten Budgets	60

CS-69 INPUT

Budgetary Measures in Relation to Economic Downturn

Measure	Percentage of Respondents
Stronger Justification for Expenses	100
Space Consolidation	10

CS-70 INPUT

Traditional Customer Services vs. Nontraditional Customer Services

CS-71 INPUT

Nontraditional Opportunities

CS-72 INPUT

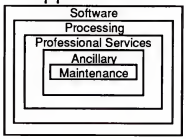
Definitions/Requirements

- Growth prospects
- Customer acceptance
- Competition

CS-73

INPUT

Information Services Opportunities



CS-74

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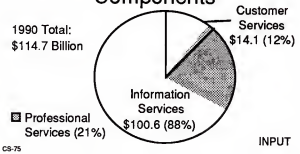
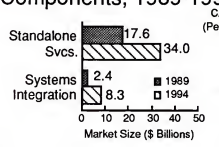
Professional Services Components



CS-75

INPUT

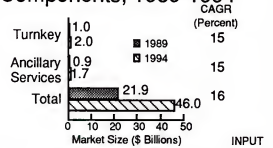
U.S. Professional Services Components, 1989-1994



CS-76

INPUT

U.S. Professional Services Components, 1989-1994



CS-77

INPUT

Professional Services Opportunities

- Systems operations: good
  - Fluid, competitive situation
- Applications support: good
  - Existing systems
  - Need project mgt. and technical skills

CS-83

INPUT

Professional Services Opportunities

- Consulting: fair/good
  - Depends on skills available
- Applications development: limited
  - New systems
  - Highly competitive

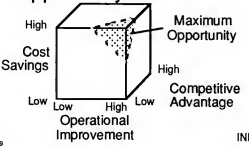
CS-84 INPUT

Professional Services Opportunities

- Systems integration: limited
  - Enter at later phase
- Turnkey: none
  - Closely tied to software products

CS-85 INPUT

Systems Operations: Opportunity Schematic



CS-89 INPUT

Network Service

CS-90 INPUT

Network Service Overview

	Network Integration	Network Operations
Professional Services	Yes	Yes
Products/ Other Services	No	No

CS-91 INPUT

Network Integration Professional Services

- Network design
  - Strategic planning
  - Requirements analysis
  - Design
- Installation planning

CS-92 INPUT

Network Integration Professional Services

- Implementation
  - Equipment/modification
  - Circuits/cabling
  - Software
  - Initial training

CS-93 INPUT

Network Operations Professional Services

- Configuration management
- Problem management
- Capacity management
- Network administration
- Management reporting

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Network Service: Products/Other Services

- Network integration
  - Equipment supply
  - Circuits
  - Software products
- Network operations
  - Transmission-related services

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Network Service Requirements

CS-96 INPUT

Key User Network Service Needs

- Network access
- Improved vendor expertise
- Flexible service offerings
- Single point of contact

CS-97 INPUT

Key Vendor Network Service Requirements

Vendor Requirement	Importance Rating
Need to work in multivendor environment	High
Need for a wider range of skills	High

CS-98 INPUT

Key Vendor Network Service Requirements

Vendor Requirement	Importance Rating
Compatibility of software	Medium
Need to structure a wider-ranging service	Medium

INPUT

CS-99

Service Skill Profile

Service	Importance Rating: Computer Systems	Importance Rating: Networks
Consulting	Medium	High
Environmental/ installation services	Medium	High

INPUT

CS-100

Service Skill Profile

Service	Importance Rating: Computer Systems	Importance Rating: Networks
Project management/ implementation	Low	Medium
Applications support	Low	Medium

INPUT

CS-101

Service Skill Profile

Service	Importance Rating: Computer Systems	Importance Rating: Networks
Systems software support	High	High
Equipment maintenance	High	Low/Medium

INPUT

CS-102

Potential for Customer Service Organizations to Offer Network Service

Strengths	Weaknesses
Increasing network and software orientation	Competition from other divisions
Geographic coverage	

INPUT

CS-103

Potential for Customer Service Organizations to Offer Network Service

Strengths	Weaknesses
Service orientation	Historic hardware orientation

INPUT

CS-104

Potential for Systems Integrators to Offer Network Service

Strengths	Weaknesses
Software-oriented	Usually, the network and hardware skills
Multiple-platform experience	

CS-105 INPUT

Potential for Systems Integrators to Offer Network Service

Strengths	Weaknesses
Broad technical skills	Development, not service, orientation

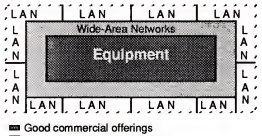
CS-106 INPUT

Potential for Software Product Companies to Offer Network Service

Strengths	Weaknesses
Software and software support knowledge	Often little communications experience
	Product-oriented

CS-107 INPUT

Disaster Recovery



CS-108 INPUT

Converging Network Service Requirements (Schematic)

CS-109 INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Network importance to customer	Very high	Varies widely

CS-110 INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Networking standards and protocols	IBM (de facto)	No vendor dominates

CS-111

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Networking software	IBM (de facto)	Multiple vendors

CS-112

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Maturity of network management tools	Medium	Low

CS-113

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Network management skills	Defined	Being defined

CS-114

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Network management organization	Within IS	Widely dispersed

CS-115

INPUT

Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Network management costs (corporate)	Very high	Being defined

CS-116

INPUT

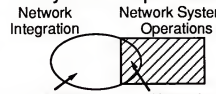
Critical Differences in Wide-Area and Local-Area Networks

Characteristics	WAN	LAN
Outsourcing of network operation	Occurring	Issues being defined

CS-117

INPUT

Overlap of Network Integration and Network Systems Operations



CS-118

INPUT

Network Integration: "Pure" vs. Network Operations Overlap

- Pure Network Integration
  - Megaprojects
  - Application-driven
  - Standalone projects

CS-119

INPUT

Network Integration: "Pure" vs. Network Operations Overlap

- Overlap
  - Smaller projects
  - Little applications content
  - Evolutionary changes

CS-120

INPUT

Network Operations: Opportunities

- Recently acquired divisions
- Operations being prepared for divestitures
- Companies under financial pressure

CS-121

INPUT

Network Operations: Opportunities

- Inefficient operations
- Technical laggards
- IS management turnover
- Relatively stable applications

CS-122

INPUT

Network Operations: Total Service Opportunities

- Network monitoring, performance analysis
- Problem management
- Terminal installation
- Disaster recovery

INPUT

CS-123

Network Operations: Total Service Opportunities

- Training and education
- User help desk
- Equipment service
- Systems software support

INPUT

CS-124

Network Integration: Total Service Opportunities

- Installation
- Test and acceptance
- Facility wiring and cabling

INPUT

CS-125

25. Client/Server (CL)

Client/Server (CL)

INPUT

CL- 1

Application Attributes Favoring Server Residency

- Large/modular application code
- Frequently updated
- Accessed from many locations
- Highly sensitive data
- Many people accessing
- Much collaborative work

INPUT

CL- 2

Application Attributes Favoring Client Residency

- Small application code
- Rarely updated
- Accessed from few locations
- Data not sensitive
- Few people accessing
- Little collaborative work

INPUT

CL- 3

Expected Gain from C/S Architecture

Lower costs	89 %
Improved application development	56
Better systems management	45
Faster data access	45
Other	43

INPUT

CL- 4

Perceived Inadequacies Installed C/S Applications

Lack of system management tools	78%
Increased support requirements	75
Increased user training requirements	45

INPUT

CL- 5

Perceived Inadequacies Installed C/S Applications

Client not powerful enough	44%
Lack of application environment	22
Other	67

INPUT

CL- 6

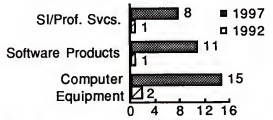
Reasons for NOT Implementing Client/Server Architectures

Lack of experience	44%
Don't know how to support	19
Too large a job	13

INPUT

CL- 7

Client/Server Architecture Forecast—Optimistic

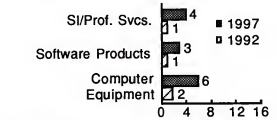


CAGR = 53%

INPUT

CL- 8

Client/Server Architecture Forecast—Pessimistic



CAGR = 27%

INPUT

CL- 9

Client/Server Driving Forces

- Vendor self-interest
- Product availability
- Expected benefits
- Absorption rate of new technologies

INPUT

CL- 10

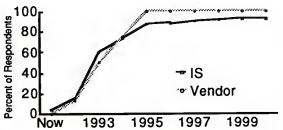
C/S Architecture as a Percent of Total Expenditures

	1992 (%)	1997 (%)
Software	<1	4-10
Services (PS/SI)	<1	8-15
Computer Equipment	2	6-15

INPUT

CL- 11

Anticipated Timing of Significant C/S Implementations



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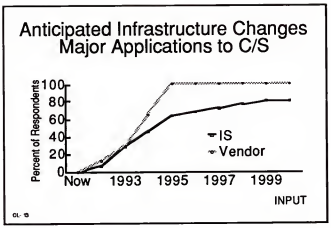
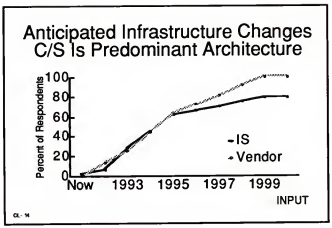
CL- 12


Anticipated Infrastructure Changes
Major Applications to C/S
Percent of Respondents
100
80
60
40
20
0
Now
1993
1995
1997
1999
IS
Vendor
INPUT


Anticipated Infrastructure Changes
C/S Is Predominant Architecture
Percent of Respondents
100
80
60
40
20
0
Now
1993
1995
1997
1999
IS
Vendor
INPUT