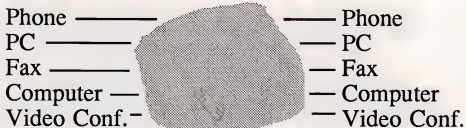


Network Management Trends in Integration

Alex Graham
Principal Consultant
INPUT



User-Viewed Network



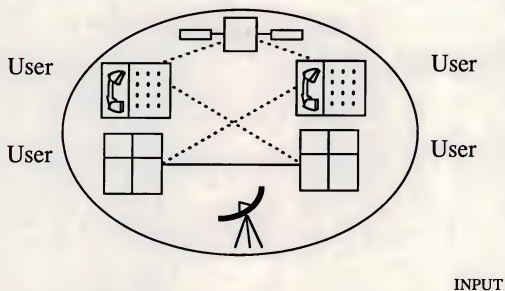
INPUT

NOTES:

MSEM-AG-2



Management-Viewed Network

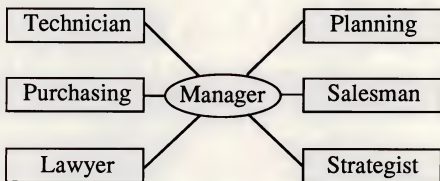


NOTES:

MSEM-AG-3



Network Manager Roles



INPUT

NOTES:

MSEM-AG-4



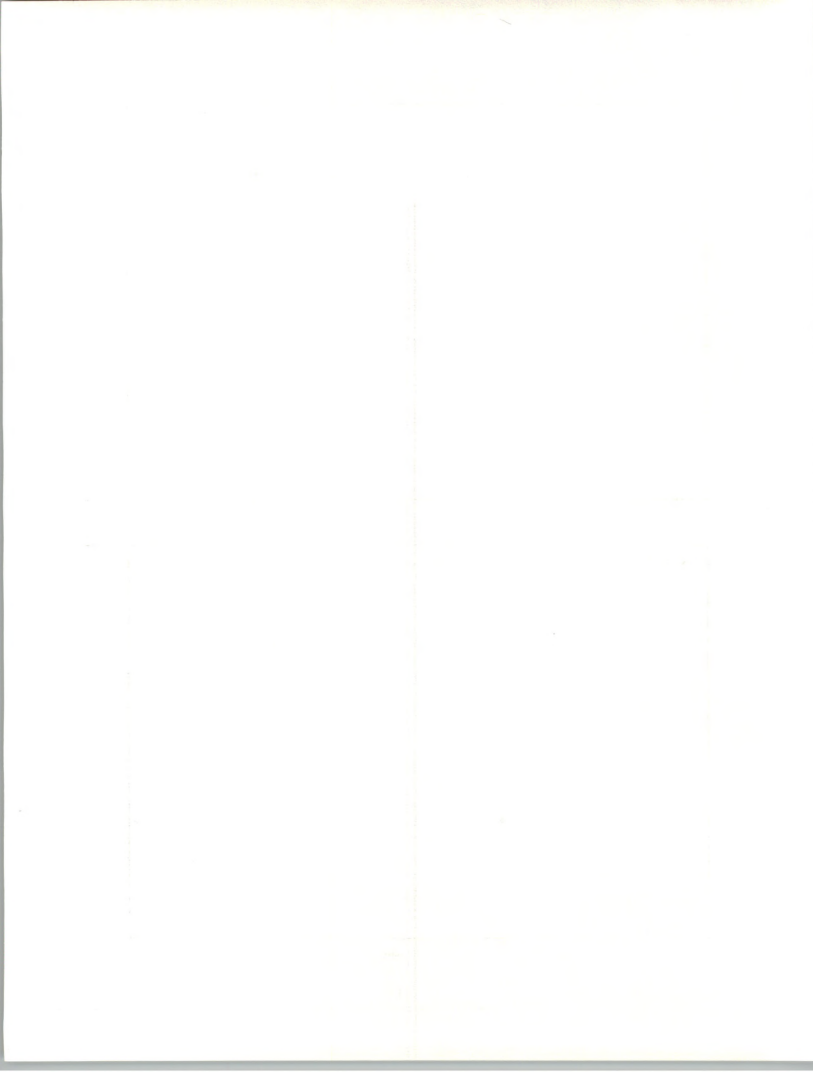
Significant Management Issues Corporate Management

- Need information
- Business advantage
- Cost reduction
- Investment return

INPUT

Notes:

MSEM-AG-5



Significant Management Issues Telecommunications Management

- Satisfied with operations
- Want more staff
- Responding strategically

INPUT

Notes:

MSEM-AG-6



Significant Management Issues MIS Management

- Keep information moving
- Telecom satisfaction low
- Buying more tools
- Managed network interest

INPUT

Notes:

MSEM-AG-7



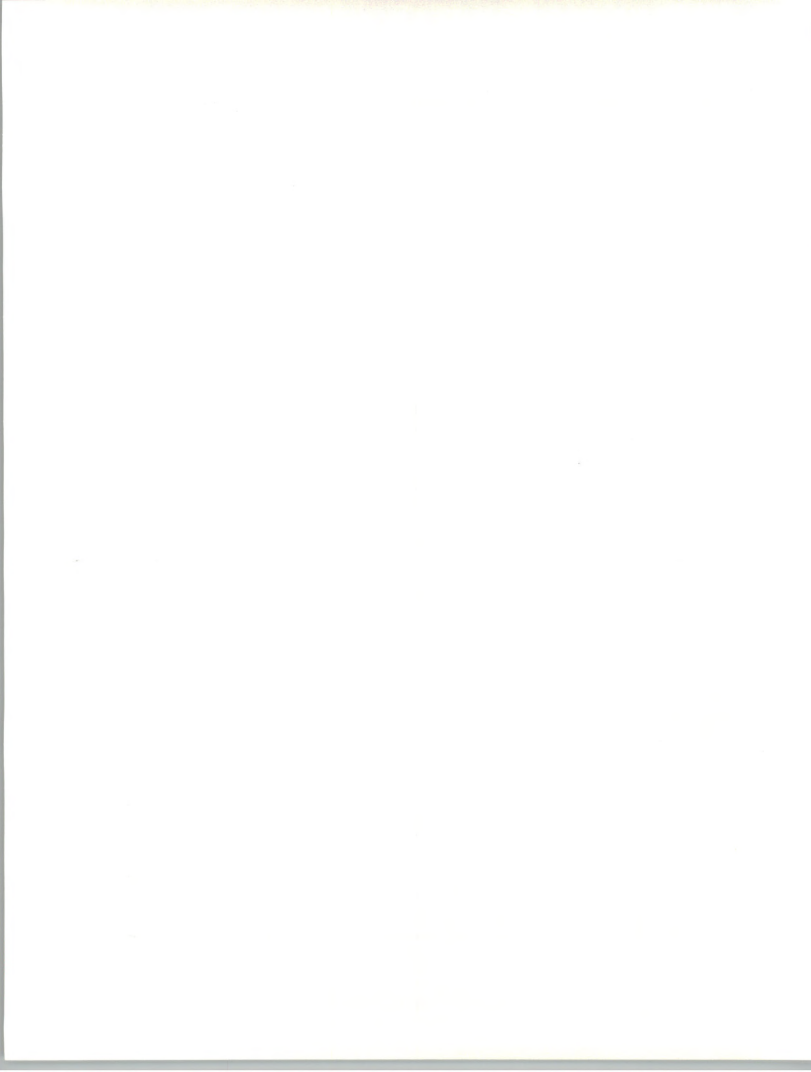
Network Management Tasks

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

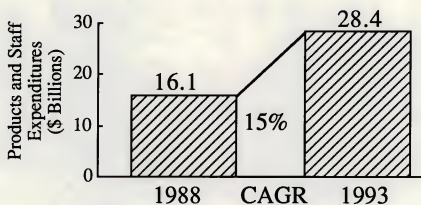
INPUT

Notes:

MSEM-AG-8



Network Management Expenditures in Large Companies, 1988-1993



* For companies with more than 500 employees.

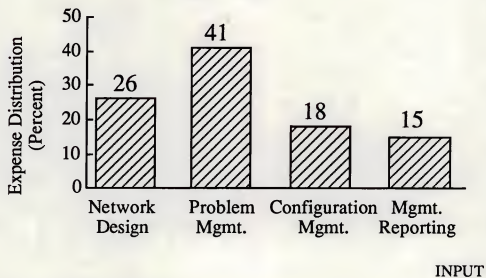
INPUT

NOTES:

MSEM-AG-10



Allocation of Network Management Expenses

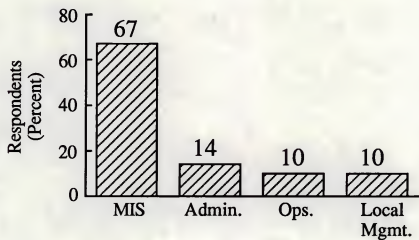


NOTES:

MSEM-AG-11



Telecommunications Responsibility



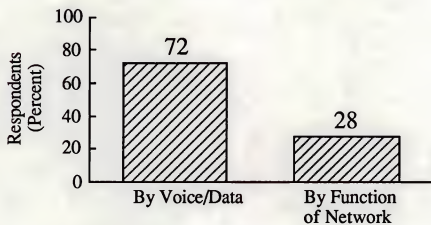
INPUT

NOTES:

MSEM-AG-12



Allocation of Responsibilities



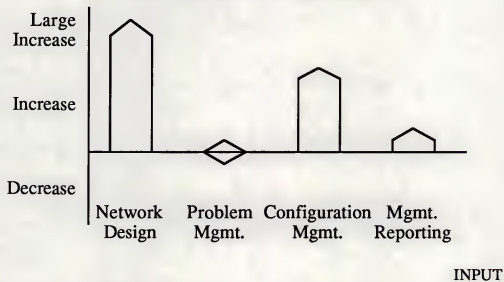
INPUT

NOTES:

MSEM-AG-13



Changing Pattern of Network Management Expenses

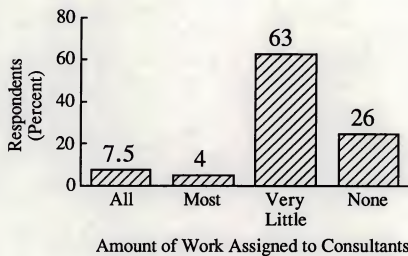


NOTES:

MSEM-AG-14



Use of Consultants for Network Design



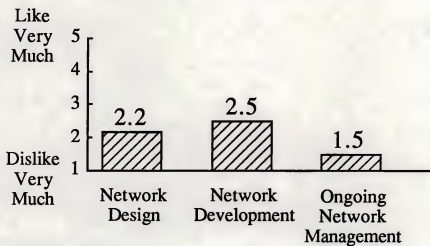
INPUT

NOTES:

MSEM-AG-15



Acceptability of Managed Networks



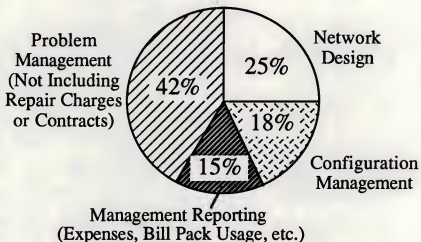
INPUT

NOTES:

MSEM-AG-16



Staff Time Used for Network Management Functions



INPUT

NOTES:

MSEM-AG-17



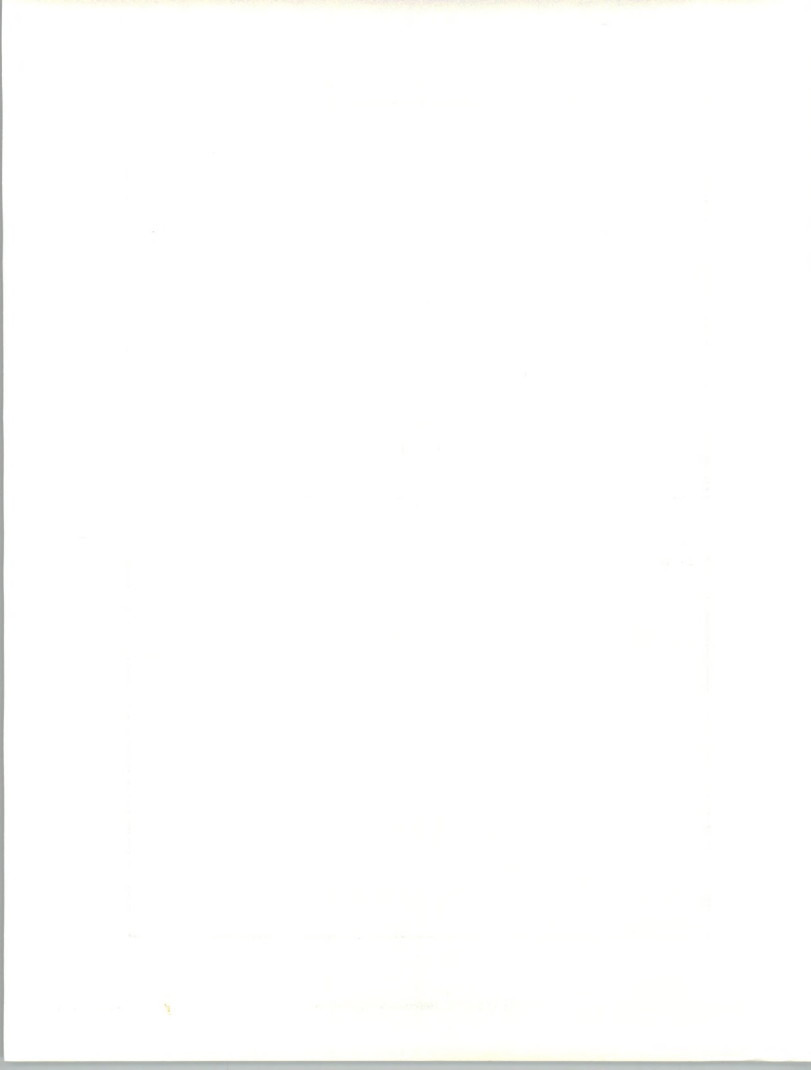
Product Needs and Requirements

- Training
 - Self-training materials
 - Built-in training guides/help
- Network Management Tools
 - Integrated solutions over a full range of problems
 - Multivendor
 - Easy to use/learn

INPUT

Notes:

MSEM-AG-18a,b



Product Needs and Requirements

- Disaster Recovery
 - Network services
 - Bypass central office
- Services from Carriers
 - Supply network usage and status information
 - Multivendor connect to others
 - Backup for failed private lines and local loops

INPUT

Notes:

MSEM-AG-18c,d



Product Needs and Requirements

- Support from Vendors of Equipment and Communications Services
 - Multivendor
 - Areas where the users are weak
 - Smaller users full range of services
 - Large users as needed
- Equipment
 - Simple to learn and use
 - Capable of self-test and remote test and reconfiguration

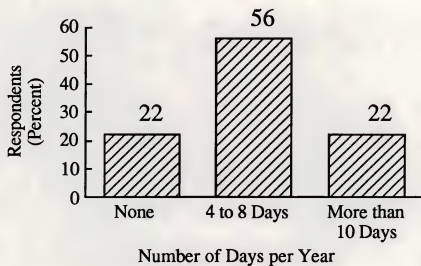
INPUT

Notes:

MSEM-AG-18e,f



Staff Training Level



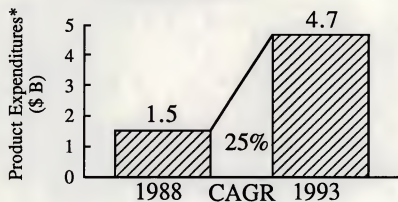
INPUT

NOTES:

MSEM-AG-19



Network Management Product Expenditures in Large Companies 1988-1993



* For companies with over 500 employees.

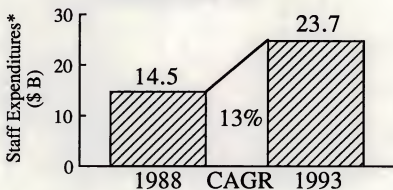
INPUT

NOTES:

MSEM-AG-20



Network Management Staff Expenditures in Large Companies 1988-1993



* For companies with over 500 employees.

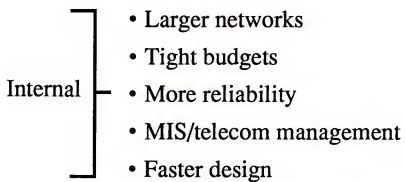
INPUT

NOTES:

MSEM-AG-21



Driving Forces



INPUT

Notes:

MSEM-AG-22



Driving Forces

- More vendors
 - More offerings
 - New technology
 - More support
 - Lack of training
- External

INPUT

Notes:

MSEM-AG-23



User Recommendations

- Ensure common goals
- Train staff
- Use unique skills
- Develop disaster plan
- Make investment

INPUT

Notes:

MSEM-AG-24



Recommendations to Vendors Management Tools

- Simplify products
- Comprehensive training
- Solution emphasis
- Senior management sale

INPUT

Notes:

MSEM-AG-25



Recommendations to Vendors Services and Equipment

- Develop relationships
- Ensure interconnectivity
- Emphasize support assistance
- Simplify products
- Adhere to standards

INPUT

Notes:

MSEM-AG-26



Recommendations to Vendors Managed Networks

- Sell higher
- Show cost benefits
- Obtain broad knowledge
- Bridge management gap

INPUT

Notes:

MSEM-AG-27



Recommendations to Vendors Consulting Services

- Relate at all levels
- Provide broad coverage
- Become expert
- Price creatively

INPUT

Notes:

MSEM-AG-28

TABLE 1. *Continued*

Variable	Description	Unit	Source
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD
GDP	Gross Domestic Product	Billion dollars	IMD

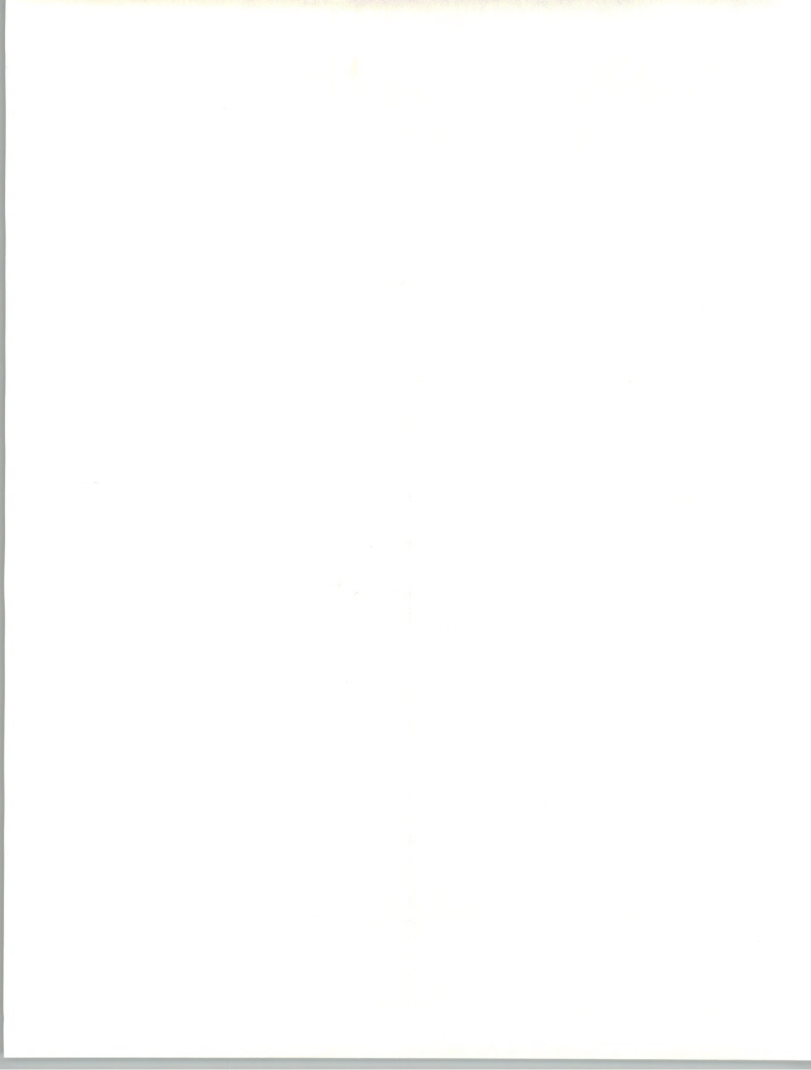
Recommendations to Vendors Training

- Relate to all users
- Vendor alliance
- Self-paced learning element
- Areas of emphasis include
 - Management principles
 - Netview

INPUT

Notes:

MSEM-AG-29



Alex Graham
Principal Consultant
INPUT

Alex Graham, a principal consultant, brings to INPUT more than 20 years of senior management experience in voice and data planning, network management planning, systems development, consulting, and marketing of telecommunications services. Additionally, he has wide-ranging experience in telecommunications, strategic planning, and development of customer support programs. He has been general manager of an international research and consulting firm, a senior consultant with Arthur D. Little, and a general manager for VISA International.

He holds an M.A. in international management from the American Graduate School and a B.A. in business from Grove City College.



Network Management

Trends in Integration



Particular
of #5

USER VIEWED NETWORK

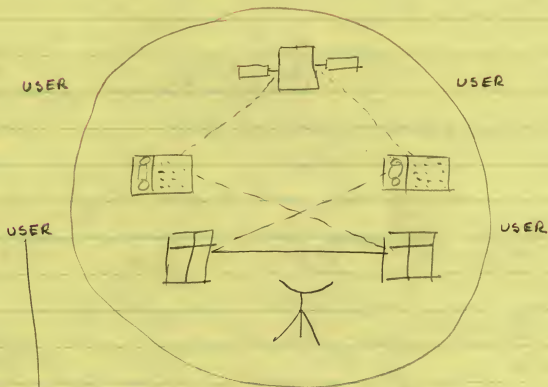
Have
order
of #5



This should be
filled in with a
color that convey
a cloud - should
be easy to see.



MANAGEMENT VIEWED NETWORK

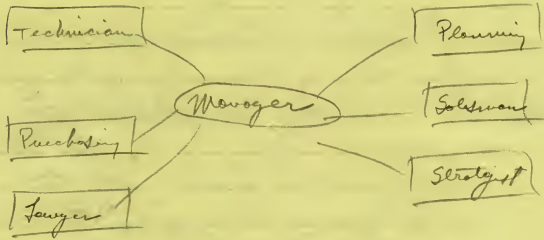


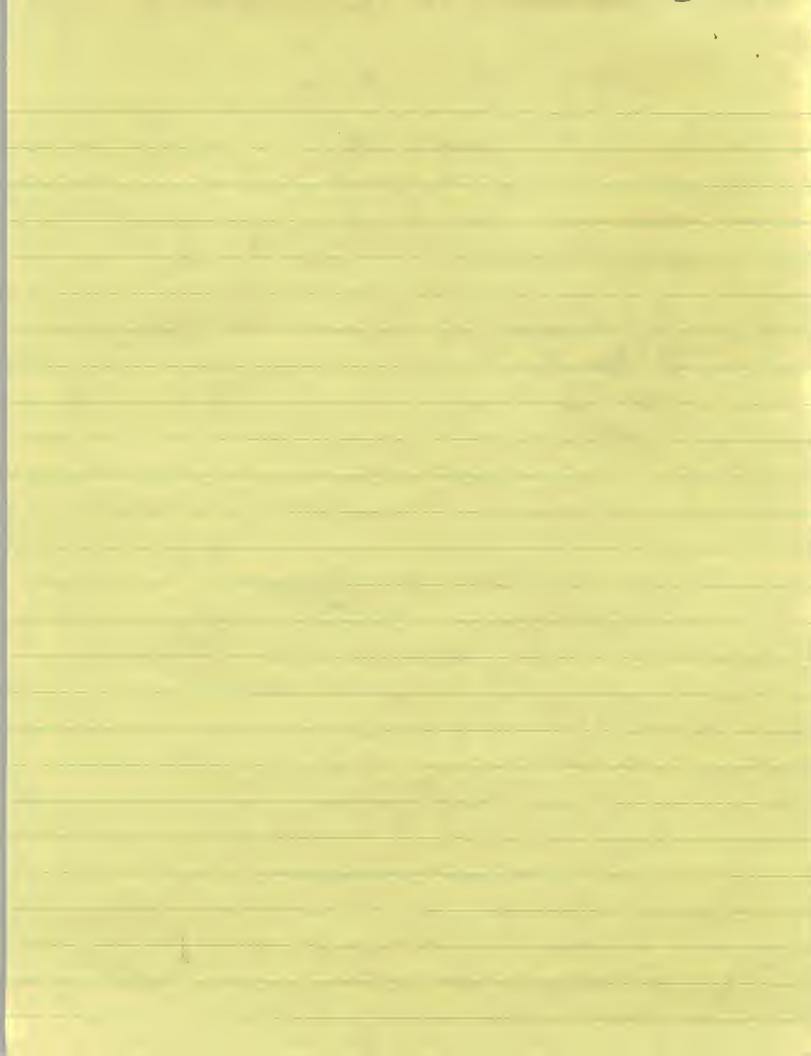
The words 'user' should be placed compared to the rest of the chart!





Network Manager Roles





Significant Management Issues

Corporate Management

- Need Information
- Business Advantage
- Cost Reduction
- Investment Return





Significant Management Issues

Telecommunication Management

- Satisfied with Operations
- Want more staff
- Responding Strategically



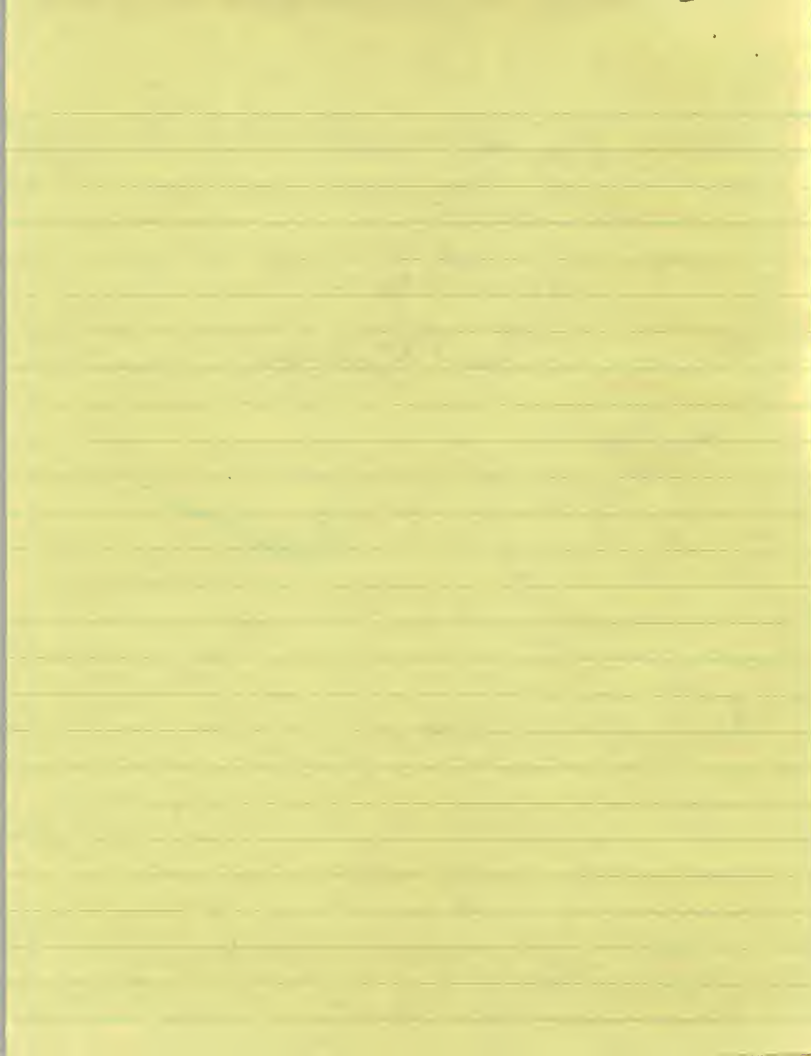


Significant Management Issues

MIS Management

- Keep Information Moving
- Telecom Satisfaction Low
- Buying More Tools
- Managed Network Interest





Network Management Tasks

- Design
- Configuration Management
- Problem Management
- Capacity Management
- Network Administration
- Management Reporting

INPUT

NOTES:

MPRE89-308

- *Others* - Other vendors such as DEC and HP have introduced systems aimed at the network management market with similar objectives.

Probably the major problem facing network users is the reality of a multivendor environment. Few of the existing network management systems, including Netview and UNMA mentioned earlier, have real multivendor capabilities.

For example, Netview/PC, IBM's multivendor interface, depends on the other vendors delivering data in an IBM-defined format for presentation. Although Netview/PC is obviously an improvement over multiple displays, the correction of problems is still the responsibility of the individual systems.

C Network Management Functions

As used in this report, the term "Network Management" covers a wide range of activities. As illustrated in Exhibit III-10, these activities can be divided into six major categories.

EXHIBIT III-10

NETWORK MANAGEMENT FUNCTIONS

Network Design

- Strategic Plan
- Design
- Optimization
- Disaster Plan

Configuration Management

- Network Inventory
- Alternate Routes

Problem Management

- Monitoring
- Diagnosing
- Bypassing
- Restoral

Capacity Management

- Traffic Measurement
- Performance Measurement
- Forecasting

Network Administration

- Order Handling
- Equipment Catalog
- Directory
- User Billing

Management Reporting

- Expense
- Organization
- Training
- User Assistance

Tasks

one table for each group B, two.

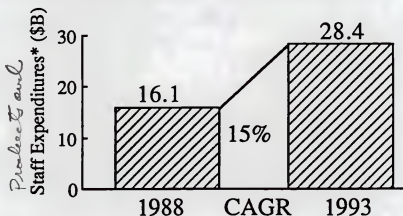
OK?

40

9 A, B, C, D, E

3(0/0/2)4

Network Management Expenditures in Large Companies, 1988-1993



* For companies with more than 500 employees.

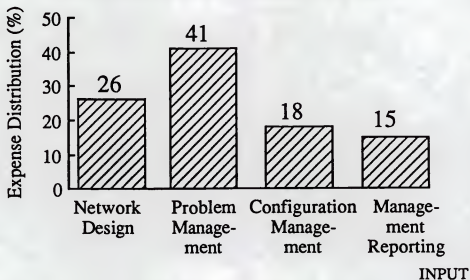
INPUT

NOTES:

MPRE89-309



Allocation of Network Management Expenses

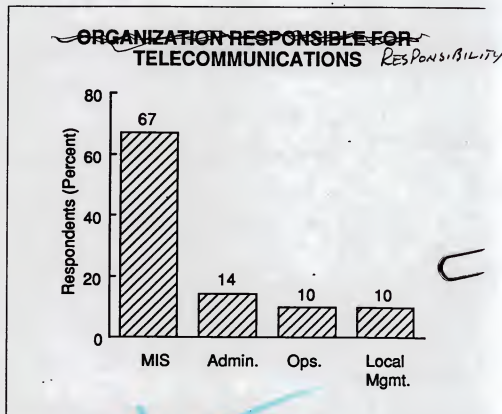


NOTES:

MPRE89-310



EXHIBIT III-1



nications is a distributed responsibility, with each plant or division handling its own telecommunications.

There are a number of considerations related to the organization of the network management function.

a. Staffing Is a Budget Problem, Not a People Problem

As a result of deregulation and the resulting layoff of staff by many of the telcos, there is a large labor pool of qualified staff to perform network management functions. However, in most organizations, budgetary considerations remain the primary reason for not increasing the staff.

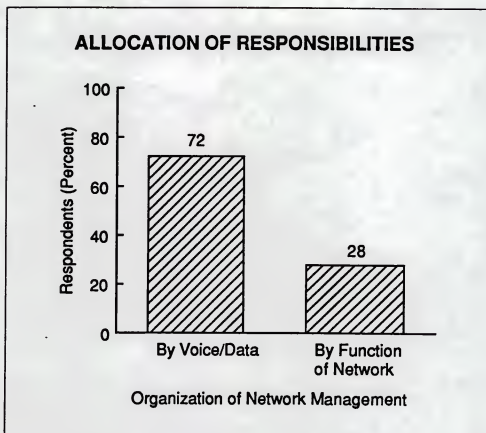
In many organizations, the quality of available staff is an additional concern. Individuals trained in the rigid structure of a telco operations center frequently do not adapt well to a corporate environment.

b. Big Organizations Gaining on Telcos

Large organizations are building staff, equipment, and procedures to manage their own networks as effectively as the telcos. Telcos, hampered by regulatory constraints and by an increasing array of CPE equipment, have not been able to respond effectively to the user need for



EXHIBIT III-5

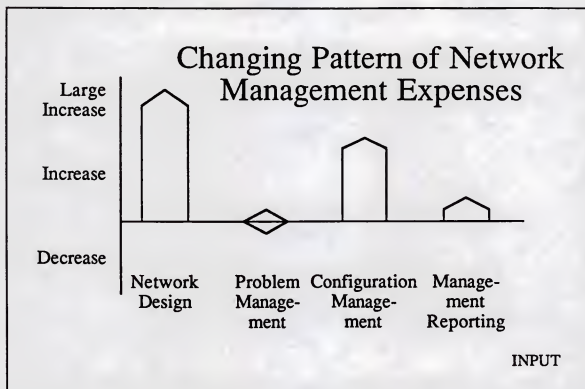


- *OSI Standards* - International standards organizations are in the process of developing a set of standards for the management of user networks. This work, now underway, is expected to be visible in network management products in about two years.

The standards work is following closely the pattern set by the OSI network model with its layered structure. As shown in Exhibit III-6, there are Layer Management Elements at each of the seven defined layers of the OSI model. The controlling element is a set of management functions (Systems Management Application Entities) that operate in the application layer and a communication protocol (Common Management Information Protocol) that enables the interconnection of these elements.

- *Vendor Standards* - A number of vendors have established network management concepts or architectures of their own. This is partly in response to user needs and the lack of an in-place OSI standard. It is also in response to the need to protect their own product lines in the face of the clear trend toward multivendor networks.



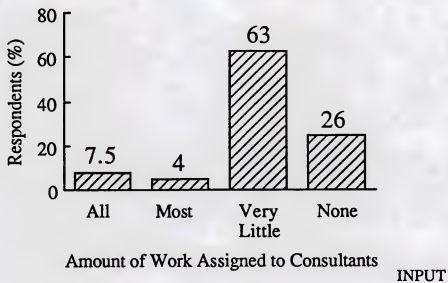


NOTES:

MPRE89-311



Use of Consultants for Network Design

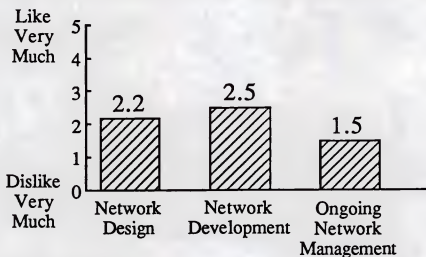


NOTES:

MPRE89-312



Acceptability of "Managed Networks"



Scale = 1 to 5

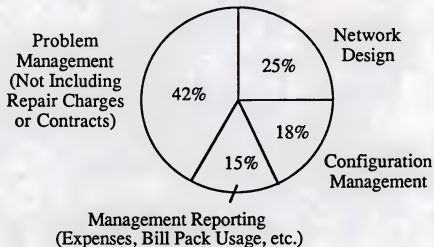
INPUT

NOTES:

MPRE89-313



Staff Time Used for Network Management Functions



INPUT

NOTES:

MPRE89-314



EXHIBIT IV-D

PRODUCT NEEDS AND REQUIREMENTS

- Training
 - Self-Training Materials
 - Built-In Training Guides/Help
- Network Management Tools
 - Integrated Solutions over a Full Range of Problems
 - Multivendor
 - Easy to Use/Learn
- Disaster Recovery
 - Network Services
 - Bypass Central Office
- Services from Carriers
 - Supply Network Usage & Status Information
 - Multivendor Connect to Others
 - Backup for Failed Private Lines and Local Loops
- Support from Vendors of Equipment and Communications Services
 - Multivendor
 - Areas Where the Users Are Weak
 - Smaller Users Full Range of Services
 - Large Users as Needed
- Equipment
 - Simple to Learn and Use
 - Capable of Self-Test and Remote Test and Reconfiguration

18. A-F

7-A

Application Frequently network operation is organized around a specific application. For example, in the airline industry the reservation networks are separate from networks used for internal management.

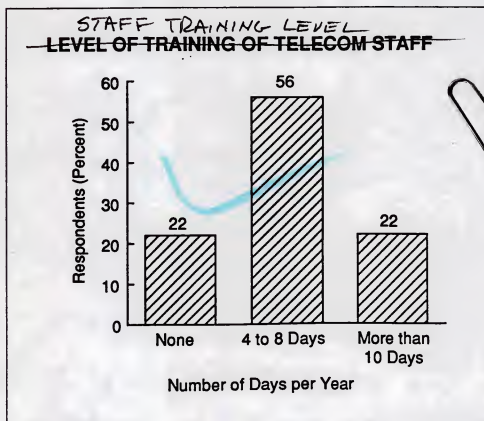
2. Training and Education

Although network managers frequently believe that this is not a problem, the amount of time spent on any kind of formal or semiformal training is a major deterrent to the application of advanced technology or even utility in the networks.

a. Little Time Spent on Training

The average amount of time spent by the respondents on training is less than 2%. As shown in Exhibit III-2, most of the companies spend fewer than two weeks per year per individual in training, and nearly twenty-five percent of companies spend no time at all.

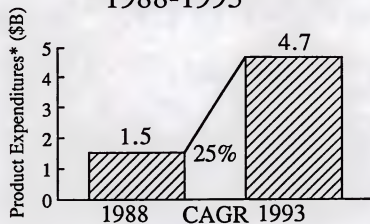
EXHIBIT III-2



As also indicated in Exhibit III-3, on-the-job training is the predominate method of training in most organizations.



Network Management Product Expenditures in Large Companies 1988-1993



* For companies with over 500 employees.

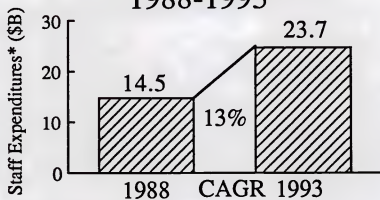
INPUT

NOTES:

MPRE89-315



Network Management Staff Expenditures in Large Companies 1988-1993



* For companies with over 500 employees.

INPUT

NOTES:

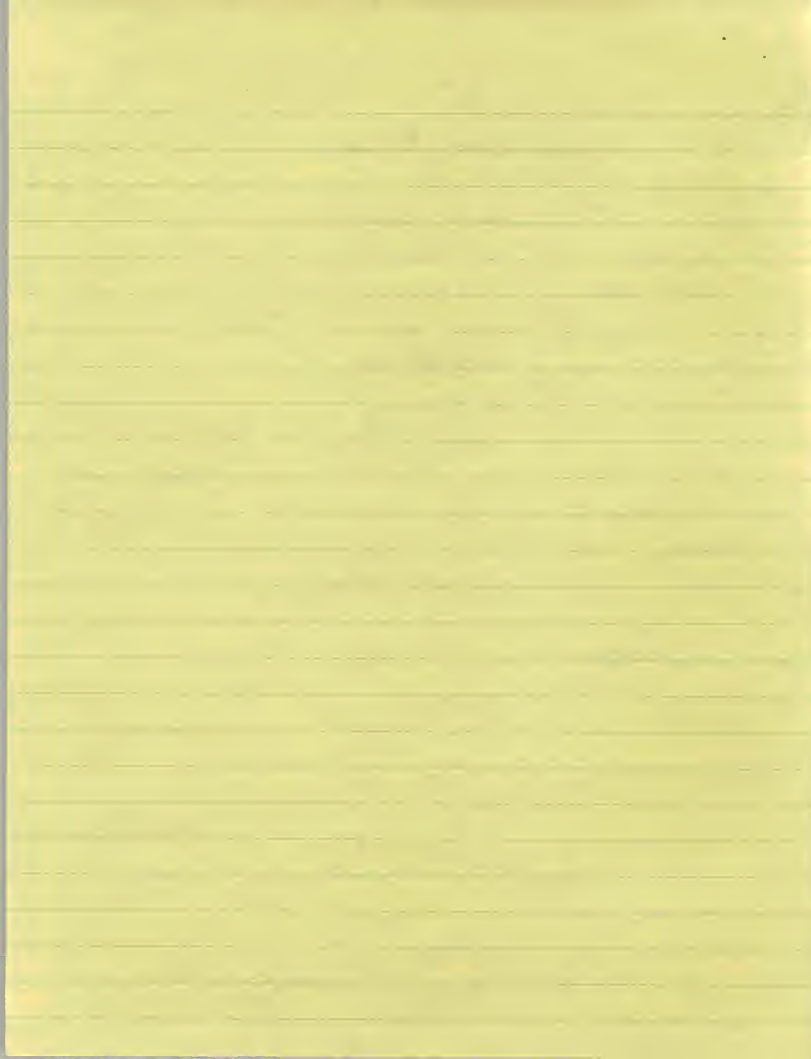
MPRE89-316



DRIVING FORCES

INTERNAL

LARGER NETWORKS
TIGHT BUDGETS
MORE RELIABILITY
MIS/TELECOM MGT
FASTER DESIGN



DRIVING FORCES

MORE VENDORS

MORE OFFERINGS

NEW TECHNOLOGY

MORE SUPPORT

LACK OF TRAINING

EXTERNAL

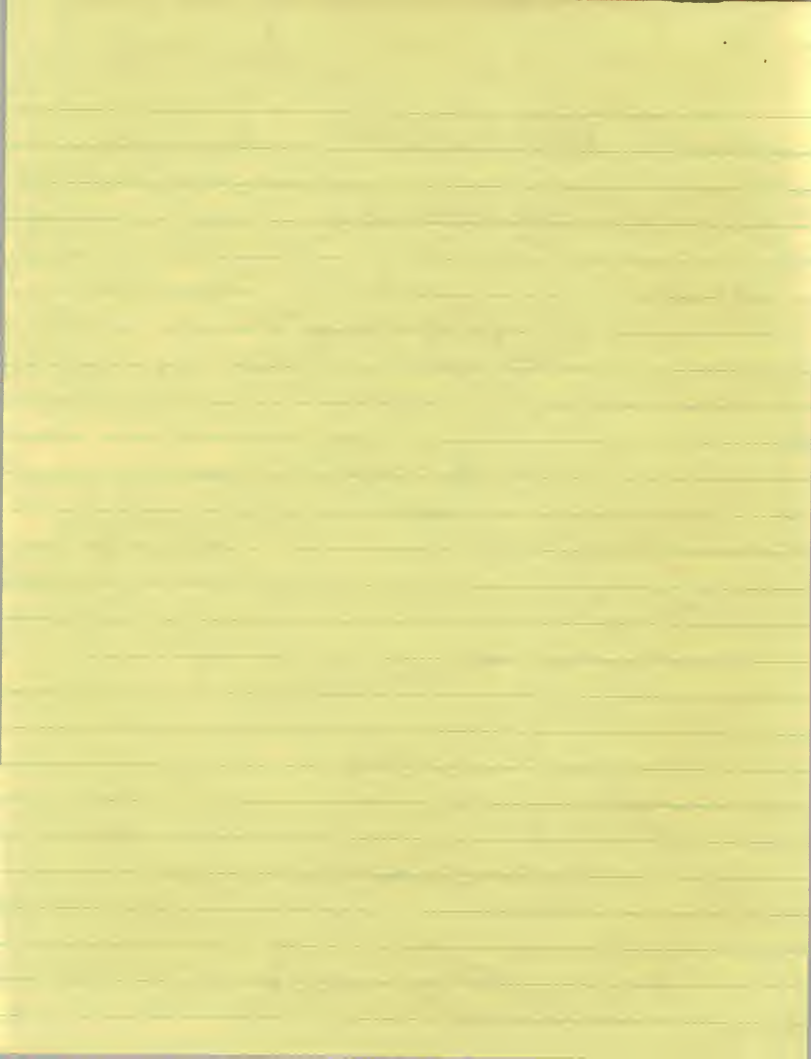




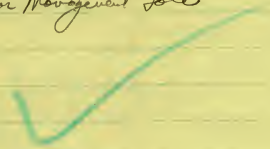
User Recommendations

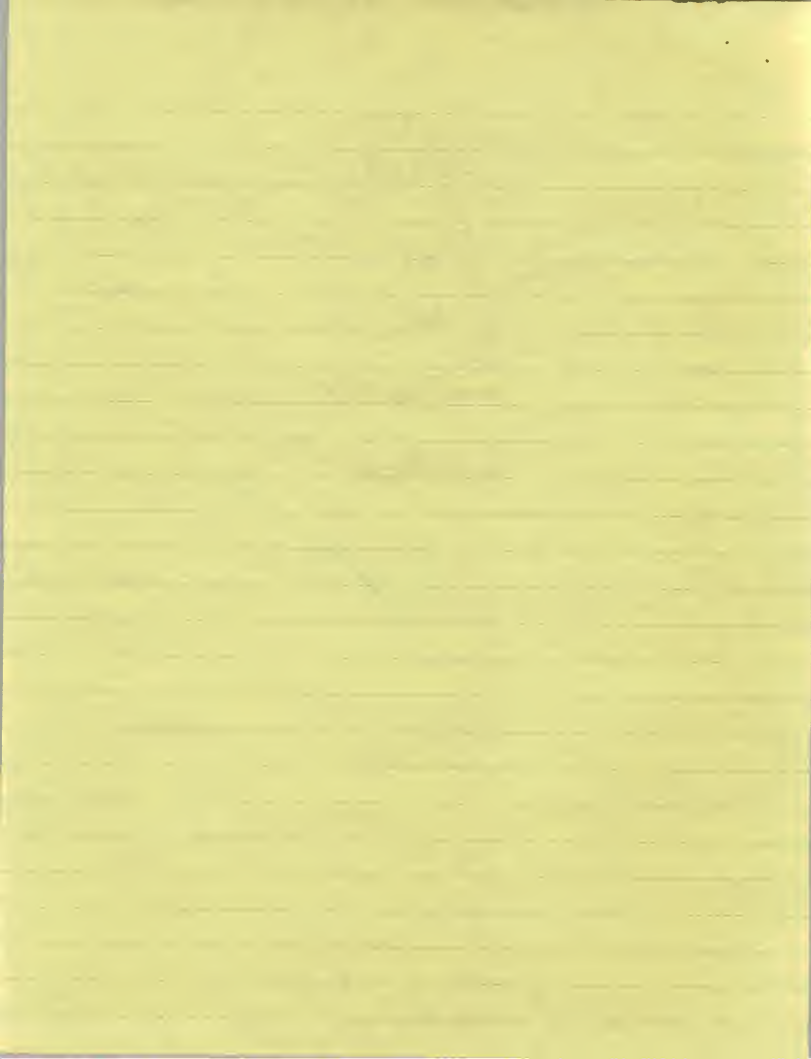
- Ensure Common Goals
- Train Staff
- Use Unique Skills
- Develop Disaster Plan
- Make Investment





Recommendations to Vendors
~~Vendors of Tools~~
Management Tools

- Simplify products
 - Comprehensive Training
 - Emphasis on Solution Explorer
 - Senior Management Sale
- 



Recommendation to Vendors Service and Support

- Develop Relationships
- Ensure Interconnectivity
- Emphasize Support Assistance
- Simplify products
- Adhere to Standards

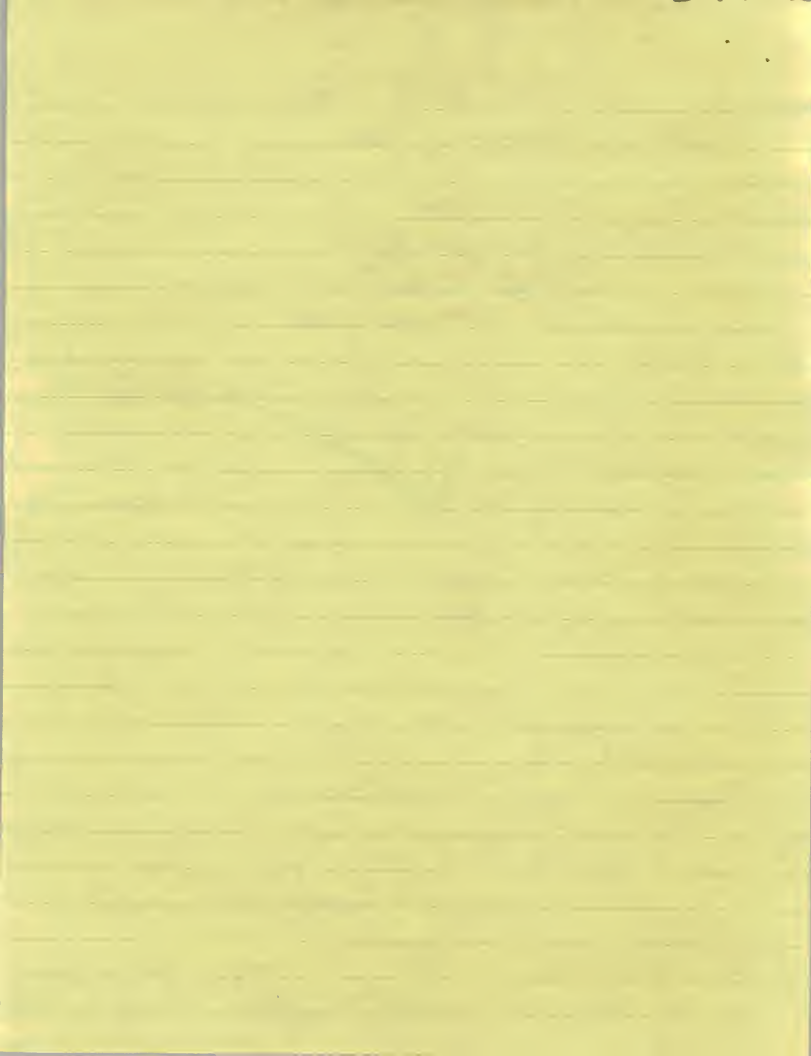




Recommendation To Vendors Managed Networks

- Sell Higher
- Show Cost Benefits
- Obtain Broad Knowledge
- Bridge Management Gaps.

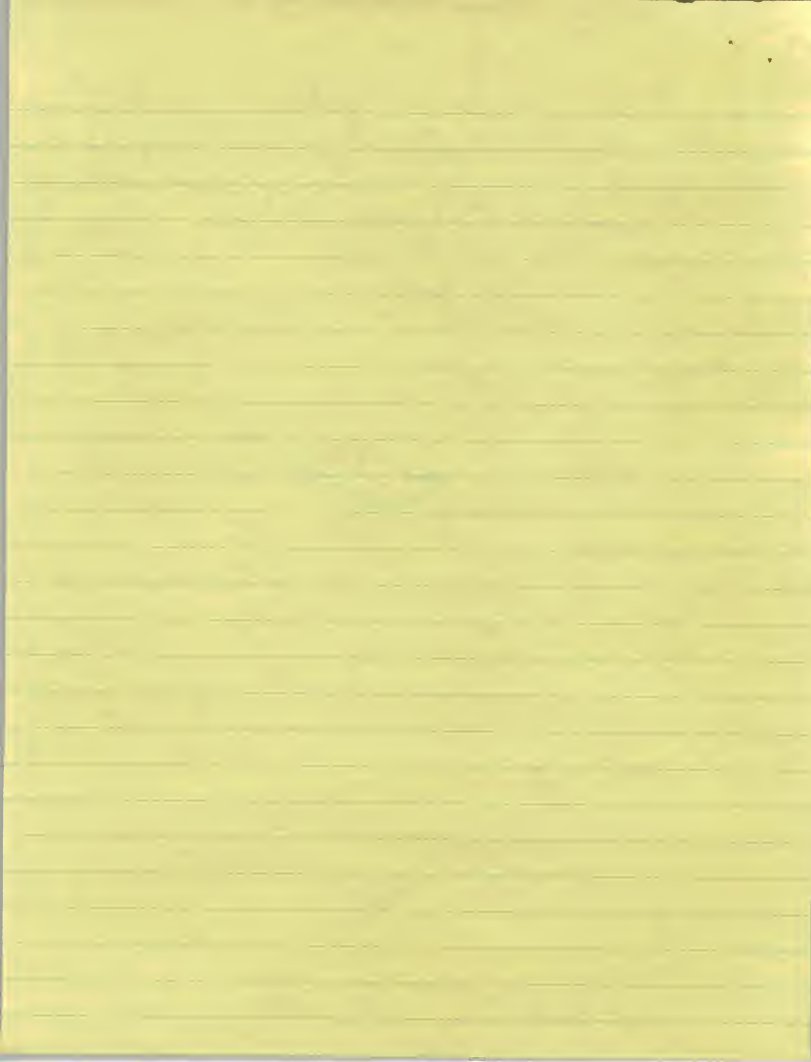




Recommendations to Vendors
Consulting Services

- Relate at all levels
- Provide Broad Coverage
- Become expert
- Price Creatively





Recommendations to Vendors Training

- Relate to all users
- Medium/Small equipment
vendor advice
- Self-paced learning element

Areas of Explosive materials:

- Management principles
- Return

