CHANGING ROLE
OF THE
CORPORATE INFORMATION SYSTEMS OFFICER

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I/S managers hardly need to be told that their world is changing. Change is everywhere -- a harsher, more competitive business environment; rapidly evolving information technology; and increasingly knowledgeable, demanding, and diverse user constituencies. The problem for I/S managers is not one of acknowledging change; it is one of adapting to it successfully. The purpose of this paper is to report on a recent research effort that describes the adaptation made by Corporate Information Officers (CIOs). The results of this research suggest that our sample of CIOs, among the most successful in the industry, are rapidly developing a new role for themselves -- one that is radically different from the traditional role of the I/S Manager.

In describing this new role of the CIO, we shall draw upon two types of material:

First, a set of predictions about the changing nature of the I/S function and the role of the CIO.

Second, findings from the CIO research, designed to test the validity of the predictions.

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I. THE CHANGING WORLD OF THE CIO: PREDICTIONS

While CIOs have coped, some more successfully than others, with the changes in their world during the last several years, researchers and consultants have attempted to understand and describe these changes. Some strong perspectives have emerged on the direction that leading-edge organizations have been taking. It is useful, therefore, to summarize several of these perspectives as a backdrop to our research findings.

Richard Nolan (1), for example, has suggested that I/S is currently in a period of "technological discontinuity" as it makes the transition from traditional "DP technology" (characterized by mainframe computers and common software under the control of a centralized data processing organization) to a new user-dominated technology. Just as the traditional DP technology has its own "learning curve" (which provided the basis for Nolan's original description of the stages of DP growth (2)), so does the newer, user-dominated technology. The complexity of the current I/S environment is caused by the discontinuity and change associated with the transition from one learning curve to another.

Nolan and others who have participated in his research, identify several implications for I/S management:

- The "computer" infrastructure of organizations will shift dramatically to the new user-dominated technologies.
- Senior management is looking to Corporate I/S for leadership in making the transition across learning curves.
- Companies are being forced to shift from "narrow DP planning" to "enterprise wide Computer Architecture

planning".

As Nolan points out, a major issue for companies as they pass through this "window" of technological discontinuity is one of leadership--effective management of the transition from traditional technology to the user-driven technologies.

Benjamin[3] draws upon Nolan's framework, but is more specific about the types of changes or discontinuities that I/S is experiencing as it moves from one technology to the other. He describes five discontinuities:

- There is a powerful trend in the direction of greater distribution and complexity of processing environments in all major organizations today. This trend will increase in velocity with the introduction of newer, lower cost, and more powerful technologies.

- Unprecedented user demand has been generated by the explosive growth in workstations, available software packages, and easy-to-use languages. This demand is now driving I/S resource management when previously I/S managed the resource by controlling its supply.

- New ways of developing systems--where the user can develop and operate many applications himself--are radically changing the power balance between I/S and the user organizations.

- In contrast to the communications task of the 70's--the connection of workstations to specific applications on mainframes-- the communications task of the 80's is much

more complex. It consists of interconnecting a range of applications to a single workstation, interconnecting the hierarchy of processing environments, and making data bases accessible wherever needed in the organization.

- In the long run of most fundamental significance, is the realization that I/S has become a factor in business strategy. Today's information technologies, coupled with advances in data communications, have made information systems a weapon to be considered in the fight for competitive advantage. Accordingly, I/S management must develop an outward business-strategy perspective in addition to its traditional operational focus.

Other authors, Rockart, Bullen and Ball[4] (subsequently referred to as RBB) emphasize an evolving staff orientation for I/S management -- and in particular for the CIO. Drawing upon the combined thinking of a group of successful CIOs and established researchers in the field, they theorize about the evolving CIO role.

The new CIO role, as RBB envision it, is developing in response to the powerful forces generated by the trends and discontinuities discussed above. The result is not only a different role for the CIO, but a new set of requisite managerial attributes for the individuals in that role. More specifically, RBB make three "predictions" regarding the emerging role for the CIO:

- He will manage the decentralization of most of his former line responsibilities to divisions and departments.
- His management style will be staff rather than line oriented.
- He will assume clear responsibility for information resource policy and strategy.

Each of these predictions is described in more detail below:

A. Decentralization of line responsibilities to divisions and departments.

The new business environment will make it impossible for the CIO to maintain direct line management control over computer-based technology throughout the company. Accordingly, "line management of local hardware and much of the software development will be thrust into divisions and departments"(5).

Nonetheless, the CIO will necessarily retain direct, line responsibility for several critical areas associated with the information "infrastructure" of the firm. These areas will include the communications network, corporate data management, common software development (including a changing array of start-up projects), and the corporate computing facility.

B. Staff orientation

The new emphasis on staff-oriented responsibilities will result in the need for organizations to have a "focal point"

for planning and facilitating the organization's move into the "information era" (or, in Nolan's terminology, into the Advanced Stages of user-dominated technologies).

The CIO will increasingly focus on strategies and planning. He/she will be oriented towards facilitating, guiding, and promoting change -- but will not control it. Techniques which will be utilized by the CIO to guide, facilitate and promote will include: communication and education processes, standards (e.g., for data, communication, privacy and security), and other indirect controls (e.g., steering committees, policies, and guidelines, and individual persuasion). Rather than being the "owner" of a centralized I/S technology, the CIO will become the "gate-keeper" and "integrator" of an increasingly diverse spectrum of technology resources which will be decentralized throughout the firm.

C. Corporate responsibility for information resource policy and strategy

Increasingly, the CIO will be a member of the top management team. He will have broad responsibility for developing policy and strategy for the information resources of the firm, just as the CFO (Chief Financial Officer) has similar responsibility for the financial resources of the firm.

This clearly suggests that the CIO will not simply be the "custodian" of the data. Rather, he or she will be the corporate officer who truly understands the interconnection of the information flow to the business. The CIO will have "the responsibility of assuring that new opportunities

presented by the technology are seized and that capital expenditures for information resources are ranked according to business needs."(6)

These predictions describe a radically different role for senior I/S management, and in particular for the CIO, than that performed by the traditional I/S manager.

If these predictions are true, RBB suggest that the emerging role for the CIO will require a set of managerial skills and attributes which -- though useful to the I/S executive in the past -- will be absolutely critical in the future. It will not be enough that the CIO have a considerable understanding of the technology. In addition, the CIO must be a general business oriented manager with considerable political, organizational, and communication skills.

II. RESEARCH ON THE CIO ROLE

RESEARCH MODEL

The CIO model developed by Rockart, Bullen and Ball, was developed to identify a range of issues associated with the transitional management of the I/S function in the 1980's. In particular, the predictions about the emerging CIO role and the associated managerial attributes for this role were intended to assist practicing CIO s in adapting successfully to a radically changed environment.

Although these predictions may be helpful, their practical value is limited until tested and validated by the actual experiences of successful CIOs in a variety of corporate environments. Our research on the emerging role of the CIO was thus undertaken to determine whether these predictions are, in fact, borne out by the actual experiences of successful CIOs in large corporate environments.

Our research model was exploratory and designed to provide some validation for the conclusions of the RBB CIO paper. Our sample was small but of very high quality. A questionnaire was sent to approximately 25 CIOs in a variety of large U.S. and Canadian corporations, of whom 20 (in a few instances their chief aides) responded. Because most of the CIOs have had a long term connection as sponsors of the Center for Information Systems Research (CISR), at the Sloan School, MIT, we were able to place high confidence in the care they took in responding to the

survey. As a further step in eliminating ambiguities, the survey results were reviewed with most of the respondees at a CISR workshop in May of 1983.

The research focused on five areas of interest:

- Reporting relationships
- Corporate I/S budget
- Critical responsibilities
- Importance of selected I/S initiatives
- Organization of I/S functions and activities

The respondees are representative of large corporations in a variety of business sectors. As summarized in Exhibit 1, the companies are spread across several different industries, with the preponderance falling in manufacturing. Annual sales for these organizations are sizeable, as shown in Exhibit 2. Expenditures for the I/S function in these companies are considerable; the responses, summarized in Exhibit 3, indicate that 60% of the companies expend at least $100 million annually.

RESEARCH FINDINGS

The three hypotheses by Rockart, Bullen & Ball cited earlier in this paper were made about the changing role of the CIO. Our research was undertaken to test these predictions, to determine whether or not they are validated by the day-to-day experiences of practicing, successful CIOs. Accordingly, we will discuss the findings of this research in the context of each prediction. Our results are not to be treated as "gospel". The research was exploratory in nature, oriented toward a first-cut understanding of an important area of knowledge for the information systems

community and its management, and not toward conclusive results. Our sample is far from random, and it is not large enough for meaningful statistical work. Yet we believe the results are interesting, indicative of some important trends, and provide interesting future direction for research.

A. Decentralization of Line Responsibility

It is now virtually impossible for the CIO to maintain direct line management control over the proliferating computer-based technology in the company. As a result, it was predicted that line management of local hardware and much of the software development will be thrust into divisions and departments. At the same time, however, it was also predicted that the CIO and corporate I/S would retain certain residual line responsibilities that are primarily associated with developing and maintaining the "information infrastructure" of the corporation. We found evidence to support this trend toward decentralization of line responsibility for I/S in two areas of our research: the distribution of line I/S activities to subsidiary I/S organizations, as well as to user management, and the changing size and composition of the corporate I/S budget.

(1) Distribution of line activities to subsidiary I/S units and user management

Results from the CIO questionnaire indicate that a decentralization of line activities from corporate I/S is definitely taking place. CIOs were asked to indicate the location of responsibility -- corporate I/S, subsidiary I/S

groups, or user management -- for an extensive list of staff and line activities, grouped into 4 general I/S management functions (planning, managing, I/S internal services, and I/S user services). Exhibit 4 presents a percentage distribution of these activities, highlights all activities where the CIOs were at least 60% agreed on whether the activities are currently located in corporate I/S or distributed to subordinate I/S or user functions, and indicates whether the corporate activities are line or staff. The data shows clearly that major elements of line responsibility have been distributed to subsidiary I/S groups and user management for the development and operation of application systems.

Consistent with the prediction, subsidiary I/S units are identified as having primary responsibility for the line management of hardware and software. Specifically it is generally agreed by the CIOs that subsidiary I/S units are responsible for operation of mainframe and minicomputer hardware, selection and maintenance of applications software, and implementation of the system life cycle, as well as implementation of end-user support. In addition they are seen as having the responsibility for such line planning functions as budgeting (multi-year and annual) and architecture design for applications (as contrasted with architecture design for hardware and data base, where the CIOs are split about even on the issue of accountability).

In spite of this significant pattern of decentralization, some

key line activities are not distributed to subsidiary I/S units and user management. Most of these activities, as predicted, are either associated with developing and maintaining the information utilities that constitute the I/S infrastructure for the firm; a major role in voice and data telecommunications; or the development of corporate wide applications (we did not include corporate applications in this question, but responses to CIO critical responsibilities in Appendix 1 indicated clearly that this was thought to be a corporate I/S responsibility), such as payroll/personnel or accounting systems. In addition, however, they identified line tasks in support of the corporate staff such as executive support systems.

There were a number of activities that the data did not identify clearly as corporate or distributed. These also are shown in Exhibit 4, (those on lines with no shaded boxes). These activities generally are associated with new evolving technologies: telecommunications, personal computers and office systems, and activities where the transition to decentralized operations is still evolving, e.g., applications planning.

The distribution of responsibilities is a general trend that has been focused on movement between corporate and subsidiary I/S. Some movement of responsibilities is taking place as well between subordinate I/S and user management. This is shown in Exhibit 5 where those activities that at least 30% of the CIOs perceive user management to be responsible for are displayed. These emphasize a heavy user management role in applications, office and personal computers and external data bases and

timesharing.

Questionnaire results regarding the distribution of responsibilities generally support the prediction that line responsibility is being decentralized from corporate I/S to subsidiary I/S groups and to user management. Further these results also suggest that the responsibilities which do remain with the CIO and corporate I/S are associated with the information infrastructure of the firm, whether it be in the form of information utilities, e.g., telecommunications, or the implementation of corporate systems. Although these results come from a sample of very large companies subsequent conversations with many other companies of varying sizes indicate that the distribution of I/S responsibility is a pervasive trend today.

(2) I/S Budget

In addition to the questionnaire focus on allocation of line responsibilities, CIOs were asked to indicate the percentage share of the entire I/S budget that is under their direct control -- both at present and estimated for three years in the future. In addition, they were asked to indicate the percentage of their budget which is dedicated to "service utilities" like data centers, corporate applications, systems programming, and voice or data telecommunications. The premise in asking for this budget information was that size of budget -- and the trend over the next three years--would corroborate, or weaken the CIOs' own stated perceptions of their line/staff relationships.

The results of these budget-related questions, graphically

represented in Exhibit 6, suggest that corporate I/S is playing a less dominant role than it has in the past--and that this trend will continue, in terms of overall expenditures, in the future. The average corporate-controlled I/S budget in the 20 firms is only 48% of the entire I/S expenditures in the firm; in the next three years, additionally, it is expected to drop to 44%. Corporate I/S does not, therefore, even today, control the majority of I/S expenditures for the firm. These figures are consistent with the specific line/staff trends discussed in(A1) above.

B. Increasing Staff Orientation

CIOs are predicted to concentrate increasingly on staff-oriented activities. This new orientation to staff responsibility is dictated by the organization's need to have a focal point for planning and facilitating the organization's move into the "information era." As the "gatekeeper" for new technology, the CIO will play an increasingly prominent role in long-range planning, corporate information strategy, communication and education ofthe potential of I/S technology, as well as the development of standards that will guide others throughout the organization in the use of that technology.

(1) Critical Responsibilities of the CIO

In order to test this prediction of increased staff orientation, CIOs were asked to describe their few most critical responsibilities. An average of 3 responsibilities was provided by each CIO. In addition, they were asked to indicate how they felt these responsibilities would be different three years from

now. Our concern in both of these questions was to determine whether these critical responsibilities were primarily staff or line oriented.

The CIO responses, summarized in Exhibit 7, clearly indicate that staff responsibilities are predominant in both instances. Of the 62 responses for current critical responsibilities, 41 (or 66%) fall into categories that are staff-oriented; only 21 (or 34%) can be classified as line responsibilities. Further, to the extent that the CIOs anticipate change in the next three years, most CIOs responded in a manner that was even more heavily weighted in favor of staff-oriented categories (13 of 15 responses, or 87%). (See Appendix I for a complete listing of the CIO responses to these questions.)

The current line responsibilities that are cited by the CIOs may be organized into three categories. The first, creating and maintaining information utilities, reflects the residual line activities that were identified earlier. Responsibilities cited by CIOs included, for example, "manage the corporate-wide computing center," "world-wide networks and data," and the like. The other two categories of line responsibility are associated with the direct provision of information services, either at the corporate level exclusively (e.g., "operations of corporate systems," "provide end-user computing environment for corporate," etc.), or for the organization as a whole (e.g., "develop/maintain administrative systems on a worldwide basis," " total responsibility for data processing operations and systems development," etc.)

Within the current staff activities, planning responsibilities are particularly prominent: over 40% of the staff-oriented responsibilities are associated with technology planning (e.g., "information architecture," " evaluate new technology and determine how it will be effective for our organization",, etc.), or " I/S Strategic Planning" (e.g., linkage to the strategic plan of the corporation), "provide direct support to corporate goals and strategic planning," etc.). Although the preponderance of responses in the strategic planning category reflect an emphasis on supporting business strategy, only two responses emphasized a responsibility to influence the strategy of the firm (e.g., "influence product strategy," and, "increase use of computer as tool to increase productivity/profitability of the corporation)".

In addition to the planning responsibilities, CIO responses also emphasized such traditional staff current functions as consultation and support (e.g., "provide consulting arm to operating company CEOs," "establish end user computing and information management," " advise and guide effective utilization of computer and telecommunications technologies," etc). These comprise over a third of the staff-oriented responsibilities identified by the CIOs. In addition, the CIOs felt that the category of consultation and support was going to be significantly more important in the future.

The remaining current critical responsibilities identified by the CIOs fall into the staff-oriented categories of human resource management (e.g., "attract, retain, and develop talent," "develop competent people for key jobs in affiliates") and literacy or

education on I/S technology (e.g., "see to it that company is trained in computer technology," "educate key executives on possibilities," etc). The human resource category of responsibilities represents a rather traditional staff function. However, the responsibilities associated with fostering a growing literacy and understanding of I/S technology represents an emerging need in these organizations to understand and communicate the rapidly changing potential for operational efficiency and business effectiveness.

The CIOs view of his critical responsibilities three years from now is little changed from today (see Appendix IA). He sees his consulting activities and his planning activities more focussed in the future, identifying nine additional consulting activities and four additional planning activities.

The staff oriented picture of the CIO's role that is developed out of the list of his critical responsibilities is consistent with the data that describes the distribution of corporate I/S activities to subordinate I/S and user management. Inspection of Exhibit 4 shows that the residual activities left under Corporate line up well with the staff activities described above.

What emerges from this aggregated listing of critical responsibilities, both at present and as anticipated for the future, is a rather sharply defined picture of the CIO as a high-level manager who is primarily concerned with issues of long-range planning (both technical and business-oriented) consultation, and support to a wide-ranging set of constituencies throughout the organization. In addition he is responsible for

educating others to the tremendous potential of information technology for the complex business needs of the firm. This picture clearly stresses an increasingly significant staff orientation, and supports the original prediction, at least in the eyes of those polled, that the CIO will become the focal point for planning and facilitating the organization's move into the information era.

C. Corporate Responsibility for Information Resource Policy and Strategy

RBB also predict that the CIO will increasingly be found among the top-management team, with broad responsibility for developing policy and strategy regarding the information resources of the firm. There are two areas of research results that relate to this suggestion of increased corporate responsibility for information resource policy and strategy.

(1) Reporting Relationships

In order to gauge CIO standing in the corporate hierarchy, CIOs were asked to indicate their reporting relationship to other top managers, particularly the CEO. The results of this question are summarized in Exhibit 8.

These results suggest two significant findings:

> First, the CIO is clearly becoming an integral part of the top-management team. Sixteen of the 20 CIOs surveyed are positioned within two levels of the CEO -- and four of them (20%) report directly to the CEO -- leaving a relatively small minority that are placed three or more levels down in

the organization. This finding, more than any other single result from our research process, may signal the "coming of age" of I/S management; no longer is the chief manager of the I/S function buried midrange on the organization chart.

The CIO reporting relationship is today generally outside what had been the traditional reporting pattern for I/S executives--through Finance. Sixteen out of 20 of the CIO's report outside of Finance (e.g., Operations, Engineering, Chief of Staff). These organizational reporting paths are very consistent with the culture of the organization. To cite one illustration, the CIO of a major chemical corporation with a strong research and engineering tradition reports to the Senior VP of Research and Engineering.

(2) Importance of Selected I/S Initiatives

CIO's were asked to rate the importance of selected I/S initiatives (specific areas requiring his concentrated attention) from a scale of 1.."little importance to me as CIO," to 5.."critical to my success as CIO," both now and 3 years in the future. The mean ratings for each of these initiatives and the standard deviation is shown graphically in Exhibit 9, and in tabular form in Appendix II.

The three initiatives rated most important by the CIOs were end user services, telecommunications and corporate strategy. CIOs have some confusion about the importance of end user services in the short term (note the large standard deviation), but little uncertainty about its importance in the long term. CIOs also

place considerable importance on initiatives in the areas of office systems, and personal computers, which are special forms of end user services.

The CIOs see application selection as growing less important to them over time, and given the fact that only 11 out of the 20 companies surveyed (manufacturing and petrochemicals) are in industries where CAD/CAM is significant, they give it considerable importance as an initiative.

Directional change in initiatives is consistent with the predictions in section 1. Application selection will be of lower concern as the CIO distributes his responsibility, and telecommunications and corporate strategy will be of increasing concern as the CIO consolidates his staff role. (The CIOs are much clearer about the importance of participating in corporate strategy in this section on initiatives, than in the previously discussed section on critical responsibilities.) It is interesting to note that the three-year-out view of end-user services, telecommunications and corporate strategy initiatives have little dispersion about them, indicating that the CIOs have a consistent sense of where they are heading.

III. THE CHANGING ROLE OF THE CIO: CONCLUSIONS, AND FUTURE RESEARCH

This research survey conducted with 20 CIOs from major companies provides strong evidence that a changed role for the Chief Information Officer is winning acceptance in major corporations. This confirms the specific predictions made by Rockart, Bullen and Ball, and the more general predictions of Nolan and Benjamin. Of most importance to the I/S executive and to senior management is that the pace of this change is faster than was anticipated. It was predicted to be transitional through the end of the decade, but in fact describes the reality for many leading companies today. Specifically:

A. The distribution of corporate I/S activities to subsidiary I/S and user management is proceeding rapidly. Our research demonstrates this from both a budgetary and from a functional point of view. CIOs are concentrating their line activities where interconnection is required -- corporate wide applications, the corporate data network, and managing corporate data.

B. The CIO as evidenced by his responses accomplishes his primary goals through staff activities. These goals are moving the organization into the "information era" that has been enabled by the highly cost effective information technologies available.

C. The CIOs are proactive executives who in general report

to the CEO or one level below him and are aligned through their reporting relationships to the strategic and operational elements of the business. Their strongest personal initiatives are in areas of strategic importance: end user computing, telecommunications, and strategic planning, (linking I/S to the business, and gaining competitive advantage through use of information technology)

As will all exploratory research, the examination of the data and conclusions raises a number of interesting research questions. The most significant to the authors are:

- To what extent is the pattern of distribution of the I/S function described in this paper related to the size of the companies in the sample (which were very large), to the type of industry, and to organizational cultures?
- To what extent will the distribution of responsibility from subordinate I/S to user management follow the pattern of distribution of responsibility from corporate to subordinate I/S?

In concluding this research report we have one final comment to make. The trends appear strong, and I/S organizations that do not take them into account may encounter significant difficulty in coping with the transitional changes of the '80's. However the implementation of change must proceed in ways that are correct for each organization and its culture.

REFERENCES

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(3) Benjamin, Robert I, Managing Through a Decade of Discontinuity; Information Systems News; August 22 1983, p.20

(4) Rockart John F, Bullen Christine V, Ball Leslie; Future Role of the Information Systems Executive; MIS Quarterly; Special Issue, December 1982.

(5) Op. Cit. p.4

(6) Op. Cit. p.5.

EXHIBIT 1

BASIC COMPANY INFO: INDUSTRY

CATEGORY	NUMBER	%
Manufacturing	9	45
Banking	3	15
Insurance	2	10
Petrochemical	2	10
Government	1	5
Other	3	15
TOTAL	20	100

EXHIBIT 2

BASIC COMPANY INFO: REVENUES

CATEGORY	NUMBER	%
$.5 to $5 Billion	9	45
More Than $5 Billion	10	50
N/A (Government)	1	5
TOTAL	20	100

EXHIBIT 3

BASIC COMPANY INFO: I/S BUDGET

CATEGORY	NUMBER	%
$10-50 Million	6	30
$50-100 Million	2	10
More Than $100 Million	12	60
TOTAL	20	100

EXHIBIT 4

DISTRIBUTION OF I/S ACTIVITES
(Shown in %'s)

ACTIVITY	CORPORATE I/S	SUBSIDIARY I/S	USER MANAGEMENT	NO ONE RESPONSIBLE
PLANNING FOR THE I/S FUNCTION				
• I/S Strategic Planning	72	28		
• *I/S Multi-year Budgets or Project Plans*	*33*	*67*		
• *I/S Annual Budgets or Project Plans*	*33*	*55*	*12*	
• **Technology Scanning/Anticipation**	**83**	**17**		
• *Architecture Planning*				
a. *Hardware*	*45*	*55*		
b. *Database*	*50*	*50*		
c. *Applications*	*27*	*55*	*18*	
• *Application Portfolio*				
a. *Plan*	*12*	*55*	*33*	
b. *Prioritize*	*11*	*11*	*78*	
MANAGING THE I/S FUNCTION				
• Mainframes/Mini				
a. *Selection*	*45*	*55*		
b. **Approval**	**61**	**28**	**11**	
c. **Standards**	**83**	**17**		
d. *Operations*	*28*	*72*		
• Personal Computers				
a. *Selection*	*33*	*17*	*50*	
b. **Approval**	**44**	**22**	**34**	
c. **Standards**	**56**	**22**	**11**	**11**
d. *Operations*	*4*	*4*	*94*	*4*
• Telecommunications/Voice				
a. *Selection*	*50*	*28*	*22*	
b. **Approval**	**65**	**11**	**24**	
c. **Standards**	**61**	**17**	**11**	**11**
d. *Operations*	*39*	*22*	*33*	*6*
• Telecommunications/Data				
a. *Selection*	*55*	*45*		
b. **Approval**	**88**	**12**		
c. **Standards**	**83**	**17**		
d. *Operations*	*55*	*33*	*6*	*6*

▨ = ≥ 60% Agreement

Italics = *Line*

Bold = **Staff**

EXHIBIT 4

DISTRIBUTION OF I/S ACTIVITES
(Shown in %'s)

ACTIVITY	CORPORATE I/S	SUBSIDIARY I/S	USER MANAGEMENT	NO ONE RESPONSIBLE
MANAGING THE I/S FUNCTION (Contd)				
• Office Systems				
a. *Selection*	*47*	*17*	*36*	
b. **Approval**	**55**	**17**	**29**	**6**
c. **Standards**	**55**	**29**	**17**	**6**
d. *Operations*	*6*	*12*	*76*	6
• Systems Life Cycle				
a. **Standards**	**61**	**33**	**6**	
b. *Implementation*	*21*	*67*	*12*	
• Applications Software				
a. *Selection*	*28*	*50*	*22*	
b. **Approval**	**39**	**28**	**33**	
c. **Standards**	**55**	**45**		
d. *Maintenance*	*31*	*67*	*12*	
• **National/Multinational Vendor Contracts**	**75**	**12**	**12**	
• **Security/Privacy Standards**	**70**	**12**	**12**	
I/S INTERNAL SERVICES				
• **Consulting Services/Technical Expertise**	**71**	**29**		
• **I/S Personnel Management**	**53**	**41**	**6**	
• **Education/Training of I/S Personnel**	**47**	**53**		
• **Information Exchange**	**88**	**6**	**6**	
I/S USER SERVICES				
• I/S Education				
a. **Senior Management**	**66**	**17**	**17**	
b. **Line Users**	**61**	**27**	**12**	
• *End User Support*	*33*	*67*		
• ***Executive Support***	***72***	***28***		
• *Office Systems*	*41*	*47*	*12*	
• *External Data Bases*	*12*	*35*	*53*	
• Timesharing				
a. *Internal*	*63*	*31*	*6*	
b. *External*	*12*	*18*	*64*	*6*
• *Implementation of Common Systems*	*50*	*22*	*11*	*11*

▨ = ≥ 60% Agreement

Italics = *Line*

Bold = **Staff**

EXHIBIT 5

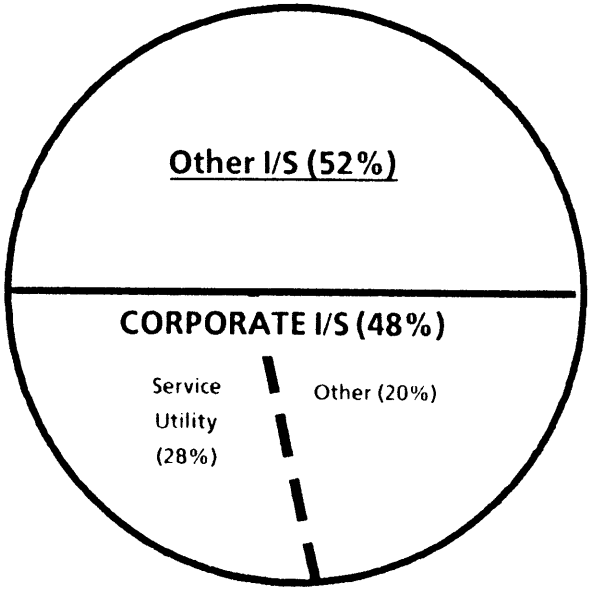
USER MANAGEMENT RESPONSIBILITIES
GREATER THAN 30% PERCEPTION BY CIO'S
(For Detail See Appendix 1)

APPLICATION PORTFOLIO	
Plan	33%
Prioritize	78%
PERSONAL COMPUTERS	
Selection	50%
Approval	34%
Operations	84%
TELECOMMUNICATIONS VOICE	
Operation	33%
OFFICE SYSTEMS	
Selection	36%
Operations	76%
APPLICATIONS SOFTWARE	
Approval	33%
EXTERNAL DATA BASES	53%
EXTERNAL TIME SHARING	64%

Exhibit 6

I/S BUDGET DISTRIBUTION: CURRENT, IN 3 YEARS

CURRENT I/S BUDGET
(Corporate-Wide)



I/S BUDGET IN 5 YEARS
(Corporate-Wide)

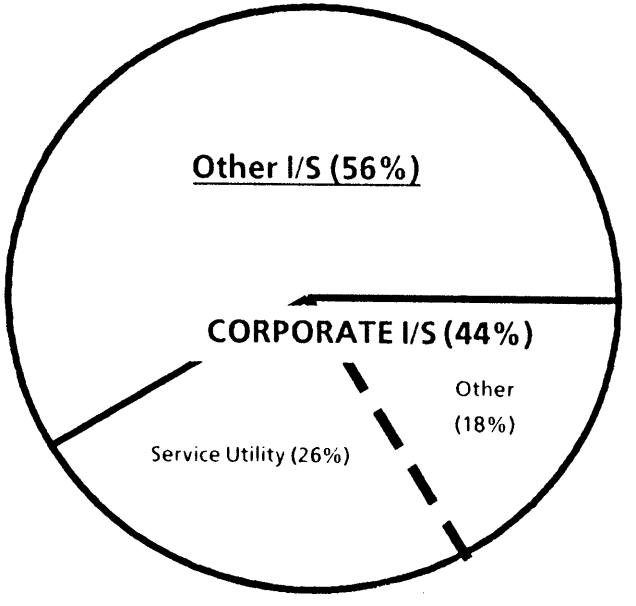


EXHIBIT 7

CRITICAL LINE AND STAFF RESPONSIBILITIES OF CIOs: CURRENT AND FUTURE

(See Appendix I For Detail)

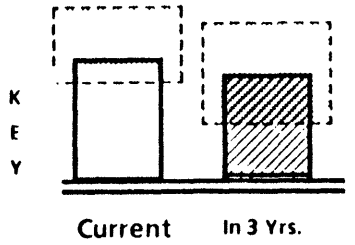
LINE RESPONSIBILITIES	CURRENT FREQUENCY	FUTURE CHANGE	STAFF RESPONSIBILITIES	CURRENT FREQUENCY	FUTURE CHANGE
1. Create/maintain information utilities	7	+ 2	1. Technology planning	6	+ 1
2. I/S services, organization-wide	6	---	2. I/S strategic planning	12	+ 3
3. I/S services, corporate	8	---	3. Literacy/education on information technology	6	---
			4. Human resource management	3	---
			5. Consultation/support	7	+ 9
			6. Standards/control	6	---
TOTAL, current responsibilities	21 (34%)			40 (67%)	
TOTAL, future change (projected)		+2 (13%)			+13 (87%)

EXHIBIT 8

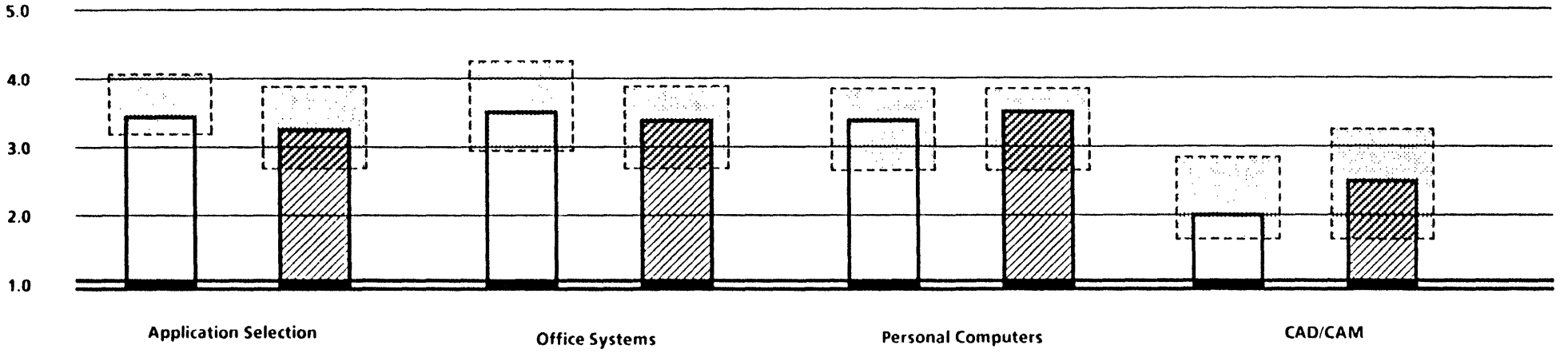
REPORTING RELATIONSHIP OF CIO

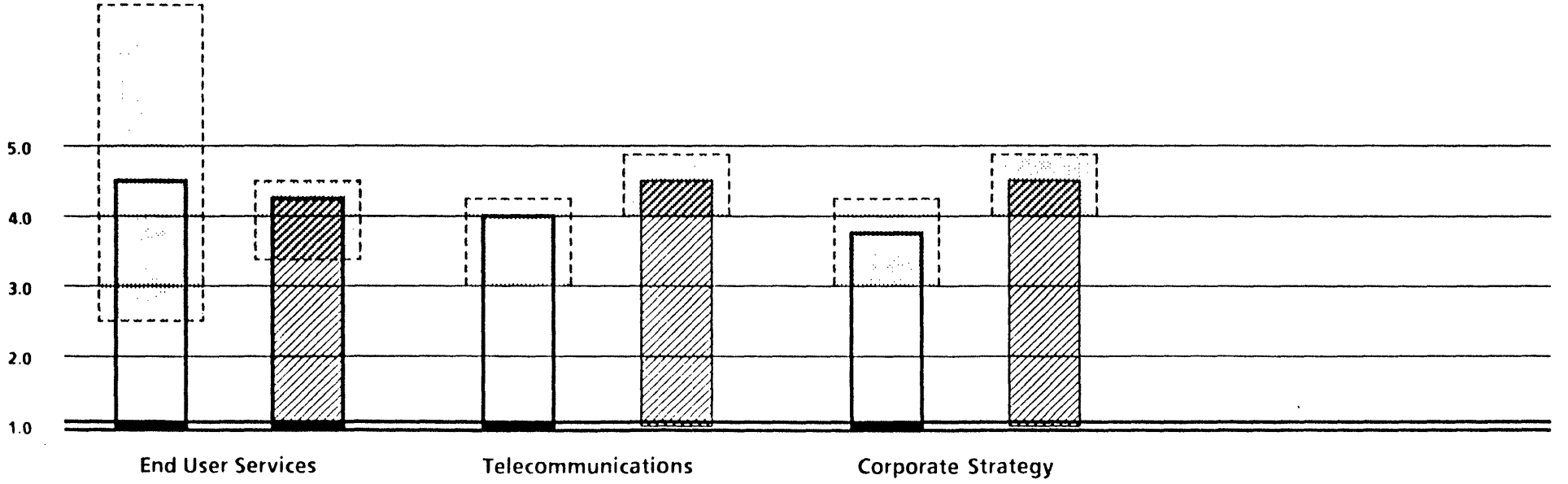
LEVELS FROM PRESIDENT/CEO

LEVEL	REPORTS TO FINANCE	REPORTS TO OTHER	TOTAL
1	N/A	4	4
2	4	8	12
3 or more	0	4	4
	4	16	20



IMPORTANCE RATINGS FOR MAJOR I/S INITIATIVES CURRENT, IN 3 YEARS





CRITICAL RESPONSIBILITIES OF CIO
(As Perceived Today)
LINE RESPONSIBILITIES

1. Create/Maintain Information "Utilities"

- o manage corporate-wide computing center
- o operations of corporate data centers and centralized information systems
- o voice communication
- o telecommunications
- o world-wide networks and data
- o effective presentation of data ("information on a corporate-wide basis")
- o systems and programming services

2. I/S Services: Organization-wide

- o develop/maintain administrative systems on world-wide basis
- o data processing services
- o manage selective cost-effective info-related services
- o delivery of cost-effective integrated info-processing services to other operating companies of the corporation
- o deliver new products without disrupting stability of operating systems, at less cost and in shorter timeframes
- o total responsibility: data processing operations and systems development

3. I/S Services: Corporate Offices

- o operations of corporate systems
- o provide corporate management's I/S
- o create EU computer environments for corporate users
- o develop and maintain information center for firm use
- o provide I/S to corporate headquarters
- o select corporate equipment for central office use
- o perform studies for President
- o support corporate management through special projects

STAFF RESPONSIBILITIES

1. Technology Planning

   - o information architecture
   - o safe-keeper of technical priorities
   - o derive economies of scale in computers and telecommunications technologies
   - o exploit technology
   - o evaluate new technology and determine how it will be effective for our corporation
   - o identify and integrate I/S technology into all aspects of business

2. I/S Strategic Planning

   - o develop I/S strategic plan for corporation
   - o manage evolution of compatible internal information services to support business needs
   - o strategic planning -- support business areas
   - o corporate systems planning
   - o provide direct support to corporate goals
   - o establish and maintain high quality service in support of business
   - o develop short- and long-term I/S plans
   - o increase use of computer as tool to increase productivity/profitability of corporation
   - o influence product strategy
   - o provide technical solutions to business problems
   - o principal overseer of ADP planning and development (I/S policy, long-term goals, priorities)
   - o merge long-term business direction (strategies) with long-term technical directions

3. Information Technology Literacy/Education

- o see to it that company is trained in computer technology
- o coordinate personnel interchange and executive development activities
- o coordinate and develop computer and communication services education
- o insure people within and without MIS are aware and trained
- o educate key executives on possibilities
- o communicate to key execs possibilities I/S can provide

4. Human Resource Management

- o ensure key I/S execs in line jobs
- o talent: attract, retain, develop
- o develop competent people for key jobs in affiliates

5. Consultation/Support

- o assist and support SBUs to achieve effective I/S
- o corporate d.p. organization to support operations of corporation
- o assist SBUs in the development of systems
- o establish end user computing and IR management
- o support to application development in SBUs
- o advise and guide effective utilization of computer and telecommunications technologies
- o high quality advice to senior management

CRITICAL RESPONSIBILITIES OF CIO
(As Perceived In 3 Years)

1. **Line Responsibilities**

   - o additional "administrative" areas (e.g., printing, mail distribution, document storage).
   - o merge voice communications into DP organization.

2. **Staff Responsibilities**

   a. Consultation/Support

   - o much broader EUC capability.
   - o more emphasis on user consultation -- assisting them to use computers in their work.
   - o more emphasis to support end user self-sufficiency.
   - o continued growth of EUC.
   - o increased emphasis on I/S support, EU facilities, engineering computing.
   - o more decentralization of DP services, systems and programming services: matrix management.
   - o emphasis will change from strategic plan development to execution.
   - o intensify productivity as a result of competitive pressures and emerging technologies.

   b. Planning

   - o more emphasis on identifying business areas/operations that can be significantly impacted by computer-based technology.
   - o move away from operations and towards planning, control, and integration.
   - o DP involved in total office -- all technologies.
   - o more emphasis on linking to business strategy.

6. Standards/Control

- o supply functional direction to SBU MIS departments.
- o give professional opinion on unit MIS activities.
- o achieve control of corporate information resources (people, data, equipment).
- o provide aggressive functional leadership.
- o functional control over dp planning and stds.
- o ensure that systems development is perceived as well-planned "in control."

APPENDIX II

IMPORTANCE OF I/S INITIATIVES: MEAN RATINGS AND STANDARD DEVIATIONS (PRESENT AND FUTURE)

INITIATIVE	PRESENT		IN 3 YEARS	
	MEAN	STD. DEV.	MEAN	STD. DEV.
1. APPLICATION SELECTION	3.5	1.1	3.2	1.3
2. OFFICE SYSTEMS	3.5	1.2	3.4	.9
3. PERSONAL COMPUTERS	3.3	1.2	3.4	.9
4. END-USER SERVICES	4.5	4.1	4.3	.9
5. TELECOMMUNICATION SERVICES	4.0	.8	4.5	.7
6. CORPORATE STRATEGY	3.8	1.1	4.7	.6
7. TIMESHARING SERVICES	2.6	.9	2.3	1.0
8. CAD/CAM	2.1	1.3	2.4	1.6