CIO/CTO Job Roles: An Emerging Organizational Model

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ABSTRACT

The position of Chief Information Systems Officer (CIO) has become a daunting job due to the myriad of business and technical responsibilities assigned to the organization's top information systems (IS) executive. CIOs are being asked to successfully ensure the firm's IS investments are continually aligned with its strategic business objectives, while also planning and maintaining an IT infrastructure that will meet the firm's current and future information processing needs. Many CIOs are finding it extremely difficult to balance the two key roles of technician and businessperson successfully. Many business experts that have analyzed this problem have concluded that the tasks and responsibilities assigned to a typical CIO may be too overwhelming for a single person. This paper advances a formal organizational structure in which the typical responsibilities of the CIO position are "re-allocated" to two IS executives – the CIO and the Chief Technology Officer (CTO). This paper also describes which responsibilities should be retained by the CIO and which responsibilities should be delegated to the CTO. Finally, a discussion of the challenges and benefits associated with the implementation of CIO/CTO organizational leadership structure is presented.

Key words: CIO, CTO, IS leadership roles.

INTRODUCTION

Over the past decade, the roles and responsibilities of the corporate chief information officer (CIO) have continued to expand rapidly in both magnitude and scope. This expansion matches the dynamic changes in today's business climate, so that the job accountabilities of the CIO position are vastly different. The job responsibilities of the CIO have transformed a mid-level technical manager into a high ranking corporate executive. Consequently, CIOs of today are now faced with the difficult and time-consuming job of juggling their time to handle both managerial and technical information systems issues. The rapid expansion of CIO job roles and responsibilities has led some to say the initials CIO mean "career is over" (Rothfeder and Driscoll, 1990). High CIO turnover rates (CIO Insight, 2004; Strassman, 2004) combined with a continued growth in the responsibilities create an expanding spiral of complexity for both the CIO and the organization.

Though various research has chronicled the evolution and growth of the responsibilities and accountabilities of the CIO (Benjamin et al., 1985; Synnott, 1987; Applegate & Elam, 1991), and discussed the technical and managerial issues facing today's CIOs (Stephens, 1992), little research has attempted to advance new organizational solutions to address this problematic issue. One solution that has garnered favor with larger business enterprises has been the creation of a new position to assist CIOs in handling a segmented portion of their responsibilities. Quickly becoming identified as the organization's Chief Technology Officer (CTO), the individual in this position would be responsible for managing the technical roles and responsibilities that are currently being handled by the CIO. Though some

theoretical discussion of how this new IS managerial function might operate has appeared in practitioner publications (McGee, 1995; Anthes, 2000; Blodgett 2000), very little research has attempted to fully expand and operationalize a possible CIO/CTO IS organizational structure and formal business relationship.

The objective of this paper is to advance new IS organizational structure scenarios based upon a new joint CIO/CTO managerial approach. This article promotes new IS hierarchies based upon the allocation of IT management and control responsibilities between the CIO and CTO, and advances a managerial working relationship between the CIO and CTO based upon the allocation. Finally, challenges and benefits facing organizations choosing to adopt this new organizational structure are presented.

THE POSITION OF CIO: YESTERDAY AND TODAY

In the early 1980's when the term CIO was coined by Synnott and Gruber (1981), the CIO position could have loosely been defined as the ideal integration of an experienced business manager with a knowledgeable information systems technician. The CIO position was viewed as some vague combination of both technical and managerial expertise in which the CIO was called upon to effectively understand and integrate business processes, technologies, and data. Depending on both the level of strategic or operational importance that the organization placed on the information technology (IT) function and the prevailing operating environment in which the organization functioned, the responsibilities and accountabilities of the CIO position could be either technical or managerial. Research during this period reflected the volatile nature of the job expectations of CIOs. One study described the CIO as the "senior executive responsible for establishing corporate information policy, standards, and management control over all corporate information resources" (Synott & Gruber, 1981). The CIO was also described as the "corporate officer who truly understands the interconnection of the information flow to the business" (Benjamin et al., 1985). Finally, CIOs were presented as the "new breed of information systems managers" - businessman first, managers second, and technologists third (Synnott, 1987). This ambiguity of the CIO positions was clearly foreshadowed in Ives and Olson's (1981), *"Manager or Technician? The Nature of the MIS Manager's Job,"* where the career of a fictional IS manager is traced to exemplify the business and technical challenges facing the individual landing a position as a IS manager. The article illustrates the role balancing process that must take place between technician and manager job roles in order for an individual to be successful in this highly dynamic and changing environment. The balancing of such roles has been mirrored by the lively June 2005 ISWorld mail list debates regarding educational placement of CS and MIS graduates.

During the 1990s, a change in the strategic nature of information systems signaled a shift in the level of importance that was accorded the position of CIO. As organizations looked to find new methods to leverage information systems to support both operational and strategic goals of the firm, the position of CIO became critical to achieving business objectives. Research performed during this period reflects the growing importance and stature of the CIO position. Studies indicated that the position of CIO had been quickly elevated to a top management or executive position in which the CIO would participate in organizational strategy development (Applegate & Elam, 1992).

TODAY'S CIO: CHALLENGES AND SOLUTIONS

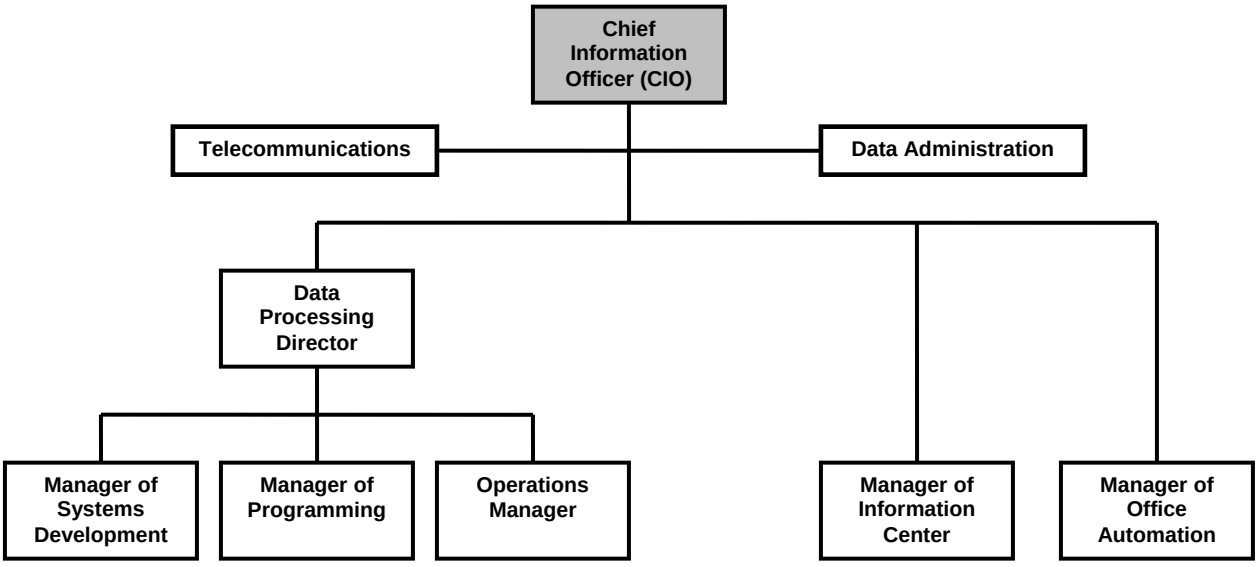
The drastic surge of importance that organizations now accord the CIO position has been a "double edged" sword for most CIOs. With increased visibility and importance being given to the CIO position, there has also come a corresponding increase in new job responsibilities and accountabilities. The CIO of today is required to both serve as high- level corporate liaison and manager between the organization's business functions and the IS function, and also to make far reaching technical and infrastructure systems decisions that will impact the future success of the business. This vast job description has presented numerous challenges and complexities for the CIO and the organization. An analysis of the academic and practitioner publications reveals that there are generally four high-level responsibilities or issues facing the CIO: 1) Meeting the Changing Technical Needs of the Organization (Architecture Manager), 2) Building a Reputation as a Knowledgeable Business Executive (Proven Businessperson), 3) Orchestrating the Successful Implementation of the IS Strategy (Operations Supervisor), and 3) Maintaining the Proper IS Staff (Personnel Developer) (Ives & Olson, 1981; Benjamin et al., 1985; Applegate & Elam, 1992; Stephens at al., 1992). Though many of these articles clearly chronicle numerous challenges facing the CIO, few advance either operational or organizational solutions for resolving these challenges.

The seemingly overwhelming accountabilities and responsibilities of the CIO have caused some members of both the business and academic communities to consider the possibility of establishing anew "CTO-based" IS hierarchy to better serve the needs of the organization. The most obvious recommendations have focused on allocating some of the responsibilities of the CIO to one or more individuals or functions below the CIO. According to a recent

report by the Meta Group on emerging trends facing the CIO position, the report stated, "The role of the CIO is becoming more business-centric, better enabling business transformation. Leading CIOs will focus more on risk and program/process change management in 2006/2007, empowering their trusted lieutenants (e.g., CTO) to manage the technology aspects of the position" (Meta Group, 2005). Though this concept is beginning to receive attention from practitioners (Anthes, 2000; Blodgett, 2000), very few studies have attempted to fully expand and operationalize this split IS management approach.

ESTABLISHING A CIO/CTO ORGANIZATIONAL STRUCTURE

The first step in recommending change to accommodate the CIO/CTO-based organizational structure is to first review a typical CIO-based organizational hierarchy. One of the more typical designs has the CIO responsible for managing all facets of information systems (See Figure 1). Reporting to the CIO is a series of managers and directors that are responsible for specific information systems functions: Director of Telecommunications, Director of Administration, Manager of the Information Center, Manager of Office Automation, and the Data Processing Director. Under the Data Processing Director, there are three key functional managers: Managers of Systems Development, Manager of Programming, and the Operations Manager.



Source: Parker and Cash, Information Systems Management: Strategy and Action, McGraw-Hill, Watsonville, CA, 1993.

Figure: 1: Typical CIO IS Organizational Hierarchy.

Any number of possible organizational designs could allow for the introduction of the CTO position into the existing business hierarchy, but only a few are likely to produce high benefits and low risks of disrupting established operating dynamics. One of the approaches places the CTO in a direct line under the CIO, while a second places the CTO on a parallel footing with the CIO. Beyond these two, a third possible scenario follows. This one recognizes that information is already being managed with different structures in all organizations and that it is the technology that must be managed differently. Thus, there is no longer a need for the traditional CIO position within organizations and executive leadership of the IT function should be given to the CTO.

A number of operational and organizational factors support the first organizational design over the second and third. A primary concern of the second is that placing the CTO on the same level as the CIO would only serve to further confuse the role of the CIO within the organization. Functional managers would be uncertain as to whom to approach to implement a project which included both technical and organizational implications. Second, placing the CTO on same level as the CIO would effectively split the management of the IS function. This would introduce unnecessary management and coordination issues that would only serve to propagate the separation that already tends to exist within IS organizations between the software systems development staff and technical support. Finally, this would eliminate the organization's notion that there is a single point of responsibility for the information technologies within the organization. The third structure might be viewed as simply a case of "new clothes for the

same IS emperor." That is, the CTO title would simply replace a title (e.g., CIO) that has struggled for status and acceptance within organizations for the past two decades. An IS executive that chooses to accept this "title" change would begin anew the struggle for comparable status with other C-level executives. Regardless of the relative strength and weakness of each organizational scenario, something must be done. The CIO is gaining status and the person who holds that CIO position is too often plagued by a growing number of both technical and business challenges.

With the first or second approach, the next step would be the establishment of a formal IS hierarchy based upon the proposed CIO/CTO functional hierarchy. Since the overriding objective of this organizational structure is to improve organizational performance by spreading both the organizational and technical responsibilities, the new hierarchy should reflect that separation. The CTO would serve as the single person responsible for all technically-related responsibilities that were once handled by the CIO. These responsibilities would include: operations, telecommunications/networking, office automation and the information center. In addition, the modem technological functions like technology assessment and workgroup empowerment would also fall under the CTO umbrella. Senior managers in charge of these functions would then report to the CTO in the new IS organization. The remaining functions would report to the CIO. Typical senior IS managers that would continue to report to the CIO would include: the Manager of Systems Development, the Manager of Programming, and the Manager of Data Administration (See Figure 2). A key point here is that the above structure is not bound by the diagram, but can be tuned to mesh with new line or traditional IS organizational structures.

There appears to be strong motivation for the preceding organizational hierarchy using a direct reporting line between the CIO and CTO, but there are negatives. If indeed the two are senior C-level executives, then how could one report to the other? It might be argued that the preceding arrangement merely gives a new title to the "key" manager beneath the CIO.

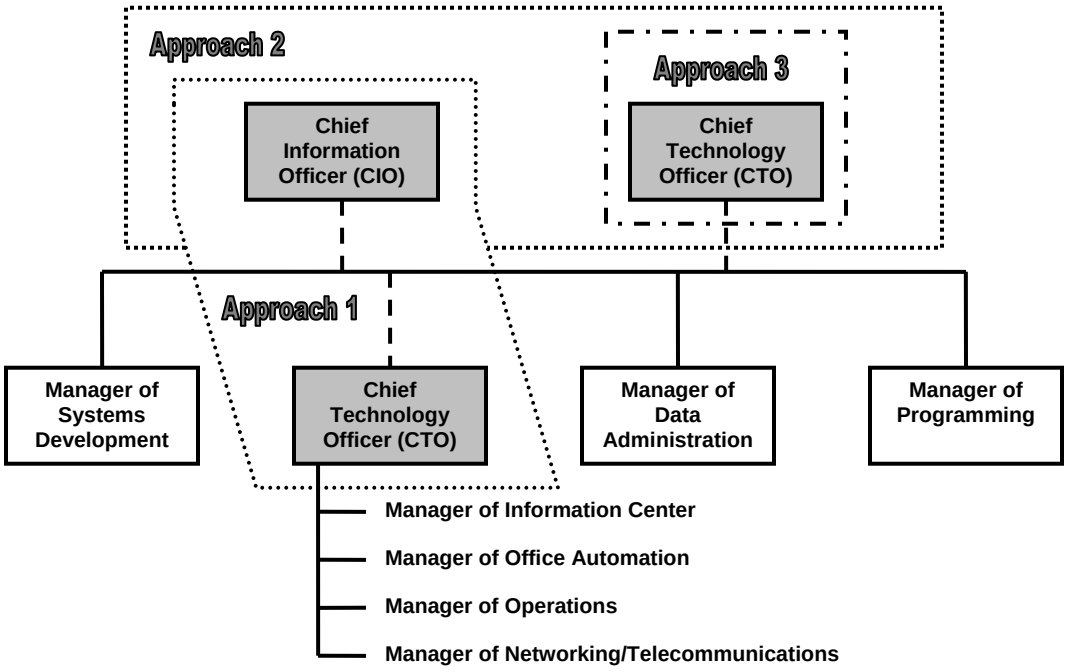


Figure 2: Proposed CIO/CTO Organizational Hierarchies.

No doubt the popularity of the CIO position as a senior level executive who sits at the table with other executives is increasing. But that fact does not indicate that business and its CIOs are best organized for achieving successful business strategies. In fact the popular literature is replete with stories about the excessively high - voluntary and non-voluntary - turnover rate for CIOs. Is this because the CIO sees the job as a dead end? We think not. As Korn/Ferry (Wiggins, 2005) suggest that the rise to CEO is based on merit, behavior style, and desire, and that CEOs and CIOs have similar leadership styles. The basic problem lies in the simple fact that far too much is expected of a single person as the chief architect and disciple of technology and its strategy within the organization. These facts lend support to the second possible organizational approach. In this second organization where CIO and

CTO are placed on a parallel footing, who then sits with the other C-level executives? A plausible solution is that both positions retain the C-level status. Certainly this structure will be met with opposition. Firstly, this organization complicates senior management coordination as noted previously. Second, issues will surely arise in terms of who reports to whom. These are concerns, but they are not unwieldy problems. The division of responsibilities has long stood as one of the classic management principles. Organization with segregation of responsibilities could readily function in this second organizational approach.

The final step in organizational approaches one or two would be the determination of responsibilities should be retained by the CIO position, and which responsibilities should be given to the CTO position. In some cases, the CTO will be called upon to provide his/her technical expertise and knowledge to a responsibility that may be typically handled by the CIO. To allocate or realign these responsibilities, it is necessary to first identify as clearly as possible the basic current responsibilities of the CIO. Since the responsibilities of the CIO are different in each organization, it is essential that a job description be prepared. Sprague and McNurlin's (1993) CIO responsibilities will serve as a basis for establishing the general CIO responsibilities. The following section provides a brief description of the possible allocation of responsibilities.

Understand the Business

The process of working closely with the top executives within the organization to establish a clear understanding of the market in which the firm sells its products and services is essential for the CIO. Typical tasks comprising this area include: attending industry meeting with line executives, becoming a partner with line management, and holding informal informational listening sessions. This is the responsibility of the CIO. In order for the CIO to ensure that IS projects and initiatives are adding business value to the organization, the CIO must be able to clearly understand the business objectives of the organization. It is then the responsibility of the CIO to communicate the business objectives to the CTO so that the proper technological infrastructure can be developed to support the approved business strategies.

Establish Credibility with the Systems Department

If the IS organization is to be viewed as an integral part of the business success of the organization, it must be viewed as successful and reliable by the functional departments which rely on information technology to meet their business objectives. Typical tasks comprising this area include: delivery of IS development projects on-time and within budget, providing prompt responses to inquiries from functional departments, and ensuring that key information technologies (e.g., networks, operations, telecommunications) are readily available to IS system users. Once again, this is the responsibility of the CIO. It is up to the CIO to work with the various functional departments to establish standards and service levels for the key IS functions. It is the responsibility of the CIO to communicate the user expectations to the CTO for technical functions that are controlled by the CTO. The CTO will then ensure that the established service levels for the various IS functions under this umbrella are met and exceeded.

Increase the Technical Maturity of the Firm

Technically mature organizations are those that are both comfortable with the process of integrating the use of IS technologies into all aspects of the organization’s business processes, and organizations in which the employees have come to rely on IS technologies to support their day to day work responsibilities. Under the proposed design organizations such as the Help Desk and the Technology Assessment functions would fall under the primary responsibility of the CTO. The CTO would be accountable for both acquiring new technologies, and also ensuring the proper initiatives are launched to support the successful integration of the technology into the organizations business processes.

Create a Vision of the Future and Sell It

There must be a single person who is responsible for both establishing the organization’s vision for the IS technology in the future, and selling that vision to other top organizational managers. This is clearly the responsibility of the CIO. The CIO must be able to establish an integrated business and technical vision that is in line with the goals of the firm. Though the CIO will certainly call on the CTO to provide technical guidance during the implementation of various phases comprising the vision, the CIO's must maintain the role of IS visionary.

Implement Information Systems Architecture

All organizations must have a person who is responsible for creating and maintaining an information systems architecture (e.g., hardware, software, networks, databases) that will allow the firm to meet its current and future business goals, objectives and strategies. Although this function is generally considered more of a technical function - organizational issues resulting from business process reengineering mean that the CTO and CIO must work in concert to ensure the architecture supports established business practices and processes. Due to the overwhelming technical implications of this area, the CTO would be the key person assigned to managing this responsibility. The CIO would assist the CTO in organizational issues resulting from the integration of new technologies into the established organizational IS architecture.

CHALLENGES AND BENEFITS

Like all new organizational structures, there are benefits and challenges that arise from the implementation of a non-traditional IS hierarchical structure such as suggested in organizational scenarios one or two. Either CIO/CTO organizational structure will help address some of the key challenges facing the current CIO position, but will also create new management and coordination issues for the organization, the CIO, and the CTO (See Figure 3). The key benefits and challenges facing an organization that adopts one of these new structures are highlighted below:

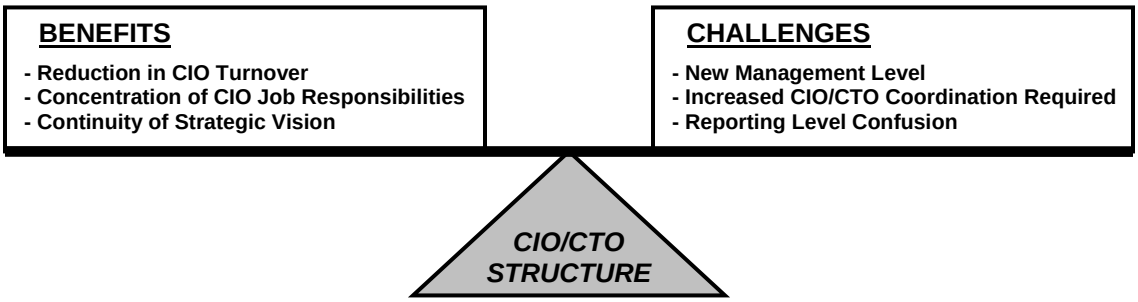


Figure 3: CIO/CTO Challenges and Benefits.

BENEFITS

Reduction in CIO Turnover

CIO turnover continues to be a major problem. An informal study of 244 companies from 2002 through 2003 found an attrition rate of CIOs to be an alarming thirty-four percent (Strassman, 2004). Though there are many factors which can easily be attributed to this growing problem, very few firms seem to be taking the necessary steps to both identify those factors and then initiative new programs to effectively address the problem. The movement toward a CIO/CTO operating environment represents a positive step toward addressing the growing problem of continuous leadership changes at the top I/S position. Providing the CIO with another senior executive to address the continually changing technical environment may in itself not be a panacea to all the problems that plague individuals at this level, but it represents a good first step in an effort to stem the tide of CIO turnover.

Concentration of Job Responsibilities

Organizations that require their CIO to be both a top level business manager and a highly competent technician are probably asking too much of a single person. The environmental and functional shifts occur too quickly to be effectively managed by a single individual. Movement to a CIO/CTO organizational structure allows both the CIO and CTO to concentrate all their management energies on one specific functional area within the diverse arena. The CIO is free to concentrate on nagging organizational and strategic issues, while delegating all of the ever-changing and highly technical job responsibilities to the CTO. According to Michael Dortch, an analyst at Robert Frances Group Inc., "At many of the smartest companies we know, the CIO represents efforts to keep IT aligned with the business goals and the CTO is the point person for making sure the IT infrastructure is sound and able to keep pace with the demands of the business" (Anthes, 2000).

Continuity of Strategic Vision

Constant change of leadership at a company's CIO position can only lead to organizational chaos. Since each new CIO will attempt to establish a new IS vision for the organization, initiatives and projects that were established by past CIOs may have to be modified or scrapped. This constant reorientation of IS visions can not only be time consuming for the organization, but also very expensive. In order for an organization to establish a stable IS infrastructure based upon a single IS vision, the organization must establish an environment which encourages the CIO to stay at the top IS spot within the firm. By splitting the responsibility for managing the key IS functions across two individuals, the CIO will be more likely to see the position as a reasonable long-term career choice.

CHALLENGES

New Management Level

The integration of the CTO into the existing I/S organizational structure by approach one or two means the addition of a new quasi-level of management that must be understood by others within the organization. Both the introduction and acceptance of this new position into the existing corporate culture could be a difficult and confusing process. Top managers may resist consulting the CIO on organizational and business issues, while having to rely on the CTO to answer technical questions. Initially, the CEO will need to initiate an organization-wide educational program to clarify and delineate the roles and responsibilities of the CTO if either organizational approach one or two are adopted.

Increased CIO/CTO Coordination Required

The only significant drawback to these organizational approaches is the increased amount of coordination that will be required between the CIO and CTO position. Almost all IS projects and initiatives require the successful integration of technology and the organization. In order for the approach to operate efficiently and effectively, it is absolutely essential that there be a close working relationship between the CIO and CTO. Even with close coordination, the shear fact that key IS functions are separated under two managers introduces new organizational risks. Other functional managers may be confused as to which individual to approach to resolve IS-related problems. In an attempt to resolve this issue, the CIO will still retain the top position within the organization in approach one, and the collective group of C-level executives will resolve these issues in approach two. Note that these problems existed many years ago between organizations involved in the management of information --- accounting and data processing. The strategy at that time was a steering committee – today's modern answer to the steering committee is the group of C-level executives, who are all led by the CEO.

Reporting Level Confusion

Whenever an organization moves from a typical hierarchical structure to a less formalized structure, questions always arise of how this new structure will impact the internal reporting structure of managers and subordinates. Will technical I/S employees be reviewed by the CIO, but have operational responsibility to the CTO? Will all employees, both technical and non-technical, be reviewed outside of the CIO/CTO realm? Failure to clearly delineate operational and reporting responsibilities for all IS employees can result in unnecessary confusion and frustration. Once again, it is up to the CIO, in concert with the CTO, to establish job descriptions which include reporting levels for all I/S employees.

SUMMARY

Now, more than ever before is the time for CEO-guided organizations to evaluate the effectiveness of the management of the information and technology functions. As the saying goes, "if it ain't broke, don't fix it!", but this rarely seems to be the case. In our judgment, organizational changes often need to be made, and there are several ways in which these changes can be made. Unless the holder of the CIO position and the CEO are equally convinced of the robustness of the management technology and the information systems being delivered to the organization and of the suitability of the occupant of the CIO position, change must be considered. Research and considerations yield several possible changes. One scenario described above promotes a re-cast of the CIO as a new position of CTO. This change recognizes that information is being managed at different levels of the organization and that technology, whether or not it is a commodity, is being subsumed under other functions without structured management controls. A major negative of this approach is that the CTO would battle, perhaps for some length of time, to regain the ground that the CIO position has gained since the term was introduced. In other words, much

status would be lost in the transition.

Another organizational scenario places the CIO and CTO as parallel positions at the C-level of the organization. There are challenges and benefits associated with this arrangement. The major challenge is that yet another C-level position is created and the CEO's span of control must necessarily broaden. Additionally, there are possible communication degradations that could take place in such an arrangement. In short, we believe that the challenges outweigh the benefits and that another scenario would work better in organizations that need to change.

The final organizational approach - which was posed as number one in the discussion above - creates and organizational structure with a senior-level CTO who reports to a true C-level executive -- the CIO. While this approach seems strange at first because one C-level position reports to another, it is not altogether out of line with what organizations are coping with today. Popular press is promoting titles such as Chief Privacy Officers (CPOs), Chief Security Officers (CSOs), Chief Information Security Officers (CISOs) and others. In short, it seems clear that at least in the immediate future, some organizations will have persons who occupy C-title positions but who do not sit at the C-level table with the CEOs and CFOs. We believe this to be the best possible organization for most organizations that need change. We believe it is workable!

The position of corporate CIO continues to be one of the most politically dangerous and operationally difficult executive positions. Rapidly changing job responsibilities, dynamic organizational information requirements, and technology shifts have made the position of CIO too much to handle for one individual. High turnover rates at the CIO position attest to the severe pressure that is now being placed on individuals at the top IS spot within the firm. Failure by organizations to both acknowledge the problems being faced by CIOs and to take steps to resolve those problems will keep the "revolving door" syndrome that is now plaguing today's top business corporations "swinging". The recommended conceptual CIO/CTO organizational structure appears to be a stable solution for addressing the problems being faced by the CIOs and their organizations. A workable IS managerial approach to develop the operational relationship between the CIO and CTO has been shown. Although the IS hierarchy is conceptual, the benefits that seem to be derived from the adoption of this organizational approach make further research into this form of IS management a worthwhile proposition.

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