

a resource paper sponsored by the

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The **Association for Federal Information Resources Management** (*AFFIRM*) was founded with the goal of advancing the state of the art in Federal IRM. *AFFIRM*'s membership is large and diverse, composed of Federal agency IRM professionals, Federal oversight agencies (GAO, GSA and OMB), Congressional staff, the National Academy of Public Administration, and industry representatives.

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Dear Colleague:

Federal Information Resources Management (IRM) professionals have been presented with an exciting opportunity to team with program managers in the accomplishment of agency missions. The Information Technology Management Reform Act (ITMRA) of 1996 requires Federal agencies to appoint Chief Information Officers (CIOs) by August of 1996. The establishment of CIOs will provide agency focus for IRM issues and a basis for IRM partnership with other senior managers.

As IRM professionals, we have begun to think about how a CIO can contribute to accomplishing each of our agency's mission. We have learned a great deal about our own roles and responsibilities to manage data centers, monitor our investments, and deliver information products and services to our customers. We have also begun to lead the cultural change from information resources management as a support function to viewing information technology as a strategic asset to the business of our agencies. ITMRA creates an environment for change by establishing a CIO who will work with senior management and provide information technology solutions to the business of the organization.

Establishing a successful relationship between the CIO and agency senior management requires a sound start for the position. The Association for Federal Information Resources Management (AFFIRM) established a task force to seek advice from public- and private-sector CIOs on the establishment of CIOs and identify critical success factors. These discussions combined with a literature review led to development of this study, which provides a framework for understanding the contribution of a CIO to IRM performance and mission accomplishment.

AFFIRM hopes this information will serve as a resource for senior IRM managers and other senior managers, as well as others interested in the establishment of agency CIO positions. We intend to continue to sponsor other similar forums with the aim of producing additional papers to advance the state of knowledge and practice in managing information resources.

I want to personally thank the many individuals who participated in the interviews and who contributed the information and concepts that enabled this paper to be produced. Our sponsor partners deserve a special thanks for providing the funds which make studies such as this possible.

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Executive Summary

"Whether or not an organization has a CIO or even needs a CIO may well reveal only one fact: whether or not that organization is yet in the mainstream of the global economy."

The *Brooks Act* "the primary legislation behind Federal information technology management over the past decades" *has been repealed*. The passage of the Information Technology Management and Reform Act (ITMRA) of 1996 established a new framework for strategic management of information by Federal agencies. Chief Information Officers (CIOs), whose appointment is mandated by Congress, will be the focal point for this new approach. Congress has given a clear statement of the need for strategic information management by mandating appointment of the CIOs at a senior management level, similar to the Chief Financial Officer (CFO). The clear intent of the legislation is to establish the CIO position as a senior management partner with a "seat at the table." To paraphrase Churchill, it is now the end of the beginning of the information age for the Federal Government.

AFFIRM is an association of Federal and private-sector IRM professionals. The Emerging Issues Forum is sponsored by AFFIRM to research critical new IRM issues.

The Association for Federal Information Resources Management (AFFIRM) commissioned its Emerging Issues Forum (EIF) to research the CIO position. The EIF conducted a survey of the literature and a number of interviews to determine the current thinking among private-sector and Federal agency officials and IRM practitioners. The EIF sought to determine critical success factors for CIO implementation, especially as related to issues currently being debated as Federal agencies near the August 8, 1996 implementation date. This study "The Chief Information Officer: A Seat at the Table" provides:

- 1) a historical perspective of the evolution of the management of information culminating in the establishment of CIOs,

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- 2) an overview of the provisions of the new legislation,
- 3) identification of critical factors for successful implementation of a CIO, and
- 4) a review of outstanding issues to be addressed by the new CIOs.

The literature revealed a number of common themes that parallel issues being raised in the Federal community and in our interviews with the private-sector CIOs. The fundamental theme

was the importance of ensuring that the CIO become a member of the executive team. The phrase we heard most often was a "seat at the table." We found that the inclusion of the CIO at the senior management table is imperative for a CIO to be effective.

How can we judge the degree to which the CIO position has been established with a "seat at the table?" We found the following four critical success factors which can be used to answer this question:

- 1) The CEO's *attitude* toward the value of the CIO position,
- 2) The CIO's *duties*,
- 3) The *skills* and qualities of a CIO, and
- 4) The CIO's organizational *placement*.

All of these factors impact the CIO's seat at the table in Federal agencies. -This study suggests the way to gauge the degree to which agencies have positioned their CIO's to deliver on strategic information management is to ask, does the CIO have a substantive "seat at the table?" The degree to which this is true reflects the new CIO's initial potential to lead their agency in strategic use of information. The graphic illustrates that without successful implementation of these factors, the CIO will not be invited to the table. However, if these critical success factors are addressed properly, it is likely that the CIO will be given a seat at the senior executive table.

Those who question the importance of having a successful CIO should consider the following point made by Dr. Charlotte Stephens of Columbus College. She says, "Whether or not an organization has a CIO or even needs a CIO may well reveal only one fact: whether or not that organization is yet in the mainstream of the global economy." Charlotte S. Stephens. "The Role of the CIO: A Status Report,"

Information Strategy:

The Executive Journal . (Winter 1994), 51.

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1. The Chief Information Officer

DEFINITIONS

Agency Director: *Either the Secretary or Administrator of a Federal agency. Equivalent to CEO in business.*

CEO: *Chief Executive Officer of a business -organizationally equivalent to the Agency Director.*

COO: *Deputy Secretary or Administrator in most Federal agencies.*

CIO: *Chief Information Officer of an organization.*

Information Management: *The practice of managing information resources such as technology, systems, etc.*

A Seat at the Table: *Full participation at the senior management "executive table" where the strategic direction of the organization is set and where business decisions are made.*

The term "Chief Information Officer" (CIO) dates from 1981. It has been applied to the senior executive responsible for establishing corporate information policy, standards, and management controls over all corporate resources." Ibid, 48. As organizations increasingly have become more information dependent and have started to focus on results, the need for this executive has become vital. The CIO is part of a wave of change, and the CIO position is a leading indicator of whether or not an organization participates in this change. Ibid.

Effective organizations have realized the importance of the CIO, and over the past few years this idea has taken hold in the Federal Government. Indeed, some agencies began to appoint CIOs on their own initiative. Now, as a result of the Information Technology Management Reform Act of 1996, by August 8, 1996, executive agencies must develop and fill CIO positions.

A new study published by Harvard University's Kennedy School of Government, "Information Technology and Government: The Need for

New Leadership," concluded that poor leadership on information technology issues and initiatives is a significant drain on government performance. *Jerry Mechling. Information Technology and*

Government

, as cited by Elana Varon in

"Study: IT understanding lags among senior managers," *Federal Computer Week*. (May

20, 1996), 12. The appointment of CIOs to strategically manage information is fitting in light of the current emphasis on performance and results.

The Association for Federal Information Resources Management (AFFIRM) originally commissioned this study because the Association identified the issue of Federal CIOs as an emerging issue for Federal IRM managers. Thanks to recent legislation, however, establishing CIOs in the Federal Government is no longer an *emerging* issue—it has emerged. Thus, this study focuses on assisting Federal managers in successfully implementing the CIO position. The purpose of this study, "The Federal CIO: A Seat at the Table," is to provide a basic understanding of the history and value of the CIO position and examine critical success factors for implementing the position in the Federal Government.

Establishing CIOs in the Federal government is no longer an emerging issue—it has emerged.

This paper:

- Provides a historical perspective on the evolution of the management of information technology.
- Discusses the importance of a CIO and the evolution of the position.

The Association for Federal Information Resources Management (AFFIRM) Emerging Issues Forum conducted this study. The Forum

allows AFFIRM members to participate in the development of policy positions with those individuals managing Federal information technology. The results of their findings and recommendations are presented to the Federal IT/IRM community for consideration. AFFIRM's Forum provides a unique view: one which combines public and private views on key IRM issues.

- Provides an overview of the provisions of the new legislation.
- Explores critical success factors for implementation of a CIO.
- Discusses additional CIO implementation issues that need further review and study.

Methodology

The study methodology of the AFFIRM Emerging Issues Task Force included interviews, a literature search, and a survey of IRM practitioners. The literature search provided a baseline of information on critical success factors for CIOs. The interviews with public officials and survey brought out the key issues being debated in the Federal community regarding the CIO position. Finally, the private-sector interviews provided an opportunity to test theories and ideas arising from the public-sector interviews and literature search. The combined research established the critical success factors for initial implementation of the CIO position. This paper explores the issues under debate in the Federal Government in light of the private-sector experience and research, and acknowledges that it is the principles learned from the private-sector which transfer to the public-sector, not always the specifics.

It is the principles learned from the private-sector which transfer to the public-sector, not always the specifics.

Interviews: The task force interviewed CIOs from the public- and

private-sectors. During the course of the interviews the task force members focused on four aspects of the CIO position: organizational relationships, the CIO's business role, senior management expectations, and the CIO's role in policies and standards. Appendix C provides the interview questionnaire used as a starting point in conducting the interviews. The interviews ranged well beyond these aspects.

Federal Government interviewees included senior information officials from the Department of Education, Department of Veteran's Affairs, the Department of Treasury, as well as the Deputy Director of the Office of Management and Budget (OMB) and the Deputy Director of the Senate Subcommittee on Oversight of Government Management. From the private-sector, the task force interviewed the CIOs from Lockheed Martin Corporation and Host-Marriot Corporation. AFFIRM, in cooperation with Oracle France, hosted CIOs from the French Ministry of Culture, Ministry of Education, and Lottery who presented their perspective on establishing and implementing CIOs in the French Government. Appendix A presents a complete list of the officials that the task force interviewed.

Survey: During a Federal Office Systems Exposition (FOSE) meeting in April 1996, AFFIRM, in cooperation with Compaq Computer Corporation, surveyed a number of IRM managers from the Federal Government on the appointment of Federal CIOs and their placement, responsibilities, and the skills required. The purpose of the survey was to determine the current state of thinking among Federal agency IRM practitioners regarding these implementation issues.

Research: The task force conducted a literature search to determine critical success factors for CIOs. Since CIOs are relatively new in organizations, the task force members found that published literature on CIO critical success factors is limited. However, studies published by the London Business School, The Sloan School of Management, *Information Strategy: The Executive's Journal*, and the Harvard

Business School were particularly relevant to the study. A list of these studies and other publications of suggested reading is included in Appendix B.

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2. Evolution of the Management of Information

The private-sector and, more recently, the public-sector have focused greater management attention on the strategic use of information to improve organizational performance. This chapter provides a historical perspective on the evolution of the use and management of information technology. The chapter concludes with a discussion of the precursors to the establishment of the CIO position in the public-sector.

A Historical Perspective

"Once we used technology to run core applications, such as general ledger, or to process key business information, such as sales and inventory. Those were applications that ran on big systems and stood alongside our business."

*Bob Martin, CEO
Wal-Mart International*

In the early days of the information revolution, from the 1950s to the 1970s, information technology served primarily a technical function designed to provide efficiency gains, mainly in accounting and other administrative processes. By using technology, organizations could process checks faster, store accounting records electronically, and automate labor-intensive tasks. Because of the emphasis on accounting and administrative functions, management frequently placed data processing responsibilities with the Chief Financial Officer (CFO) or a similar position. The function was labeled "data processing"—process numbers faster and cheaper. As one former CIO put it, data processing

"stood alongside our business." Bob L. Martin, CEO, Wal-Mart Stores International. "The End of Delegation? Information Technology and the CEO," *Harvard Business Review* (Sept.-Oct. 1995), 4.

In the 1970s and through the early 1980s, the use of information expanded from merely administrative efficiency to include the management of business information necessary to perform a line function on a real-time basis. This shift allowed line management to improve accuracy, efficiency, and tactical results—in short, management effectiveness. As the cost of information technology increased and management began to pay more attention to systems and information products, management created more formal organizations. Their various titles—Information Management Systems (IMS) Department, Management Information Systems (MIS) Department, and Information Resources Management (IRM) Department—reflected the broader information perspective. These organizations sprang up to manage the technical infrastructure and systems, usually centered around a mainframe computer systems.

Information: A Strategic Asset

Examples of the strategic use of information include Federal Express's automated package tracking, Wal-Mart's inventory and sales systems, and airline reservation systems. This phenomenon is not limited just to these textbook cases. Today, it is widespread throughout industry.

A recent article in the Investor's Business Daily explored how Kent Electronics Corporation (a profit leader in its industry) uses information to gain an advantage over its competitors. They have "no wasted materials, no excess stock, and no extra warehouse space" and maybe most critically, no wasted time for customers in obtaining information on product availability.⁶

Today, companies not using information technology as a strategic tool are

often industry also-rans, not leaders.

A new kind of executive, the MIS Director, arrived to manage these departments. The typical MIS executive was in charge of the data center and centralized process organization. MIS Directors generally had good technical and project management skills. However, they did not generally possess significant business backgrounds or a clear business vision. The role of the MIS executive was to develop technology and software. They worked with middle and occasionally top management to develop systems to manage the information needed in the line organizations.

Fueled by a technological explosion, the use of information changed dramatically to a more strategic approach in the late 1980s.

Organizations increasingly relied on information technology (LANs, faxes, e-mail, and the Internet) for real-time communications. Personal computers brought computing to millions of people's offices and homes, sparking the imaginations of many to develop revolutionary new uses for computers. Information technology has become omnipresent; it has become an essential tool in the workplace. As a result, organizations began to develop strategic applications of technology. (For several examples, see the sidebar *Investor's Business Daily*, 5/28/96). Although these new technologies help provide significant opportunities, they also present significant management challenges.

To manage this strategic asset, companies began to appoint seasoned executives as CIOs at the corporate level. Many companies—though not all—in the private-sector have realized the importance of information to their organization and have positioned the CIO at the corporate level to participate in the strategic decision-making process

of the organization. Some Federal agencies have also begun to move in this direction in recent years.

Therefore, during the 1980s, CIOs appeared in the private-sector just as CFOs appeared years earlier. The CFO position appeared because management felt that the organization's financial position and operations were a core management function, vital to the long-term success of the

organization. The CIO position was established in the private-sector for the same reason. Increasingly, information is viewed as a core management function, requiring a senior official overseeing the function to bring focus to information technology solutions for the entire organization.

The Evolution of Information Management⁷

Thus, as the value and use of information grew, the type of manager selected to oversee the information technology and resources has changed from the Data Processing Manager to the corporate CIO. The graphic summarizes these changes.

Precursors to the Legislation: The Federal Evolution

Recognizing this shift in information management in the private-sector, Federal agencies began to adopt similar models. One particular study merits close attention. The General Accounting Office's (GAO) 1994 study, "Improving Mission Performance Through Strategic Information Management and Technology,". U.S. General Accounting Office.
Improving Mission Performance through Strategic

Information and Technology: Learning from Leading Organizations

(May 1994). is a synthesis of selected public- and private-sector case studies. The study examines how the Federal Government could resolve its various information technology problems through use of the best management practices followed by industry leaders.

GAO estimated that the Federal Government spent over \$25 billion on information systems in 1993 and more than \$200 billion over the last twelve years. The 1994 study concluded "it is unclear what the public has received for its money." Ibid, 7. GAO found that efforts in the government to improve the mission of agencies and reduce costs are limited by lack of information or ineffective use of information technology. For example, earlier reports in 1988 and 1992 discussed how agencies lacked critical information to analyze programmatic issues, control costs, and measure results. In the 1994 study of best practices, GAO concluded:

- 1) In the private-sector, leaders have emerged while in the public-sector few Federal agencies have learned how to manage information technology to achieve results, even though most realized the need.
- 2) Strategic information will be crucial for Federal agencies as they begin to implement the Government Performance and Results Act (GPRA). GAO states that without improved management information systems Federal agencies will not be able to "develop vital data and useful information systems" to improve operations, measure operational performance, and produce results.
- 3) Without action by Federal executives, the gap between public expectations and agency performance will continue to grow wider. The study

noted, "sustained Congressional attention is vital to reinforce the link between accountability for returns on information-related investments and satisfaction of public expectations."

4) The appointment of a CIO as a senior management partner is a key step in supporting the improvements needed to build a modern information management infrastructure.

Thus, from this report, Congress and the Executive Branch were given a clear statement of the need for strategic information management and a recommendation for the appointment of CIOs as critical to improvement of the information technology function.

Following the GAO report, Senator Cohen of Maine published a report entitled "Computer Chaos," which detailed similar problems and called for a number of changes in Federal information technology practices. Many of these ideas are found directly in the Information Technology Management and Reform Act of 1996.

These publications should be seen in the context of the increased recognition of the need for better information management in the Executive Branch. At the same time Congress was investigating these issues some executive agencies were making significant efforts of their own. The Environmental Protection Agency, the Veterans Administration, and the National Aeronautics Space Administration appointed CIOs to lead information management well before the legislation was written.

ITMRA: A New Era in Federal Information Management - Highlights

The Information Technology Management and Reform Act (ITMRA) of 1996 mandates the appointment of CIOs in twenty-three Federal agencies. Other provisions of the legislation mandate better capital planning, performance monitoring, and training, in conjunction with a number of improvements in the acquisition of information technology. One of the most notable requirements of the legislation is the repeal of the Brooks Act, the primary legislation behind Federal information technology management since the 1960s.

Duties and Responsibilities of the Federal CIO

- *Management of an agency's information resources, including technology, systems, and data.*
- *Being the focal point within the agency for all information technology issues.*
- *Responsibility for the organization's information architecture.*
- *Responsibility for overseeing the development, implementation, and maintenance of all information systems of the agency.*
- *Responsibility for monitoring, evaluating, and advising the Agency Director on information technology programs and performance of those programs.*
- *Responsibility for establishing requirements for agency information technology personnel; developing strategies for staffing; and planning for hiring, training, and professional development.*

The legislation outlines the CIO's general responsibilities and the duties and qualifications required for the position. In addition, the legislation requires that Agency Directors consult with the CIO and the CFO to develop policies and procedures that ensure accountability with regard to the design, development, maintenance, and use of agency information systems; ensure that financial and related program information is reliable, consistent, and timely before it is entered into the financial management system; and ensure that the financial statements support the assessment of mission-related processes, administrative processes, and investment in information technology.

3. A Seat at the Table

This study demonstrates that information management is a strategic issue for effective business operations. The private-sector solution has been to establish the CIO as a corporate manager with a seat at the executive table. What can the Federal Government learn from the private-sector as agencies begin the process of appointing CIOs? The following paragraphs provide the lessons learned.

Without a seat at the table, the CIO cannot provide the input required...and cannot provide corporate leadership.

The task force heard the phrase "a seat at the table" in every interview, and this phrase was substantively mentioned in virtually every article researched. Researchers and practitioners alike indicate that the success of the CIO and the companies/agencies success in using information strategically was dependent on the CIO having a seat at the table. The clear message was: without a seat at the table, the CIO cannot provide the input required to shape corporate strategic vision and cannot provide corporate leadership in managing the change and infrastructure needed to deliver the strategic vision.

In listening to the Federal community's views on the appointment of Federal CIOs and researching CIO critical success factors, we found four critical factors related to the successful implementation of the CIO position:

1. The Agency Director's *attitude* towards the value and purpose of a CIO,
2. The *duties* of the CIO,
3. The essential *skills* and qualities of a CIO,
4. The *placement* of the CIO as a credible peer with others at the table.

The following pages review the research results and the conclusions reached as they pertain to the Federal Government. A scale of success is also provided for each of the four factors. For each critical success factor we provide a pyramid graphic which illustrates the progression

toward the apex (success) in that factor. Finally, we summarize the four scales into one overall scale to measure how well the CIO is given "a seat at the table."

The Agency Director's Attitude Toward the Value and Purpose of the CIO

If you don't know where you're going, any road will do.

If you don't know where you're going, any road will do. This axiom applies to almost any management context, including the creation of the CIO position. The director of each Federal agency needs to think about what they want the CIO to achieve and needs to define where the CIO is going. As John Rockart, Director of MIT's Center for Information System Research at the Sloan School of Management, states, "More important than what the CEO knows about information technology is how he and key members of the organization think about it and about their respective roles in ensuring that the organization uses it effectively." John Rockart, Director, Center for Information

Systems. "The End of Delegation?

Information Technology and the CEO," *Harvard Business Review* (Sept.-Oct. 1995), 7.

Mr. Rockart continues the focus on the CEO evolution of thinking by noting that Peter Drucker has argued that organizations fail because their theory of business is outdated. He argues this occurs when "assumptions on which the organization has been run no longer fit reality." Peter Drucker, as cited by Rockart, 7. These assumptions include "markets, customers, competitors, mission, and *technology* (our emphasis)." Drucker then notes that when this reality changes, organizations must change their theory of operations. Information technology is one of the fastest changing areas today. This requires

business and government leaders to seriously consider their theory of business as it relates to information management and the CIO position.

Views of Information and the CIO: After a number of years of research on information systems leadership, authors Michael Earl and David Feeny have concluded that there are two basic attitudes towards information and the CIO position. They contend that, "CEOs appear to be polarized between those who see information technology as a strategic resource and those who see information technology as a cost." Michael Earl and David Feeny. "Does the CIO Add Value?"

Information Week . (May

30, 1994), 64. The London Business School study also found the organization's and CEO's attitude toward information technology to be one of the critical factors in CIO success, and they divided the attitudes in a similar fashion. Earl and Vivian, 12.

Peter Keen further divides those who see information systems as important into two groups: 1) those who think the job should be upgraded and delegated to a heavyweight in the organization, and 2) those who see information systems as a part of everyday life and recognize that the information systems chief now has to be part of senior management. Peter Keen as cited by Stephens, 49.

These views were clearly borne out in our interviews. Some information resources management staff could not see the Agency Director having any involvement with the issue. However, our private-sector interviewees said it was critical. One interviewee noted that it took successful implementation of mission critical work to raise the CEO's view of information management issues.

CEOs who see information technology as a cost center, not as an enabler, are rooted in information technology history, not its future.

The Old Paradigm: Those who see information technology as a cost,

generally view it as an administrative or support function and do not see it as a strategic asset. This view of information and information technology is clearly rooted in information management's origins as a data processing function. However, as we have seen, this is an old paradigm, and according to Earl and Feeny's study, such companies have limited information technology achievement. · Earl and Feeny, 64.

Clearly, such a view will serve to limit the CIO's ability to contribute to the strategic success of an organization, just as it limits its value to a company. For example, Kmart, a key competitor of Wal-Mart, has been in the news with its financial difficulties and some business analysts have suggested that at least part of their difficulty is a failure to match Wal-Mart's use of technology.

While the Federal Government expends millions managing information technology, many GAO and other reports have questioned the benefits received by the public. Without agreeing with every problem suggested, it is hard to ignore the thrust of their argument: the Federal Government has insufficiently managed this resource. One interviewee suggested that a major cause of information technology failures is the lack of sufficient senior management leadership and attention to the issue. A recent Harvard University Kennedy School of Government study confirms this concept. · Mechling, 12.

Have Federal agencies adjusted their "theory of business" to account for the rapid change in technology, to exploit the benefits, and to serve the customer? Today the Federal Government has a credibility problem with the American public. A government failure to adequately change its theory of business would further contribute to this problem. Clearly, the emphasis on the National Performance Review (NPR) suggests that such a review of the Federal Government's operating assumptions is required and in progress.

A New Theory of Business: What is the value and purpose of the CIO in government as government forms a new theory of business? Our research suggests two basic reasons why CEOs do and Agency Directors should value the position of CIO.

First, the CIO can help the Agency Director manage the risk of information technology critical to an organization's survival. Wal-Mart International CEO, Bob Martin, says that, "Information technology risks are becoming increasingly entailed with business risks, and it is the CEO's responsibility to distinguish between them. CIOs who share the language and the vision of the CEO and have a strong link with the business will help the CEO understand the business and organizational risks of new communications and technologies." Martin, 4.

Similar stories concerning the Federal Government can be pulled from today's headlines. Is there anyone who has not heard of the problems with old technology in the air traffic control system or the problems with Internal Revenue Service's tax modernization program? While survival in the private-sector sense may not be at stake in the Federal Government, clearly the quality of mission accomplishment and customer satisfaction is at stake.

*In the 1990s, information technology has become the fourth major resource available to executives to shape and operate an organization. Companies have managed the other three major resources for years: people, money, and machines. But today information technology accounts for more than fifty percent of capital goods dollars spent in the United States.*¹⁹

Second, a CIO can assist the Agency Director in using information as a key resource for strategic mission accomplishment. "Knowledge is the ultimate substitute, so much so that many futurists predict it will be the chief resource of next century's economy." Sperry, A4. In the new paradigm, information is a corporate asset, and it is a strategic tool,

vital to the organization's success. The Harvard Business Review notes that in the future, organizations will be measured by their "intellectual" property, not their tangible assets.

In the Federal Government this notion is even more pronounced. Many, if not most, of the Federal Government's services are in the form of, or at least highly dependent on, information. For example, the Social Security Administration collects work history information, analyzes the data, and distributes entitlements to millions of Americans. This organization is entirely dependent on information.

The Duties of a CIO: Time to Do It All

Two key questions arise in discussing the duties of the CIO position. First, what are the functions and duties of a CIO beyond the various responsibilities established in the legislation? Second, is this a full-time job and what does "primary duty" mean as it is outlined in the legislation? A review of the duties and functions of a CIO is useful in answering both of these questions.

CIO Functions: The London Business School study summarizes the job of CIO as three functions:

- 1) The functional specialist - The CIO heads the information technology function and is its representative.
 - 2) The operations executive - When something in information technology goes wrong, the buck stops with the CIO.
 - 3) The integrator of information technology and the business - The CIO is active at the highest levels of the organization to link information technology capabilities to business/mission needs and opportunities.
- Earl and Vivian, 9.

Jonathan Newcombe, CEO of Simon and Schuster, says "The CIO attends the operating reviews for all our businesses and works in partnership with line managers and technology staffs to design and implement systems that best serve the organization's needs. The CIO helps me understand technological advances outside and inside the company and aids me in formulating priorities for technology investments."²¹

(Harvard Business Review).

The third function is perhaps the newest function that is most uniquely linked to the position of CIO. Under this duty, the CIO must play four roles. First, the CIO must interpret information technology issues and external success stories for the CEO and other senior managers. Second, the CIO must integrate the information management possibilities with the business/mission needs to create a shared vision of where and how information technology will contribute to the strategic goals of the organization.

Third, the CIO must help make sound financial decisions about capital deployment. The fourth and final role is that of a change manager, both in his or her own field of information technology, and in partnership with line managers whose work is changed by technology.

To fulfill this integration function, it is imperative that the CIO be involved with the strategic planning and business decisions of the organization. One interviewee from the private-sector stated, "The CIO is very much involved with setting the goals and policies of the organization which can only be accomplished at the table."

The CIO also ensures that senior management focuses on total returns and cost savings when management evaluates information technology. One interviewee suggested that while at the table, the CIO can ensure that the following questions are answered when technology solutions are suggested:

- Why do this? Do we still need to do the function we're about to automate?
- Who should do it? Is this within the organization's core competency or can someone else do it?
- Are we doing business in the most effective and efficient manner? Should we reengineer before we apply technology?

These questions will thrust the CIO into the heart of change management while protecting the CEO from adverse risks and wasted capital investment. Wayne P. Yetter, CEO of Astra Merck, said that the CIO must participate in the high-level meetings of the organization to help identify how technology can make the business more effective. Wayne Yetter, CEO, Astra Merck. "The End of Delegation?

Information Technology

and the CEO," *Harvard Business Review*. (Sept.-Oct. 1995), 9.

In the end, it is the CIO's role to bridge the gap between information technology and the operational side of the organization and to communicate the use of information as a strategic tool to the CEO and other senior officials. The CIO can demonstrate how information technology helps set the vision of the organization, as opposed to being just a technical delivery tool. In addition, the CIO can explain how the organization can use information technology to solve business problems.

Primary Duty: The legislation clearly states that IRM should be the primary duty of the CIO. Our Congressional interviewees and the IRM practitioners surveyed at FOSE clearly believed IRM should receive the majority of the CIO's time. Yet senior managers in the Executive Branch and on the survey panel felt it is acceptable if IRM is the

primary duty among a number of other duties. Virtually none of the private-sector literature addresses this issue. When our private-sector interviewees were questioned about this issue, they clearly felt anything less than a full-time job was ridiculous for a CIO of a major company.

While it is possible to employ a part-time CIO in a small agency where most of the IRM work is financial, it is hard to see how a CIO of a large agency could truly fulfill the legislative responsibilities and functions outlined for a successful CIO on a part-time basis. This is an area in which outside observers can easily test an agency's leadership outlook on information. Do they take this function seriously enough to devote a full seat at the table? This may take time given the work required to shift organizations, but it is clearly the ideal for most agencies covered by this legislative requirement.

The Essential Skills and Qualities of a CIO: Only Superpersons Need Apply

Clearly, one of the most difficult decisions is the selection of the CIO. Our interviews revealed a serious debate about the skills and experience needed to be a CIO. Many interviewees in the government stressed the need for someone with business skills and experience, often indicating information management skills were unnecessary or secondary. The legislation, however, requires some information management skills for a CIO.

Our conclusion is that a CIO must have both *technical* know-how sufficient to deliver information solutions on time and within budget, and sufficient *business* skills to communicate and work with the other senior managers to build a shared information technology vision. Is this person difficult to find? Yes, but then this is the top job in information management, not a staff job. Just as not all accountants make good

CFOs, not all information management personnel will make good CIOs. However, it is also true that many good managers will not be successful as CIOs if they lack basic information management skills and knowledge. The following paragraphs review the basis for these conclusions.

We found that the London Business School conducted the most comprehensive study of critical success factors. They studied forty-nine variables to determine which, if any, were good

predictors of success. Seven variables in the skill area were found to be clearly important to success. These are:

- Sensitivity
- Credibility
- Creating information technology vision
- Planning
- Information technology ability and experience
- Social skills
- Relationship building

Of these, they found that the most significant factors were sensitivity and credibility. They also observe that, "Business know-how may be essential for the CIO, but it is clearly not enough." Earl and Vivian,

¹⁶. Business experience was not a discriminator of success, as both survivors and non-survivors felt they had adequate business experience.

You can't sell the sizzle of IT if you don't deliver.

Credibility and Information Technology Skills: In all the literature and in our interviews, we found the overarching quality a CIO needs is credibility. A CIO needs a reputation for delivering what is promised on time and within budget. This point is repeated in all the literature. During our interviews, the CIOs from the private-sector stated that to gain and retain access to the CEO, the CIO had to demonstrate good

project management skills and establish credibility. One CIO noted, "You can't sell the sizzle of IT if you don't deliver." A CIO, as cited by Earl and Feeney, 67. Is this ability to deliver related to information technology know-how and experience? One CIO we interviewed stressed his belief that it was clearly related. Michael Earl and David Feeney state, "The value-adding CIOs in our research have invariably come from the information systems function." Ibid, 69. It seems clear that having these skills enhances a CIO's ability to fulfill the functional specialist and operating executive duties of a CIO's job.

Business Skills: Our interviews and other research agreed with the London Business School study findings that CIOs must have considerable communication skills and sensitivity to the organization. These skills are critical to building a shared vision of the contribution information technology can make to the organization. All interviewees also agreed that a CIO needs to be an innovator and an agent of change, taking an anticipatory planning stance to find opportunities rather than waiting to react to events.

Summary: This position requires an extraordinary leader who can inspire, has a clear focus, and has the right balance of management skills and technological understanding. These leadership qualities enable the CIO to network with senior managers and make alliances. One must not over-interpret the London Business School study finding that business experience is not a significant variable in predicting success. In the end, a CIO must deliver internal solutions based on information management skills *and* must relate well to the other senior managers. Since the government's senior leadership is heavily policy-oriented, this may mean that general business and policy skills may weigh more heavily in a CIO's success than would be the case in the private-sector.

John F. Rockart, Director of the Center for Information System Research

*at MIT's Sloan School of Management, states, "Companies that use information technology most effectively boast...CIOs who have a deep understanding of the business and who are therefore capable of building strong relationships with line management. The CIO's understanding of technology is a given. But it is through a deep knowledge of the business that the CIO can not only understand what is necessary but also build credibility with line managers and thus build the ability to influence them to move in the right direction."*²⁶

(Harvard Business Review)

Where Should the CIO be Placed in the Organization?

The legislation specifies that the CIO report directly to the head of the organization. To what degree is this important to the success of the CIO? We conclude that in order to maximize the potential for success, the CIO: 1) must have routine access to the Agency Director, 2) can report on a daily basis to either the director or the Chief Operating Officer (COO), and 3) should not have anyone in their direct chain of command between the CIO and either them or Agency Director.

Research Findings: The literature and interviews differed on where CIOs should report in the organizational chain and the importance of this issue. Government interviewees saw reporting relationships as important, but the literature and the private-sector interviewees did not. The London Business School study states that organizational placement and reporting relationships and the administrative infrastructure did not prove to be a critical factor in the survival of a CIO. One interviewee stated that he (a CIO) could report to the CFO and still be a full team member at the table. His status, not placement, depended on the relationship with the CEO.

However, the literature and most interviewees agreed that the CIOs must be *at the table* with senior managers. In addition, the literature

stressed the importance of the CIO's relationship to the CEO. The London Business School study found relationship building with other senior managers and the CIO's relationship to the CEO as two of the five most significant factors in a CIO's survival. By building relationships with these managers at the table, successful CIOs are able to "influence perceptions of their own and of information technology's contribution to the business." Earl and Vivian, 11. Good relationships also helped the CIOs understand the business. The Sloan School of Management report further reinforces this by advising CEOs to build this relationship in a number of ways (see sidebar).

Key Messages for Agency Directors/CEOs

1. Position IT and CIOs as agents of change
2. Institutionalize business values for IT
3. Build an executive team that includes the CIO
4. Manage IT as integral, not as adjunct to the business²⁸

The emphasis on relationships with the head of the organization and other senior managers may explain the difference between the literature and the government emphasis on reporting relationships. In the government, relationships and how managers are perceived depend heavily on their reporting relationships. This often defines whether a manager is at the table in any credible sense. In the private-sector, however, we found daily reporting relationships did not have this same level of importance. In any event, it is clear that in the Federal Government for a CIO to be at the senior management table requires a direct reporting relationship with the Agency Director or COO in all but the most rare of instances.

4. Conclusion

Information is a primary resource of the Federal Government, and it

must be managed as a strategic asset that is integral to the business. The legislation requiring CIOs in the Federal Government reflects a natural evolution of information technology management in the private- and public-sectors. The legislation validates Federal leaders in information management and encourages laggards to do better. "Whether or not an organization has a CIO or even needs a CIO may well reveal only one fact: whether or not that organization is yet in the mainstream of the global economy." Stevens, 51.

We found four critical success factors: attitudes, duties, skills, and placement. All of these factors center on placing the CIO at the table. This inclusion at the table is imperative for a CIO to be effective and have an impact on organizational effectiveness. The CIO needs to be at a level consistent with the status of others at the table. The CIO's duties need to be well-defined and primarily focused on information technology management and its application to the mission needs of the organization. The CIO must have a balance of skills that include a general understanding of business and a good knowledge of information technology. The CIOs interpersonal relationship and team building strengths are also important attributes.

How well an agency has positioned its new CIO to be successful can be gauged by reflecting on the four pyramids associated with the four critical success factors. Any agency that has positioned its new CIO at the top of all four pyramids has given its CIO a strong position for success. Clearly, in that case, the CIO has been placed at the table; it is up to the CIO to retain this seat by delivering on promises. The CIO must create the shared vision of information management's contribution to the mission and then deliver on it.

Conversely, an agency that places its new CIO position at the bottom of each side of the pyramid has indicated that it does not take

information and its promise seriously. A new CIO

will need to focus attention, build relationships, and deliver when given the chance to build the position into something more substantial. This will be a challenging but rewarding position for some.

Most agencies will fall somewhere between these extremes, especially in the beginning. These CIOs must be consistent and persistent. If they build a shared information technology vision and then deliver, they will gain stature; if they fail at either task, they will slowly lose credibility and diminish their rightful position at the table. The immediate challenges include:

- Establishing a position at the right level and empowering the individual appointed consistent with the intent of the legislation.
- Specifying the relationship of the CIO to the CEO/COO, CFO, and line management.
- Selecting the right person to be CIO. Finding the right person with the necessary skills will be difficult. Acting CIOs may be required to meet the August 8th, 1996 deadline. Career senior executives should not be discounted as possible appointments to the position.
- Building credibility; success will take time. The CIO needs to deliver leadership, ideas, and products.
- Changing the perception of a information technology manager from a technical support function to a CIO who is part of the senior management team.

Long-term challenges include establishing a comprehensive management system for information resources. The system must incorporate legislatively mandated components with other best management practices in the industry. Among these practices:

- Building a knowledge-base in acquisition, inventory, capital and performance measurement, and business process reengineering.
- Defining roles and responsibilities for CIOs, CFOs, and COOs.
- Convincing executive management to take a more active role in capitalizing on information.

ENDNOTES

Appendix A LIST OF INTERVIEWEES

Paul Brubaker
Deputy Staff Director
Subcommittee on Oversight of Government Management and the
District of Columbia

Joe Cleveland
Chief Information Officer
Lockheed Martin Corporation

Wushow (Bill) Chou
Deputy Assistant Secretary for Information Systems
U.S. Department of Treasury

Steve Hanna
Chief Information Officer
Host-Marriot Corporation

William Greenwald
Chief Investigator
Subcommittee on Oversight of Government Management and the
District of Columbia

John Koskinen
Deputy Director for Management
Office of Management and Budget

Gloria Parker
Director of Information Resources
U.S. Department of Education

Newell E. Quinton
Chief Information Officer
Veterans Benefits Administration

French Government Chief Information Officers:

Alan Abecassis
Ministry of Education

Bernard Lapeyerae
French Lottery

Bruno Mannonni
Ministry of Culture

Herve Boog
Oracle France

FOSE Panel Speakers:

Frank Quagliata
Program Manager
Anteon Corporation

Marvin Gordon
President
Business Information Associates

Alvin Pesachowitz
Acting Administrator Office of Administration and Resources
Management
U.S. Environmental Protection Agency

Gloria Parker
Director of Information Resources
U.S. Department of Education

Rene DiPentima
Chief Information Officer
SRA

Christopher W. Hoeing,
Associate Director
Accounting and Information Management Division
Information Resources Management Policy and Issues Group
General Accounting Office

Paul Brubaker
Deputy Staff Director
Subcommittee on Oversight of Government Management and the
District of Columbia

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Appendix B

SUGGESTED READING

"The End of Delegation? Information Technology and the CIO",
Harvard Business Review. September-October 1995

"The Role of the Chief Information Officer. A Study of Survival", M.
Earl and P. Vivian. London Business School

"The Role of the CIO: A Status Report", C. S. Stephens, *Information
Strategy: The Executive Journal*, Winter 1994

"Executive Guide, Improving Mission Performance Through Strategic
Information Management and Technology", United States General
Accounting Office, Comptroller of the United States, GAO/AIMD-94-
115, May 1994

"Information Technology Understanding Lags Among Senior
Managers", Federal Computer Week, May 20. 1996

CIO QUESTIONNAIRE

The following questions are intended for incumbent federal or other CIOs. The "subject" level questions indicate the general area of inquiry. Respondents should be encouraged to express their opinions freely at that level. In the event that respondents require encouragement or request more detailed questions, exploratory questions are provided for use at the direction of the interviewers.

Subject 1: What organizational relationships have proven most effective for the CIO role?

In your organization, where is the CIO placed?

To whom does the CIO report (higher level executives, steering committee, board of directors, or control agency)?

- At what level of the organization is the CIO position?
- What is the CIO's relationship to the organization's senior IRM official?

- Has your organization tried other placements?
- What influenced your organization's top management to place the CIO position where it now is?
- How do you (the CIO) relate to other IRM policy staff, systems developers, data center management, contractors, other sources of services, and operating (line) managers?
- How formally or informally are these relationships structured?
- Are you (the CIO) the primary information resources executive?
- Which information management functions do you perform directly? Provide leadership on? Provide advice regarding? Oversee? Review?

Subject 2: What is the role of the CIO in business operations?

- What are the CIO's functional and business management responsibilities?
- What is the role of the CIO in implementing changes in business operations?

Subject 3: What are senior management's expectations of the CIO?

- What are the performance criteria for the CIO?
- What are the CIO's responsibilities as part of senior management?
- What is the CIO's role in setting overall corporate policy?
- Where does senior management expect the position to be in a few years?

Subject 4: What is the role of the CIO in developing, disseminating, and enforcing information resources management policy, procedures, and standards?

- Who articulates overall corporate goals (productivity gains, strategic advantage, customer service, process improvement) for use of information technology?
- What is your role in establishing policies regarding use and safeguarding of information as a corporate resource?
- What is your role in setting information technology acquisition policy?

Appendix C

Subject 5: What role does the CIO play in information technology investment decisions?

