

**EVALUATING CLINGER-COHEN ACT COMPLIANCE IN
FEDERAL AGENCY CHIEF INFORMATION OFFICER POSITIONS**

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(ABSTRACT)

This dissertation develops a method for evaluating whether federal agencies have complied with the intent of the Clinger-Cohen Act (CCA) of 1996 as they established Chief Information Officer (CIO) positions.

The research is important because the CIO position, as envisioned by the CCA, oversees a growing information technology infrastructure that is increasingly becoming the primary vehicle for inter/intra-government communication and for delivering services to the public. Yet despite this importance, CIO-related aspects of the CCA have not received in-depth evaluation in policy science or public administration literature.

The CCA specified many roles for the CIO position but provided few criteria for evaluating how agencies complied with the provisions that required the establishment of a CIO position. Therefore, a seven-step policy analysis process was used to develop a federal agency CIO position evaluation method that would fill this gap. This analytic research included describing the CCA's legislative context, modeling the federal CIO position, determining the intent of the CCA relative to CIO establishment, and devising a method to evaluate this activity. This research approach was grounded in organizational theory related to institutional structure.

A validated "Federal CIO Position Evaluation Method" (FCPEM) is the result of the research. FCPEM, which contains thirteen evaluation criteria, was tested and validated through key actor interviews at four federal agencies and focused on CIO position establishment activity between 1996 and 2000. Additional research is required to replicate this finding in other agencies and to further validate the use of FCPEM in conducting this type of public policy inquiry.

Dedication

This is dedicated with love to my father Ralph who I draw example from, to my mother Bonnie who I miss, to my wife Joyce who's support made this possible, and to our children Bill, Kristin, and Katie who are our life and legacy.

This dissertation is also dedicated to CIOs around the world who are the captains of information management in a new age, yet are still struggling for their rightful seat at the executive table.

Acknowledgements

I began my doctoral studies in January 1995 shortly after arriving in Washington D.C.. This was done in the spirit of embarking on a last big quest for personal and professional achievement. So much has happened in the ensuing years that I often am surprised that the continuity of effort in these studies was maintained. That it was, is evidence of both my natural curiosity and my stubbornness, but more importantly is the result of the support and guidance of many people.

Without a doubt, my wife Joyce was key to completing this work in the midst of the birth of two of our three children, a career change, and a second masters degree that was an offshoot of these studies. A wonderful partner, mother, Naval Officer, and wife, I can only say that I owe her a tremendous debt that hopefully many future years of family fun and travel together will partially repay.

The second person that I must recognize is my academic mentor and committee chairman, Dr. Philip Kronenberg, who encouraged me, challenged me, and in so doing made me a better contributor to the field. I will remember his wisdom, expertise, high standards, and willingness to do whatever it took to help keep me going, including conducting an independent study when I was deployed half-way around the world on a Navy aircraft carrier for six months and we communicated via some of the first shipboard Internet links that the Navy had in 1997.

I would like to thank my doctoral committee members: Dr. Charles Goodsell who was my first instructor in the program, Dr. Jim Wolf who is the first faculty member I met when I was applying and who's classes I enjoyed greatly, Dr. Dick Worrall who was kind enough to have me speak on the subject of CIOs to his class, and Dr. Steve Holden who added greatly to my understanding of the field of information resources management through his academic writings and work in the federal government. I am fortunate to have such a distinguished and supportive group of scholars on my committee.

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LIST OF ABBREVIATIONS

A-11	OMB Circular A-11
A-130	OMB Circular A-130
ADP	Automated Data Processing
CCA	CCA (ITMRA).
CIO	Chief Information Officer
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CKO	Chief Knowledge Officer
COO	Chief Operating Officer
CPIC	Capital Planning and Investment Control
CPO	Chief Privacy Officer
CTO	Chief Technology Officer
DOD	Department of Defense
E	Electronic (e.g., E-Government, E-Mail)
EFOIA	Electronic Freedom of Information Act
EO	Executive Order
EPA	Environmental Protection Agency
FARA	Federal Acquisition Reform Act of 1994
FASA	Federal Acquisition Streamlining Act of 1996
FCPEM	Federal CIO Position Evaluation Method
FEAF	Federal Enterprise Architecture Framework
FEMA	Federal Emergency Management Agency
FOIA	Freedom of Information Act
GAO	General Accounting Office
GITSB	Government Information Technology Services Board
GPEA	Government Paperwork Elimination Act of 1998
GPRA	Government Performance and Results Act of 1993
GSA	Government Services Agency
IRM	Information Resources Management
IS	Information Systems
IT	Information Technology
ITMRA	Information Technology Management Reform Act of 1996
MIS	Management Information Systems
NPR	National Performance Review
OCIO	Office of the Chief Information Officer
OIRA	Office of Information and Regulatory Affairs.
OMB	Office of Management and Budget
PDD-63	Presidential Decision Directive 63
PL	Public Law
PRA'95	Paperwork Reduction Act of 1995
SES	Senior Executive Service
SIRMO	Senior Information Resources Management Officer
USDA	United States Department of Agriculture

Note: "Agency" refers to all Federal executive branch organizations, including departments, agencies, bureaus, and commissions.

CHAPTER 1 – OVERVIEW

Introduction

This dissertation proposes a method for policy analysts to use in evaluating whether federal government agencies have complied with the intent of the Clinger-Cohen Act (CCA) of 1996¹ as they established Chief Information Officer (CIO) positions. The method that was tested and validated in this research is referred to as the Federal CIO Position Evaluation Method (FCPEM).

I chose the CCA to be the policy reference for this dissertation not only because it is the law that created the federal CIO position and mandates its creation in twenty-three agencies, but also because the CCA is quoted by the Administration, Congress, and agencies as the authoritative source on how this position should function. Further, the CCA created the federal CIO Council, which has raised the visibility of agency CIOs, as the Council has become the preeminent inter-agency information technology (IT) coordination body. The CCA also dramatically changed the way that agency IT systems are bought by shifting control from the General Services Administration to the agencies themselves, a process that the CCA requires the agency's CIO to oversee.

What are not established in the CCA are evaluation criteria for determining if the CIO position was created as Congress intended in this

law. Several recent government studies have emerged on the CCA and CIOs, including two GAO reports on federal CIO organizations and practices, but they do not suggest CIO position establishment evaluation criteria.^{2 3}

My general assumption in doing this research is that agency compliance with the CIO-related mandates of the CCA is in the best interest of the public. By this I mean that if an agency creates its CIO position in accordance with the CCA, some benefit to mission accomplishment will occur.

Purpose of the Dissertation

The purpose of this dissertation research is to enhance the analysis of public policy implementation in the area of federal CIO position establishment by filling in the gap identified above. The research question is:

Can a method be developed to evaluate whether federal agency CIO implementation efforts are consistent with the intent of the CCA?

¹ Formerly known as the Information Technology Management Reform Act of 1996, or "ITMRA," Public Law 104-106, 110 Statute 124, 40 U.S. Code 1401.

² General Accounting Office. Implementing Successful CIO Organizations. GAO/AIMD-00-120. Government Printing Office, Washington D.C., March, 2000.

³ General Accounting Office. Maximizing the Success of Chief Information Officers: Learning From Leading Organizations. GAO/AIMD-00-83. Government Printing Office, Washington, D.C., February 2000.

To answer this question, the research followed this seven-step policy analysis process:

1. Identify a policy research context based on applicable legislation, other documentation, and theory.
2. Determine the policy intent of CIO sections of the CCA.
3. Model the CIO position to support its evaluation.
4. Develop the Federal CIO Position Evaluation Method (FCPEM).
5. Validate that the FCPEM functions as intended.
6. Discuss the importance of this research contribution.
7. Make conclusions about the research and recommendations for future use of the FCPEM.

In accomplishing this policy analysis process, I established the legislative and agency context for research by reviewing the history of Information Resources Management (IRM) policy in the federal sector. This included the history of the CCA and its relationship to other IRM policy that has a bearing on the federal CIO position.

To provide an interpretation of CCA's legislative intent with respect to the federal CIO position, I analyzed the CCA and other federal IRM policy documents and related law, and conducted interviews with individuals involved in drafting this legislation in 1995 and 1996.

Because I could not find a model of the federal CIO position that incorporates both CIO roles and an organizational context, one was developed and validated as part of the research effort. This CIO Position Model provides a way to view the federal CIO position itself and also serves as a background for evaluating CIO position establishment.

I then developed the FCPEM, a CIO position establishment evaluation method, by identifying CCA-mandated roles for the CIO position and evaluation criteria for each of those roles.

To see if the FCPEM accomplishes CIO position evaluation in the way I intended, I conducted interviews with key actors in the four federal agencies that were selected as case studies.

After presenting the findings of this research here, I discuss its importance in terms of its potential contribution to IT-related discussions of federal government processes, and to policy science and public administration literature. I also offer recommendations for additional research in this area and for agency actions in using the FCPEM.

In addition to accomplishing and reporting on this policy evaluation research, I comment in the last chapter on general and specific observations about evaluating the CIO position, the limits of the FCPEM, and make recommendations on how to extend the utility of the FCPEM method.

Significance of the Subject

It is the federal agency CIO who increasingly determines the "what, when, and how"⁴ of IRM-related policy decision-making. Consequently, this is a significant area for public policy inquiry for two inter-related reasons, (1)

⁴ Lasswell, Harold. Politics: Who Gets What, When, and How. New York: St. Martin's Press, 1988 (Originally published in 1936).

the power and ubiquity of federal CIOs, and (2) the increasingly important role of technology in enabling government functions.

First, federal CIOs are uniquely powerful in that they largely control the growing information technology (IT) infrastructure of their agency. This infrastructure of nation-wide networks, databases, and interfaces to the global Internet has often become the primary vehicle for inter/intra-government communication and for delivering services to the public. According to Gloria Parker, CIO at the Department of Housing and Urban Development, "The CIO has been able, generally speaking, to initiate IT reform across the federal government."⁵

Not only are CIOs powerful, but they are now ubiquitous in government organizations. All twenty-three of the federal agencies mentioned in the CCA had established CIO positions by late-1998.⁶ These agencies comprise all of the cabinet-level institutions, and other major agencies. Having senior level CIOs now functioning across the apex of the executive branch and in many other federal, State, and local agencies makes this a new area of importance for studies on government policy and decision-making.

Second, CIOs are in the vanguard of the still-emerging "Information Age" (or Digital Age), a global revolution in the way people share information. In the previous millennium, advances in farm and mechanical

⁵ Ferris, Nancy. "CIO's on the Go". *Government Executive*, March 1999, Volume 31, Number 3, pages 18-33, 86.

⁶ GAO Report T-AIMD-00-128, page 2.

technologies propelled the Agricultural Age and Industrial Age. Today, advances in computer and telecommunications technologies are at the center of what Thomas Kuhn would recognize as a scientific and social revolution that has begun to alter basic paradigms in economics, business, and government.⁷

In this new politico-economic environment, vast amounts of data are rapidly aggregated and sorted into information, which is then synthesized into knowledge. This increasingly rapid cycle produces views of people, places, and processes not available before. It is fueled by ever more capable computers and robust broadcast channels that now reach to virtually every part of the globe.

In terms of the impact of this new politico-economic environment on government, the desire to capture the benefit of these new technologies and to harvest the new riches of information is a distinguishing feature of current American politics and public policy. The Information Age has put its imprint on the most common of political processes, including issue research, conversing with stakeholders/constituents, coordinating legislation, voting, and delivering public services. During the 2000 Presidential race, William Matthews stated that “the candidate’s vision for

⁷ Kuhn, Thomas S. The Structure of Scientific Revolutions. Chicago: The University of Chicago Press, 1962.

reform hinges on [electronic] e-government.”⁸ He also quotes “cyberlobbyist” Pam Fielding as saying that in this Digital Age, office holders and candidates in both political parties must have a clear position on technology that supports their vision of how to improve government.

The need to address issues of e-government is not restricted to candidates or office-holders. Career bureaucrats also must be conversant in the new lexicon of the Information Age and must be aware of how to apply and manage emerging technologies. In that information is the defining resource of this new era, having the ability to strategically manage and leverage this resource has become increasingly important to the functioning of government.

While the Information Age is changing many features of the way government functions, some are still recognizable. Over a half century ago Dwight Waldo described an American “Administrative State” that centers on expert government agencies that function through loosely drawn statutes that empower unelected officials.⁹ This dissertation focuses on just such a loosely drawn federal statute, the CCA, which creates and empowers a new expert executive position, the CIO.

⁸ Matthews, William. “Bush to fight back with e-gov plan”. *Federal Computer Week*. Volume 14, Number 13, May 1, 2000. Page 41.

⁹ Waldo, Dwight. The Administrative State. New York: Ronald Press, 1948.

Research Tradition

The research for this dissertation was conducted using a multidisciplinary ethnographic approach to policy analysis. The function of this research is twofold: (1) to establish a context for the federal CIO position through modeling and a review of applicable literature, and (2) to develop and validate a policy evaluation method regarding this position through interviews and a retrospective analysis of selected case studies.

The approach was selected because it supports an understanding of the CCA's CIO-related mandates within the context of the federal agency culture in which the CIOs are to operate. Further, published research studies have recognized this approach for studying public policy implementation.^{10 11}

Organizational theories regarding the structure of social organizations are the main paradigmatic framework from which research observations will be made about the CIO position and its legislative/agency context. Central to this is the idea that organizations are multi-level systems that are influenced by their environment.^{12 13 14}

¹⁰ Pressman, Jeffrey L., and Aaron Wildavsky. Implementation: How Great Expectations in Washington Are Dashed in Oakland. Berkley: University of California Press, 1984.

¹¹ Mazmanian, Daniel A., and Paul A. Sabatier. Effective Policy Implementation, Lexington, MA, Lexington Books, 1981.

¹² Bertalanffy, Ludwig von. General Systems Theory. In *General Systems: Yearbook of the Society for the Advancement of General Systems Theory*, ed. Ludwig von Bertalanffy and Anatol Rapoport, 1, 1-10, 1956.

¹³ Simon, Herbert. "The Architecture of Complexity". *Proceedings of the American Philosophical Society*, 106, 467-482, 1962.

¹⁴ Scott, Richard W. Organizations: Rational, Natural, and Open Systems (3rd edition). Englewood Cliffs: Prentice Hall, 1992.

Dissertation Setting

The dissertation's research took place in the Washington, D.C. area, where the headquarters are located for all federal agencies named in the CCA. This proximity greatly supported access to agency documents and staff, as well as to those former congressional staff members who were involved in creating the CCA and who know best its original intent.

During the early portion of the research period, I was a naval officer assigned to the Joint Chiefs of Staff at the Pentagon in their IRM Office, reporting directly to the Deputy CIO. Later in the research period, I became a private-sector IT management consultant, working with CIOs, Deputy CIOs, and their staffs at the Departments of Education, Energy, Labor, Transportation, and the Office of the Secretary of Defense.

Prior to the dissertation, I had held a variety of IT management positions in the Department of the Navy, including being the Information Systems Officer (CIO equivalent) for a nuclear-powered aircraft carrier carrying 5,400 people in over three dozen organizations (a city afloat). Therefore, this dissertation reflects my knowledge and experience as a practitioner in the field of IRM who is engaged in research as a participant-observer in federal CIO activities.

Limits of the Dissertation

There are five principle limits to this dissertation. First, the dissertation was designed to develop, validate, and propose a method for evaluating federal

CIO position establishment (the FCPEM); it was not designed to conduct an evaluation of CIO implementation actions in all of the agencies mentioned in the CCA. Therefore, four agencies out of a population of twenty-three were selected as a representative group with which to test the validity of the FCPEM. These twenty-three agencies listed in the CCA are a highly diverse group of institutions, and conclusions drawn from case study observations should therefore be viewed as part of an initial attempt to establish a policy evaluation method, and not as an exhaustive evaluation of that policy's implementation.

Second, this research should be considered to be exploratory because the method of complying with many of CCA's mandates continues to be interpreted by Congress, the Bush Administration, and agencies. Two examples of this are the December 2000 revision to OMB Circular A-130 that only now incorporates CCA mandates, and congressional inquiry this past year into CCA/CIO compliance. In particular, an October 2000 investigative report by Senator Fred Thompson (R-Tennessee) found that "Roles, reporting relationships, and boundaries of authority among CIOs within large executive agencies and departments are not clearly established."¹⁵

Third, only those federal agencies that are specifically listed in the CCA in Section 5125 as having to establish a CIO position will be included in the research, with the exception of considering the Department of Defense as a

¹⁵ U.S. Senate Committee on Governmental Affairs. Investigative Report of Senator Fred Thompson on Federal Agency Compliance with the Clinger-Cohen Act. Government Printing Office, Washington, D.C., October 20, 2000.

case study, as they were my employer during a significant portion of this dissertation. The exclusion of the Department of Defense is considered to be a minor limitation in that there are several other large, diverse federal departments to choose from. Appendix A contains the language of CCA Section 5125, and shows that there are twenty-three federal agencies listed. This limit on the population of organizations is imposed so that they all have the same legal criteria for establishing a CIO position. Other federal agencies have created CIO positions, many of them along the lines of the CCA requirements. However, it is arguable whether they are bound by the CCA's CIO mandates because within the language of this law there is no "extension" of its authority to other federal organizations that are not specifically named. This includes the sub-organizations of the major agencies that are named. For this reason one finds a CIO at the Department of Transportation, but no CIO at the Federal Highway Administration, or the Maritime Safety Administration, which are two of fifteen sub agencies that report to the Secretary of Transportation.

Fourth, the number of interviews and time spent with each was of necessity limited. Because of their senior positions, some individuals would only give 25-30 minutes. More than two dozen people were interviewed. While this is considered to be sufficient for the tasks of gaining background information and validating the FCPEM evaluation method, future studies involving more agencies and more types of senior agency executives may reveal additional information on the federal CIO position and approaches to its evaluation.

Fifth, the dissertation is mainly descriptive in nature, looking for general and then more specific patterns, providing interpretation and recommendations. The step from descriptive observation to conclusions and prescriptive recommendations is undertaken with some caution due to the relatively small sample size of the research population and the relatively short life of this federal policy (the CCA was passed in 1996). Also, the drafters of the CCA stated in several interviews that they specifically avoided prescriptive language in order to make the law more palatable for passage and more adoptable by the wide variety of institutions represented in the twenty-three named agencies. This leaves the researcher with a heavier burden of interpretation in making recommendations based on findings.

CHAPTER 2 – A REVIEW OF THE LITERATURE

Contribution

By offering a method for evaluating the CCA compliance of federal agency CIO positions, this research is intended to contribute to policy analytic studies of federal information resources management (IRM). Because the research question focuses on public policy evaluation, the two main bodies of relevant academic literature are the policy sciences and public administration. Practitioner-related literature on government IRM practices and the CIO position is also relevant because the particular policy area being studied is federal IRM.

The theoretical grounding for this research comes from literature on the structure of social organizations and the ways people interact within them. A review of this theoretical literature follows a brief overview of the policy sciences and a review of policy science, public administration, and information resources management literatures.

Policy Sciences Overview

The eighteenth century empiricist philosophies of John Locke and David Hume profoundly influenced the framers of our Constitution, hence our early governmental structure with its carefully crafted checks and balances of power.

These philosophies, which are so distrustful of man's basic nature, also influenced the social reform movement of the early 1900s that spawned the field of public administration. The social engineers of the early part of the

century were the forerunners of today's policy analysts.¹⁶ It was the writings of John Burgess, Woodrow Wilson, Arthur Bentley, Charles Beard, Charles Merriman, John Dewey, Ernest Griffith, and others that established an early twentieth century core of theories on public institutions and policy processes, as well as the role and influence of elites, policy subsystems, and interest groups.

The world changed with World War II, and with it changed the direction of the emerging policy sciences. The War brought a need for social science and policy research, with empirical analysis as the goal. Out of this period came the work of sociologist Robert Merton¹⁷ who influenced the emerging policy sciences through his writings on organizations and social structure. Also, in 1956, Harold Lasswell¹⁸ published a defining model of policy-making phases (or functions) that marked the beginning of modern policy inquiry and formed the basis of work by many others in the late 1950s-1970s. It was during this period that the empirical basis of policy analysis became nearly universal, and the role of "policy analyst as expert" became widely accepted. This empirical focus had its roots in the philosophy of positivism.

The French philosopher Auguste Comte conceived of positivism in the early 1800s. It centers on observable, scientific facts and their relations to each other, and rejects speculation about or a search for ultimate origins. Comte is also

¹⁶ Ward, Robert. Class lecture: PAPA 6294 Capstone Seminar in Public Policy, Virginia Polytechnic Institute and State University, Blacksburg, Virginia. June 16, 1998.

¹⁷ Merton, Robert K. Social Theory and Social Structure (2nd edition). Glencoe, Illinois: Free Press, 1957.

¹⁸ Lasswell, Harold D. The Decision Process: Seven Categories of Functional Analysis. College Park, MD: Bureau of Government Research, University of Maryland, 1956.

credited with being the founder of the field of sociology as a systematic study. Positivist social science focuses on empirical research design, the measurement of outcomes, using sampling techniques and data gathering procedures, and the development of causal models with predictive power¹⁹. These empirical-analytic techniques include cost-benefit analysis, multiple regression analysis, survey research, input-output studies, operations research, mathematical simulation models, and systems analysis.^{20 21 22} The use of such techniques is typically identified with the "rational model" of policy decision making, which can be outlined in the following five steps:²³

1. Decision-makers first empirically identify the existence of a problem.
2. They formulate the goals and objectives that would lead to an optimal solution.
3. They determine the relevant consequences and probabilities of alternative means to the solution.
4. They assign a value, that is, a numerical cost or benefit, to each consequence.
5. They combine the information about consequences, probabilities, and costs/benefits, selecting the most effective/efficient alternative.

Underlying this rational-positivist approach is the principle of maintaining a separation between facts and values, which became known as the "fact-value dichotomy." The dichotomy speaks to a foundational orientation of empirical research that precludes any reference to normative concepts or implications.

¹⁹ Lin, Nan. Foundations of Social Research. New York: McGraw Hill, 1976.

²⁰ Putt, Allen D., and J. Fred Springer. Policy Research: concepts, Methods, and Applications. New York: Prentice Hall. 1989.

²¹ Sylvia, Ronald D., Kenneth J. Meier, and Elizabeth M. Gunn. Program Planning and Evaluation for the Public Manager. Prospect Heights, IL: Waveland Press, 1991.

²² Fischer, Frank. *Participatory Expertise: Toward the Democratization of Policy Science*. In Advances in Policy Studies Since 1950. W. Dunn and R. Kelly editors. New Brunswick, NJ: Transaction. 1992.

This has caused a paradigmatic schism within the social sciences for decades, to the point that post-positivist social scientists see positivistic methods as being incomplete and insufficient for social inquiry, including public policy analysis.

Frank Fischer summarizes the critique of the fact-value dichotomy as follows:

The concept of value neutrality itself must be considered a value orientation, as it has clear implications and consequences for evaluation. Insofar as every political action is purposeful, and thus is based on a point of view, the investigation of political phenomena is unavoidably based on a value orientation.

There is no language available for the study of political events that is inherently nonevaluative, as language is itself a construction of a social world.

The processes by which social scientists establish the concepts to be employed in their examinations of particular actions or events rest upon implicit value judgements.²⁴

Although the rational-positivist approach to policy analysis was in the forefront following World War II, the field was also expanding in scope through studies of the civil rights movement and social welfare programs of the late 1950s through 1970s.

In the 1980s, several new “postpositive” ontologies emerged which decry the separation of fact and value and eschew empirical validation. These frameworks are exemplified in the hermeneutic theories of John Dryzek²⁵ and the critical theory works of Jürgen Habermas.²⁶ In particular, critical theory

²³ Fischer, Frank. Evaluating Public Policy. Chicago: Nelson-Hall Publishers. 1995.

²⁴ Ibid, page 13.

²⁵ Dryzek, John S. Policy Analysis as a Hermeneutic Activity. *Policy Sciences*, Volume 14, Number 4 (August), pages 309-331. 1982.

²⁶ Habermas, Jürgen. Communication and the Evolution of Society. Thomas McCarthy (Translator). Boston: Beacon. 1979

argues that knowledge conceived as a body of facts and truths existing apart from human purpose is a myth. The theory agrees with a statement of Lasswell that in the policy sciences there are multiple perspectives and purposes to a problem that need to be simultaneously coexamined.²⁷

Policy Science and Public Administration Literature

To date, there have been few academic studies of the CIO position in either the public or private sector. As far as I could determine, no policy dissertation has focused on the federal CIO position; and academic journals in the areas of public administration, organization theory, policy sciences, political science, and management have only marginally addressed this position or CIO-related issues.

A new group of IT/IRM-oriented texts, journals and publications has emerged, but the focus is most often on high-level policy, strategy, or technology issues, with the CIO position still receiving little attention. Only one book specifically on the functions of the CIO position can be found, and it uses five management case studies to describe differences and similarities in five CIO positions in the public and private sector.²⁸

A review of the leading public administration journals over the past ten years revealed a paucity of writing on federal IRM policy and/or the CIO position. Only thirteen related articles were published in the past decade. Other issue

²⁷ Yankelovich, Daniel. Coming to Public Judgment: Making Democracy Work in a Complex World. Syracuse, NY: Syracuse University Press. 1991.

areas covered during this period included governmental efficiency at the federal/State/local level, gender issues, theory and practice of bureaucratic politics, ethics, the devolution of government, and relationships between groups and organizations. The journals reviewed were *Public Administration Review*, *Administration and Society*, *Public Administration Quarterly*, and *American Review of Public Administration*.

A similar review of leading public policy journals revealed an equally sparse coverage of federal IRM or the CIO position, with seven articles published in the past decade. The journals reviewed were the *Journal of Policy Analysis and Management*, *Policy Studies Journal*, *Policy Sciences*, and *Policy Studies Review*. Other topic areas covered by these journals during the past decade included policy systems, civil society, performance management, ethics, innovation, privatization, welfare, education, militarism, and special interest groups.

A review of leading management journals and practitioner publications reveals a greater body of literature on IRM and IT issues, including four CIO-related articles. A total of nine IT/IRM articles were published in this area in the past year, twenty-three more in the previous five years, and thirty-one more going back to 1990, including a CIO-specific article in 1994. *Government Executive* and *Sloan Management Review* are the clear leaders during the past

²⁸ Stevens, Charlotte, S. *The Nature of Information Technology Managerial Work*. New York: Quorum Books, 1995.

decade, with twenty-six total articles and a monthly section on technology issues.

The journals reviewed included *Sloan Management Review*, *Harvard Business Review*, *Academy of Management Journal*, *Academy of Management Review*, *Government Executive*, *Academy of Management Executive*, *Administrative Science Quarterly*.

Given that the CIO position originated in the private management sector twenty years ago and the public sector took a decade to embrace this concept, it should perhaps not be surprising that management journals and practitioner publications have devoted more attention to CIO and IRM writings than have public administration/policy journals.

Though no books were found that exclusively focused on the federal CIO position, two books were found that covered topics significantly involving federal and/or State and local CIOs. The first book is a 1998 work by a consulting team at PriceWaterhouse, Inc., whose authors "show the practical ways that government CEOs, CFOs, and CIOs use to gain control over the juggernaut of public sector information technology and steer it toward strategic goals and objectives."²⁹ The other book was published in January 2001 and looks at IT management at the State and local level. It is the first in a series of books that will document the results of a four-year study by the Maxwell School of Public Administration at Syracuse University, and the Pew Charitable Trust on

how these governments manage people, money, IT, and results. According to the editor, this first book in the series, called "Powering Up," focused on IT management "because it has become clear that IT is fundamentally important to managing everything else."³⁰ Chapter 5, entitled "Who's in Charge," looks at what State and local level CIOs do and cites four States as models of IT management (Missouri, Utah, Virginia, and Washington). Beyond that though, the book does not have a CIO focus.

Information Management Literature

The current leader in IT/IRM/CIO publishing is a whole new group of academic journals and practitioner-oriented publications that are devoted exclusively to this area. Starting in the mid-1960s through early 1980s, several new academic journals (e.g., *Management Information Sciences* and *Government Information Quarterly*) and numerous practitioner magazines (e.g., *CIO*, *Federal Computer Week*) have appeared which are devoted to IT/IRM/CIO issues. The public and private sector interest in this area is so great that some publications come out weekly and do not charge for subscriptions, being wholly advertisement supported.

This group of publications now stands as the main forum for announcing new IT products (with close industry participation), debating and announcing new IT

²⁹ PriceWaterhouse, Inc. Information Leadership: A Government Executive's Guide. Mansfield, Ohio: Bookmasters, Inc. Page ix. 1999.

standards, considering IT-related public issues (e.g., citizen data privacy, and e-government), and examining federal IRM policy and technology impacts on organizations.

CIO magazine is currently the only CIO-specific publication. It started being published in the early 1980s, and has grown significantly in circulation and topic coverage. Circulation for *CIO* went from 25,000 in 1987 to more than 135,000 in 2000 (including over 23,000 nation-wide who claim to have the title of CIO or Vice President of IS/MIS). During 1998 and 1999, three magazines from the publishers of *CIO* were being printed twice monthly: *CIO*, *CIO Enterprise*, and *CIO Web Business*. However, in early 2000, they consolidated their efforts and now publish only *CIO* magazine twice a month.

Literature on federal IRM policy is increasing, with *Government Information Quarterly* being the most prolific academic journal. Despite this increase in attention, articles that mention both the federal CIO position and the CCA are often focused on other issues such as CIO position turnover, acceptance, and executive power (or lack thereof). The IT/IRM journal and magazine group includes *Management Information Sciences*, *Government Information Quarterly*, *IRM Journal*, *Journal of Government Information*, *Federal Computer Week*, *Government Computer News*, and *CIO*.

Even in this most active of IRM literature areas, no article devoted to adherence to CCA guidelines for establishing CIO positions could be found.

³⁰ Barrett, Katherine and Richard Green. [Powering Up: How Public Managers Can Take Control](#)

Neither of two GAO reports released in March 2000 on CIO organizations provides a framework for evaluating the extent of agency compliance with the CCA in creating CIO positions.

The Parsons/Thompson Model of Organizations

This dissertation takes an eclectic approach to describing the multi-dimensional aspects of the federal CIO position, as well as the agency organizational context in which CIOs operate. Indeed, the FCPEM evaluates CIOs who belong to organizations, which in this case are federal agencies. To enhance the analyst's understanding and use of the FCPEM, I also created a general model of the Federal CIO position that incorporates a generic model of organizations. The organizational model chosen for this was originally developed by Talcott Parsons and then was advanced by James Thompson.

It was in the 1950s-1960s that Parsons developed this model of social systems, which he argued could be used to analyze many types of organizations, from small social units to large societies.³¹ His idea was that social organizations have a multi-level structure and exhibit interaction with their environment.

In the mid-1950s the original concept of organizations as “open” systems with sub-structure and environmental interchange was introduced by biologist Ludwig von Bertalanffy in his general systems theory, which attempted to

of Information Technology. Washington, D.C.: CQ Press. Page xiv. 2001.

³¹ Parsons, Talcott. Structure and Process in Modern Society. New York: The Free Press of Glencoe, 1960.

demonstrate applicability across a broad spectrum of disciplines and fields.³²

Also in this timeframe, Kenneth Boulding proposed the notion of types or levels of systems that vary both in the complexity of their parts and in the nature of the relations among the parts.³³

Those concepts were brought into Parson's general model of organizations, as he acknowledged the influence of interactions with the environment at the "outermost" level of his construct.

Open systems thinking grew in the 1960s–1970s to become a leading concept in organizational theory. This was out of recognition of the limitations of rational systems models of previous decades, which had largely ignored the role of the environment in system maintenance, function, and reference.

Contingency Theory, Institutional Theory, Organizational Learning Theory, and Postmodernism all emerged in part from this more holistic view of systems and organizations.

Parsons identified three general levels in organizations. The bottom *technical* level is where the actual "product" of an organization is processed (e.g., assembly line work, classroom teaching, data entry). The middle *managerial* level is where mediation between the organization and the immediate task environment occurs, where the organization's internal affairs are administered, and where the organization's products are consumed

³² Bertalanffy, Ludwig von. *General Systems Theory*, in *General Systems: Yearbook of the Society for the Advancement of General Systems Theory*. Ed. Ludwig von Bertalanffy and Anatol Rapoport, 7, 1-20, 1956.

and resources supplied. The top *institutional* level is where the organization relates to the larger society in deriving legitimization, meaning, and higher-level support, thus making possible the implementation of organizational goals. Parsons said that there is a qualitative break at the two intersections of these levels, such that they can be identified as areas of discrete organizational activity.³⁴

James Thompson built on Parsons' idea of three levels by using them to describe how organizations function.³⁵ At the technical level, Thompson argued that the organization is "rational" as it carries on production (input/output) functions and tries to seal off those functions from the outside to protect them from external uncertainties as much as possible. At the institutional level, the opposite dynamic is observed: the organization is very open to the environment in order to determine its domain, establish boundaries, and secure legitimacy. In between, at the managerial level, a dynamic of mediation occurs where less formalized and more political activities occur.

Parsons/Thompson's tri-level model of complex organizations also depicts them as open systems that are subject to rationality. According to this aspect of the model, at an organization's technical core, lowering the number of items (variables) that affect key business processes reduces uncertainty, which is important to the stability and success of the organization. Reducing this

³³ Boulding, Kenneth E. General Systems Theory: The Skeleton of Science. *Management Science*, Number 2, pages 197-208. 1956.

³⁴ Thompson, James D. Organizations in Action. New York: McGraw-Hill. Page 65. 1967.

uncertainty is further supported by sealing off the technical core's organizational processes to outside influence as much as is possible.

On the other hand, at the top institutional level of the Parson/Thompson model, where environmental interfaces predominate, uncertainty would appear to be greatest and the organization (unable and/or unwanting to seal off this level) uses generalizing norms to deal with the intrusion of variables that are largely unyielding to authority or control. These normative elements range from codified law to informal standards of good practice or socially accepted interpretations of the public will.

The value of the Parsons/Thompson model is in its maturity as a theoretical view of organizations, and in its potential applicability to a wide range of social organizations, including federal agencies. The question of whether this 40-year old view is actually applicable to the current federal agency organizational structure is addressed by observing that many agencies continue to be representative of early twentieth century rational institutions that are hierarchical, rule-based, and goal-oriented. Evidence of this is seen in agency organization charts, mission statements, strategic plans, operational plans, and web sites.

I therefore chose to use the Parsons/Thompson model to enhance the modeling of the CIO position, as it provides a structural hierarchy for viewing the operation of various CIO competency areas. While the Parsons/Thompson

³⁵ Ibid, page 8.

model is not used directly in the FCPEM CIO evaluation method, its use in the CIO Position Model serves to improve the understanding of the position that is being evaluated.

In summary, this dissertation's research is grounded in organizational theory and seeks to develop a method for public policy analysts to use in evaluating a particular public policy (the CCA) as it applies to a new bureaucratic role (the CIO) in public agencies at the federal level. The research will contribute to policy analytic and public administration studies of large government institutions, as well as document the emergence of a significant new bureaucratic position. The approach used in conducting this research will be covered in the following chapter.

CHAPTER 3 - RESEARCH METHODS

Methodological Grounding

This dissertation's research used a multi-disciplinary ethnographic policy evaluation approach to address the following question:

Can a method be developed to evaluate whether the CIO implementation efforts of federal agencies are consistent with the intent of the Clinger-Cohen Act?

The answer to this research question fills a gap in the way that one area of the CCA is currently evaluated.

Previous public policy studies have recognized this type of ethnographic, case study-oriented approach for studying public policy implementation.^{36 37} The dissertation's research followed this approach in developing and validating the "FCPEM" CIO evaluation method. FCPEM was initially developed through document research, modeling the CIO position, interviews with individuals involved in drafting the CCA, and retrospective case studies of selected federal agencies that are subject to the CCA. The FCPEM was then validated through interviews with key actors in those selected case study agencies.

I will now provide an overview of the research methods that were used and then discuss the particular policy analytic process used to develop the FCPEM, including the data gathering approach used in the case studies.

³⁶ Mazmanian, Daniel A., and Paul A. Sabatier. Implementation and Public Policy, Lanham, MD; University Press of America, 1981.

³⁷ Pressman, Jeffrey L., and Aaron Wildavsky. Implementation: How Great Expectations in Washington Are Dashed in Oakland. Berkeley; University of California Press, 1984.

Research Design

The public policy process in general can be viewed as a five-phase cycle of agenda setting, formulation, adoption, implementation, and assessment.^{38 39}

Evaluation is the analytic procedure appropriate to the last phase (assessment).

Policy evaluation may be conducted through several methodologies

depending on the nature of the policy being studied and the chosen approach

of the analyst. Evert Vedung defines policy evaluation as "careful retrospective

assessment of the merit, worth, and value of administration, output, and

outcome of government interventions, which is intended to play a role in future

practical action situations".⁴⁰

The seven-step approach to policy analysis in this research develops an evaluation method (the FCPEM) for the federal CIO position. This policy analysis process is outlined in Table 1 on the next page.

³⁸ Dunn, William. Public Policy Analysis (2nd edition). Englewood Cliffs: Prentice Hall. 1994.

³⁹ Anderson, James E. Public Policymaking. New York: Houghton Mifflin & Company. 1997.

⁴⁰ Vedung, Evert. Public Policy and Program Evaluation. New Brunswick: Transaction Publishers, 1997.

Table 1. Policy Analysis Process

1. Establish a research context. The policy and theoretical basis for this research was established in Chapters 1 and 2 by identifying a contribution to public policy literature, and the legislative/agency context. The approach to this research is covered in Chapter 3.
2. Identify the intent of the CCA's CIO mandates. Section 5125 of the CCA is identified as the source of mandated federal CIO roles. In Chapter 4 the intent this section of the CCA is discerned from an analysis of the CCA, related federal IRM legislation, and interviews with individuals involved in drafting the CCA.
3. Create a model of the federal CIO position. In Chapter 5, a general model of the Federal CIO position is developed by identifying ten CIO competencies, and relating them to three organizational levels. This model is not part of the FCPEM, but is intended to aid policy analysts in understanding the CIO position they are evaluating.
4. Establish a method for evaluating federal CIO positions. Using CCA Section 5125's list of CIO roles, and an interpretation of the intent of the CCA for those roles, a set of normative criteria were developed in Chapter 5 to evaluate whether an agency established their CIO position within the intent of the CCA. These thirteen normative criteria serve as the foundation of the FCPEM evaluation method.
5. Validate the FCPEM evaluation method in agency case studies. Chapter 6 describes key actor interviews in four case study agencies that were used to validate that the FCPEM is useful in evaluating whether their implementation actions are consistent with the intent of the CCA. Background and CIO-related information on the case study agencies was also provided in Chapter 6.
6. Discuss the importance of this research contribution. In Chapter 7 the inquiry is pushed to a higher level in a discussion of the value of the FCPEM to the government and the importance of this contribution to public policy evaluation methodologies.
7. Make recommendations for policy improvement. Also in Chapter 7, conclusions are drawn from the research and recommendations are made on how to improve federal IRM policy in the area of federal CIO roles and responsibilities.

Qualitative research is a particular tradition in social science that primarily centers on watching people in their own environment and interacting with them in their own language and social context. This approach to research is appropriate to developing and validating the Federal CIO Model and the FCPEM evaluation method because it recognizes the social/managerial character of the CIO position and the organizational environment in which the CIO works.

Jerome Kirk and Marc Miller identify four activity phases in qualitative research that "do not in themselves guarantee a respectable research product, but they do provide structure and direction pertinent to this objective."⁴¹ These phases are:

1. Research Design
2. Data Collection
3. Analysis
4. Documentation

This dissertation's research design was presented during the prospectus defense in November 1999. The data collection effort (document reviews and CCA/case study interviews) was conducted from March to early September 2000. Analysis of documentary and interview information was conducted from August to October 2000. Documentation in the form of the descriptive reporting and interpretation was conducted from October 2000 to January 2001.

⁴¹ Kirk, Jerome, and Marc L. Miller. Reliability and Validity in Qualitative Research. Beverly Hills: Sage Publications. Pages 72-73. 1986.

"Construct Validity," as Kirk and Miller define it, looks at "the quality of the relationship between an observation and the element of the model that represents it."⁴² In this research, this type of validation focused on the extent to which key actors stated during interviews that the proposed CIO Position Model could generally represent the federal CIO position in their and/or other agencies, and that the FCPEM evaluation criteria were measuring federal CIO roles as they believed the CCA would intend them to be measured. No effort was made to brief or educate the key actors on the CIO-related intent of the CCA prior to or during the interviews.

In addition to validity, qualitative research must address reliability. In the instance of conducting case studies, this puts focus on the adoption of a language for coding the behavior or phenomenon being observed, so that the researcher "knows where they are in the research process at different points in time."⁴³ Kirk and Miller argue that qualitative research can be performed as social science and can be evaluated in terms of objectivity. They say that the problem of validity is handled by field research and the problem of reliability is handled by documented ethnographic processes that help the researcher with decision making. More specifically:

Qualitative researchers do not report on studied objects so much as they report on their interaction with the objects. This is why objectivity is difficult and essential. The success of a research effort is measured in terms of its validity and reliability. Perfect validity entails perfect reliability

⁴² Ibid, page 81.

⁴³ Ibid, page 72.

but not the converse; perfect validity is theoretically impossible. Herein lies the paradox of the qualitative tradition.⁴⁴

In this research, the use of a standardized Key Actor Interview Guide provided structure and consistency to the interview/data gathering process. This and the use of standardized interview feedback mechanisms in the Guide (e.g., Lickert-scale questions in prepared tables, and standard closed-end questions) increased the reliability of the data being collected.

With regard to the case study methodology for qualitative data gathering, Ann Majchrzak states that “case studies promote examination of the processes by which an intervention or policy action has been implemented.”⁴⁵ Also, Robert Yin says that the case study approach is a preferred strategy for answering “how” and “why” questions and is used when the focus is on contemporary events.⁴⁶

Accordingly, case studies of selected federal agencies were conducted to describe and evaluate how the CIO mandates of the CCA were implemented. These case studies included interviews of key actors on the topics of CIO position establishment activities and/or related policy processes. Interview questions included open-ended questions to avoid bias, determine the possible range of responses, and obtain detailed responses that allowed for

⁴⁴ Ibid, page 73.

⁴⁵ Majchrzak, Ann. Methods for Policy Research. Newbury Park: Sage Publications, 1984.

⁴⁶ Yin, Robert K. Case Study Research: Design and Methods, Revised Edition. Newbury Park, CA: Sage Publications, 1989.

elaboration.⁴⁷ Closed-response questions were used to obtain specific details on policy implementation and to promote an aggregation and comparison of answers. Some tailoring of questions was required to respond to differences in the person's agency organizational position and/or where they may have participated in the CIO implementation process, or are currently serving as or working with CIOs. A copy of the Key Actor Interview Guide is provided in Appendix E.

Case Study Parameters

The case study population encompasses the fourteen federal departments and nine agencies that the CCA explicitly directs to implement the CIO position. The Department of Defense (DOD) was excluded from case studies, due to its unique structure and the fact that it was my employer during part of the period of this dissertation. However, DOD IT executives were included in a pre-test of the study's Key Actor Interview Guide.

The selected case study institutions were the Department of Agriculture, the Department of the Treasury, the Environmental Protection Agency, and the Federal Emergency Management Agency. Additionally, former Senate staff members involved with the drafting of the CCA were interviewed concerning the background of the legislation's development and intent.

⁴⁷ O'Sullivan, Elizabeth and Gary R. Rassel. Research Methods for Public Administrators (2nd ed.). White Plains, NY: Longman Publishers, 1994.

The twenty-three agencies covered in the CIO-related section of the CCA are a diverse group of institutions in terms of mission, size, history, culture, and structure. The missions of the agencies in this group were not duplicative, but do overlap in some areas. History and culture were also different for these federal institutions, in that most of them were established in different years/decades/centuries and in response to different social and/or political needs. I could not determine a case study selection criterion for mission, history, or culture that would lend itself to clear identification and that would have potential relevance to evaluating the CIO position. The criteria for selecting the case study agencies were therefore based on having a sufficient number to perform research validation, including different sized institutions, and institutions with different structures (agency vs. department).

It should be noted again that this was a qualitative, exploratory research effort, not a quantitative effort that employed empirical evaluation methods requiring the satisfaction of accepted sampling levels and criteria. This is not to say that these concepts were ignored in designing the case study research, as they were not. But it is to say that a specific percentage of case study agencies, or interviews, or responses were not sought. What was sought was sufficient evidence to validate the proposed FCPEM evaluation method, such that a conclusion of usefulness of the method could be made. This might be achieved with two, six, ten, or all twenty-three of the agencies in the case study population. But the realization of the diversity of the group of case study

agencies, the seniority of the potential interviewees, and the constraints of available time all combined to convince me that a reasonable number of agencies and interviews must be chosen in achieving an acceptable level of validation of the FCPEM and CIO Position Model.

The case study agencies were therefore chosen as follows:

(1) I determined that I could conduct in-depth case studies of four out of twenty-three agencies (seventeen percent) in the time planned for the data-gathering phase of research (eight months; during which time I was employed full time). I felt that this amount of representation from the population could provide validation of the FCPEM and the CIO Position Model. The four case studies and related overall findings are provided in Chapter 6.

(2) I believed it was important to include both large and small institutions in the case study population to see if there were differences in CCA-CIO compliance that might be attributable to size. Some of the larger departments are well over 100,000 people, while the smaller ones are less than 5,000 people. Observations on CCA-CIO compliance relative to the size of the agency are made in Chapter 8.

(3) I believed it was relevant to have both departments and agencies represented to see if there is a difference in CCA-CIO compliance that might be attributable to differences in organizational structure. Many of the federal departments are the larger institutions with many sub-agencies (though the Department of Education is quite small [5,000 people] with few sub-

organizations, and the Department of Labor is relatively small [14,000 people] with only seven sub-agencies). The departments often operate in a decentralized manner, compared to the centralized nearly single entity mode of smaller agency operations. Observations are made in Chapter 8 on CCA-CIO compliance issues relative to the general structural differences between larger federal departments and smaller federal agencies.

Taking all three selection criteria into account, two large departments (USDA and Treasury) and two agencies (EPA and FEMA) were selected for the case studies. The two large organizations were Treasury and USDA (over 100,000 people), and the two smaller organizations were FEMA and EPA (less than 10,000 people).

Parameters for the case studies include settings, actors, events, processes and timeframe.⁴⁸

Settings: Washington D.C. metropolitan area. The offices of key actors in Congress, GAO, USDA, Treasury, EPA and FEMA.

Actors: Congressional staff involved with the creation and passage of the CCA. Staff and key administrators in the USDA, Treasury, EPA, and FEMA including CIOs, Deputy CIOs, IT staff, and agency leaders.

Events: Interviews, agency meetings, document reviews.

⁴⁸ Miles M. B., and A. M. Huberman. Qualitative data analysis: A sourcebook of new methods. Beverly Hills, CA: Sage Publications, 1984.

Processes: Executive level decision-making, discussing, planning, explaining, justifying, negotiating, reviewing, evaluating, interpreting, testifying, and formulating.

Timeframe: Data collection on agency CIO implementation actions from passage of the CCA in 1996 to December 2000. This data collection effort was conducted from March 2000 to October 2000.

Data Collection

The most important aspect of data collection is to ensure that it provides information to the study that is relevant, reliable, and valid. *Relevance* speaks to the need to ensure that data are collected which answer the research question at hand, and that this is the right question for the inquiry. *Reliability* addresses the extent to which the same observational procedure in the same context yields the same information. *Validity* speaks to the quality of fit between an observation and the basis on which it is made.⁴⁹

This dissertation's document collection efforts included obtaining copies of the CCA and other IT legislation. Additionally, dozens of articles from trade magazines and academic journals on the CIO position in the public and private sector were obtained. During some of the case study interviews, additional agency documents were obtained concerning the CIO organization, CIO

position establishment, and documents on other CCA-CIO related topics (e.g., IT workforce planning).

Case study interviews were pre-coordinated via e-mail message exchange or a telephone request that outlined the purpose of the research study and arranged for the interview time and place. Prior to starting the interview, the content and organization of the Interview Guide was covered with the interviewee.

Key actor interviews were conducted in person and were recorded through note taking and the preparation of transcripts within two days after the interview. Biographic information was collected beforehand whenever possible, on the key actor's agency position, civil service status (career or appointee), and length of public service. Interviews lasted 25-120 minutes, with closed-response questions being asked first and the open-ended exploratory questions following, in order to obtain as much comparable information as possible.

The Key Actor Interview Guide was used to obtain feedback on both the CIO Position Model and a prototype of the FCPEM evaluation method (then called the CIO Roles Model: provided in Appendix E). In addition, standardized interview questions were asked about the key actor's perception of the applicability of these models to that agency. If time permitted, more extensive discussions were also held on the way that the CIO position was established in

⁴⁹ Kirk, Jerome, and Marc L. Miller. Reliability and Validity in Qualitative Research. Beverly Hills: Sage Publications. Pages 79-80. 1986.

that agency, the effects of direct reporting of the CIO to the agency head, the effects the structure of CIO organizations, and the complexity of CIO roles.

A copy of the "Key Actor Interview Guide" is provided in Appendix E. It was pre-tested in March 2000 with government IT managers (GS 13-15) from various federal agencies who were attending "CIO Certificate" courses at the National Defense University's IRM College in Washington, DC. No one from the pre-test group was in the key actor interview group. The pre-test procedure consisted of going over the Interview Guide with one or several IRM managers in 30-45 minute sessions, in the same way that the actual key actor interviews were conducted. Responses of these IRM managers to questions on the CIO Position Model and the precursor to the FCPEM (CIO Role Evaluation Matrix) were used to adjust the final version of the Interview Guide so that it only included questions that provided validation feedback for these two models. The pre-test also served to identify administrative mistakes in the Interview Guide and to gain preliminary feedback on the content of the models, in that these IRM managers were at the same IT/IRM/CIO knowledge level as many of the key actors.

In validating the CIO Position Model, key actors were asked about the relative importance of the indicated CIO competencies (rating them as low, medium, or highly important). They then were asked to relate those CIO competencies to one or more of Thompson's three organizational levels by placing an "X" where they should be.

The Interview Guide also sought to obtain validation of the prototype FCPEM (then called the CIO Roles Matrix) by having interviewees provide closed-response answers and open-ended comments on the roles and proposed evaluation criteria. In the area of closed-response questions, the interviewees were provided with a general context and CCA language for CIO roles and then were asked whether they agreed or disagreed with the proposed CIO role evaluation criterion. This was accomplished by placing an "X" in the "agree" or "disagree" column of the Role Evaluation Matrix next to each proposed criterion.

Key actors were also asked whether each CIO role represented a goal "for" or goal "of" the agency. This was done by placing an "O" or "F" next to each CIO role. The interviewees were also asked for their assessment of the relative complexity of each of the thirteen CIO roles. They did this by indicating "High," "Medium," or "Low" for each CIO role.

The information gathered during interviews on CIO role complexity and goal orientation was not for validating the FCPEM; rather it provided information for additional comments on CIO roles that I make in Chapter 8.

Data Analysis

Key actor interview notes were transcribed into 2-6 page transcripts within two days of conducting the interview. Answers to open-ended questions were categorized into themes and issues to enhance interpretation, and closed-response answers were compiled into agency-specific and overall response

tables for quantitative and qualitative analysis. The results of this analysis are provided with case study results at the end of Chapter 6.

Though not requested, one key actor provided written comments. In this case, a CIO's secretary asked for a copy of the Interview Guide when I made the appointment. This was to be able to better prepare the CIO for the interview. A copy of the Interview Guide was also requested in advance by several other key actors when I was setting up the meeting, but no one else then prepared written comments. While written responses may have helped capture every word in the data-gathering effort (versus taking notes), it was apparent to me that to request this of the busy and very senior agency executives I was interviewing would result in fewer of these people accepting my request to talk with them. Further, several key actors asked for non-attribution in my reporting of their Interview Guide feedback and other comments during our discussion. I therefore have not associated any names with interview information.

CHAPTER 4 – THE FEDERAL CIO POSITION

Antecedents to the CIO Position

Leveraging IT to promote mission accomplishment has called for a new breed of technology executive, one who can span a wide range of strategic, technology, policy, and business process issues. The private financial sector recognized this in the early 1980s and created a counterpart to their most senior financial and operations executives, which was the Chief Information Officer. Fifteen years later, the federal government similarly sought to establish a CIO executive position at the top level of each agency to improve the acquisition and use of IT.

The linkage between private sector CIO activity and public sector adoption of those ideas is clearly indicated in a March 2000 GAO report:

The Clinger-Cohen Act required major departments and agencies to appoint CIOs and implement IT management reforms largely grounded in successful commercial IT management practices.... This mirrors the evolution of the CIO position in industry where it has largely moved from solely a technical support focus to a much more executive and strategic level position.⁵⁰

Perhaps the earliest reference to a CIO-like position came in 1959 from Schultz and Whistler of the Graduate School of Business at the University of Chicago. In a management seminar, they discussed the position of "Information Technologist," and stated that this person should take leadership in organizing and systematizing the latest information available to the firm in order to provide

⁵⁰ GAO Report AIMD-00-128, March 2000, page 4.

management with clear-cut decision alternatives and feedback about company operations.⁵¹

In this early era of the computer, information systems often belonged to financial departments or to automated data processing (ADP) departments whose function was to provide centralized mainframe data to users in the form of reports or queries via directly connected "dumb terminals." This paradigm dominated the 1960s and 1970s, when the top IT official was often called an "ADP Manager" who normally reported to a financial department or operations senior manager.

In 1968, Richard Canning stated that the "Data Processing Executive" should be in a position to deal with senior executives one on one and not through two or three levels of management. Canning also argued that work done by this individual cannot be performed by the financial Vice President, who is a specialist in finance and not in data processing.⁵² He titled the position "Director of Information Services."

In graduate study research, Brenda Shewchuck found what is perhaps the first use of the CIO title was seen in 1969 with the "Chief Information Officer of the Maharashtra Information Centre," a government agency in Connaught Circus, New Delhi, India.⁵³ The person given the title of CIO was the author of a book

⁵¹ Schultz, G. and T. Whistler, Management Organization and the Computer. Proceedings of a seminar sponsored by the Graduate School of Business, University of Chicago and the McKinsey Foundation. 1959.

⁵² Canning, Richard G. The Management of Data Processing. London: BT Batsford Ltd., 1968.

⁵³ Shewchuck, Brenda. History of the CIO Position. Unpublished research paper. Syracuse University, School of Information Studies. July, 2000.

sponsored by the Centre called "Dnyanadeo." Professor S.V. Dandekar wrote this book and it provided a translation on an unknown topic from Sanskrit to Marathi. It would be a decade before the CIO title was used in the U.S. private sector.

In 1972, Joseph O'Hora published an article that argued that "the management responsibility for data communications would rise from the bowels of the data processing department." He was concerned that the emerging generation of Management Information Systems (MIS) and/or ADP managers did not have the basic education, background, and business experience to grow and broaden as their responsibilities and functions expanded.⁵⁴

In 1973, Leon Albrecht defined the functions that should be associated with what he called the "Head Manager of the Information Systems Division."⁵⁵ Interestingly, Albrecht identified three other types of information managers who should report to this Head Manager of ISD: an Electronic Data Processing Methods Manager, a Systems/Procedures Manager, and a Data Center Manager. The functions he specified for the Head Manager are:

- Initiate and influence future company systems and operations
- Recommend detailed system structure, policies and procedures
- Influence the direction and pace of projects
- Create a political environment that will both attract and repel certain types of human resources and talent
- Influence the degree to which top management will become

⁵⁴ O'Hora, Joseph. "Who Runs the Information System." In A Working Source Book for the Modern Manager by J. Tarrant. Chapter 8, pages 43-46.

⁵⁵ Albrecht, Leon K. Organization and Management of Information Processing Systems. New York: Macmillan. 1973.

- involved in the affairs of company information systems
- Have an outlook compatible with the company's long range objectives
- Be compatible with the current company environment in order to build a bridge between today and tomorrow⁵⁶

In the 1980s, the advent of both the affordable personal computer and localized data communications created the ability to establish fully interactive Local Area Networks (LANs). These LANs pervaded private and public sector organizations and moved IT away from the mainframe-centric paradigm. LANs were also the driving factor in the elevation of the ADP Manager position to a higher-level "Management Information Systems (MIS) Director" position, attaining a Vice President's rank in some businesses. The public sector followed suit, with mid-level civil service managers moving up in seniority as they assumed MIS Director titles.

James Saviano stated that the country is in the third phase of an IT revolution.⁵⁷ In his first phase (the 1960s-1970s), we ran our businesses with big iron, taking advantage of a new capacity to handle large amounts of data. In the second phase (the 1980s), personal computers (PCs) emerged, giving managers quick access to critical data and the ability to process and analyze those data much more effectively. Today, in the third phase, IT innovations – particularly in the area of networks – make it possible for businesses to interact in ways never before possible and, in the process, to develop strategies for

⁵⁶ Ibid

⁵⁷ Saviano, James. "Are We There Yet?" CIO; June 1, 1997, Volume 10, Number 16.

creating entirely new markets, customers, and lines of business. Saviano also said:

There's a new chief in town. Companies have always had Chief Executive Officers, Chief Operating Officers, and Chief Financial Officers. But in recent years, Chief Information Officers have also entered the upper echelons of corporate management.⁵⁸

It was in 1980 that the first corporate CIO positions came out of the financial sector as the second phase of Saviano's IT revolution was emerging. CIOs became needed when companies realized that IRM could be strategically employed to provide competitive advantage. The financial sector realized that computer networks could extend outside the enterprise, much as the 1970s concept of linking manufacturer and supplier invoicing through Electronic Data Interchange (EDI) had begun to demonstrate value within the automobile and freight transportation industries. William Synott, then Senior Vice President at the First National Bank of Boston, gave a standing-room-only speech at the 1980 Information Management Exposition and Conference, where he was one of the first in the U.S. to use the term "CIO" when he stated,

The manager of information systems in the 1980s has to be Superman – retaining his technology cape, but doffing the technical suit for a business suit and becoming one of the chief executives of the firm. The job of chief information officer (CIO) – equal in rank to chief executive and chief financial officers – does not exist today, but the CIO will identify, collect, and manage information as a resource, set corporate information policy and effect all office and distributed systems.⁵⁹

⁵⁸ Ellison, Evelyn. "New Exec Title on the Rise," *Indianapolis Business Journal*, Vol. 18, No. 26, page 27. September 15, 1997.

⁵⁹ Winkler, Connie. "Manager Must Be Superman, Conferees Told," *Computerworld*, October 20, 1980, page. 20. Note: It is also possible that Dr. William H. Gruber, an associate of Synott, was the first to coin the term "Chief Information Officer" in the 1978-1980 timeframe.

The private sector slowly embraced the CIO position during the late 1980s, in much the model that Synott predicted. CEOs and CFOs often questioned the CIO's newfound place in the boardroom, until competitors began to show market gains through the strategic application of IRM. David Feeny, et al. argued in 1992 that

Good CEO/CIO relationships will contribute to success in at least three respects: strategic information systems planning, business partnerships, and CEO involvement in IT management.⁶⁰

In the nearly fifteen years that have passed since corporate CIOs first emerged, the position has become a normal fixture in the boardroom. However, it was only in the last eight years that the federal government saw the benefit of following suit. This was first done in several innovative agency actions (the U.S. Forest Service in 1992⁶¹, and the National Aeronautics and Space Administration in February 1995⁶²). Then, this was extended to the entire executive branch with the designation of a "Senior IRM Official" in each agency through the PRA in 1995. Finally, the current CIO position came into existence in 1996 when the CCA renamed and re-chartered the "Senior IRM Official" position as the "Chief Information Officer."

⁶⁰ Feeny, David F.; Edwards, Brian R; Simpson, Keppel M. "Understanding the CEO/CIO Relationship," *MIS Quarterly*, December 1992, Vol. 16, Issue 4, pages. 435-448.

⁶¹ United States Department of Agriculture, Forest Service. Information Management: A Framework for the Future. February 1992.

⁶² United States General Accounting Office. NASA Chief Information Officer: Opportunities to Strengthen Information Resources Management. GAO/AIMD-96-78. Government Printing Office, Washington, D.C. August 1996.

Successors to the CIO Position

By 2000, CIOs had become ubiquitous in the public and private sector, so much so that the position has spawned several similar IT-related executive positions: those of the Chief Knowledge Officer (CKO), Chief Privacy Officer (CPO), and the Chief Technology Officer (CTO).

On the new CKO position, Michael Earl argued in 1999 that

The much commoner and well-established role of CIO, although sometimes thought to be similar to that of CKO, is quite different. CIOs have distinct responsibilities: IT strategy, IT operations, and managing the IT function, and so far have not formally taken on the full range of knowledge management activities. Where a CKO exists, there is likely to be a CIO, but the corollary is not true.⁶³

CKOs arose from the creation of the concepts of “knowledge management” and “learning organizations,” along the lines of what is espoused by Peter Senge.⁶⁴ Knowledge Management, as conceived in the business sector, aims at capturing, archiving, and sharing information on key business activities, so that it is leveraged and not lost over time or as the result of employee turnover. Key CKO roles include (1) fostering learning organizations, (2) developing Internet “portals” to coordinate the access to information, (3) creating “data warehouses” that support decision-making in the organization, and (4) developing “data marts” of selected database information that is formatted

⁶³ Earl, Michael J. “What is a Chief Knowledge Officer?” *Sloan Management Review*, Vol. 40, No. 2, Winter 1999.

⁶⁴ Senge, Peter M. *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York: Doubleday, 1990.

and placed in easy-to-retrieve system areas that are "close" to the particular business group who uses this information.

Once again, the public sector is following the lead of the private sector by appointing CKOs in several agencies, though this is not mandated by legislation. An example of this type of new bureaucratic executive is the CKO at the General Services Administration, Shereen Remez (who was previously their CIO).

A second CIO-like executive position, the Chief Technology Officer (CTO), is an outgrowth of private and public sector recognition that IT is growing rapidly and simultaneously in over two dozen areas. Many aspects of IRM involve complex technologies that are evolving quickly, with some products having "lifecycles" of less than six months. Recognizing the change and opportunity that properly leveraged IT can bring, some organizations have felt the need to designate an executive-level CTO position that is dedicated to tracking technologies and continually evaluating their potential utility.

An example of this type of CTO position is that of Rob Thomas II, Director of the Technology and Architecture Group for the U.S. Customs Service in the Department of the Treasury. Mr. Thomas is Customs' CTO, with responsibility for ensuring that his organization's IT infrastructure benefits from an enterprise-level view of business processes and information systems that form an "architecture." As CTO, Mr. Thomas also facilitates the review and selection of new technologies for use within the architecture. Mr. Thomas reports directly to Woody Hall, the CIO of the Customs Service (and formerly the CIO at the

Department of Energy). In this example, the senior-level CTO reports to the CIO so that the CIO can focus on more strategic IT issues.⁶⁵

Chief Privacy Officer (CPO) positions started to appear in companies and government agencies in late 1999 due to an increased emphasis on protecting citizen, customer, transaction, and organizational information. Verizon Communications (formerly Bell Atlantic) decided to create a CPO position in August 2000 when it created a company Internet site that was designed to allow customers to post repair requests turned out to enable people to see other customers' account information. Responding to a barrage of complaints, Verizon appointed Shelly Harms as CPO, a role that she says is part public relations, part customer service, part IT security oversight, and part policy development.⁶⁶ In the past year, other major companies have established CPO positions, including AT&T, IBM, American Express, Sybase, and General Motors. Of six CPOs interviewed by Steve Ulfelder for his article in *CIO* magazine on the new CPO position, three had legal backgrounds, two had both legal and IT backgrounds, and one had a "pure" IT background.⁶⁷ CPOs are reporting to a variety of other executives, including CEOs, COOs, and general counsels, but Ulfelder does not report that any of the new CPOs report to a CIO, in spite of what may be perceived as an overlapping of IT security, records management, and related policy roles.

⁶⁵ Interview with Mr. Robert Thomas on June 4, 2000, at the U.S. Customs Service Data Center, Springfield, VA.

As far as the future of the public sector CIO position is concerned, recent debate has focused less on the roles of CTOs/CKOs/CPOs than on the potential creation of a national-level "Federal CIO" within both the Clinton and Bush Administrations, as originally proposed in the 1995 draft ITMRA Bill (which eventually became the CCA). The mid-2000 resurgence of the Federal CIO idea comes from Congressional and media observations of nation-wide IT security problems, including recent virus attacks on business and government Internet sites worldwide, and the success of national-level IT coordination in addressing the Year 2000 date/code problem. According to Karen Schwartz,

No matter what side people take [on supporting the idea of a Federal CIO], virtually all agree that within two years – and maybe sooner – the United States will indeed have a government-wide CIO. President Bush has said repeatedly that he believes the concept of a Federal CIO is sound. Two bills are on the table, each promoting the idea. The Chief Information Officer of the United States Act, H.R. 4670, sponsored by Representative Jim Turner (D-Texas) proposes to make the Federal CIO a Cabinet official appointed by the President. Under that bill, the Federal CIO would advise the President, chair the CIO Council, and direct the IT budget to encourage innovative and cooperative IT practices in federal agencies. A second bill, H.R. 5024, the Federal Information Policy Act of 2000, sponsored by Representative Tom Davis (R-Virginia) proposes to create an office that would take on many of OMB's responsibilities, including all IT management functions.⁶⁸

Roger Baker, CIO at the Department of Commerce, was one of the first agency CIOs to suggest in early 2000 that a Federal CIO was needed.

According to Baker:

⁶⁶ Ulfelder, Steve. "Oh No, Not Another O!" *CIO*. Volume 14, Number 7,, pages 89-90. January 15 2001

⁶⁷ *Ibid*, page 90.

⁶⁸ Schwartz, Karen D. "Power Seekers." *Government Executive*, Volume 33, Number 2, page 44. February 2001

Today every major federal agency has its CIO, its IT budget and its vision of the future, however vague. [But] there's no common strategy there's no common approach, we're all re-inventing the wheel, and once in a while we compare notes on whether it should be round or square. We have a zillion data centers and a zillion help desks. With such rampant duplication and disjointed IT endeavors, the result often is an online service of limited utility. Under a strong central IT administrator, it wouldn't have developed that way. But don't say that government needs a "czar," that word evokes the wrong image. This is a management issue, it calls for a Federal CIO.⁶⁹

George Molaski, former CIO at the Department of Transportation, echoed Baker's comments, saying in spring 2000 "The Federal CIO should be a cabinet-level position so the CIO has direct access to the President. He should be a special assistant to the President, we don't need a new Department."⁷⁰

The topic became a campaign issue when then Republican presidential candidate George W. Bush issued a position paper stating that if elected, he would appoint a Federal CIO to oversee IT projects involving multiple federal agencies and/or other levels of State and local government. This forced his then Democratic challenger, Vice President Al Gore, to address the fact that the Clinton Administration had steadfastly opposed the idea. At the time of this writing (January 2000), it is not clear if the new Bush Administration is going to appoint a Federal CIO as promised during the campaign, though March 2000 statements from the new senior leadership at OMB indicate that it may not happen, desiring instead to leave federal agency CIOs as the senior advocates for IRM in the executive branch.

⁶⁹ Matthews, William, and Diane Frank. "Do We Need an IT Czar?" *Federal Computer Week*. Volume 14, Number 21, pages 18-22. June 26, 2000

Clinton Administration opposition to the Federal CIO idea began through their representative at the drafting of the Information Technology Management Reform Act (ITMRA). John Koskinen, then at OMB, was able to have it struck from the final draft of the Bill in late 1995.⁷¹ The Clinton Administration's position remained unchanged throughout the 2000 election campaign, as was reflected in the June 2000 statement of Sally Katzen, former Deputy Director of OMB: "The Clinton Administration prefers enhancing individual agency CIOs' authority... they know best what the needs are."⁷² Echoing this was Bruce McConnell (former head of the Information Policy and Technology Branch at OMB/OIRA in 1995-1996): "You are better off giving extra responsibility to the people who are already responsible... and in this case, the right place is OMB for security management because OMB has responsibility for all IT management."⁷³

As discussed by Karen Schwartz, Congress has also addressed the issue of a Federal CIO. In June 2000, Representative James Turner (D-Texas) introduced a bill to create the post of Chief Information Officer of the United States.

According to William Matthews and Diane Frank, Representative Turner's Federal CIO would,

Be a cabinet-level advisor to the President, chairman of the Federal CIO Council, and keeper of a \$4.7 billion nest egg for funding IT projects that cross agency boundaries. The CIO's job would be to ensure that the federal government is not left behind in the technology revolution. In

⁷⁰ Ibid, page 19.

⁷¹ Interviews with Paul Brubaker, and David Plocher, both involved in drafting the CCA.

⁷² Matthews, William, and Diane Frank. "Do We Need an IT Czar?" *Federal Computer Week*. Volume 14, Number 21, page 20. June 26, 2000

⁷³ Ibid, page 20.

order to build a working e-government, we need to focus the government's attention on its use of information technology.⁷⁴

Finally, David McClure, the Director of IT Management Issues at GAO testified before the House Subcommittee on Technology and Procurement Policy on April 3, 2001 on the proposed Federal CIO position in the context of improving government-wide IRM Leadership.⁷⁵ In this testimony report, McClure quotes a March 2001 GartnerGroup (private research firm) report that gave four suggested roles for a Federal CIO: (1) advise the President on technology-related public policy, (2) developing and implementing federal e-government initiatives, and (4) developing standards for e-government interoperability and other IT-related transformation initiatives.⁷⁶

Whatever the fate of the proposed Federal CIO, there can be little doubt about the ubiquity and staying power of the CIO position. In spite of predictions of its demise, it is still present in many major corporations, federal/State/local government agencies, non-profit organizations, universities, and even small businesses. The increasing role of information in our society will require that executives, managers, educators, and workers continue to incorporate IT into work processes and the CIO role is likely to become even more important.

⁷⁴ Ibid, page 22.

⁷⁵ GAO Report 01-583T. Information and Technology Management: Achieving Sustained and Focused Governmentwide Leadership. Government Printing Office, Washington, D.C., April 3, 2001.

⁷⁶ GartnerGroup Report TG-12-8984. Mr. President, Appoint a Federal CIO. March 18, 2001

Stan Gibson said in June 2000, "There's no question that the CIO of today is more business-oriented than the vice president of IS of years gone by."⁷⁷ He argued that most leading-edge CIOs now are moving beyond strategy execution to strategy formulation of e-business, and are seeing that this strategy is carried out by "the best people that can be found." The business advantage he says is in both the concept and the execution. Leadership in this combined area is being filled in some companies by the CIO and in others by the CTO; but more importantly Gibson says that the title of "Chief Strategy Officer" (CSO) may better befit this executive role, and that CIOs and CTOs could easily move to into it. From there, CEO could be a more logical and accepted final career step.

The CIO and the Clinger-Cohen Act

The CCA establishes the Federal CIO position, title, and roles, as well as codifying OMB guidance and GAO recommendations in the area of IRM capital planning and IT-related acquisition. The origins of the CCA go back thirty years to a period when the use of large computers was rapidly growing in the executive branch, and the need for government-wide information management guidance became apparent.

⁷⁷ Gibson, Stan. "CIO: A Title Born For an Era That's Over?" *E-Week*, Volume 3, Number 28, page 66. June 12, 2000

In 1977, the Commission on Federal Paperwork was launched to investigate information management practices. In doing its work the Commission observed that,

The absence of a body of doctrine covering the effective and efficient management of information resources has fostered overlap and duplication in both the administrative controls over, and organizational structures which manage information gathering, processing, and dissemination.⁷⁸

In 1980, Congress passed the Paperwork Reduction Act, which incorporated the Commission's findings, recognized information as a valuable and manageable resource, sought to reduce federal agency paperwork burdens on the public and industry by 15 percent by 1982, and centralized federal information policy functions into the Office of Information and Regulatory Affairs (OIRA) within OMB (which is part of the Executive Office of the President).⁷⁹ The Paperwork Reduction Act of 1980 (PRA '80) also codified industry and government best practices in IRM, including mandates for each agency to:

- (1) Carry out information management activities in an efficient, economical manner
- (2) Designate a senior official or officials to carry out agency responsibilities under the Act
- (3) Inventory major information systems and review, periodically, its management activities
- (4) Ensure that its systems do not overlap each other or duplicate systems of other agencies
- (5) Develop procedures for assessing the paperwork burden of its collection activities
- (6) Ensure that each information collection request submitted to nine or fewer persons that it is not subject of the provisions of PRA '80

⁷⁸ Holden, Stephen H. and Peter Herson. "An Executive Branch Perspective on Managing Information Resources". In Federal Information Policies in the 1990's: Views and Perspectives. Peter Herson, Charles R. McClure, and Harold C. Relyea editors. Norwood: Ablex Publishing Corporation, Pages 50-51. 1996

⁷⁹ Ibid, page 51.

In 1985, OMB/OIRA issued the first comprehensive policy for federal IRM in Circular A-130: The Management of Federal Information Resources that incorporated PRA '80, other federal guidance and government/industry best practices. For more than a decade after this PRA '80 and OMB A-130 remained the federal government's primary IRM guidance. They created the government's version of the term/scope for Information Resources Management, the position of an agency Senior Official for IRM, and evolved these concepts through two major revisions of the PRA (in 1986 and in 1995) and two revisions of OMB A-130 (1996 and 2000). The currently accepted federal definition of IRM was provided in the 1996 revision to OMB A-130, and is perhaps the best general description of what the federal agency CIO does. The definition from OMB A-130 is:

The term "information resources management" means the process of managing information resources to accomplish agency missions. The term encompasses both information itself and the related resources, such as personnel, equipment, funds, and information technology.

In 1993, a paradigmatic change in the way that federal IT was acquired, evaluated, and managed was led by the Clinton Administration, spearheaded by Vice President Gore's National Performance Review (NPR). This was followed closely in a Democratically-controlled Congress by passage of the Government Performance and Results Act of 1993 (GPRA), which for the first time sought to link federal IRM with the Total Quality Management (TQM) principles of strategic planning and performance-based program evaluation.

In 1994 the "Republican revolution" swept the House, but IRM reform proved to be a bipartisan movement. The 1995 reauthorization of the PRA introduced a dramatic new approach to federal IT oversight by creating a "Senior IRM Official" in each agency and reinforcing the IRM/TQM principles of the NPR and OMB A-130.⁸⁰ Same-year efforts to reform IT acquisition procedures and create a cabinet-level "Federal CIO" were blunted by the Clinton Administration and in Congress, as the draft Bill for an "Information Technology Management Reform Act" (ITMRA) was shelved in Committee. This left PRA'95 as the leading guidance from Congress on IRM practices.

In comparing the PRA's 1995 IT acquisition philosophy to that of the 1966 Brooks ADP Act, John Bertot et al. stated:

A fundamental objective of the PRA was to have agencies manage their own information resources, and to include IT as part of this, while the Brooks Act's primary objective was for agencies to acquire IT through the most cost-effective and efficient means.⁸¹

Congressional and agency criticism of the Brooks Act was that its emphasis on cost-effectiveness in IT acquisition did not necessarily produce systems that allowed agencies to produce efficient information-based services. In spite of this criticism of the Brooks Act, PRA'95 (which was being crafted at the time of this debate) did not replace or modify the Brooks Act.

⁸⁰ Ibid, page 78.

⁸¹ Bertot, John C., Charles R. McClure, Joe Ryan, and John C. Beachboard. "Federal Information Resources Management: Integrating Information Management and Technology," in Federal Information Policies in the 1990s: Views and Perspectives. Peter Herson, Charles R. McClure, and Harold C. Relyea (ed.), Norwood NJ: Ablex Publishing Corporation, 1996.

Then, in late 1995, Congressional dissatisfaction with thirty-year old IT Brooks Act acquisition procedures (that PRA '95 overlooked) enabled ITMRA to rise like a phoenix at the first legislative opportunity and become law at the beginning of 1996. In 1997, the Omnibus Consolidated Appropriations Act (Public Law 104-208) renamed ITMRA as the Clinger-Cohen Act of 1996.

The fuller story of this unusual legislative resurrection follows, and many of the congressional and Clinton Administration players involved in creating PRA'95 and Clinger-Cohen were the same people. In fact, one former congressional staff member said, "The history of Clinger-Cohen is the history of the PRA."⁸²

One of the catalysts for ITMRA (CCA) was an October 1994 investigative report by then Senator William S. Cohen (R-Maine), which stated,

Government computer systems affect the daily life of every American – from processing tax returns and entitlement benefits to providing weather information for morning commuters. The federal government is the largest single buyer of computers and computer-related equipment in the world. Annual federal computer related expenditures exceed \$25 billion, or almost 5 percent of discretionary federal spending, and have grown steadily over the last two decades. Unfortunately, weak oversight and a lengthy acquisition process have led to the American taxpayers not getting their money's worth on \$200 billion in expenditures over the last decade.⁸³

⁸² Interview with David Plocher, Office of the General Counsel, General Accounting Office. Washington D.C., March 2, 2000.

⁸³ Cohen, William S. Computer Chaos: Billions Wasted Buying Federal Computer Systems. Investigative Report of Senator William Cohen, Ranking Minority Member, Subcommittee on Oversight of Government Management, Senate Government Affairs Committee, Washington D.C., 1994.

That same year (1994), GAO released a report reflecting similar concern for inefficient federal IRM practices.⁸⁴ In this report, Christopher Hoenig stated that federal agencies had not kept pace with evolving management practices and skills necessary to (1) precisely define critical information needs, and (2) select, apply, and control changing information technologies. The result, he said, is wasted resources, a frustrated public unable to get quality service, and a government ill-prepared to measure and manage its affairs in an acceptable businesslike manner. Despite spending more than \$200 billion on IT systems in the previous decade, the government had received too few meaningful returns. The consequences were poor service quality, high costs, low productivity, unnecessary risks, and unexploited opportunities for improvement.

In 1996, OMB reported that federal agencies had requested \$27.3 billion for IT programs in Fiscal Year 1995, accounting for 6.1 percent of the operating budget. OMB also noted that this proportion had been growing steadily since Fiscal Year 1982.⁸⁵ For Fiscal Year 2001, the Clinton Administration proposed spending \$40 billion on IT, a \$1.8 billion increase over the previous year.⁸⁶

Congress was not convinced that GPRA and PRA '95 would result in a correction of identified federal IT problems. They therefore passed the CCA less

⁸⁴ General Accounting Office. Improving Mission Performance Through Strategic Information Management and Technology. GAO/AIMD-94-114. U.S. Government Printing Office, Washington, D.C. May 1994.

⁸⁵ Holden, Steven H. "Managing Information Technology in the Federal Government: assessing the Development and Application of Agency-wide Policies." *Government Information Quarterly*, Volume 13, Number 1, pages 65-82.

⁸⁶ Robb, Karen. "Federal IT Budget to Grow to \$40 Billion in 2001". *DOD IT/Defense IT International*. Page 4. June 2000

than a year after PRA'95 in order to create a synergy of IT acquisition reform and program performance reviews, and to consolidate IT oversight under CIOs. The CCA also modified the Computer Security Act of 1987 and the National Institute of Standards and Technology Act, and it eliminated the Federal IRM Regulations (FIRMR), which were absorbed into the Federal Acquisition Regulations (FAR). In so doing, the CCA in early 1996 replaced PRA'95 as the predominant piece of legislation dealing with federal IRM policy.

OMB Circular A-130 was revised in mid-1996 to align with PRA'95, but was issued before the mandates of the newly-passed CCA could be incorporated. In the most recent revision to OMB A-130 (December 2000) the mandates of the CCA were incorporated.

On February 19, 1996 President Clinton signed into law S. 1124, the National Defense Authorization Act for Fiscal Year 1996, which contained ITMRA (the original name of the CCA).⁸⁷ As with many of the annual National Defense Bills in the past, legislators added other funding authorizations and entire laws because they knew that eventually this Bill would pass. President Clinton vetoed the original 1996 Defense Bill, H.R. 1530, in December 1995 over partisan differences on defense programs and peacekeeping operations. Only in the final version of the 1996 Defense Act was Division E (ITMRA/CCA) added.

⁸⁷ Weekly Compilation of Presidential Documents, Number 260, February 19, 1996. U.S. Government Printing Office, Washington, D.C.

Interviews with several former congressional staff members who drafted ITMRA revealed the reason that it could be resurrected. First, a legislative opportunity was created by the addition of the Federal Acquisition Reform Act (FARA) as Division D, which opened the door to adding another Act as Division E. More significant factors were the House leadership role of Representative William F. Clinger (R-Pennsylvania) and the Senate leadership role of William S. Cohen (R-Maine). Their staffs (primarily Cohen's Chief of Staff, Kim Corthell, and two staff members, Paul Brubaker and Bill Greenewald) breathed life back into the dormant draft ITMRA provisions by quickly negotiating a host of compromise revisions over a 2-3 day period with members of OMB (John Koskinen and Bruce McConnell), the principal staff member who drafted PRA '95 (David Plocher), and other key congressional players. This opportunity to add an amendment to the Defense Bill, combined with the quickly revamped ITMRA Bill being readied by Senate staffers within a matter of days of that opportunity's appearance, along with the presence of powerful Senators as sponsors, all resulted in the successful addition of ITMRA to the 1996 Defense Authorization Act as Division E. A year after passage of the 1996 Defense Authorization Act, ITMRA was renamed the Clinger-Cohen Act in honor of its principle sponsors.

The main objectives of the CCA are (1) to require agencies to replace the Senior IRM Official position title with that of Chief Information Officer; (2) to invest the CIO position with expanded IT program oversight in the areas of capital planning, architecture, security, business process improvement, program

oversight, strategic planning, and personnel training; (3) to eliminate the General Services Administration's IT procurement oversight role, as it replaced the 35-year old Brooks ADP Act with agency-level acquisition authority and introduced a "modular" IT systems acquisition strategy; and (4) to provide the spirit of the law in a "Sense of Congress" paragraph, which stated that over the next five years agencies should achieve an annual 5 percent decrease in the cost of operating/maintaining IT systems and an annual 5 percent increase in the efficiency of the agency's operations due to better IRM practices.

In April 1996, two months after the CCA became law; then OMB Director Alice Rivlin wrote the following policy directive on CCA implementation that included guidance on CIO position establishment to Cabinet Secretaries and Agency Heads in the executive branch of federal government:

By August 8, 1996, the head of each agency shall designate its Chief Information Officer, as required by Clinger-Cohen and the Paperwork Reduction Act. While the organizational placement of the CIO is to be determined by the agency head, the person selected should report to the agency head directly, and not through another official. The CIO must actively participate with agency head and other senior agency officials, in planning and budget deliberations, support of work process redesign in areas being considered for IT investment, and the development of IT program performance measures. Information resources management shall be the primary duty of the CIO.⁸⁸

⁸⁸ Executive Office of the President, Office of Management and Budget. Memorandum of Director Alice M. Rivlin for the Heads of Executive Departments and Establishments; Subject: Implementation of the Information Technology Management Reform Act of 1996. M-96-20 dated April 4, 1996.

In this memo, Rivlin was moving beyond the mandates of the CCA by providing a deadline for establishing CIO positions. She also was laying out in plain language that these CIOs should be top-echelon government executives with a significant say in how IT resources were to be managed in the organization.

In July 1996, the CCA was endorsed by President Clinton directly in Executive Order 13011 (EO-13011).⁸⁹ EO-13011 began with a sentence derived from the Clinton Administration's 1993 National Performance Review (NPR): "A government that works better and costs less requires efficient and effective information systems."⁹⁰ The NPR had led to the passage of the Government Performance and Results Act of 1993, and President Clinton sought to tie its general reform mandates to the IT/IRM reform mandates of PRA'95 and the CCA.

EO-13011 coordinated the CCA with GPRA and PRA'95 in five ways: (1) improving the management and acquisition of agency IT systems by coordinating relevant provisions of all three laws; (2) refocusing IRM to support agency strategic missions by implementing investment review processes that drive budget formulation and execution for IT systems, and directing a review of related business processes before investing; (3) establishing clear accountability for IRM activities by creating agency CIOs; (4) promoting the use of IT to improve

⁸⁹ Clinton, President William J. "Executive Order 13011: Federal Information Technology," *Federal Register* 61 (1996): 37657-37662.

federal programs and to create a government-wide IT infrastructure; and (5) establishing interagency IT support organizations/structures (e.g., the CIO Council and the Government IT Systems Resources Board).

EO-13011 promotes accountability for IRM activities by giving agency CIOs the visibility and management responsibility necessary to advise their agency heads on the development and operation of IT systems. These responsibilities include (1) participating in the investment review process for IT systems; (2) monitoring and evaluating the performance of those IT systems on the basis of applicable performance measures; and (3) advising the agency head as necessary to modify or terminate those systems.

As now chartered under the CCA, the CIOs of large federal institutions have under their control dozens of information systems, hundreds or thousands of IT workers, and budgets in the hundreds of millions or billions of dollars (though many agency program managers have still retained direct control over significant segments of IT-related funding). According to Paul Brubaker, one of the drafters of the CCA, there was a feeling among those creating the CCA that based on the example of how major corporations were using the CIO position, IRM on this level required the creation of a full-time executive position that is firmly grounded not only in technology, but also in strategy, policy, capital planning, acquisition, architectures, security, workforce planning, and program

⁹⁰ Office of the Vice President. Creating a Government that Works Better and Costs Less. Washington D.C.: U.S. Government Printing Office, 1993.

management.⁹¹ Within the CCA, this full-time executive was to be the federal agency CIO.

Initial Government Reactions to the CIO Position

Perhaps the first non-Clinton Administration comment on the CCA's CIO provisions came in a mid-1996 GAO report on one agency's efforts (pre-CCA) to establish a CIO position.⁹² This agency, NASA, had established a CIO position in 1994 along the lines of what CIOs were doing in the private sector. NASA saw the potential value of the CIO position in correcting IRM problems that the agency had been criticized for by GAO and the NASA Office of Inspector General.

Because of the direct applicability of the CCA's CIO mandates to the report, GAO chose to include comment on this recently passed law. The GAO report interpreted the CCA as a mandate for strong, highly placed CIOs with budget authority and broad responsibilities. What GAO found in this case was that NASA had failed to establish a productive CIO position because it had problems with apportioning authority and responsibility among senior managers and the

⁹¹ Interview with Paul Brubaker, Assistant Secretary of Defense for C3I (Acting), and Deputy CIO. Washington D.C., February 12, 2000.

⁹² Government Accounting Office. NASA Chief Information Officer: Opportunities to Strengthen Information Resources Management. GAO/AIMD-96-78. U.S. Government Printing Office, Washington, D.C. August 8, 1996.

CIO.⁹³ Supporting the CIO were a deputy and a staff of six at headquarters, but there were also twenty-three other lower-level CIOs at NASA field centers.

The GAO report found that the CIO was “hobbled” by NASA’s insistence on dispersing power. For example, to stay “customer-focused,” the twenty-three field center CIOs had to report to their local managers as well as serve the NASA CIO. To maintain “friendly tension,” the CIO was forced to reach memoranda of understanding with centers rather than give them orders. Nor was the CIO given control over any part of NASA’s budget, permitted to join in program decisions, or allowed to make IT investment decisions. GAO’s recommendations on the CIO position (provided in full in Appendix B) can be summarized as follows:

- (1) An agency should place its CIO at a senior management level, making the CIO an equal partner with other senior officials in decision-making with regard to IRM issues, and supporting the position with an effective organizational framework for leading agency-wide IRM initiatives.
- (2) The CIO should be supported with effective management controls.
- (3) The CIO should be responsible for working with other agency officials to ensure the effective acquisition and management of information resources to support agency programs and missions.

By mid-1998, sixteen months after passage of the CCA, several agencies had not yet appointed a CIO, including the Department of State and the Department of Transportation. During the same time period, five agencies experienced turnover in their new CIO position: the Department of Housing and

⁹³ Anonymous. “Battling over CIO power”. *Government Executive*, Volume 28, Number 10, October 1996.

Urban Development, General Accounting Office, Department of the Navy, U.S. Agency for International Development, and NASA. This was not unlike the experience during the establishment of the first Chief Financial Officers (CFOs) in agencies in the early 1990s as a result of the CFO Act of 1990.⁹⁴ According to John Finedore, then Assistant Director of GAO's Accounting and Financial Management Division, "When the CFO position was created in 1990, GAO found that agencies spent several years struggling with appointments and assigning responsibilities to the position."⁹⁵

By 1999, the initial tumult of CIO position establishment and subsequent frequent turnover in many agencies had decreased, and all twenty-three agencies listed in the CCA had established CIO positions. Many had already implemented the position of "Senior Official for IRM" in accordance with the mandate of the Paperwork Reduction Act of 1980, and simply changed the title of that position to "CIO." Other agencies created CIO positions for the first time where no comparable position had existed before. Still others made the CIO position another duty for an existing executive. Several did this with the CFO position or the position of Assistant Secretary for Management and Administration, which is common to several departments.

In March 2000 testimony to Congress, David McClure (GAO's Associate Director of Governmentwide and Defense Information Systems) provided

⁹⁴ Congress. Senate. The Chief Financial Officer Act of 1990. Public Law 101-576, Statute 2838, 31 U.S. Code 501.

comments on the CCA and the role of the agency CIO. He stated that to gain the benefits of new technologies, agencies must have effective IRM leaders who can "transform IT dollars into prudent investments that achieve cost savings, increase productivity, and improve the timelines and quality of service delivery."⁹⁶ McClure pointed out that the CCA required major departments and agencies to appoint CIOs and implement IT management reforms largely grounded in successful commercial IRM practices. In particular, he said, "The Act established CIO positions that report directly to the agency heads and have Information Management (IM) as their primary function."⁹⁷

Section 5125 of the CCA is specific in identifying the seniority and responsibilities of the CIO position, mirroring the mandates of the CFO Act.⁹⁸ As with federal CFOs, the CCA specified that agency CIOs shall serve at least at "Executive Level-IV" of the government civil service. There are five Executive Levels in the federal government, with Level-I being at the top. Executive Level positions are normally reserved for positions within the Executive Office of the President, or the very top positions of each executive branch agency. In designating the CIO as a Level-IV position, the CCA identified the CIO as an

⁹⁵ Harreld, Heather. "Some CIO Positions Still Vacant," *Federal Computer Week*. Volume 11, Number 39, November 17, 1997, page 15.

⁹⁶ GAO Report T-AIMD-00-128, page 7.

⁹⁷ *Ibid*, page 8.

⁹⁸ Interview with David Plocher, March 2, 2000, Washington D.C. He was a Senate staff member working for Senator John Glenn (D-Ohio), and principle drafter of PRA'95, he participated in drafting the CFO Act, GPRA, and CCA.

agency executive at the highest levels of the organization, a peer of (or perhaps superior to) members of the Senior Executive Service (SES), whose numbers are greater than those in Executive Level positions as they serve to provide a body of career and politically appointed executives in each agency to perform policy and high-level decision making functions. For comparison, Executive Level IV is paid the same as the top two of the six SES levels; \$125,700 in fiscal year 2001.

Section 5125 also provided the roles for the CIO position, and tied to the PRA'95 mandate for a direct reporting relationship between the CIO and the agency head. In the case of federal Departments, this would be the Secretary; for agencies, it is the Administrator, Commissioner, or similarly titled person.

The CIO and Federal IRM Policy

In the broader context of how CIOs function in federal agencies, a policy analyst should understand the policy and organizational environment in which they operate. The general requirement for an agency CIO is based upon an evolving need for public policies, civil service leadership, and management practices that together provide effective oversight for the use of IT in accomplishing a federal agency's mission. On this, David McClure of GAO stated in a March 2000 report to Congress:

To reap the full benefits of new technologies, federal agencies must have effective information management leaders who can transform IT

dollars into prudent investments that achieve cost savings, increase productivity, and improve the timeliness and quality of service delivery.⁹⁹

Agency IRM policy is largely derived from federal law, Executive Orders from the President, Administration directives from OMB/OIRA, and recommendations based on audits and GAO studies. Other sources for policy include observed/published best practices from industry and from other federal, State, and local, agencies, as well as internal agency reviews.

According to the CCA, PRA'95, and OMB Circular A-130, a CIO must attend to the following IRM policy issues, (among others):

- Identifying the role of technology in strategic plans
- Documenting an integrated business/technology architecture
- Determining approaches to IT security
- Issuing procedures for balancing the release of agency information with citizen demands for privacy
- Setting IT project cost, schedule, and performance goals
- Establishing and overseeing a capital investment portfolio
- Setting recruitment/training goals in new technology areas

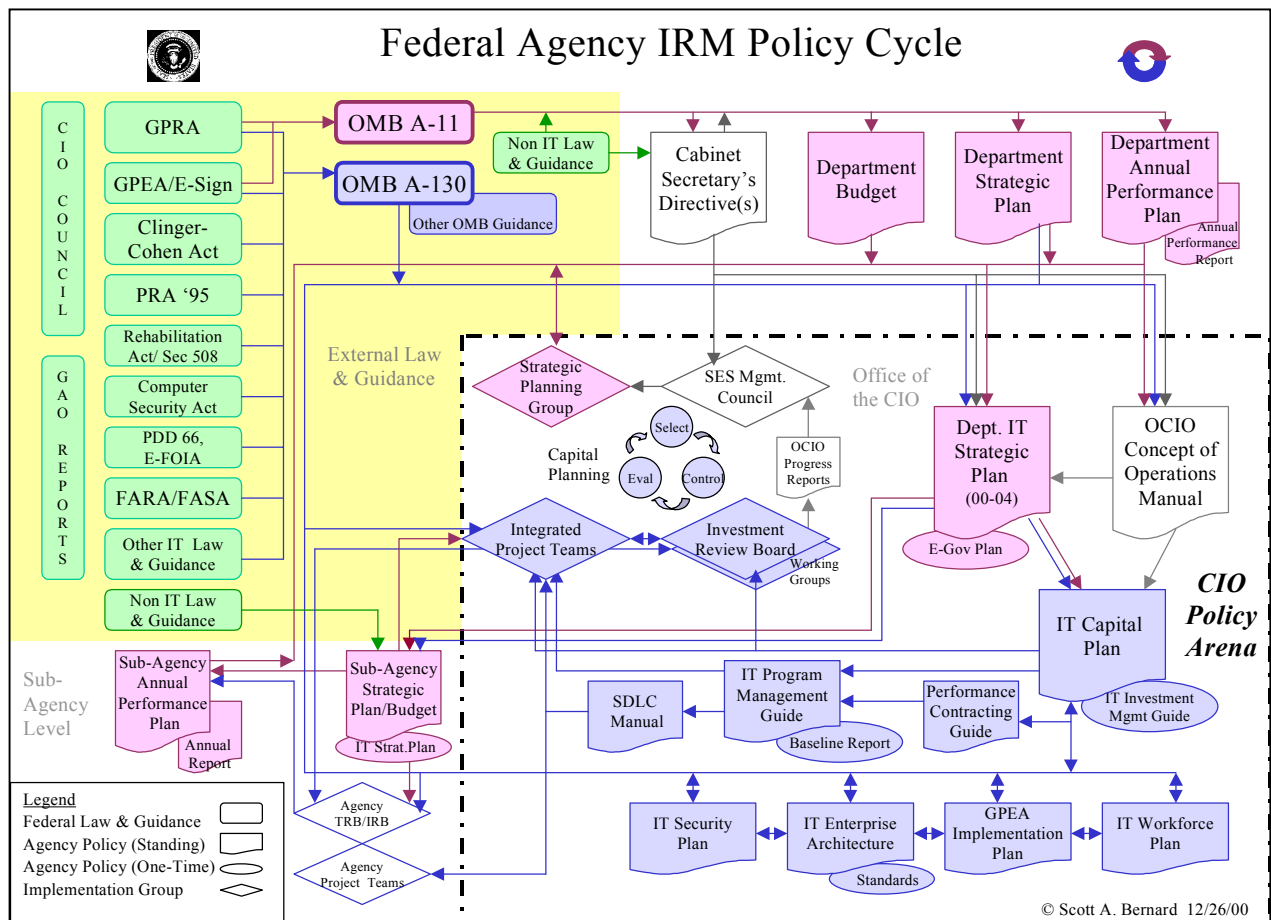
As this list shows, the CIO must address more than a half-dozen major policy areas. The timing, interrelationships, and execution of this body of agency IRM policy must be understood in order to better view the requirements placed upon the CIO and the functions of the CIO position. A flow diagram of agency IRM policy was developed for this purpose that is based on my observations of CIO policy activity during a three-month commercial consulting engagement in the summer of 2000 at the Department of Labor, as well as subsequent observations during similar engagements at the Departments of Education,

⁹⁹ GAO Report T-AIMD-00-128, page 2.

Energy, and Transportation in fall 2000. This "Federal Agency IRM Policy Cycle Model" was then reviewed, by CIOs and senior IRM staff of several agencies, OMB and GAO representatives, and by private sector IRM consultants.

One realization from the charting of agency IRM policy is that this policy process is somewhat cyclic. This is because several federal laws/directives require the submission of agency reports to OMB on an annual basis. For example, OMB Circular A-11 requires an annual agency Budget, Strategic Plan and Performance Report, all of which have IRM components. These submissions to OMB create a yearly IRM policy cycle, as shown in Figure A below.

Figure A. Federal Agency IRM Policy Cycle Model



From this general Federal Agency IRM Policy Cycle Model, the context for the CIO roles evaluated by the FCPEM can be better understood. Note that the area of CIO influence is the lower right quadrant (inside the dotted line). The model works in a clock-wise manner, beginning in the upper left corner with *External Federal Law and Guidance*, and moving through two influential OMB policy documents: OMB Circular A-11 covering budget, strategic planning, and annual performance reporting; and OMB Circular A-130 covering architecture, capital planning, security, and many other IRM topics.

Agency IRM policy guidance is represented by the documents shown in the model. This is translated into program activity, and then into management and reporting functions through the CIO's Office (OCIO). The OCIO has its own set of policy documents, most of which are prescribed in OMB Circular A-130 (e.g., a published architecture, a capital investment plan, an IT security plan, and project management guidance). This guidance moves in two directions, to the sub-agencies where it is often duplicated and operationalized for sub-agency specific IT activity, and concurrently to departmental Integrated Project Teams (IPTs) that execute crosscutting IT activities and utilize personnel from many areas of the department and sub-agencies. This IPT activity data are then fed into the capital planning process, which "closes" the policy loop by being transmitted back to the OCIO staff and departmental budget/strategic planning bodies, who update the departmental performance reports that are required to be submitted annually to OMB.

An additional (and original) aspect of IRM policy context is provided in Table 2 to provide a chronological view of IRM-related federal law and directives divided into four general categories. I created this Table by first gathering citation information on all of the federal IRM policy documents that I could find from libraries, and on-line searches of Congressional, OMB, GAO, and agency web sites. Over eighty items were gathered. These IRM policy items were then divided into five general categories: (1) Records Management, (2) Acquisition, (3) Resource Management, (4) Security and Privacy, and (5) Technology. By dividing IRM-related policy items into these categories that were presented in chronological order, policy activity patterns were revealed in various IRM issue areas.

Examples of these policy activity patterns include the acquisition area that was of interest in the late 1970s and again in the mid to late 1990s, in addition to IT reform issues, which made their way into a host of IRM laws and directives after the Clinton Administration's National Performance Review reports were published in 1993. Another example of policy activity patterns is the area of IT security, which was not a topic of interest until the mid-1990's advent of computer systems "hackers" and destructive "virus" attacks. These cyber security incidents led to everything from a Presidential Decision Directive on Protecting Critical Information Infrastructures (PDD-63) to a revival of agency interest in the Computer Security Act of 1987, to the new Government Information Security Act of 2000.

Federal CIOs must be aware of the presence and purpose of all of the IRM-related law and guidance in Table 2. Translating these mandates into successful agency IRM policy is one of their greatest current challenges.

The next chapter provides the method that was developed through this research for evaluating whether an agency's CIO implementation activities comply with the intent of the CCA.

Table 2. Federal IRM-Related Legislation and Guidance

Year	Records Management	Acquisition	Resource Management	Security & Privacy	Technology
1934					Communications Act 47 USC 151
1949		Federal Property & Administrative Services Act PL 81-152, 63 Stat 377, 40USC471			
1950		Budget and Accounting Procedures Act <i>(relates to OMB A-34)</i> 64 Stat 832, 31 USC 11			
1966	Freedom of Information Act PL 89-487, 80 Statute 250, 5 USC 552	Brooks ADP Act <i>(eliminated by Clinger-Cohen in '96)</i> PL 89-306, 79 Statute 1127, 40 USC 759			
1973			Rehabilitation Act <i>(Amended for IT in '88 & '98)</i> PL 93-112, 87 Stat 384, 29USC776b		
1974		Office of Federal Procurement Policy Act <i>(the FAR)</i> PL 93-400, 86 Statute 796, 40 USC 474		Privacy Act PL 93-579, 88 Stat. 1896, 5 USC 552a	
1976		OMB Circular A-109 ADP Systems Acquisition Process 4/5/76			
1978		Inspector General Act PL 95-452, 98 Statute 1101, 5 USC 5315		Right to Financial Privacy Act PL 95-630, 92 Stat 3697, 12 USC 3401	
1980	Paperwork Reduction Act PL 96-511, 94 Statute 2812, 49 USC 35				
1983		OMB Circular A-76 Performance of Commercial Activities <i>(Outsourcing Criteria/Procedures)</i> 8/4/83			
1984	National Archives & Records Administration Act PL 98-497, 98 Stat 2280, 44USC101	Competition in Contracting Act PL 98-369, 98 Statute 1175, 40 USC 759		Executive Order 12472 National Security Preparedness 4/3/84	
				Computer Fraud and Abuse Act PL 98-473, 98 Stat 2190, 18 USC 1030	
1986	Paperwork Reduction Act <i>(Reauthorized)</i> PL 99-500, 100 Statute 3341, 44 USC 35			Freedom of Information Reform Act PL 99-570, 100 Statute 3204, 5 USC 552	Federal Technology Transfer Act of 1986 PL95-502, 100Stat4510, 15USC701
				Electronic Communications Privacy Act PL 99-508, 18 USC 2701	
1987				Computer Security Act of 1987 PL 100-235, 40 USC 471	

Year	Records Management	Acquisition	Resource Management	Security & Privacy	Technology
1988					Telecommunications Accessibility Enhancement Act PL 100-542, 40USC 762, 29 USC 2201
1990		Chief Financial Officer Act <i>(Established Agency CFO Positions)</i> PL101-576, 104 Statute 2838, 31USC 501			
		Budget Enforcement Act PL 101-508, 2 USC 900			
1991					High- Performance Computing Act PL102-194, 105Stat594, 15USC5501
1992		OMB Circular A-94 Discount Rates to be Used in Cost-Benefit Analysis 10/29/92			
1993		Executive Order 12845 Requiring Agencies to Purchase Energy Efficient Computer Equip. 4/21/93	Government Performance And Reform Act PL 103-62, 31 USC 331 8/3/93		Executive Order 12864 US Advisory Council on the National Info Infrastructure 9/15/93
			OMB Circular A-130 Mgmt. Of Federal Info Resources 7/2/93		Executive Order 12881 National Science & Technology Council 11/23/93
1994	OMB Bulletin 95-01 Establishment of the Govt. Info. Locator Service (GILS) 12/7/94	Federal Acquisition Streamlining Act PL 103-355, 108Stat3242, 10USC2220	Government Management Reform Act of 1994 PL 103-356, 5 USC 5303		
			OMB Circular A-130 (Rev 1) Mgmt. Of Federal Info Resources 7/24/94		
1995	Paperwork Reduction Act <i>(Reauthorized)</i> PL 104-13, 44 USC 35	OMB Circular A-11 Preparation/Submission of Strategic Plans, Annual Performance Plans, and Budgets <i>(Revised 11/10/99)</i>	OMB Bulletin 96-02 Consolidation of Agency Data Centers 10/4/95		National Technology Transfer & Adv. Act <i>(Est. FIPS stds for NIST/Dept of Commerce)</i> PL104-113, 110Stat775, 15 USC 701
	OMB Memo 95-22 Implementing Dissemination Processes of PRA '95 9/29/95				
1996	Electronic Freedom of Information Act Amendment PL 104-231	Federal Acquisition Reform Act PL 104-106, 110 Statute 186, 41 USC 251	Clinger-Cohen Act (ITMRA) <i>(Eliminated FIRMR, Est. OIRA and CIO Positions)</i> PL 104-106, 110 Statute 124, 40 USC 1401		Telecommunications Act <i>(Amends the Communications Act)</i> PL 104-104, 110 Statute 56
		OMB Memo 96-02 Funding Information System Investments <i>(Raines' Rules)</i> 10/25/96	OMB Memo 96-20 Implementation of ITMRA 4/6/96	Executive Order 13010 Critical Infrastructure Protection 7/1/96	Executive Order 12999 Educational Technology: 4/17/96
1966			OMB Circular A-130 (Rev 2) Mgmt. of Federal Info Resources <i>(Did not include Clinger-Cohen)</i> 2/8/96		Executive Order 13011 Federal Information Technology <i>(Est. CIO Council)</i> 7/16/96

Year	Records Management	Acquisition	Resource Management	Security & Privacy	Technology
1997		OMB Memo 97-07 Multi-Agency Contracts Under ITMRA 2/26/97	OMB Memo 97-09 Interagency Support for Information Technology 3/10/97		Executive Order 13035 Advisory Committee on HPCC IT & Next Gen. Internet 2/11/97
		OMB Memo 97-12 Evaluation of Agency Implementation of Capital Planning & Investment Control Procedures 4/25/97	OMB Memo 97-16 IT Architectures 6/17/97	Executive Order 13064 Critical Infrastructure Protection (Amends EO 13010) 10/14/97	
1998	Government Paperwork Elimination Act PL 105-277, 44 USC3504		Year 2000 Information and Readiness Disclosure Act Stat 2392	Presidential Decision Directive-63 Critical Infrastructure Protection 5/98	Workforce Investment Partnership Act, Sec 508; Disabled Access to IT PL 105-220
	OMB Memo 98-05 Guidance on the Government Information Locator Service 2/6/98		Executive Order 13073 Year 2000 Conversion 2/4/98	Executive Order 13103 Computer Software Piracy 10/1/98	
1999	OMB Memo 99-05 Complying with Privacy & Personal Info. In Federal Records 1/7/99	Federal Activities Inventory Reform Act PL 105-260	Additional IT Responsibilities for CIOs (in '99 Defense Act) (Amends ITMRA to add Military Department CIOs) PL 105-261, 10 USC 131	Executive Order 13130 National Infrastructure Assurance Council 7/14/99	Executive Order 13111 Using Technology to Improve Training Opportunities for Federal Govt. Employees 1/12/99
	OMB Memo 99-18 Privacy Policies on Federal Web Sites 6/2/99			OMB Memo 99-20 Security of Federal Information Resources	Executive Order 13113 President's IT Advisory Committee (Amend EO-13035) 2/11/99
				Executive Order 13133 Working Group on Unlawful Conduct on the Internet 8/6/99	
2000	OMB Memo 00-10 Implementing GPEA 4/25/00		OMB Circular A-130 (Rev3) Mgmt. Of Federal Info Resources 12/2000 (Includes CCA, GPEA, etc.)		OMB Memo 00-07 Incorporating & Funding Security in IS Investments 2/28/00
	Electronic Signatures in Global & National Commerce Act PL 106-229 6/30/00		Chief Information Officer of The United States Act (TBD; Rep. Turner – H.R. 4670)		Government Information Security Act (PL 106-TBD- TBD; in Committee)
			Federal Information Policy Act (TBD, Rep. Davis – H.R. 5024)		
2001			E-Government Act of 2001 In Committee (Sponsors: Thompson-Leieberman)		

CHAPTER 5 – EVALUATING CIO POSITION ESTABLISHMENT

Agency CIO Position Implementation Activity

My interpretation of the Clinger-Cohen Act's provisions regarding the federal agency CIO is that it served to codify government guidance and recommendations as far back as the Paperwork Reduction Act of 1980 and OMB reports in the late 1980s/early 1990s. The CCA also incorporated industry best practices in IRM, including the renaming of the "Senior Official for IRM" position to that of "CIO", emphasizing capital planning and performance measurement in IRM, and delegating procurement authority to lower levels. Further, I believe that the CCA provided the weight of law to these concepts, as opposed to the lower importance that agencies might have attached to OMB guidance and GAO recommendations. Additionally, public law (versus public policy) brings a new significance and level of attention in terms of congressional oversight in this area of agency activity. As described later in this Chapter, increasing levels of IT-related spending, coupled with highly visible project failures were a key element in raising congressional interest in IRM, and was a significant driver in the passage of the CCA.

Section 5125 of the CCA identifies the title, roles, executive level, and reporting relationship for the federal agency CIO, but does not give a method to evaluate compliance with these mandates. Implementation of Section 5125 began shortly after passage of the CCA in February 1996, but these activities

appear to have progressed at different rates and with different levels of commitment between the twenty-three agencies covered by the CIO provisions of the CCA. A copy of CCA Section 5125 is provided in Appendix A.

Larry Allen, Executive Director of the Coalition for Government Procurement, stated in 1997 that "Many agencies had done a good job of putting into place a CIO with a strong background in IT management, while others appear to have picked employees without proper qualifications.... those agencies without permanent CIOs may prove to be particularly problematic."¹⁰⁰ Allen further said that contrary to the Section 5125 mandate that "IRM shall be the CIO's principle duty," in at least six departments the CIO's duties had originally been combined with other existing roles (such as CFO or the Assistant Secretary for Management). These departments included Commerce, Education, Labor, Justice, Health and Human Services, and the Veterans Administration.¹⁰¹

Varying degrees of compliance with the CCA were also evident in a 1998 telephone survey that I conducted with all twenty-three organizations listed in the CCA.¹⁰² That survey looked at several factors to obtain an initial determination of whether the letter and spirit of the legislation were being followed in establishing CIO positions. The underlying question of this survey was to see whether CIOs were being hired as figureheads or whether the intended IT

¹⁰⁰ GAO Report T-AIMD-00-128, page 2.

¹⁰¹ Ibid, page 2.

¹⁰² Bernard, Scott A. ITMRA's Linchpin: CIO's. Unpublished article. December 1998.

management authority and access to the cabinet secretary were actually being provided.¹⁰³ Table 3 summarizes the survey's results:

Table 3. 1998 Federal Agency CIO Survey Results

Survey Question	Departments (14) (% Yes responses)	Agencies (9) (% Yes responses)
1. Was a CIO position established?	100%	100%
2. Does the CIO hold other non-IRM positions?	41%	25%
3. Does the CIO report to the agency/department head?	35%	75%
4. Does the CIO control IT operations and planning?	100%	100%
5. Does the CIO serve on the Federal CIO Council?	100%	100%

Similar to GAO's 1996 report on NASA's CIO, this survey found that CCA mandates for direct CIO/agency-head reporting relationships and for IRM to be the CIO's primary responsibility were not being followed.

Evaluating Policy Intent

The intent of the CIO mandates of the CCA were determined in this research through (1) an analysis of the language of the Act, (2) feedback from interviews with drafters of the Act, (3) analysis of other IRM-related federal legislation, (4) a review of information gained in key actor interviews at four case study federal agencies, and (5) information gained from the publication of a Guide on the CCA by one of its drafters, Paul Brubaker.

¹⁰³ GAO Report T-AIMD-00-128, page 8.

Brubaker, who as a member of Senator Cohen's staff helped draft the CCA (he followed Cohen to DOD and became Deputy CIO in March 2000), contributed to and edited a guidebook on the Clinger-Cohen Act that was used by his staff. In this guide, it is stated that "The impetus for the enactment of the Clinger-Cohen Act was the federal government's increased reliance on IT, and the resulting increased attention and oversight on its acquisition, management, and use."¹⁰⁴ The guide also stated that the CCA was intended to resolve:

Insufficient attention to (a) the way business processes are conducted, and (b) opportunities to improve these processes before investing in the IT that supports them;

Investments in new systems for which agencies had not adequately planned, and which did not work as intended and did little to improve mission performance;

Implementation of ineffective information systems resulting in waste, fraud, and abuse; and

Outdated approaches to buying IT that do not adequately take into account the competitive and fast pace nature of the IT industry.¹⁰⁵

From this document, interviews, and analysis of the CCA and other CCA-related documents, I interpreted the CIO-related intentions of CCA Section 5125, to be as follows:

1. *Build on the mandates of previous IRM-related legislation by eliminating out-of-date guidance and filling-in where guidance was lacking. An*

¹⁰⁴ Brubaker, Paul. Clinger Cohen Act of 1996 and Related Documents. Office of the Deputy Assistant Secretary of Defense for Command, Control, Communications, Intelligence (and Deputy Chief Information Officer). Pages 1-4. May 2000.

¹⁰⁵ Ibid, page 4.

example of this is replacing the title of Senior IRM Official with that of CIO. Another example is eliminating the Brooks Act for acquisition guidance and replacing it with agency-level authority. Providing guidance in areas that were lacking is exemplified by requiring agency heads and CIOs to establish IT capital planning and investment control processes (though other "best practice" reports from OMB and GAO had covered this).

2. *Establish the CIO position as a top-level player in the federal agency.* This is done by requiring direct agency head reporting and executive status (at least Executive Level-IV).
3. *Make IRM oversight the CIO's primary duty, so that the position is not held "in name only" such that hands-on attention is lacking, or where "duty-overload" occurs.* The creation of in-name-only CIOs is what could happen when this position is combined with another executive position such as CFO or Assistant Secretary for Administration. In my opinion, this characterization is accurate in a scenario where the other executive position is perceived by the occupant and/or peers to be the more powerful post. Also, there is a danger that the CIO and other position will not be performed well and/or correctly due to the complex, time-intensive activities that are associated with these type of key executive positions. Being an effective CFO, CIO, or Assistant Secretary of Management involves expertise in related competencies and the time

each week to devote to the duties of that position. The CIO position alone involves thirteen roles, as described in the FCPEM.

4. *Give specific, yet not too prescriptive, roles for the CIO in order to standardize these duties in all federal agencies.* This promotes intra-agency IRM oversight and inter-agency IT and organizational process integration.
5. *Promote better uses of technology by placing the CIO in an oversight role that extends agency-wide.* This includes budget authority over all IT-related programs in the agency and a leading role in the agency strategic planning process.
6. *Promote better investment processes by directing that the CIO participate in strategic and capital planning.* That the CIO should partner with the agency CFO in facilitating the selection of IT program initiatives to optimally leverage technology in accomplishing the agency's mission, and then control (oversee) the execution of those programs together to ensure that cost, schedule, and performance goals are met.
7. *Facilitate the development and maintenance of an agency-wide information architecture that integrates the documentation of key business processes and supporting technologies (systems, applications, and databases).* This helps to identify security weaknesses, eliminate system duplication, establish technical standards, and create better

integration with other agencies, State/local governments, industry, and the public.

8. *Identify the IT-related knowledge and skills that the agency will need at all levels to support the employment of technology in accomplishing the agency's mission.* This includes promoting better recruiting, retention, and professional development of IT workers as well as the needed technology training at all levels of the agency.

Modeling the CIO Position

In addition to discerning the intent of CCA-CIO mandates, having a descriptive model of the federal CIO position serves to improve an analyst's understanding of that position's implementation. While there are several models of the CIO position in the public and private sector,¹⁰⁶ none could be found that both derive from the CCA and account for the position's functioning within a general federal agency organizational environment. Most of these other models are not graphical or multi-dimensional views of the position; they are often simply a list of CIO duties. Therefore, a graphic and organizationally-

¹⁰⁶ In a presentation to the Federal CIO Council's Architecture Working Group, the Chief Technology Officer of the Performance Engineering Corporation identified two types of CIOs in the public sector: the Operational CIO, and the Policy CIO, stating that the Operational CIO is the model that predominates in the private sector. Also, the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence sponsored a "Model CIO Study" in April 2000 that presented a model of the CIO position that adds four competency areas to the 10-competency model adopted by the Federal CIO Council (Business Leadership Thinking, Delivery of Information Technology Services, Communications Skills, Agent of Change). This study also presents a model of CIO internal and external relationships, but does not map the CIO's competencies or roles to relationships in that model.

oriented model of the federal CIO position was developed. The model that was created focuses on ten CIO process areas that are set in the context of a multi-level agency organization.

A list of CIO competency areas developed by the Federal CIO Council in 1998 was used to identify the core processes that a federal agency CIO engages in. The close alignment of the CIO Council and the CCA makes this list (presented on the next page) more suitable than other private sector or agency CIO competency lists.^{107 108}

Federal CIO Council 1998 CIO Competency List

1. Acquisition
2. Capital Planning and Investment Management
3. Desktop Technology Tools
4. Information Resources Strategy and Planning
5. IT Performance Assessment: Models and Methods
6. Leadership/Managerial
7. Process/Change Management
8. Project/Program Management
9. Policy
10. Technical/Data Management/Security/Architecture

An eleventh CIO competency area of Records Management was identified during key actor interviews.¹⁰⁹ In fall 2000, the Federal CIO Council sponsored focus group meetings with agency, academic, and industry representatives to

¹⁰⁷ The Federal CIO Council is based in Washington, D.C. and is comprised of the CIO and Deputy CIO from the twenty-eight "large" Federal departments and agencies, two CIOs from the small agencies, and representatives from OMB and the Government IT Services Board (GITSB). Both the CIO Council and GITSB were established in EO-13011.

¹⁰⁸ The CIO Competency List was first developed by Ms. Joyce France of the Department of Defense in 1998, and later adopted by a working group of the CIO Council that was looking at CIO training and competencies.

review this CIO Competency List, and in November 2000, it added two competencies: IT Security and E-Government/E-Commerce. However, the two new areas were not added to this dissertation's model of the CIO position, because the CIO Council identified them after key actor validation interviews had been conducted. The Records Management competency area replaced the Desktop Technology competency area in the FCPEM after feedback from key actor and context interviews was analyzed.

I did not consider this CIO competency list to be sufficient for describing the federal CIO position, because it lacked an organizational context. Without this context, the roles of the federal CIO are not seen in the highly dynamic, multi-level, complex organizational environment that is described in GAO reports^{110 111} and by agency IRM managers during research interviews. In selecting a model of organizations to be used, five criteria were considered:

1. The model had to be generic enough to fit the variety of federal departments, agencies, and commissions that comprise the executive branch.
2. The model had to support interaction of an organization with its environment, consistent with the open-systems orientation of this dissertation.
3. The model had to support the mapping (cross-linking) of CIO competencies to organizational levels.
4. The model had to recognize that business processes are a part of CIO competency areas, and be able to support that concept.

¹⁰⁹ March 2, 2000 interview with David Plocher, Senior Attorney for the General Consul, General Accounting Office. Mr. Plocher was the principal Senate staff drafter of PRA'95, and a key staff player in the drafting of the CCA.

¹¹⁰ GAO Report AIMD-00-128, pages 2-7.

¹¹¹ GAO Report AIMD-00-83, page 4.

5. The model had to be grounded in organizational theory to support use in scholarly research.

The model of organizations developed by Parsons and later adapted by Thompson was selected because it fit these criteria. Case study validation of the CIO Position Model further supported this choice.

The addition of an organizational structure dimension to a CIO Position Model is unique, as far as can be determined by looking at other "models" of the CIO position (which, as noted, amount to lists of duties or competency areas). The chief reason for placing the CIO competency areas in the context of an organizational structure is to reveal more about how and where these competency areas function in the complex federal agency organization.

The Parsons/Thompson general model of organizations provides this aspect of structure by identifying three distinct levels of responsibility and control: technical, managerial, and institutional. The CIO Position Model builds on this concept by relating the CIO's general functions (competencies) to the organizational level(s) at which they operate. For this research, a CIO competency area was defined as being an area of knowledge that is needed to successfully perform as a CIO.

At the technical level of the CIO Position Model, CIO functions related to core business processes, information protection, and maintaining/enhancing the IT infrastructure are paramount, and rational decision making is a key CIO activity. At the managerial level, CIO roles involving facilitation, resource

management, and the maintenance of interpersonal relationships are the focal point, and developing and maintaining social relationships are key activities of the CIO. The highest of the CIO Position Model's three organizational levels, the institutional level, is where environmental factors predominate. Here CIOs are engaged in both rational decision-making, as they interpret the influence of the environment on core business processes, and socially-constructed relationships with external actors.

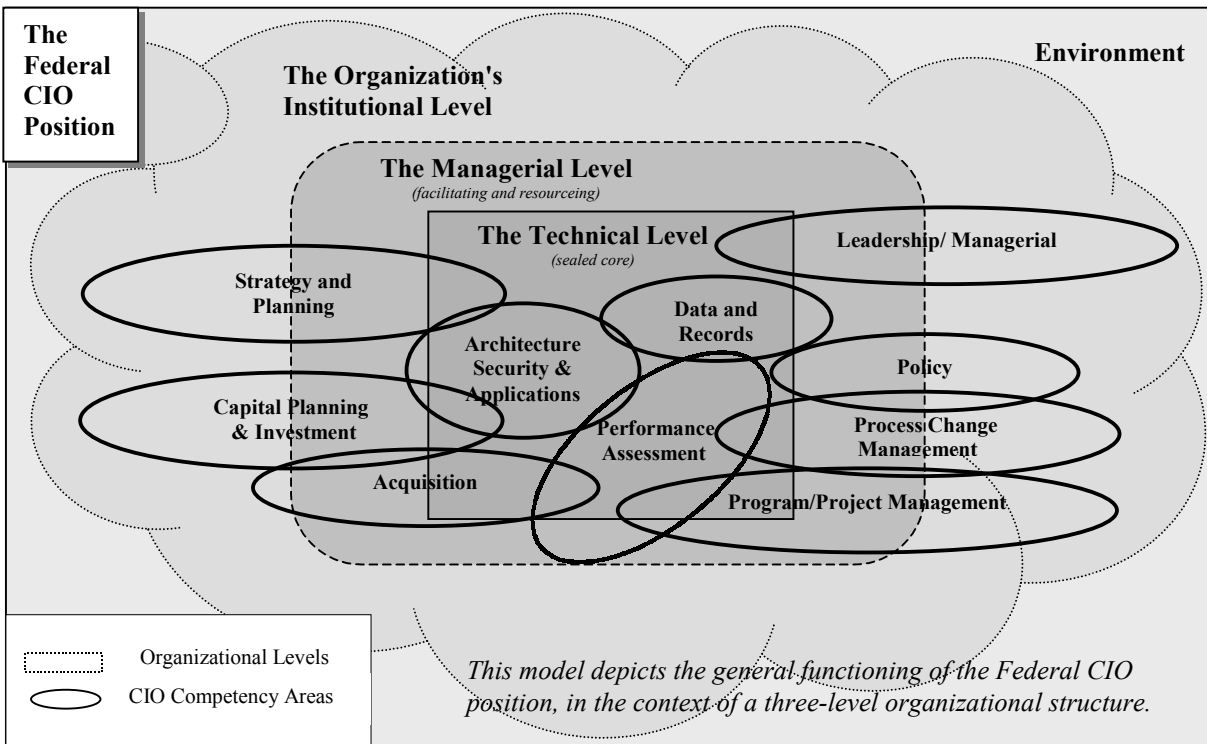
When CIO competency areas are related to the organizational model's levels, relationships can be depicted as in Figure B.

Figure B. Relating CIO Competencies to Organizational Levels
(These are example relationships)



This relationship model might be sufficient to reflect the CIO position except that it must be considered that CIO competency areas may extend to and operate in more than one organizational level. Figure C provides a "final" CIO Position Model that incorporates the CIO Competency List and the Parsons/Thompson tri-level organizational view, informed by key actor feedback. It is intended to be normative and to produce a visually intuitive depiction of the CIO position that indicates that the ten roles of a federal CIO operate across different levels of a generic agency organization.

Figure C. CIO Position Model



¹¹² Thompson, James D. Organizations in Action. New York: McGraw-Hill, 1967.

Some of the CIO's roles relate primarily to key business processes that are protected in the core, others range out across all three levels, penetrating the core and also extending out into the institutional environment where they may interact with external entities. Some CIO roles are mostly facilitation-oriented and therefore exist mainly in the middle management layer.

The implications of the role/level relationships and interactions between CIO roles shown in the CIO Position Model are not explored further in this research, but are discussed further with respect to areas for future research, in Chapter 8.

With this CIO Position Model, one can now visualize the multitude of IT-related activities that a CIO must attend to. An understanding of how CIO competency areas work across multiple levels of the organization also creates a more realistic functional context for viewing the specific mandates of the CCA for federal CIO oversight and process facilitation roles. With these tools, the analyst can now proceed to use the FCPEM method to evaluate CIO positions on a more informed basis.

The Federal CIO Evaluation Method (FCPEM)

The FCPEM is an evaluation method for determining the degree to which a federal agency has complied with the intent of the CCA in creating their CIO position. To support the development of this method, the CIO-related mandates in Section 5125 of the CCA were identified and interpreted as shown in Table 4.

Table 4. CCA Section 5125 CIO Roles List

<ol style="list-style-type: none">1. Serve with the title of Chief Information Officer.2. Serve at Executive Level IV of the Civil Service.3. Report directly to the agency head.4. Have IRM as principal duty.5. Ensure efficient IRM processes and reduce information collection burdens on the public.6. Support defining program information needs/strategies/systems.7. Lead a process to evaluate proposed information collections.8. Provide advice to agency head to ensure IT is acquired and IRM performed in accordance with PRA'95 and agency head priorities.9. Develop, maintain, facilitate an integrated IT architecture.10. Monitor/evaluate IT program performance and advises continuation.11. Participate in annual strategic planning and evaluation processes.12. Assess IRM skill requirements, develop strategies to rectify deficiencies & plan for hiring, training, professional development.13. Report annual progress in improving IRM capability to agency head.
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The first version of the FCPEM was developed in late 1999 and called the "CIO Roles Evaluation Matrix". It was used in the Key Actor Interview Guide (Appendix E), to obtain feedback on the proposed CIO evaluation method. The matrix also promoted comment on CIO establishment efforts in the case study agencies. The preliminary matrix was updated after all interviews were complete to produce the final FCPEM, as provided in Table 5 on the next page.

Table 5. Federal CIO Evaluation Method (FCPEM)

	CIO Role Mandates Per CCA, Section 5125	CIO Role Establishment Question	Comments on Compliance/ Non-Compliance	Other Related Federal Reference(s)
1	Agency establishes a CIO position/title. 5125(a)(1)(A)&(B)	Was a CIO position formally designated & established in writing?		OMB 96-02, EO-13011, PRA'95
2	CIO designated at Executive Level-IV 5125 (e)	Is the CIO a member of the Senior Executive Service, Level IV?		Title 44, U.S. Code, Section 5315
3	CIO reports directly to the agency head 5125 (a)(1)(A)&(B)	Is direct CIO-agency head reporting established in writing?		PRA'95, OMB Memo96-02
4	IRM is the CIO's principle duty. 5125(c)(1)	Does the designation document make IRM the CIO's principle duty?		OMB Memo96-02
5	CIO ensures efficient IRM processes, including reducing information collection burdens on the public 5125 a(1)(C)	Does the CIO facilitate reviews to improve IRM-related processes, including reducing the public information collection burden?		PRA'95, OMB A-130, GPEA, GAO Reports
6	CIO supports defining the agency's program information needs, strategies, systems, and capabilities. 5125 (a)(1)(C)	Is there a CIO & CFO facilitated process for identifying all agency program IT needs, strategies, systems, capabilities?		PRA'95 OMB A-130 GAO Reports
7	CIO heads a process to evaluate proposed agency collections of information. 5125 (a)(2)	Does the CIO facilitate the evaluation of information collections independent of CIO program roles?		PRA'95
8	CIO provides advice to agency head/management to ensure IT is acquired & IRM done IAW PRA '95 and agency head priorities. 5125 (b)(1)	Does the CIO facilitate an IT Capital Planning process, advise agency head/mgmt, & ensure IT is acquired & IRM/ITA are done IAW PRA'95 & agency head priorities?		CCA 5122(a) PRA'95 OMB A-130 OMB Memo96-02 FAR
9	CIO develops, maintains, facilitates an integrated agency IT architecture (ITA) 5125 (b)(2)	Does the CIO facilitate an ITA that ties to Capital Planning and follows OMB A-130 (rev. 2000) format/guidance?		CIO Council's FEAF, OMB Memo97-02 OMB Memo97-16 OMB A-130
10	CIO monitors/evaluates IT program performance & advises continuation 5125 (c)(2)	Does the CIO review IT programs for <10% variance in cost, schedule, and performance?		OMB A-11, OMB A-130, GPRA, PRA'95
11	CIO participates in FY agency strategic planning & performance evaluation processes. 5125 (c)(3)	Is there an agency IT Strategic Plan and is it reflected in the FY Strategic Plan and the Performance Report?		GPRA, OMB A-11
12	CIO assesses IRM skill requirements, develops strategies to rectify deficiencies, w/ plans for hiring, training, professional development 5125 (c)(3)(A),(B)&(C)	Does the agency have a CIO-facilitated IT Workforce Plan that addresses needed IRM skills, training, hiring, & professional development?		OMB A-11 OMB A-130, CIO Council
13	CIO reports annual progress in improving IRM capability to the agency head. 5125 (c)(3)(D)	Does the CIO report in writing to the agency head each year on how IRM capability is improving?		OMB A-11, PRA'95

The FCPEM operates by asking evaluation questions that determine whether thirteen CCA/CIO mandated roles have been established for that agency's CIO position. Determining the degree of compliance in each area gives both a functionally specific, and in summary, an overall indication of support for the CIO provisions of the CCA. Both compliance with and variance from CCA-CIO mandates are potentially valuable information for policy studies on what the effect of this portion of the law has been. Additionally, the identification of patterns of compliance or variance within the twenty-three agencies listed in the CCA may inform discussions regarding future federal IRM law and guidance.

Therefore, the FCPEM is not meant to be a "pass/fail" evaluation method, rather to be used to identify in component form whether an agency is complying with the intent of the CCA relative to how they established their CIO position. The variety of organizational forms, cultures, and mission orientations of the twenty-three agencies listed in the CCA make a "cookie-cutter" approach to using the FCPEM not useful or appropriate. I recommend that the analyst using the FCPEM as an analytic tool do so with the intention of documenting an agency's CIO/CCA compliance in each of the thirteen areas using techniques and information appropriate to that area, examples of which are provided in the next section of this chapter. While a "comply/not comply" overall rating for each area may be appropriate, amplifying comments in areas of non-compliance are an intended part of using the FCPEM.

FCPEM Evaluation Criteria

This section contains a detailed description of each of the thirteen CCA/CIO mandated roles in the FCPEM, as well as the evaluation criteria and underlying questions pertaining to these roles, a discussion of the source for the criterion, and the focus of recommended evaluation actions.

FCPEM Evaluation Criterion 1. Agency established CIO position and title. 5125(a)(1)(A)&(B).

Evaluation Question: *Was a CIO position formally designated and established in writing?*

This criterion evaluates whether a position for the CIO had been formally established. Here, not only was the title to be changed from "Senior IRM Official," but the responsibilities identified in PRA'95 were to be updated to those identified for the CIO. The actual text of this mandate in CCA Section 5125(a)(1) is as follows:

Amends Section 3506 (a)(2)(A) of title 44, United States Code [which is PRA'95] as follows: "Except as provided under subparagraph (B), the head of each agency shall designate a Chief Information Officer who shall report directly to such agency head to carry out the responsibilities of the agency under this chapter. The Secretary of the Department of Defense and the Secretary of each military department may each designate Chief Information Officers who shall report directly to such Secretary to carry out the responsibilities of the department under this chapter. If more than one Chief Information Officer is designated, the respective duties of the Chief Information Officers shall be clearly delineated.

My recommended approach to evaluating this criterion is to verify that the CIO title and position description was established in writing within the agency.

Sources for evaluating this include evaluating the agency memo/directive that established the CIO position, organization charts on agency web sites and those published internal to the agency, and agency phone lists.

FCPEM Evaluation Criterion 2. CIO was designated at Executive Level-IV. 5125(e).

Evaluation Question: *Was the CIO a member of the Senior Executive Service, Level-IV?*

This evaluation criterion focuses on the mandate that agency CIOs were designated at "Executive Level-IV." The purpose of this mandate was to indicate that CIOs were to be peers of the Senior Executive Service of the federal government, making them equal in rank to other policy-making executives, and eligible to hold high offices such as Assistant Secretary or Assistant Administrator positions in the agency. This mandate was modeled after a similar mandate in the Chief Financial Officers Act of 1990, which designated CFOs at Executive Level IV in the same twenty-three agencies listed in the CCA. The actual text of this mandate in PRA'95/CCA Section 5125(e) is as follows:

(e) EXECUTIVE LEVEL-IV – Section 5135 of title 5, United States Code, is amended by adding at the end of the following: 'Chief Information Officer, Department of Agriculture, 'Chief Information Officer, Department of Commerce...' (and lists all 23 agencies, as provided in Appendix A of this study).

My recommended approach to evaluating this criterion is to verify that the CIO was getting paid at least at Executive Level-IV and/or was an equivalent member of the Senior Executive Service (SES level 5 or 6). Methods of doing this include evaluating the CIO position description (if it exists), evaluating the

agency directive that established the CIO position, or verifying the paygrade through agency pay records.

CIO Evaluation Criterion 3. CIO reported directly to the agency head.
5125 (a)(1)(A)&(B).

Evaluation Question: *Was direct CIO-agency head reporting established in writing?*

This evaluation criterion focuses on the mandate that CIOs report directly to the agency head. This CCA mandate was created by modifying and then adopting language from PRA'95 (originally seen in PRA '80). The text of this mandate in PRA'95/CCA Section (a)(1)(A) follows:

Amends Section 3506 (a)(2)(A) of title 44, United States Code {which is the Paperwork Reduction Act of 1995} as follows: "Except as provided under subparagraph (B), the head of each agency shall designate a Chief Information Officer who shall report directly to such agency head to carry out the responsibilities of the agency under this chapter. The Secretary of the Department of Defense and the Secretary of each military department may each designate Chief Information Officers who shall report directly to such Secretary to carry out the responsibilities of the department under this chapter. If more than one Chief Information Officer is designated, the respective duties of the Chief Information Officers shall be clearly delineated.

This evaluation criterion draws on the same CCA language as does Evaluation Criterion #1 (Establish the CIO Position/Title). It is identified as a separate evaluation element in this research because there may be agencies that established the CIO position/title but did not implement a direct CIO-agency head reporting relationship. Evidence of this was seen in the 1998 study of CIO position establishment in federal agencies, the results of which are provided in Table 3.

My recommended approach to evaluating this criterion includes reviewing the position descriptions for the CIO and the agency head (if they existed for such senior executives), evaluating the agency memo/directive that established the CIO position, and evaluating organization charts relating to the research period (1996-2000) on agency web sites and those published internal to the agency.

FCPEM Evaluation Criterion 4. IRM was the CIO's principal duty. 5125(c)(1).

Evaluation Question: *Did the designation document make IRM the CIO's principle duty?*

This evaluation criterion focuses on the mandate that the CIO's responsibilities were primarily focused on IRM-related duties such as agency-wide IT architecture coordination, IT capital planning facilitation, IT program oversight, IT security reviews, IT workforce planning, and IT-related policy development and promulgation.

This CCA mandate was intended to preclude the creation of a CIO position that is "in name only." Some agencies initially designated their existing CFO position as being a "dual-hatted" CFO/CIO, but industry observations after treating the position similarly were that the CFO and CIO positions are extensive and complicated enough in their own right to require that a separate executive fill each position.

Another way in which the subordination of CIO duties was occurring is exemplified by the CIO position at the Departments of Labor and Justice as it

existed during the research period. These agencies had assigned CIO responsibilities as a sub-duty area for the Assistant Secretary for Administration and Management. Based on interview information, the Assistant Secretary for Administration and Management at both of these agencies spent a minority of their time on CIO duties, leaving day-to-day CIO functions to the Deputy CIO.

The text of this CCA Section 5125 (c)(1) mandate is:

The Chief Information Officer of an agency that is listed in section 901 (b) of title 31, United States Code, shall have information resources management duties as that official's primary duty.

My recommended approach to evaluating this criterion is to review the agency document that established the CIO position for language that indicates that IRM duties, as specified in the CCA, were the CIO's primary duties.

Secondary evaluation sources would include agency web site descriptions of CIO areas of responsibilities, and management time/desk audits of what activities the agency CIO engaged in.

FCPEM Evaluation Criterion 5. CIO ensured efficient IRM processes, including reducing information collection burdens on the public. 5125 a(1)(C).

Evaluation Question: *Did the CIO facilitate reviews to improve IRM-related processes, including reducing the public information collection burden?*

This evaluation criterion focuses on the mandate that CIOs facilitate the implementation of efficient/effective IRM processes and the reduction of information collection burdens on the public. This mandate is actually found in the language of PRA'95, which CCA Section 5125 amended (similar to

Evaluation Criteria #1 and #3). The text of this mandate in PRA'95/CCA is as follows:

The Chief Information Officer designated under paragraph (2) shall head an office responsible for ensuring agency compliance with and prompt, efficient, and effective implementation of the information resources management responsibilities established under this chapter, including the reduction of information collection burdens on the public. The Chief Information Officer and employees of such office shall be selected with special attention to the professional qualifications required to administer the functions described under this chapter.

My recommended approach to evaluating this criterion is to verify that a CIO-facilitated procedure existed for review/improving IRM-related processes. This would include consideration for reducing the public information collection burden. For example, reducing the number of agency forms that citizens must complete to obtain public services, and controlling the growth of agency files and/or electronic databases of public information that must be maintained and archived. Congress had recognized the growing burden of government information collection that primarily affected small businesses but was also becoming a bothersome problem for citizens in filing taxes, requesting benefits, or obtaining records. The cost to agencies for maintaining the growing paper and electronic data/records library was also increasing, and this was a significant driver for the passage of PRA a year before the CCA. Because the principal drafter of PRA'95 provisions was also involved with drafting the CCA, there is significant linkage between the two laws in the area of CIO responsibilities that enhance the execution of their mandates.

FCPEM Evaluation Criterion 6. CIO was supported in defining agency program information needs, strategies, systems, and capabilities to meet those needs. 5125 (a)(1)(C).

Evaluation Question: *Was there a CIO & CFO facilitated process for identifying all agency program IT needs, strategies, systems, capabilities?*

This evaluation criterion focuses on the intended role of the CIO as the top executive in the agency charged with coordinating the use of IT in program activities, including new and ongoing information systems development efforts (though coordination with the CFO is specifically mentioned in CCA sections 5126). This would potentially have provided in the CIO position a single reference point for defining IT requirements, strategies, and solutions so that the integration, cost, and performance of systems could be improved. The mandate is actually found in the language of PRA'95, which CCA Section 5125 amended (similar to Evaluation Criteria #1, 3, and 5). The text of this mandate in PRA'95/CCA is as follows:

Each agency program official shall be responsible and accountable for information resources assigned to and supporting the programs under such official. In consultation with the Chief Information Officer designated under paragraph (2) and the agency Chief Financial Officer (or comparable official), each agency program official shall define program information needs and develop strategies, systems, and capabilities to meet those needs.

My recommended approach to evaluating this criterion is to look at whether the agency had defined, documented, and implemented a CIO/CFO-facilitated process for first identifying all agency program IT needs and then developing strategies, information systems, and capabilities to meet those needs. This criterion spoke to the need for agencies to coordinate their

programs' IT needs through the use of a single, comprehensive process that has top executive sponsorship. In this way, agency IT infrastructure costs could be reduced and the integration of capabilities and services increased, with the objective of improving agency mission performance.

During the decade prior to the CCA, agency program offices had often pursued IT-related needs on an individual basis. This led to duplication and a lack of integration in the resulting support systems, a major criticism leveled by GAO, OMB, and Congress. Therefore, this mandate in the CCA was meant to charge CIOs with replacing a "stovepipe" IT systems development approach with an enterprise-wide view and supporting processes that are then documented in the agency's business/technology architecture (in Criterion #9).

FCPEM Evaluation Criterion 7. CIO headed a process to evaluate proposed agency collections of information. 5125 (a)(2).

Evaluation Question: *Did the CIO facilitate the evaluation of information collections independent of CIO program roles?*

Similar to many of the other criteria, this one also related to a CCA mandate that supports mandates contained in PRA'95. In this case the mandate sought to ensure that information collections (records) management was a part of CIO oversight responsibilities. The term "information collection" was defined in PRA'95, Section 3502 as:

The obtaining, causing to be obtained, soliciting, or requiring the disclosure to third parties or the public, of facts or opinions by or for an agency, regardless of form or format, calling for either (i) answers to identical questions posed to, or identical reporting or record keeping requirements imposed on, ten or more persons, other than agencies,

instrumentalities, or employees of the United States; or (ii) answers to questions posed to agencies, instrumentalities, or employees of the United States which are to be used for general statistical purposes; and (B) shall not include a collection of information described under section 3518(c)(1)." [e.g., federal criminal investigations, prosecution, intelligence activities].

Congress had recognized the cost and importance of maintaining federal records in both paper and electronic form. Electronic records management had been a particular area of emphasis for Congress in light of debates over the significance of e-mail records, the incompatibility of electronic storage media and reading devices, and the need in agencies for increasingly larger databases, storage computers, and retrieval systems and supporting infrastructures to handle these information collections. All of these elements added significantly to overall agency IT-related spending. The control of this area by CIOs was meant to provide a focal point for controlling cost increases for information storage and retrieval by evaluating the merit of establishing each new information collection. The specific language of this PRA'95/CCA mandate is as follows:

With respect to the collection of information and the control of paperwork, each agency shall (1) establish a process within the office headed by the Chief Information Officer designated under subsection (a), that is sufficiently independent of program responsibility to evaluate fairly whether the proposed collections of information should be approved under this chapter to — (A) review each collection of information before submission to the (OMB) Director for review under this chapter, including — (i) an evaluation of the need for the collection of information; (ii) a functional description of the information to be collected; (iii) a plan for the collection of the information; (iv) a specific, objectively supported estimate of burden; (v) a test of the collection of information through a pilot program, if appropriate; and (vi) a plan for the efficient and effective management and use of the information to

be collected, including necessary resources; (B) ensure that each information collection – (i) is inventoried, displays a control number and, if appropriate, an expiration date; (ii) indicates the collection is in accordance with the clearance requirements of section 3507; and (iii) informs the person receiving the collection of information of – (I) the reasons the information is being collected; (II) the way such information is to be used; (III) an estimate, to the extent practicable, of the burden of the collection; (IV) whether responses to the collection of information are voluntary, required to obtain a benefit, or mandatory; and (V) the fact that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid control number; and (C) assesses the information collection burden of proposed legislation affecting the agency.

My recommended approach to evaluating this criterion is to determine whether the agency CIO had established/facilitates a fair and ongoing process for evaluating whether proposed collections of information should be approved. Also, it should be determined whether this process was conducted sufficiently independent of any other CIO program responsibilities to ensure fairness in all reviews.

FCPEM Evaluation Criterion 8. CIO provided advice to the agency head and management to ensure that IT was acquired and IRM was done in accordance with PRA '95 and agency head priorities. 5125(b)(1).

Evaluation Question: *Did the CIO facilitate an IT capital planning process, advise agency head/management, and ensure that IT was acquired and IRM/ITA were done in accordance with PRA'95 and agency head priorities?*

This evaluation criterion focuses on the need for agencies to more critically evaluate their IT-related capital investments to ensure that funding was approved in a way that maximizes the return on investment in terms of leveraging technology to improve mission performance. CCA Section 5112(b)

gave overall guidance to the Executive Branch by charging the OMB Director to:

Promote and be responsible for improving the acquisition, use, and disposal of information technology by the federal government to improve the productivity, efficiency, and effectiveness of federal programs, including through dissemination of public information and the reduction of information collection burdens on the public.

These themes carry through to the agency CIO, as can be seen in the language of CCA Section 5125(b)(1):

The Chief Information Officer of an executive agency shall be responsible for providing advice and other assistance to the head of the executive agency and other senior management personnel of the executive agency to ensure that information technology is acquired and information resources are managed for the executive agency in a manner that implements the policies and procedures of this division, consistent with chapter 35 of title 44, United States Code, and the priorities established by the head of the executive agency.

My recommended approach to evaluating this criterion is to determine whether the CIO had implemented and continued to facilitate an IT Capital Planning and Control (CPIC) process that enabled the CIO to provide cogent IT-related investment advice to the agency head and senior management. CPIC was encompassed in GAO's August 2000 "IT Investment Management" (ITIM) methodology, which measures the CPIC process maturity in an agency. There are five CPIC maturity levels, following the design of Carnegie Mellon University's "Capability Maturity Model."¹¹³

¹¹³ General Accounting Office. Information Technology Investment Management: A Framework for Assessing and Improving Process Maturity. GAO/AIMD-10.1.23. (Review Draft), May 2000.

CPIC, as endorsed by OMB, involves creating investment "portfolios" of IT projects that have an IT element that exceeds pre-determined funding thresholds (e.g., programs whose fiscal year IT expenditures are in excess of \$100,000). In CPIC, these programs must go through a "select" phase to get approval based on mission contribution, return on investment, risk mitigation, architecture alignment, security, and the incorporation of performance measures.

As the program's systems are being built, CPIC moves into a "control" phase that monitors for/corrects variance in excess of 10 percent of cost, schedule, and performance goals established by the program's management.

Finally, fully implemented programs enter an "evaluation" phase where Post-Implementation Reviews (PIRs) provide an analysis of things that went well and things that did not go well, so that the agency can learn from these experiences and implement improved processes (which is part of what leads to a higher ITIM maturity rating for an agency).

FCPEM Evaluation Criterion 9. CIO developed, maintained, and facilitated an integrated agency IT Architecture. 5125(b)(2).

Evaluation Question: *Did the CIO facilitate an ITA that ties to Capital Planning and follows OMB A-130 format/guidance?*

This evaluation criterion focuses on the mandate that CIOs develop and maintain an agency-wide IT Architecture (ITA). This mandate was derived from the February 1996 concept of "technical frameworks" introduced in OMB

Circular A-130 (Section 8b(4)), but not incorporated into the CCA which had been passed only weeks before.

After CCA was passed, OMB Memo 97-02 endorsed and strengthened this mandate by directing that ITAs were to be implemented in all federal agencies. This memo, entitled "Funding Information System Investments," required that agency investments in major information systems be consistent with federal, agency, and bureau ITAs. Additionally, in June 1997, OMB Memo 97-16 entitled "Information Technology Architectures," required agencies to "be prepared to indicate the status of the development, implementation, and maintenance of the agency ITA during the formulation of the fiscal year 1999 President's budget." OMB Memo 97-16 defines architecture as follows:

A complete ITA is the documentation of the relationships among business and management processes and information technology that ensure:

- Alignment of the requirements for agency-sponsored information systems (as defined in OMB Circular A-130) with the processes that support the agency's missions and goals;
- Adequate interoperability, redundancy, and security of information systems; and,
- The application and maintenance of a collection of standards by which the agency evaluates and acquires new systems.

The CCA defines "information technology architecture" with respect to an executive agency in Section 5125(d) as:

An integrated framework for evolving or maintaining existing information technology and acquiring new information technology to achieve the agency's strategic goals and information resources management goals.

The text of this IT Architecture mandate in the CCA reads as follows:

The Chief Information Officer of an executive agency shall be responsible for developing, maintaining, and facilitating the implementation of a sound and integrated information technology architecture for the executive agency.

The Federal CIO Council released guidance on developing enterprise-wide ITAs in September 1999 in its publication, *Federal Enterprise Architecture Framework (FEAF)*.¹¹⁴ In a September 2000 speech to industry and government IT executives, GAO's Director of IT Issues said that three ITA frameworks are preferred by GAO for agency use: the FEAF, the Defense Department's "C4ISR" architecture, and Treasury's "Enterprise Architecture Framework" (TEAF). Guidance and ITA examples therefore exist to support CIO execution of this Clinger-Cohen mandate area. In December 2000, the IRM provisions of OMB Memos 97-02 and 97-16 were subsumed into the revised OMB Circular A-130, and then these two OMB memos were cancelled.

My recommended approach to evaluating this criterion is to focus on whether the CIO complied with OMB Circular A-130, which (as quoted above) provides definitions, guidance, and a deadline for indicating the status of agency ITA development efforts (FY 1999 budget submissions). OMB has increasingly emphasized the role of architecture in promoting systems integration, reducing duplication, and supporting the efficient leveraging of new technologies. According to one senior OMB official who was informally interviewed during this study, OMB denied over \$1.4 billion new agency requests

for IT programs during the fiscal year 2000 budget reviews, because of a lack of integration with the agency ITA. The same OMB official indicated that he expected even more funds to be denied in subsequent years, due to slow progress by some agencies in implementing a compliant enterprise-wide integrated business and technology architecture. Finally, this OMB official pointed out that the revision to OMB Circular A-130 focuses heavily not only on ITAs, but also on capital planning and IT security processes, as all of these are integrated processes at various levels of the agency.

FCPEM Evaluation Criterion 10. CIO monitored/evaluated IT program performance and advises on whether to continue, modify, or terminate the program. 5125(c)(2).

Evaluation Question: *Did the CIO review IT programs for greater than 10 percent variance in cost, schedule, and/or performance?*

This evaluation criterion focuses on whether the CIO is evaluating IT-related program performance and advising senior management on whether to continue, adjust, or terminate the effort. Similar to IT capital planning, an entire section of the CCA is devoted to "Performance-Based and Results-Based Management" (Section 5113). This in concert with the concepts of the 1993 Government Performance and Results Act (GPRA), indicates its importance to Congress as a management practice. The CCA charges the OMB Director with evaluating the IRM practices of agencies with respect to the performance and

¹¹⁴ Chief Information Officers Council. Federal Enterprise Architecture Framework (version 1.1). Available from the Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831. September 1999

results of the investments made in IT. A maximum level for variance in a project's cost, schedule, and performance goals is given in OMB Circular A-11 (no more than 10 percent).

CCA Section 5113 charges the agency head with establishing an effective and efficient capital planning process for selecting, managing, and evaluating the results of all of its major investments in IT, and with determining before making these investments whether the IT function could be outsourced. It also requires agency heads to analyze mission-related processes before making significant investments in IT that would be used to support those missions, and to ensure that the information security policies, procedures, and practices are adequate. The specific language in the CCA Section 5125 related to CIO program oversight responsibilities is:

The Chief Information Officer of an agency that is listed in section 901 (b) of title 31, United States Code, shall monitor the performance of those programs on the basis of the applicable performance measures, and advise the head of the agency whether to continue, modify, or terminate a program or project.

My recommended approach to evaluating this criterion is to determine whether the CIO led an agency-wide process to review IT programs for variances above 10 percent in cost, schedule, and/or performance. Also, the evaluation should determine whether this process enabled the CIO to recommend to the agency head whether to continue, modify, or terminate a program or project based on the results of the review. Similar to the CIO role of providing capital planning advice to the agency head to enhance CPIP select

phase decision-making, this CIO role emphasized stronger management oversight during the CPIC control phase that centers on evaluating performance measures of program outcomes that were identified early in the program/project requirements establishment process. OMB Circular A-11 requires agencies to report to OMB any variances in major programs of greater than 10 percent of planned cost, schedule, or performance in their Annual Performance Report.

FCPEM Evaluation Criterion 11. CIO participated in annual strategic planning and performance evaluation processes. 5125(c)(3).

Evaluation Question: *Was there an agency IT Strategic Plan and was it reflected in the FY Strategic Plan and the Performance Report?*

This evaluation criterion focuses on the CCA mandate to make the CIO a top-level planner and decision-maker in the agency. Along with specifying the seniority of the CIO, the Act sought to provide language that would ensure that the CIO participated in the highest level planning and evaluation processes in the agency so that IT investments can best be leveraged in supporting key mission processes. The specific language of the CCA for this mandate states:

The Chief Information Officer of an agency that is listed in section 901 (b) of title 31, United States Code, shall annually, as part of the strategic planning and performance evaluation process [details three items covered in Evaluation Criterion 12].

My recommended approach to evaluating this criterion is to identify the role of the CIO in agency strategic planning and evaluation processes, and look at whether the CIO was designated in writing as a member of various executive

level committees/boards that conducted these activities. There should also be a determination of whether there was an IT Strategic Plan at the agency (though not a mandated item) that was subordinate to but aligned with the agency's Strategic Plan, a Plan prepared in accordance with OMB Circular A-11. Finally, measurement of this evaluation element should look at whether IT contributions and program performance evaluation processes were reflected in the agency Annual Performance Report and Annual Performance Plan, which are also required by OMB Circular A-11.

FCPEM Evaluation Criterion 12. CIO assessed IRM skill requirements, developed strategies to rectify deficiencies, and plans for IT workforce hiring, training and professional development. 5125(c)(3)(A),(B),(C).

Evaluation Question: *Did the agency have a CIO-facilitated IT Workforce Plan that addressed needed IRM skills, training, hiring, & professional development?*

This evaluation criterion focuses on the CIO's role in IT workforce planning and management. Congress had recognized and GAO had reported on a continuing shortage of federal employees who were skilled in established and leading-edge technologies. Fundamental to both the efficient operation of legacy information systems and the development of new information systems, applications, and databases are the skills and continuing presence of properly trained government workers (and support contractor personnel). To promote the success of IT-supported mission processes, the CIO must therefore attend to the recruitment, retention, training, and professional development of a skilled IT workforce. The specific language of the CCA in this area is:

The Chief Information Officer of an agency shall annually, as part of the strategic planning and performance evaluation process required (A) assess the requirements established for agency personnel regarding knowledge and skill in IRM and the adequacy of such requirements for facilitating the achievement of the performance goals established for IRM; (B) assess the extent to which the positions and personnel at the executive level of the agency and the positions and personnel at management level of the agency below the executive level meet those requirements; and (C) in order to rectify any deficiency in meeting those requirements, develop strategies and specific plans for hiring, training, and professional development.

My recommended approach to evaluating this criterion is to determine whether the CIO had facilitated the development and implementation of an agency IT Workforce Plan (also called the IT Human Capital Plan). This IT Workforce Plan should have assessed the executive, managerial, and staff level IT knowledge and skills that are required for each employee to successfully perform in their position. From the need for a wide range of skills in using office automation software (e.g., Microsoft Word/PowerPoint/Excel, or Lotus Notes) and desktop computers, to highly specialized needs to develop and oversee government web sites on the Internet (or agency Intranet), many skills changed and/or have come into existence only in the past few years.

The IT Workforce Plan also should have addressed the need in various agency areas for hiring replacements for an increasingly senior federal workforce (some agencies estimate that over half of the IT managers present in 2000 will retire by 2005), and developed strategies for retaining skilled/productive workers not nearing retirement age. Finally, the IT Workforce Plan should have identified IT-related professional development paths and training courses that would be

required during each year in various agency areas, as well as budget estimates for accomplishing the IT Workforce Plan.

FCPEM Evaluation Criterion 13. CIO reported annual progress in improving IRM capability to the agency head. 5125(c)(3)(D).

Evaluation Question: *Did the CIO report in writing to the agency head each year on how IRM capability was improving?*

This evaluation criterion focuses on ensuring that the CIO took ownership in annually reporting overall improvement in agency IRM capability to the agency head. Inasmuch as IT-related expenditures had become the highest portion of some agency budgets, the Clinton Administration and Congress had a significant interest in ensuring that an effective leveraging of IT was occurring (termed in the CCA "improvement in IRM capability"). The federal reporting requirement for reporting IRM effectiveness is also covered in OMB Circular A-11, Part III: Annual Performance Reporting. The specific language of the CCA related to CIOs in this area is:

The Chief Information Officer of an agency shall annually, as part of the strategic planning and performance evaluation process required report to the head of the agency on the progress made in improving information resources management capability.

How to measure this improvement in IRM capability is not specified for CIOs in Section 5125; however, Section 5132 of the CCA states:

It is the sense of Congress that, during the next five-year period beginning with 1996, executive agencies should achieve at least a 5 percent decrease in the cost (in constant fiscal year 1996 dollars) that is incurred by the agency for operating and maintaining information technology, and each year a 5 percent increase in the efficiency of the

agency operations, by reason of improvements in information resources management by the agency.

My recommended approach to evaluating this criterion is to identify whether the CIO reported yearly in writing to the agency head on the progress of IRM capability. Submission of IRM-related contributions to agency mission performance in the OMB-mandated A-11 Annual Performance Report would have been the primary way to comply with this mandate. Also, and without holding the CIO responsible for attaining the statement's goals, the evaluation of this criterion may also ask whether the agency had adopted CCA's "Sense of Congress" statement and created agency goals for attaining an overall 5 percent decrease in IT systems costs and a concurrent 5 percent increase in agency operating efficiency due to improved IRM practices.

The following chapter presents case studies to describe selected agency CIO establishment activities and to document validation of the CIO Position Model and of the FCPEM through key actor interviews and analysis of agency documentation on their CIO position.

CHAPTER 6 - AGENCY CASE STUDIES

Overview of the Case Studies

Four case studies and related key actor interviews were conducted to validate the Federal CIO Position Model and the Federal CIO Evaluation Method (the FCPEM). The case study agencies were the Department of the Treasury (Treasury), the Department of Agriculture (USDA), the Environmental Protection Agency (EPA), and the Federal Emergency Management Agency (FEMA).

As discussed in Chapter 3, factors in the selection of these particular agencies took into consideration the potential influence of organizational size and mission diversity on the establishment of their CIO position. The Departments of Treasury and Agriculture are large, diverse organizations with many sub-agencies, and EPA and FEMA are smaller independent agencies with a more singular mission focus and few if any sub-organizations.

The identification of key actors¹¹⁵ for case study interviews focused on people who work with CIOs and their staffs. This included people who currently hold the CIO or Deputy CIO position, people who routinely interact with the CIO position, and selected others whose work is affected by the CIO position.

A series of additional interviews were also conducted with three people who were involved with drafting the CCA, to better discern the original legislative

intent. These individuals are all former Senate staff members who now hold other federal government positions, namely, acting Deputy CIO of the Department of Defense, senior counsel to the Comptroller General of the United States, and a senior staff member of the Senate Armed Services Committee. A context interview was also conducted with the person who developed the CIO Competency List adopted in 1998 by the Federal CIO Council.

The following format is used in presenting each case study:

- Agency Size and Mission
- CIO Reporting Structure
- Documentation of the CIO Position
- Feedback on the CIO Position Model
- Feedback on the FCPEM
- Additional Observations on the CIO by Key Actors

A discussion of overall case study findings for the four agencies studied is provided at the end of the chapter.

¹¹⁵ The term "Key Actor" in this chapter normally refers to people in these agencies who were interviewed for the case studies. Their names are not used because in several cases they asked for non-attribution.

Case Study #1 - Department of Agriculture

Agency Size and Mission

The U.S. Department of Agriculture (USDA) was established in 1862 under President Lincoln, to provide better information on farming and sources of good seed to the nation, a majority of whose workforce was farmers. Today, the USDA is a large federal department that employs more than 110,000 people and receives over \$90 billion in annual federal funding. The mission statement of USDA is as follows:¹¹⁶

Enhance the quality of life for the American people by supporting the production of agriculture:

- Ensuring a safe, affordable, nutritious, and accessible food supply.
- Caring for agriculture, forests, and range lands.
- Supporting sound development of rural communities.
- Providing economic opportunities for farm and rural residents.
- Expanding global markets for agricultural and forest products and services.
- Working to reduce hunger in America and throughout the world.

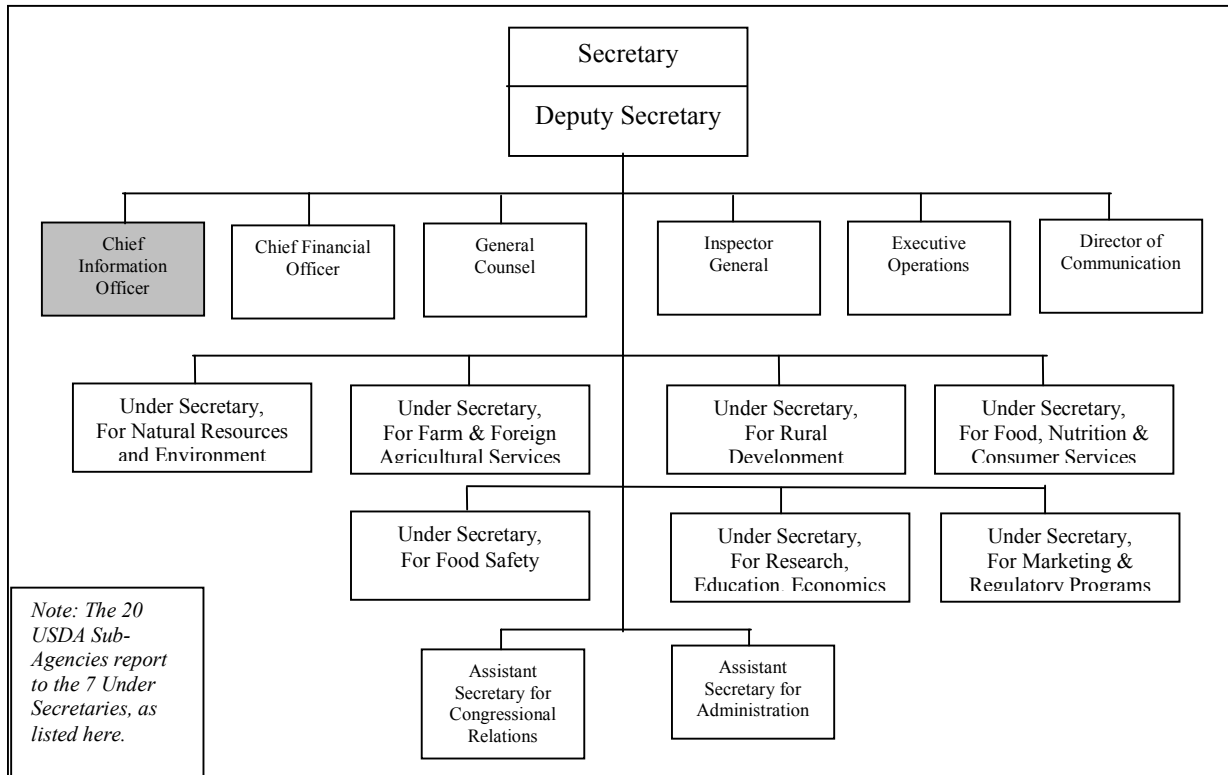
The USDA is comprised of 12 headquarters offices, a graduate school, and 20 field agencies/centers/services divided into the following seven mission areas:

- Farm and Foreign Agricultural Services
- Food, Nutrition, and Consumer Services
- Food Safety
- Marketing and Regulatory Programs
- Natural Resources and Environment
- Research, Education, and Economics
- Rural Development

¹¹⁶ USDA Web Site. <http://www.usda.gov/mission/miss-toc.html>

Figure D shows the USDA headquarters organizational chart, reflecting headquarters offices and the seven mission areas run by Under Secretaries of Agriculture. Appendix D provides a detailed organizational chart from USDA.

Figure D. USDA Organizational Chart, December 2000



CIO Reporting Structure at USDA

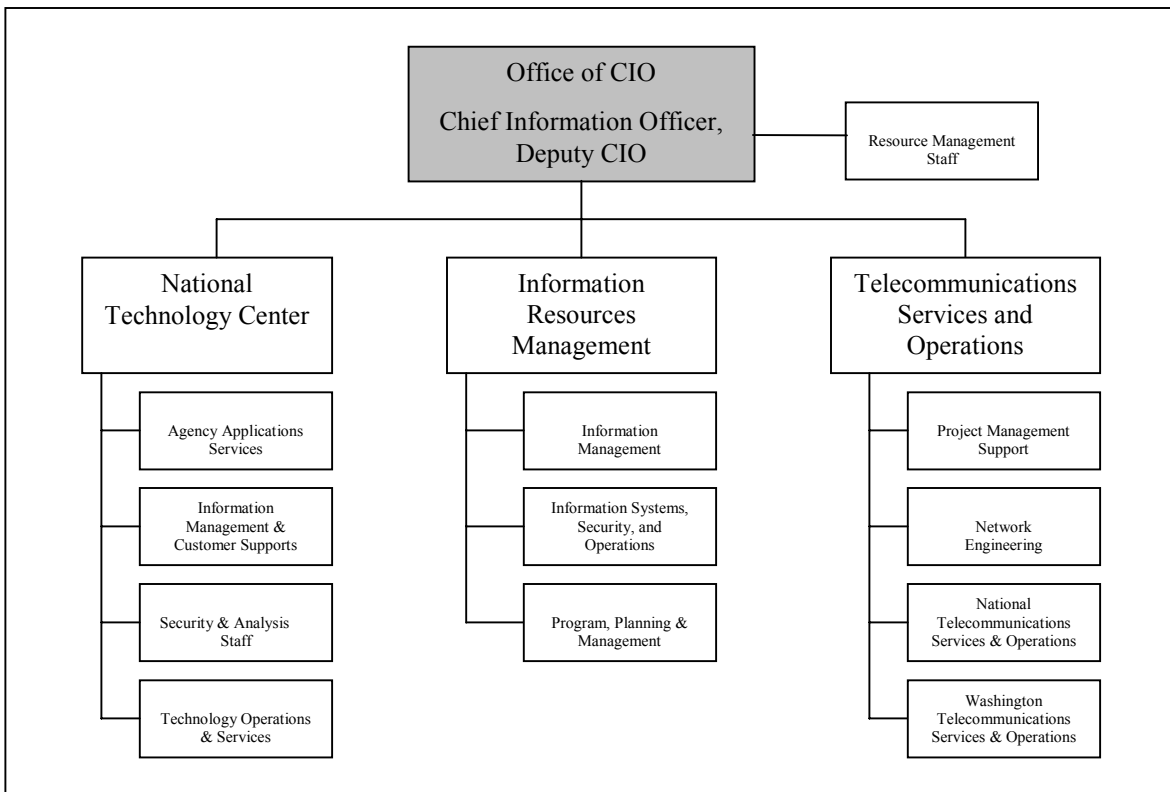
The current USDA CIO is an SES Level-6 political appointee, with status equal to that of an Assistant Secretary and to federal Executive Level-IV.¹¹⁷ As Figure D shows, the CIO reports directly to the Secretary of Agriculture, but key actor

¹¹⁷ There are six levels for the Senior Executive Service (SES), and six Federal Executive Levels. Executive Level positions are senior politically appointed positions in the Executive Office of the President or in executive branch agencies. SES positions are both politically appointed positions in agencies and career positions in agencies (not confirmed by Congress). Federal CIO positions have been filled since 1996 by a mix of these.

interviews indicated that most day-to-day business is conducted with the USDA Deputy Secretary.

The USDA CIO executes his functions through an “Office of the Chief Information Officer” (OCIO) staff at the USDA’s Washington, D.C. headquarters. This includes oversight of a Resource Management Staff and three main IT-related functional groups: the National Information Technology Center, Information Resources Management, and Telecommunications Services and Operations. The three functional groups encompass eleven divisions, many of which are located throughout the country. Figure E provides a high level USDA CIO Organizational Chart.

Figure E. USDA CIO Organizational Chart, December 2000



Documentation of the CIO Position at USDA

USDA created its CIO position to comply with the CCA and Executive Order 13011 by issuing Secretary of Agriculture Memorandum 1030-30, dated August 8, 1996 (included in Appendix D). This was only three weeks after the Executive Order was signed, marking USDA as one of the earliest departments to comply with the mandate for CIO position establishment. USDA has had two CIOs since the position was created in 1996, with the first CIO, Anne Reed, serving from August 1996 to January 2000. Joseph Leo has been the CIO since January 2000.

The USDA CIO's responsibilities are stated as follows:¹¹⁸

The Chief Information Officer (CIO) has primary responsibility for the supervision and coordination with the Department of the design, acquisition, maintenance, use, and disposal of information technology by USDA agencies, and for monitoring the performance of USDA's information technology programs and activities, and for assuring that USDA information management is consistent with the principles of the PRA and with information security and privacy requirements. The CIO is required to deal with top level officials in the Office of Management and Budget, other federal agencies, and appear to testify before congressional committees. The CIO must be knowledgeable of the requirements of the CCA, the PRA, GPR, and the Computer Security Act.

Mr. Leo, like other politically appointed federal CIOs, left his position in late January 2001, with the conclusion of the Clinton Administration. As of February 2001, a new CIO at USDA has not been appointed, and the Deputy CIO, Mr. Ira Hobbs, is the acting CIO (Mr. Hobbs is a career civil servant).

¹¹⁸ USDA Web Site: http://www.ocio.usda.gov/it_01_cio.html

In the following section of the case study, feedback is presented from interviews with USDA key actors regarding preliminary versions of the CIO Position Model and the FCPEM evaluation method.

USDA Feedback on the CIO Position Model

Five key actor interviews were conducted at USDA, involving the CIO, Deputy CIO, one of the four Associate CIOs, and two Agency-level senior IRM executives. The interviews ranged from 30 to 90 minutes.

The initial version of the CIO Position Model that was used during key actor interviews (Figure F), as well as a summary of feedback on this initial model (Table 6) is provided on the next page for reference. As stated in Chapter 5, a CIO competency area was defined in this research as an area of knowledge that is needed in order to successfully perform as a CIO.

Figure F. Initial CIO Position Model

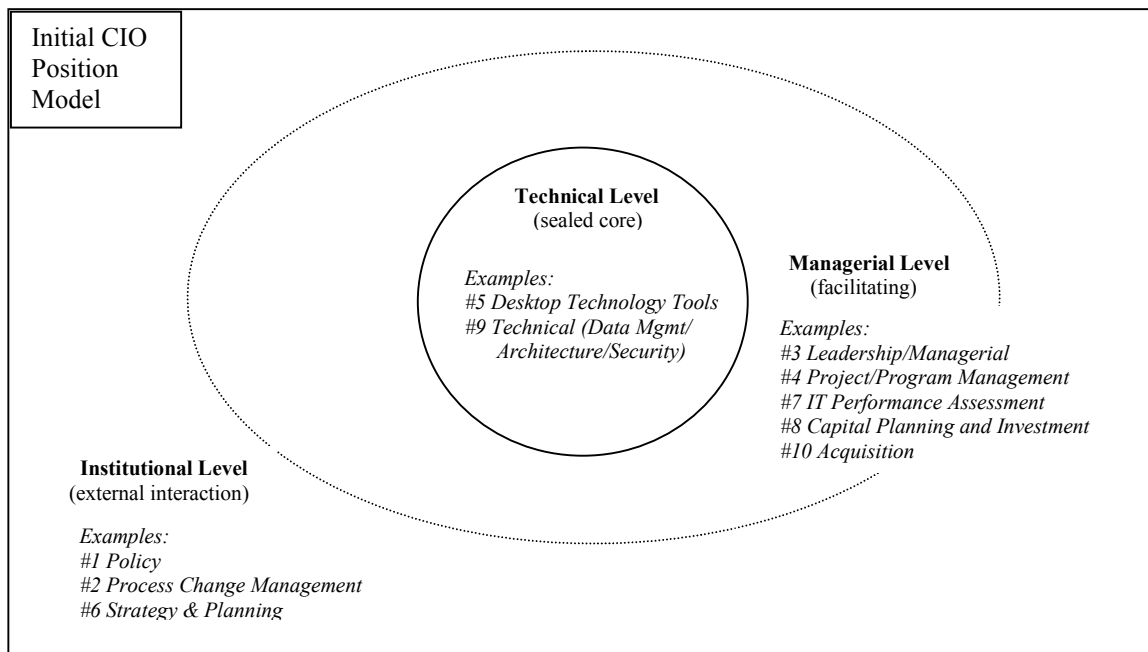


Table 6. USDA Feedback on Initial CIO Position Model

CIO Competency Area	Very Important	Somewhat Important	Not Important	Technical Level	Managerial Level	Institutional Level
Policy	5				2	3
Process/Change Management	3	2			4	1
Leadership/Managerial	5				3	3
Project/Program Management	3	2		2	4	
Desktop Technology Tools	1	2	2	5		
Information Resources Strategy & Planning	3	1	1		4	1
IT Performance Assessment: Models & Methods	1	3	1	3	3	1
Capital Planning & Investment Assessment	5			1	4	4
Technical (Data Mgmt/Security/Architecture)	3		2	5	2	1
Acquisition	1	3	1	2	4	1

(5 USDA Key Actor Respondents, Fall 2000)

In reviewing this initial model of the CIO Position, the USDA key actors were asked to rate the importance (high, medium, or low) of each CIO competency area in terms of its contribution to accomplishing CIO roles. They were also asked to select an organizational level for each competency area to be shown in the model (technical, managerial, or institutional). A summary of this feedback is provided above, and additional key actor feedback and amplifying commentary follow. Overall case study results are presented at the end of the chapter.

1. Rating the Importance of CIO Competencies.

In interpreting key actor responses in this area, I looked for the presence of majorities of opinion (more than half of the respondents) in rating the importance of CIO competencies, and I also looked for patterns of responses within the key actor group.

More than half of the five USDA key actors rated the following CIO competencies as very important for CIOs to have: Policy, Process/Change Management, Leadership/Managerial, Project/Program Management, IRM Strategy and Planning, Capital Planning, and Technical. A majority of the key actors also rated two competencies as somewhat important: IT Performance Assessment, and Acquisition. They further indicated that the Desktop Technology Tools competency area was between somewhat and not important to doing the CIO job.

It would appear that most of the competencies rated as very important are also higher-level executive functions, with the exception of "Technical." The interpretation of this lone standout is that while the CIO is seen as a senior executive, having the ability to understand the technologies that the CIO oversees is very important. The area of Performance Assessment involves developing measures for organizational processes and supporting IT systems, and Acquisition can be viewed as contracting-oriented. Both of these may have been viewed as management level functions that are less important to the CIO.

One notable key actor response was that of the USDA CIO who indicated that in his opinion, all of the very important CIO competencies (four of them: Policy, Leadership/Managerial, IRM Strategy, and Capital Planning) operate at the institutional level of this model, while the somewhat important competencies (three: Change Management, Program Management, and Acquisition) operate

at the managerial level, and the not important ones (three: Desktop Technology Tools, IT Performance Assessment, and Technical) operate at the technical level. His comment was that this assignment of a relationship was meant to support his opinion that the CIO "should function at a very high level, and be interested in seeing the overall plan, not the in-the-weeds details." No other USDA key actor identified this type of specific linkage between the importance of competencies and the organizational level they operate at.

If, as these key actors indicated, it is very important that CIOs possess at least a half-dozen CIO competencies to successfully function, then questions also arise about the timing of and level at which these competencies operate. This is further discussed in Chapter 8 as an aspect of the complexity of the CIO position. The next section contains additional feedback regarding the level at which these competencies operate.

2. Relating CIO Competency Areas to Organizational Levels.

Several of the USDA key actors wanted to relate a CIO competency area to more than one organizational level, citing that the CIO performs different kinds of functions within a competency area at different times. An example of this is the program management area, where the CIO may work at the technical level in approving the design of a new multi-agency information system, then move to the managerial level in helping the project manager to obtain resources for the planned system, and finally operate at the institutional level when the CIO negotiates standards for operating the system between several agencies.

The USDA key actors placed half of the ten competency areas at the management level, three at the technical level, and two at the institutional level. There was no pattern between the assigned importance ratings of competencies and the level at which they were identified as operating. For example, the Policy competency was rated as very important and operated at the institutional level, while the Technical area was also very important but operated at the technical level. Four other competencies rated as very important were placed at the management level.

After going through these detailed questions on importance and operating level of competencies, I asked each key actor the general question of whether they felt that this approach and the resulting model of a federal CIO position could be used to reflect their CIO. Four of the five USDA key actors stated that the CIO Position Model could be used to represent their CIO's position, including USDA's CIO and Deputy CIO. The fifth person said the Position Model was "moving in the right direction".

USDA Feedback on the FCPEM

The initial version of the FCPEM is provided in Table 7 on the next page for reference in the discussion of USDA key actor feedback in this area. This initial version was labeled the "CIO Role Evaluation Matrix, and was presented to the five USDA key actors. This is a normative model that is intended to be applicable to all twenty-three CCA case study agencies.

Table 7. Preliminary FCPEM (CIO Role Evaluation Matrix)

	Clinger-Cohen Mandate	Proposed Evaluation Measure	Additional Source
1	Replace Agency Senior Official Title w/ CIO	Agency has established a CIO position	OMB Memo 96-20, EO 13011
2	Pay CIO at Level IV	CIO is a Level IV for pay	Title 44 USC Sec 5315
3	Advises Agency Head on IT acquisition/mgmt IAW PRA '95	CIO involvement in IT capital planning (I-TIPS portfolio/ A-11 process)	PRA '95, GPRA, OMB A-11, M 96-02, FARA
4	Develops/maintains an integrated IT architecture	Has published an enterprise information architecture.	CIO Council's FEAF, OMB M97-16 " & M96-02, A-130
5	Promote effective IRM processes	5% annual increase in agency ops due to increased IRM effectiveness ('96-'01)	GPRA, PRA '95
6	IRM is principle duty	Evaluate impact of any other duties (i.e., CIO is also CFO, or DAS M &A)	Agency policy and position description
7	Monitor/advise on performance of IT programs	CIO involvement in IT oversight (i.e., TRB Chairman, I-TIPS S/E/C)	ITMRA Section 5125, CIO Council, OMB, GPRA, PRA '95
8	Submit annual IT Strategic Plan	Submission of annual plan to OMB	OMB A-11, Part II
9	Assess IT personnel requirements & attainment	5% decrease in overall annual IT program costs ('96-'01)	EO 13111, Federal CIO Council
10	Rectify deficiencies; training & professional development	No. of deficiencies corrected.	Agency training goals, CIO Council, EO 13111
11	Report IRM capability improvement to agency head	5% target annual increase in agency operations	GPRA, PRA '95
12	CIO reports directly to agency head	% of CIO's that report directly to agency head	PRA '95, OMB M96-20

USDA key actor feedback on this initial matrix fell into four areas: (1) the appropriate level at which to evaluate CIO roles; (2) additional considerations in evaluating the roles beyond what I suggested; (3) a misprint; and (4) The importance of having a CIO. Table 8 at the end of this chapter provides a summary of the changes that were made to this pre-FCPEM matrix as a result of key actor feedback in all four case studies.

1. The Appropriate Level for CIO Role Evaluation:

This area of feedback centered on comments that the proposed evaluation criteria (then called measures) for two CIO roles (#5 and #7) were at too high of a level. For Role #5 (Promote effective IRM processes), I had proposed using a part of the "Sense of Congress" statement in CCA Section 5132, that agencies should achieve a 5% annual increase in agency operations due to increased

IRM effectiveness in the 1996-2001 timeframe. The feedback was that at this level of analysis little would be revealed about the nature of improvements in various IRM processes, or about how these improvements contributed to an increase in agency operations (if there was one).

One key actor said that while IT is improving agency efficiency, legal mandates specifying how IT will be used are also driving up operating costs more than is realized. This is exemplified, he said, by the 1998 amendment to the Disability Act (Public Law 105-220, Section 508) which requires all federal IT systems and applications become accessible to citizens with many forms of physical disability by June 2001. The implementation of this represents an improved IRM process in the areas of internal and external use of federal IT systems by workers and by the public. However, the cost of achieving this improvement was an unanticipated and far-reaching IT expense. The key actor's point was that to capture not only the improved effectiveness of IRM processes, but also their true cost, a more appropriate evaluation criterion would operate at the level of the core business processes for an agency and would identify those IT systems that support them. A 5 percent aggregation of costs and improvements as suggested in the original criterion only blurs things, including the contribution of the CIO to the area of promoting effective IRM processes.

For Role #7 (Monitor/advise on the performance of IT programs), the proposed evaluation criterion was similarly criticized as being at too high a level

of analysis. The proposed criterion looked for CIO involvement in IT oversight, with examples being Chairmanship of the Technical Review Board, or using an automated capital planning tool such as the "I-TIPS" software application created by the Federal CIO Council (described later in this chapter) to support IT program selection, control, and evaluation activities. The comment from one key actor was that it would be better to review IT program performance at the level of IT systems and applications by asking whether they are supporting the agency's mission, and this is a question below the level of the CIO. Looking at this CIO role at all was therefore the central question of this key actor. No other key actor suggested doing away with this CIO role (which is mandated in Section 5125c(2)), although another key actor stated that a CIO should function at a very high level and be interested in the overall plan and design of IRM processes, not the fine details.

2. Additional Considerations for Evaluation Criterion.

These comments were made by key actors as general statements and were not directed toward the evaluation of one particular CIO Role in the initial CIO Role Evaluation Matrix.

One key actor stated that the CIO is an "enabler of change" and that CIO roles involve more than pushing IT; rather, they involve establishing where IRM boundaries are and where gaps exist. This person wondered how those concepts could be reflected in the evaluation criteria.

Another person commented that the CCA provides the CIO with more authority, but lacks in providing the tools to get their job done. I believe the person was referring to standard approaches to documenting the agency's technology architecture, capital planning methods, program management tools with built-in measures for cost/schedule/performance, performance-based acquisition contracts, and methods to assess IT workforce requirements that come with the implementation of new technologies. Some of these tools exist and some are in development. Few if any of these IRM methods and tools are integrated, such that the CIO has a comprehensive toolset for their staff and other involved areas of the agency. However, the areas of architecture and capital planning are ones that the Federal CIO Council are currently seeking to integrate methodologically. They are doing this through combined meetings of related working groups on the Council, and by funding an expansion of the I-TIPS capital planning support tool to include a "module" for architecture. The Enterprise Architecture Management System (EAMS) at the Department of Housing and Urban Development became the prototype for this CIO Council effort in early 2000, with a planned integration date with I-TIPS of late 2001.

3. Mis-match of a Role Evaluation Criterion.

The recommended method of evaluating CIO Role #9 (Assess personnel/skill requirements) was identified as not being related to that role, as I had proposed an evaluation measure that looked at a 5 percent decrease in annual IT program costs (taken from the CCA "Sense of Congress" statement in Section

5132). This was indeed a misprint, and the evaluation criterion for this CIO role was changed to one that fits in the final FCPEM.

4. Importance of Having a CIO

In reviewing Role #12 (CIO reports directly to the agency head), one key actor pointed out that the proposed evaluation criterion looks at the percentage of CIOs reporting directly to the agency head, while the criterion should actually specify only the absence/presence of a single direct reporting relationship because the evaluation is of a single agency.

Another key actor commented that at their USDA sub-agency, the CIO does report directly to the agency head, and this makes a difference in the CIO's effectiveness. This particular sub-agency was the one that has had a CIO position since 1992 (U.S. Forest Service: USFS), as described earlier in this chapter.

Based on an interview with another key actor who previously had served at USFS, it appears that the position and roles of the CIO in this particular institution are not an issue. This is in contrast with other case study agencies where I received many key actor comments that indicate that the merits of the CIO contribution and the extent of the CIOs influence are still in debate. This difference is perhaps due to the internal generation of the CIO position at USFS (they created it four years before the CCA) in contrast with other key actor viewpoints that their agency CIO position had been externally mandated by the CCA. This alternate view is exemplified by that of the most senior key actor interviewed at USDA, who felt that all of the CIO roles in the preliminary FCPEM

matrix should be considered as externally induced mandates for an agency that were imposed by the CCA.

Additional Observations on the CIO from USDA Key Actors

This section (and similar sections in the other case studies) summarizes additional general observations about the case study agency's CIO position offered by the key actors who were interviewed.

One key actor interview at a sub-agency of USDA produced information about the earliest pre-CCA federal agency effort to create a CIO position that was found during this research. In that earliest CIO establishment effort, it was described how the U.S. Forest Service (USFS) noted the 1990 CFO Act's purpose of coordinate financial oversight in agencies, in part through the creation of a CFO position.

USFS sought in 1992 to use the example of the CFO Act to create more effective senior IT leadership during a period of intensive systems development, hardware and software selection activities, and operational changes. To examine the problem, USFS created a cross-agency "Strategic Information Management Team" of 22 people. Hank Montrey, then Director of the Rocky Mountain Forestry Station, led it. The team recommended that an agency CIO position be established at the SES level, which was approved and implemented by USFS. This agency therefore has had a CIO for more than eight years, twice

as long as most other federal organizations. The USFS CIO roles and responsibilities were identified in 1992 as follows:

The CIO represents information resources at the Forest Service decision-making level, maintaining ongoing Chief and Staff involvement and feedback in implementing the shared information environment and anticipating new technologies. The CIO has leadership responsibility for information management functions. With the assistance of the Information Management Advisory Group, the CIO proposes policy, sets priorities, plans and supports interdisciplinary involvement, and coordinates decision-making necessary to achieve the integrated information management environment. The CIO plans and coordinates information, communications, and training across the agency to keep employees current with implementation and new technologies. The CIO represents Forest Service information management with the USDA Office of Information Resource Management and other external interests.¹¹⁹

A variety of views emerged in talking with key actors about the purpose and contribution of the CIO position that was created at USDA in mid-1996. One key actor stated that USDA is still early in the process of determining what the role of a Federal agency CIO is. Another person said that "It helps to have the law [CCA], but we were already doing some of this.... The law helps give CIOs more authority and legitimizes their role." A third key actor stated that "Prior to the CCA, the Senior IRM Official did not have the same authority [as the CIO does now]." Finally, one key actor stated that CIOs must watch how deep they get into each area, and that it can't be too deep. The CIO is an enabler of change, the one who looks for the "deltas," establishes boundaries, and determines what the "degrees of freedom are."

¹¹⁹ U.S. Forest Service. Information Management: A Framework for the Future. USDA Forest Service Strategic IM Team. February 1992

On the topic of how the CIO's roles have emerged, the area of capital planning came to the forefront during several USDA key actor interviews, apparently due to the agency's role in developing a related management tool. In this area, one person mentioned that the CIO and his staff have gained a great deal of respect within and external to USDA for leadership in general IT capital planning, and this has changed the culture of that office. This comment refers to the key role that the USDA CIO played in 1997-1999 by volunteering (along with the Department of Energy's CIO) to work with OMB and the Federal CIO Council to develop a software application (called I-TIPS) for agencies to use in performing capital planning functions. I-TIPS was created to provide agencies with a software tool that would allow them to perform the capital planning activities called for in PRA '95, the CCA, and OMB Circular A-130, including cost-benefit analysis, risk analysis, investment screening and scoring, total life cycle cost estimation, and control phase data collection on an investment's (project's) cost, schedule, and performance. Because of this effort, the same key actor considered USDA and their CIO to be "out ahead of OMB's IT capital planning challenge," and noted that the CIO prefers a role that maintains a low-confrontation approach with other offices and sub-agencies in directing how CIO-centric tools like I-TIPS are used.

Contradicting this somewhat were comments that surfaced in several other interviews indicating that while they recognize that IT capital planning is one of the CIO's leading responsibilities, many people in program offices at USDA still

don't participate in it because of inadequately identified processes. This is the case despite the widely recognized support for the development of I-TIPS (IT Investment Portfolio System), which is now the de facto standard for work with OMB in this area.

In discussions of the CIO role for overseeing IT acquisition and program management processes, concern was raised by one key actor that the USDA CIO does not have budget approval authority for many of the department's IT-related programs. That authority remained with the CFO, USDA sub-agencies, and the program management offices -- many of which are individually funded by Congress. According to this person, the effect of this was a continuation of the opinion among sub-agencies and program offices that they have an independent and direct relationship with congressional committees.

Similarly, another key actor stated that "the USDA CIO has not played a strong enough role in overseeing administrative information systems, and gave the farm away in budget areas to the CFO and others." By this, the person was referring to the lack of ability of the CIO to capture any department-level funding authority when the CIO position was created in 1996.

Further discussion with USDA key actors about this lack of CIO influence on budget processes, indicated that the underlying situation goes deeper than financial oversight. As of December 2000, there were two major IT data centers at USDA: the National Financial Center in New Orleans, Louisiana (which is a financial and accounting center run by the CFO), and the National Information

Technology Center in Kansas City, Missouri (where most of the "heavy" computing and data storage for USDA occurs, run by the CIO). The competition between these data centers for resources and recognition has served to continue what has become a long-running duel between the CIO and CFO.

This duel began before 1990, when all of USDA's IT functions came under the Assistant Secretary for Administration and Management. Then in 1990, the CFO Act pulled all CFO-related functions into a newly created Office of the CFO. This remained stable until 1993, when the "Craft Report" (an internal USDA executive review of the management of civil rights-related data) caused a movement to re-combine all IT functions under the Assistant Secretary for Administration and Management. This not only failed, but also allowed the CFO to gain oversight over all headquarters IT functions. This was the situation until 1996, when Clinger-Cohen forced most of the CFO's IT oversight roles to be transferred to the new CIO. Exceptions to this were management of the National Finance Center and program budget authority (including IT programs). Two key actors stated that the IT oversight roles were actually transferred to the CIO "in name only," with the original program offices and the CFO retaining control of actual IT program funding decisions and related program management processes.

In 1998, an attempt by Congress (sponsored by Senator Richard Lugar, R-Indiana) to pass a Bill that would specifically give the USDA CIO more budget authority was defeated, in part because it was externally induced. A similar Bill called "E-File" was passed in June 2000, giving the USDA CIO IT-related budget

authority in three sub-agencies. This passed mainly because there was up front buy-in from these sub-agencies and the USDA Secretary had indicated his support. In an interview, the USDA CIO called E-File a "pilot program," indicating that the fight for IT-related budget approval authority is not settled in favor of the CIO at the other sub-agencies, or with the CFO.

In generally talking about the CIO provisions of the CCA, one key actor felt that the Act is flawed in that its vision is not solidified. That is, it is overlaid on existing authority and does not change the "stovepipe" (single focus/function) approach to IT-program funding and approval that Congress and agencies have traditionally taken. This stovepipe funding approach restricts progress in promoting more inter-program (crosscutting) policies, infrastructures, and applications. This key actor felt that while the Act strengthened the CIO's authority to carry out the Act's provisions, it did not give the money or other tools with which to do so.

Regarding the CIO's role in promoting more efficient IRM processes, one key actor stated that the federal government must go beyond CCA requirements in transforming IRM practices, in order to achieve better management of IT resources. This person indicated that more efficient and effective IRM practices could be found in the private sector.

In a unique and singular observation, one key actor (with CIO experience) complained that there is a proliferation in the use of the title of "CIO" within agencies. This person stated that to him it was confusing during conversations

and business dealings, as one was concurrently trying to determine if that CIO was the head of a national-level/multi-billion dollar organization, or is a staff office's CIO that oversees two direct reports and a fifty thousand dollar budget. This person advocated the use of more descriptive CIO titles, such as Deputy, Associate, or Division CIO.

Several USDA key actors indicated that they felt the agency CIO should operate at a very high level and should not engage in hands-on management activities. The examples provided by one key actor were CIO facilitation of the development of a "descriptive" agency-wide IT architecture, and in general talking about *what* things should be done. This person further said that sub-agency CIOs should then work at the level of implementation and integration (e.g., developing "prescriptive" IT architecture elements), and focus on the *how-to-do-it* side of IRM.

One USDA key actor (and several at other case study agencies) mentioned the significant IT management and operations challenge posed to CIOs in the late 1990s by the "Year 2000" software problem. In brief, an uncorrected computer, application, or database would confuse the year 1900 with the year 2000 if it only saw the last two digits. The labor intensive IT systems testing and software correction effort that followed was a tremendous challenge for many CIOs to coordinate. This key actor saw the Y2K problem as a unique circumstance of global proportion that raised the level of awareness of agency heads, executives, and managers about the IT/IRM processes on which they

had come to rely. This person said that it "hit home" at the Secretary and Under Secretary level and made them active participants in CIO matters for a while. However, the same person observed that soon after any residual problems were corrected in early 2000, the executive emphasis on CIO concerns returned to a lower level. He asserted that the CIO should be at the Under Secretary [or equivalent] level in the agency, so as to have the power and visibility to maintain support for IRM issues.

In the area of current themes involving both government and business, one key actor with CIO experience said "Individual brilliance is not going to cut it; speed-to-market is important nowadays, as is process change management. This person also said that the CIO should function at a very high level and be interested in seeing the overall plan/design, not in-the-weeds detail. Further, CIOs must understand investment strategy and be right the first time.

Finally, one key actor mentioned that IT workforce issues are important to the USDA CIO, and observed that the government's IT capability in this area has gone down. This is in reference to the widely recognized aging of the federal workforce, which for the past several years has been causing increased retirement rates at many agencies, resulting in a loss of knowledge and skills. The comment also refers to the slowness of the federal government in dealing with changing IT skill sets. It was not until June 2000 that the Office of Personnel Management dealt with the aging IT workforce issue by revising and expanding

the "334" class of IT-related work positions and obtaining Clinton Administration support for special pay increases for this and other related work classes.

Case Study #2 - Environmental Protection Agency

Agency Size and Mission

The Environmental Protection Agency (EPA) was created in 1970 under President Nixon, as a result of a report from the President's Advisory Council on Executive Organization (the Ash Commission) on the current state and future trends of environmental programs and pollution in the nation. EPA functions, authority, and program oversight were transferred from the Departments of Agriculture; Interior; Health, Education, and Welfare; and the Atomic Energy Commission. Today, EPA oversees a myriad of environmental programs nationwide, employing over 18,000 people and receiving over \$7.2 billion in annual federal funding. The EPA's mission statement reads:¹²⁰

The mission of the U.S. Environmental Protection Agency is to protect human health and to safeguard the natural environment; air, water, and land upon which life depends.

The enactment of new environmental laws and amendments to older laws in the 1970s-80s expanded EPA responsibilities; it now administers most of its functions through ten comprehensive environmental protection laws:

- Clean Air Act
- Clean Water Act
- Safe Drinking Water Act
- Toxic Substances Control Act
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund)
- Resource Conservation and Recovery Act

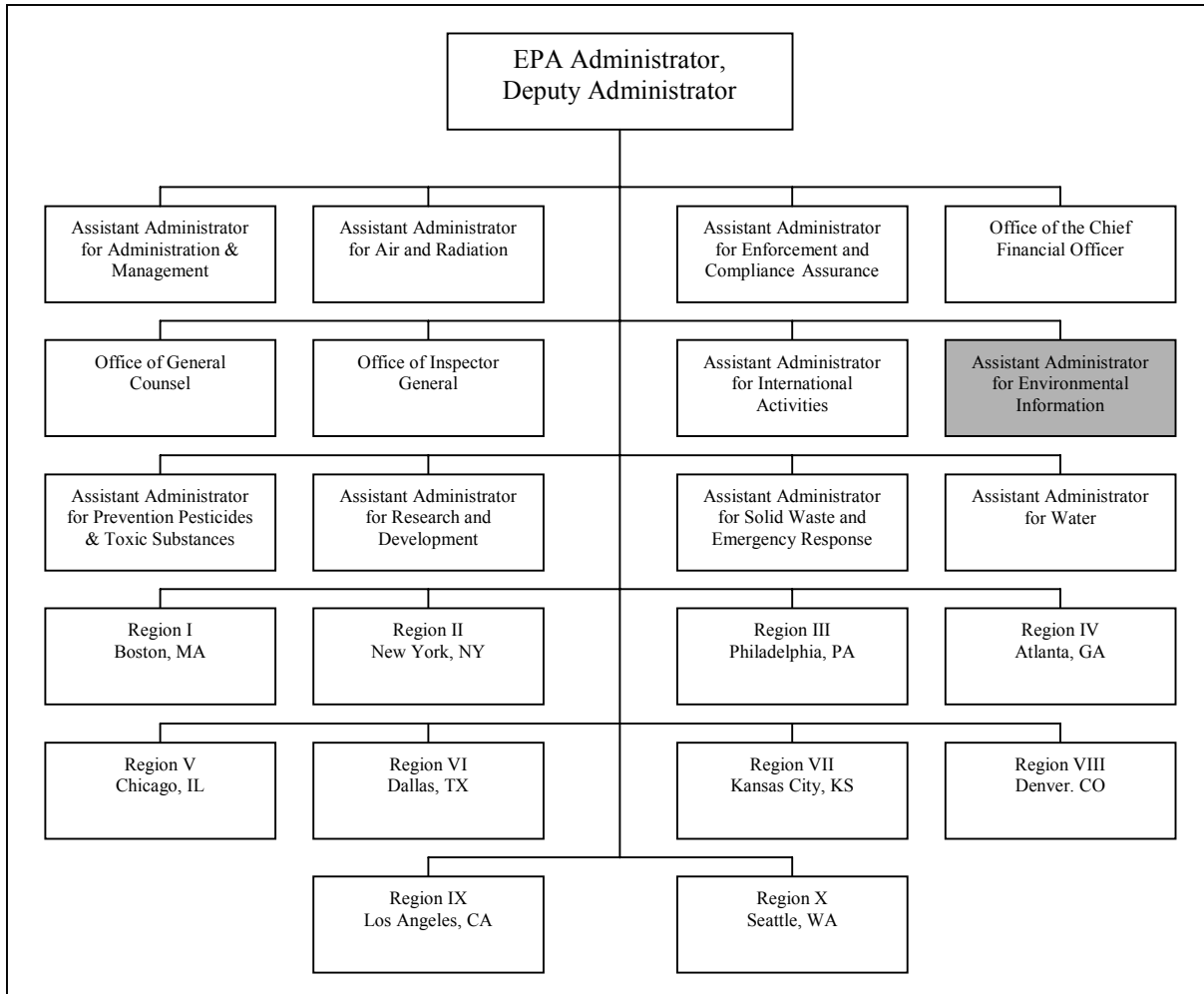
¹²⁰ U.S. Environmental Protection Agency Web Site. <http://www.epa.gov/history/org/origins/mission.html>

- Federal Insecticide, Fungicide, and Rodenticide Act
- Marine Protection, Research, and Sanctuaries Act
- Uranium Mill Tailings Radiation Control Act
- Pollution Prevention Act

CIO Reporting Structure at EPA

At EPA, the CIO position is combined with that of Assistant Administrator for Environmental Information, reporting directly to the EPA Administrator (agency head) as shown in Figure G.

Figure G. EPA Organizational Chart, December 2000



Documentation of the CIO Position at EPA

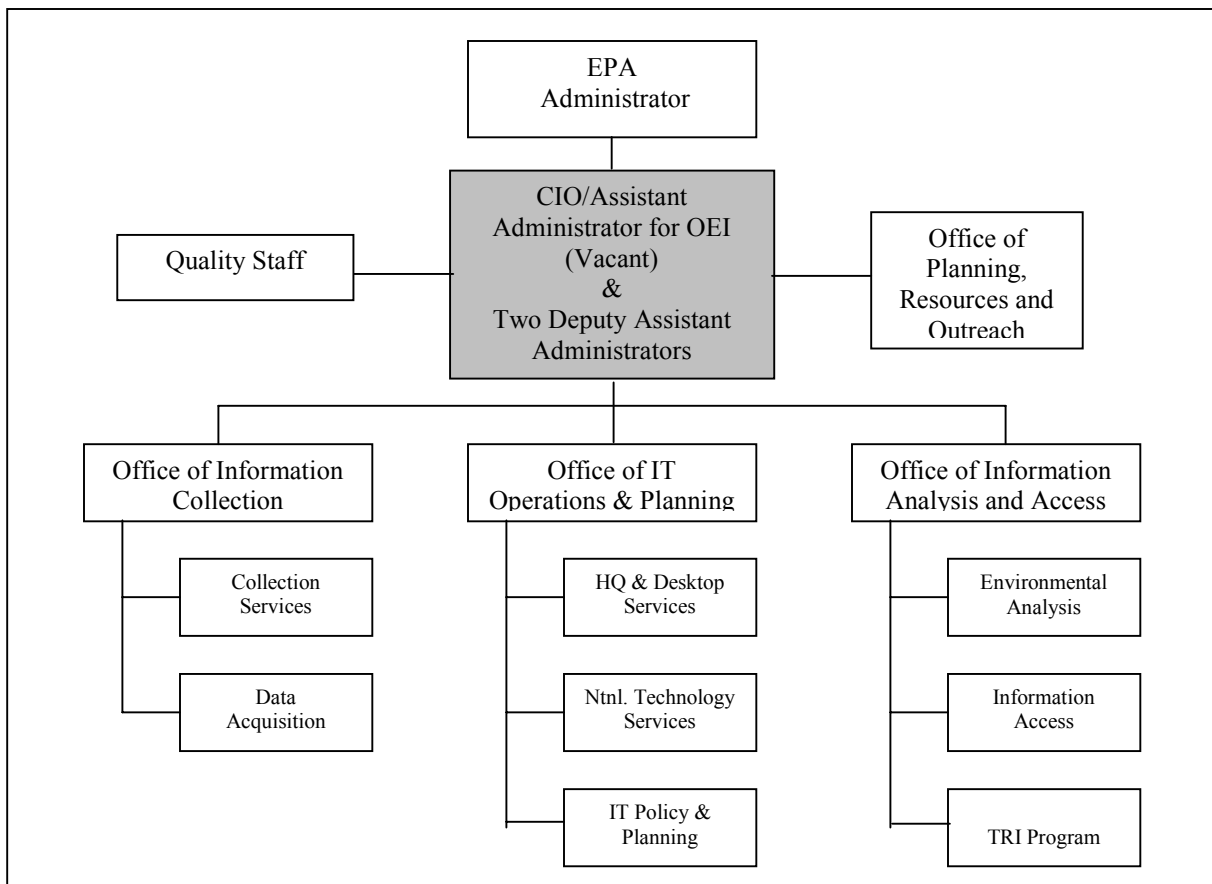
The EPA CIO position was first established within the Office of Administration and Resources Management by a memorandum from the EPA Administrator in June 1996 (provided in Appendix D). The first CIO served for more than three years before resigning when he was not named (after a major agency IRM reorganization) to head EPA's new IRM office that was created in early 2000, the Office of Environmental Information (OEI).

As part of this organizational change, the CIO position was combined with the newly created position of Assistant Administrator for OEI, an SES-level political appointee position that was not filled as of January 2001. During the year-long vacancy period, EPA's CIO functions have been split between the two OEI Deputy Administrator positions (also SES-level), who could be considered to be "co-CIOs." As an example of how duties are split between the two co-CIO/Deputy Assistant Administrators, one handles all interactions with Congress on IRM matters and IT planning issues, and coordinates major internal IT policy matters, while the other represents EPA on the Federal CIO Council and handles technical issues, vendor relationships, and IT-related acquisition/program oversight. Both report directly to the EPA Administrator on high-level issues in their respective areas of IRM.

The two acting "co-CIOs" and the OEI staff work with other EPA headquarters and regional offices, federal agencies, and State/local governments to provide

leadership and direction for overseeing IT-related aspects of national environmental program oversight. This includes gathering and synthesizing data on air, water, and land pollution, quality assurance, toxic cleanup, and industry emission regulation and inspection. OEI's organizational structure is provided in Figure H.

Figure H. EPA CIO Organization Chart, December 2000



According to agency documents, the CIO position at EPA is responsible for “establishing an innovative center of excellence that advances the creation, management and use of information as a strategic resource at EPA. Specific functions include:

- Developing the Agency's information and data plan to support the business needs of EPA.
- Providing leadership and management for the Agency's strategic information planning and investment processes.
- Establishing and overseeing the implementation of EPA information policy.
- Establishing and enforcing agency information standards. Developing and overseeing the implementation of the Agency's information security program."¹²¹

EPA Feedback on the CIO Position Model

Four key actor interviews were conducted at EPA: with one of the "co-CIOs," the Director of the Office of Information Collection, the Associate Director of the Office of Planning Resources and Outreach, and one of the thirteen "Senior Information Resource Management Officers" (SIRMOs) that head IT/IRM activities in major offices at EPA headquarters. The interviews ranged from 30 to 60 minutes, with several involving extensive discussions of CIO functions at EPA and the agency's structuring of IRM positions under the CIO.

The initial version of the CIO Position Model (Figure I) and related key actor responses (Table 8) are provided on the next page for reference in reviewing EPA feedback in this area.

¹²¹ U.S. Environmental Protection Agency Web Site; www.epa.gov/oei/offices.html

Figure I. Initial CIO Position Model

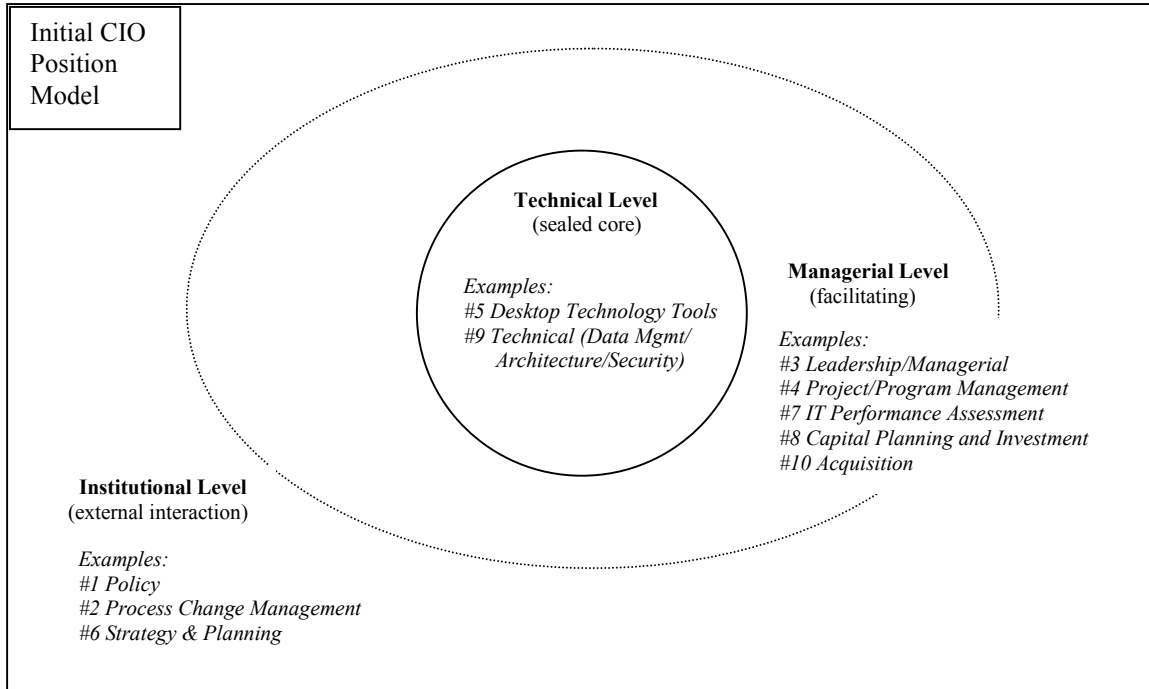


Table 8. EPA Feedback on the Initial CIO Model

CIO Competency Area	Very Important	Somewhat Important	Not Important	Technical Level	Managerial Level	Institutional Level
Policy	4				2	2
Process/Change Management	4				3	1
Leadership/Managerial	4				4	
Project/Program Management	2	2		3	2	
Desktop Technology Tools		4		4		
Information Resources	4				2	2
Strategy & Planning						
IT Performance Assessment: Models & Methods	2	2		2	1	2
Capital Planning & Investment Assessment	4			1	1	2
Technical (Data Mgmt/Security/Architecture)	3	1		4		
Acquisition	1	3		2	3	1

(4 EPA Key Actor Respondents, Fall 2000)

1. Rating the Importance of CIO Competencies

In reviewing this initial CIO Position Model, a majority of the EPA key actors felt that the following competency areas were very important to accomplishing CIO responsibilities: Policy, Process/Change Management, Leadership/Managerial,

IRM Strategy and Planning, Capital Planning, and Technical. A majority also felt that the Desktop Tools and Acquisition competencies were somewhat important, and they split on the Program Management and IT Performance Management areas, rating them as very important and somewhat important. No CIO competency was rated as being not important.

This follows a pattern that also was seen at USDA, where the competency areas that could be viewed as higher-level executive functions are identified by these key actors as very important to the CIO, and those perceived as being more of a line-management function are rated as less important. As with USDA, the exception to this rationale for rating competencies is the Technical competency. Because the Technical competency encompassed the key IT areas of architecture, security, and databases, it may have been viewed by key actors as central to the CIO position in terms of comprising the basic foundation of what CIOs support and defend in dealing with peers and superiors.

2. Relating CIO Competencies to Organizational Levels

A majority of the EPA key actors related the following three CIO competency areas primarily to the technical level of the organization: Project/Program Management, Desktop Technology Tools, and Technical. They also placed the following competencies at the managerial level: Process/Change Management, Leadership/Managerial, and Acquisition. The Capital Planning area was related to the institutional level, and there was no clear majority

opinion on the Policy and IRM Strategy areas, though they tended to be assigned to the managerial and institutional levels.

All four EPA key actors stated (when asked) that this CIO Position Modeling approach could be used to represent their CIO's position. As stated in the USDA case study, this question of a general nature was intended to provide overall feedback from the key actors on the utility of the model in describing a federal agency CIO position.

One key actor mentioned that record management goes beyond data management, and should be added as a competency area. This agrees with what one of the drafters of the CCA said in another interview. This key actor also said there was a lack of IRM leadership in the records management area within the federal government; along with one other EPA key actor, he mentioned an incident of mishandling EPA information records that became a highly publicized and negative media story. The informant used this example to emphasize that management of public records may seem routine, but if not given proper support and oversight can cause significant problems for the organization. The linkage of the CCA to PRA'95 in defining CIO responsibilities actually brings in specific language on the requirement for the CIO to oversee the record management area. It therefore was added as an evaluation criterion in the final FCPEM.

EPA Feedback on the FCPEM

The initial version of the FCPEM (CIO Role Evaluation Matrix) is again provided below in Table 9 for reference in the discussion of EPA key actor feedback in this area.

Table 9. Preliminary FCPEM (CIO Role Evaluation Matrix)

	Clinger-Cohen Mandate	Proposed Evaluation Measure	Additional Source
1	Replace Agency Senior Official Title w/ CIO	Agency has established a CIO position	OMB Memo 96-20, EO 13011
2	Pay CIO at Level IV	CIO is a Level IV for pay	Title 44 USC Sec 5315
3	Advise Agency Head on IT acquisition/mgmt IAW PRA '95	CIO involvement in IT capital planning (I-TIPS portfolio/ A-11 process)	PRA '95, GPRA, OMB A-11, M 96-02, FARA
4	Develops/maintains an integrated IT architecture	Has published an enterprise information architecture.	CIO Council's FEAF, OMB M97-16 " & M96-02, A-130
5	Promote effective IRM processes	5% annual increase in agency ops due to increased IRM effectiveness ('96-'01)	GPRA, PRA '95
6	IRM is principle duty	Evaluate impact of any other duties (i.e., CIO is also CFO, or DAS M &A)	Agency policy and position description
7	Monitor/advise on performance of IT programs	CIO involvement in IT oversight (i.e., TRB Chairman, I-TIPS S/E/C)	ITMRA Section 5125, CIO Council, OMB, GPRA, PRA '95
8	Submit annual IT Strategic Plan	Submission of annual plan to OMB	OMB A-11, Part 11
9	Assess IT personnel requirements & attainment	5% decrease in overall annual IT program costs ('96-'01)	EO 13111, Federal CIO Council
10	Rectify deficiencies; training & professional development	No. of deficiencies corrected.	Agency training goals, CIO Council, EO 13111
11	Report IRM capability improvement to agency head	5% target annual increase in agency operations	GPRA, PRA '95
12	CIO reports directly to agency head	% of CIO's that report directly to agency head	PRA '95, OMB M96-20

EPA key actor feedback on this initial matrix fell into three general areas: the method of evaluating particular CIO roles, the appropriate level of evaluation, and additional considerations for the evaluation criteria. The mistake in Role #9's evaluation criterion was also noted by key actors at EPA.

1. The Method Used to Evaluate Particular CIO Roles.

On the evaluation of CIO Role #3 (The CIO advises the agency head on IT acquisition and management in accordance with PRA'95), the feedback was that the CIO must not only advise the agency head, but also influence the

agency head so that change occurs. A fuller reading of this part of CCA Section 5125 reveals that the CIO is to advise not only the agency head, but also other senior management personnel to ensure that IT is acquired and IRM is performed in a way that implements the mandates of PRA'95 and the priorities of the agency head. In response to this and other similar feedback, the final version of the FCPEM included more expanded CCA descriptions of CIO roles and of the related evaluation criterion, as set forth in Section 5125.

However, this particular area of feedback gets at a deeper theme that ran throughout the key actor interviews at several agencies: that of the CIO as an agent of change. Promoting and facilitating change is one of the CIO competency areas identified by the Federal CIO Council in 1998 (see Chapter 4), and is an implicit quality that is foundational to several of the CIO roles given in the CCA. These include the CIO's role in ensuring the agency's proper acquisition of IT (#3); facilitating the development of an enterprise-wide business/technology architecture (#4); promoting effective IRM processes (#6); and identifying IT training and professional development requirements for all levels of the agency (#10 and #11).

For CIO Role #6 (IRM is the CIO's principal duty), one key actor stated that if IRM is not the CIO's primary duty, then a percentage breakout of time spent on other duties should be provided in the evaluation. My suggested evaluation criterion had focused only on evaluating the impact of other duties. Previous discussions in this dissertation have described agency implementations of the

CIO position that amounted to merely adding the CIO title and responsibilities to another existing executive position, such as the CFO or the Assistant Secretary of Administration and Management (ASAM). Senior positions such as these usually involve a number of significant duties, which when combined may create a situation of "duty overload" that has been observed to be dealt with mainly through the delegation of a significant number of these duties to subordinates (e.g., the Department of Labor).

On the evaluation of Role #10 (rectify deficiencies in training and professional development), the feedback was that simply reporting the number of related deficiencies that were corrected does not give a proper measure related to any beneficial outcome. Those making this observation added that counting deficiencies would be mainly an output measure that could fail to identify ongoing problems in meeting personnel/skill requirements because the areas not covered by those reported deficiency corrections would remain unidentified.

2. The Appropriate Level of Evaluation.

Additional feedback on Role #3 was that the evaluation criterion that proposed looking at CIO involvement in capital planning did not indicate a high enough level of CIO involvement in the IT acquisition process. This CIO role, as expressed in CCA Section 5125b(1) (and as described earlier in this section), calls for the CIO to provide advice on IT acquisition to the agency head and senior managers, to ensure compliance with the priorities of the agency head

and with Chapter 35 of U.S. Code Title 44 (Coordination of Federal Information Policy), as amended by PRA'95. Within Chapter 35, the CIO is charged with "heading an office responsible for ensuring agency compliance with and prompt efficient implementation of the IRM policies and responsibilities established under this chapter, including the reduction of information collection burdens on the public." This indicates both a high level (relationships with other senior agency executives) and a high activity level in executing this CIO role, as specified in both the CCA and PRA'95.

On CIO Role #7 (monitor/advise on the performance of IT programs), the feedback was similar to that among several key actors at USDA, that the criterion proposes too high a level of evaluation. The comment was that the CIO must be directly involved in the oversight of IT programs, not just in providing advice to the agency head on whether to continue, modify, or terminate a particular program. A similar comment is that the CCA's mandate in this area does not go far enough to produce effective program oversight. While the evaluation criterion could be (and was) changed in the final FCPEM, the language of the CCA mandate should not be changed if the purpose of the FCPEM is to evaluate compliance with the intent of the original language of the CCA.

3. Additional Considerations for Evaluation Criterion.

Regarding Role #12 (the direct reporting of a CIO to an agency head), one of the key actors stated that while important, the identification of a direct

reporting relationship between CIO and the head of the agency is not adequate in itself. The reporting relationship, according to this person, should actually be to the senior agency executive who has internal responsibilities. An example is the State Department, where the CIO reports to the Deputy Secretary because the Secretary of State is often out of the country and is almost exclusively externally focused. The reporting relationship, this person said, should depend on the management model of that particular agency, and many political appointees have an external and/or political focus.

One area of additional feedback concerned the inclusion of linkages to existing agency budget processes in the evaluation criteria for applicable CIO roles. Although not specified by the key actor making this comment, CIO roles that might benefit from including budget considerations in the evaluation include: advising on IT acquisition and management (3#); promoting effective IRM processes (#5); monitoring the performance of IT programs (#7); and rectifying deficiencies in IT training and professional development (#10). This recommendation has merit in that the CCA states in Section 5126 (right after CIO roles are delineated in Section 5125) that

The head of each executive agency, in consultation with the CIO and CFO.... shall establish policies and procedures that (1) ensure that the accounting, financial, and asset management systems and other information systems of the executive agency are designed, developed, maintained, and used effectively to provide financial or program performance for financial statements of the executive agency (2) ensure that financial and related program performance data are provided on a reliable, consistent, and timely basis to executive agency financial management systems; and (3) ensure that financial statements support (A) assessments and revisions of mission-related processes of the

executive agency; and (B) performance measurement of the performance in the case of investments made by the agency in information systems.

This would indicate that the CCA intends for the CIO and the CFO to work together in selecting, monitoring, and evaluating IT investments, as well as supporting information required for financial processes, including budgeting. My observation of the success of these functions in the case study and other federal agencies is that when the CIO, CFO, and Chief Procurement Executive (CPE) work together, the leveraging of technology in accomplishing the agency mission is more effective. I believe that this may also be at the center of this key actor's feedback on including budget considerations when evaluating some of the CIO roles.

On CIO role #12 (The CIO reports directly to the agency head), one key actor suggested that the evaluation criterion should include a determination of who signs off on the CIOs performance evaluation. This assumes that such a written evaluation is done on the CIO, which in practice may not be the case for all high-level executives in an agency. If one is done, and the reviewer for the CIO evaluation is not the agency head, this would indeed indicate that reporting is not to the agency head, because only the person reported would have the information with which to conduct a performance rating. Looking at direct CIO/agency head reporting on organization charts may only reveal what the agency wants the public to see. The actual reporting function may differ, and the aforementioned methods or others such as desk audits of

correspondence and contacts may be more effective in determining to whom the CIO reports.

Additional Observations on the CIO from EPA Key Actors

Regarding executive decision-making practices outside the EPA CIO office, one key actor stated that executives have come to realize that the #2 (Deputy Assistant Administrator) position in all of EPA's major headquarters offices is very challenging. This key actor said that many offices have split the position, with one person being the "Decision Approval Authority" (DAA) for policy and the other being the DAA for management. This key actor explained that this is why there are two Deputy Assistant Administrators in the EPA CIO's office. The same informant expressed the opinion that if the EPA Administrator perceived that this was working well, that would be a rationale for continuing to split the CIO's duties rather than appointing a new CIO, who might not mix well with the two Deputy CIOs.

This CIO arrangement was unique among the case study agencies, as it represents the CIO position itself being split, with the two Deputy Assistant Administrators claiming the CIO title as they perform their respective duties within and external to EPA. It is more common to see CIOs delegate many of their responsibilities to Deputy CIOs or Division Directors. At EPA, this bifurcated approach to the CIO position has remained in place for over one year, and may not be changed until a single EPA CIO/Deputy Administrator for OEI is

named when Bush Administration political appointees are selected in winter/spring 2001.

In discussing the reporting relationship of the co-CIOs to the EPA Administrator, one key actor observed that in order to transform an organization via IT, a CIO must have sufficient resources, and these only come from the senior manager for internal management (the Deputy Administrator). Therefore, according to this person, it may be appropriate for the CIO not to report directly to the agency head, the CCA and PRA'95 mandates notwithstanding. If direct reporting of a CIO to the Agency head reduces or eliminates the relationship with the senior internal agency manager [assuming an external agency head focus], then the benefit is more political than practical.

A similar observation was made by a key actor who is the Senior IRM Officer (SIRMO) of one of thirteen functional offices at EPA headquarters responsible for overseeing a specific area of environmental regulation. This person commented that SIRMO duties have expanded over the past two years to now include IT policy and program oversight, although to varying degrees in these thirteen offices. As such, the SIRMO role seems to be moving more toward a CIO type of position, with a full range of IRM oversight responsibilities. This person stated that there was no formal policy on the set of duties for the SIRMOs. Thus their effectiveness and ability to obtain resources varies, being largely dependent on the quality of the working relationship with the Assistant Administrator and Deputy Assistant Administrators in each headquarters office.

The same key actor stated that at the operating level, many of the SIRMO's are unable to effectively manage change and overcome resistance of regulatory and technical managers in their offices. This was slowing SIRMO-level actions, both to eliminate IT systems/database duplication at EPA and to conduct contractor-supported strategic planning and business process evaluation initiatives. This key actor stated that the co-CIOs have not provided leadership in these areas, leaving it the SIRMOS to initiate and manage new IRM processes. He cited an initiative of his that has resulted in the completion of a Strategic Information Plan for the office and showed that the part of the EPA regulatory organization that they support has more than 1,000 external and internal "drivers" that determine or influence organizational processes and business decision making.

Finally, one key actor commented that private sector CIOs have operated without mandates like those in the CCA, doing the job based on industry best practices. This person further commented that it would be interesting to compare industry best practices to CCA mandates, asking "is this what you would be doing anyway if Clinger-Cohen did not exist?" The interviews at both EPA and the other case study agencies addressed this question by asking for opinions on whether the CCA's CIO role mandates represented goals "for" or goals "of" the organization. This information goes beyond validating the FCPEM, but helps to provide additional understanding of agency interpretations and motivations in implementing CIO positions. For example, if a CIO role is seen as

being performed only because CCA says to do it, then it might be categorized as a goal "for" the agency (as Thompson said, "externally induced"). If the mandate area was already being performed before the CCA was enacted, or if the goal is viewed by the agency as central to good IRM practices, then it might be categorized as a goal "of" the agency (internally generated). So, key actor feedback that a measure is a goal "of" the organization may be saying just what was suggested: that the agency would be doing it anyway (and several key actors at several agencies said just that). More on this topic is provided in Chapter 8 as an additional area of research observation.

Case Study #3 - Federal Emergency Management Agency

Agency Size and Mission

The Federal Emergency Management Agency (FEMA) is a small, independent agency that was created by Executive Order in 1979 under President Carter to consolidate and coordinate national civil disaster mitigation, preparedness, response, and recovery. FEMA employs approximately 2,600 personnel who work at FEMA headquarters in Washington, D.C. and at regional and area offices across the country, as well as nearly 5,000 standby disaster assistance employees around the nation.

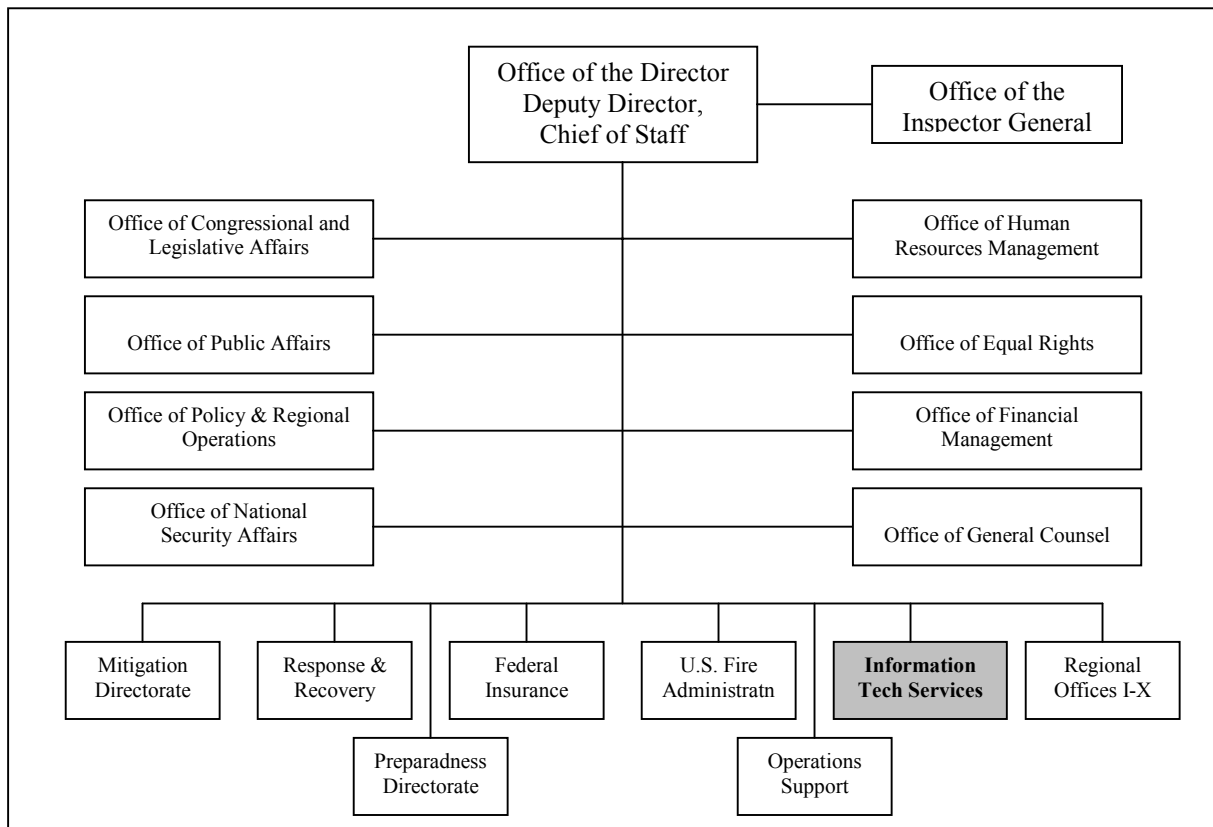
FEMA often works in partnership with other organizations that are part of the nation's emergency management system. These partners include state and local emergency management agencies, twenty-seven other federal organizations, and the American Red Cross. In February 1996, President Clinton conferred Cabinet status on the Director of FEMA. FEMA's mission includes:

- Advising on building codes and flood plain management.
- Teaching people how to get through a disaster.
- Helping equip local and state emergency preparedness.
- Coordinating the federal response to a disaster.
- Making disaster assistance available to states, communities, businesses and individuals.
- Training emergency managers.
- Supporting the nation's fire service.
- Administering national flood and crime insurance programs.

CIO Reporting Structure at FEMA

The FEMA CIO is a career government civil service executive (SES level) who reports directly to the FEMA Administrator as CIO and Associate Director for the Information Technology Services Directorate. Currently, the CIO fills a third position, that of Chief Information Assurance Officer (CIAO) managing information systems security policy and incident response coordination. Through these positions, the CIO is responsible for overseeing the agency's information technology services for voice and data networks, and the agency's radio network. Figure J provides a high-level view of the agency.

Figure J. FEMA Organization Chart, December 2000



Documentation of the CIO Position at FEMA

The FEMA CIO position was established on June 28 1996 via a FEMA Administrator's memo to OMB (copy provided in Appendix D). This was just four months after Clinger-Cohen was signed into law, making FEMA one of the early implementers of the CIO position. The CIO position at FEMA has had only one incumbent since 1996, G. Clay Hollister, a 23-year career civil servant who has been at the SES level for over five years. Prior to becoming CIO, Mr. Hollister served as the FEMA Deputy Associate Director for Response in the Response and Recovery Directorate, where he managed operation of the Federal Response Plan including FEMA's mobile communications, automated data processing and logistics systems.

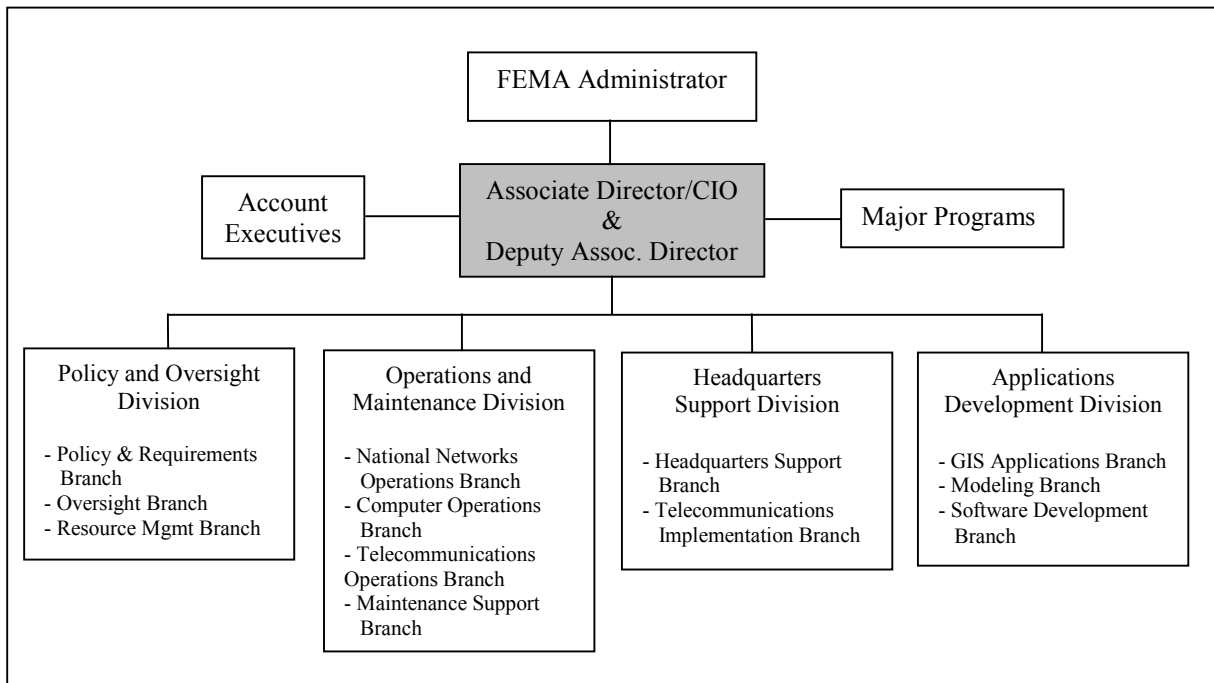
As a precursor to establishing the CIO position at FEMA in 1996 (responding to the CCA), the Policy and Requirements Branch of the IT Services Directorate prepared discussion papers on what the position and responsibilities of the CIO would be. The options centered on whether the CIO would have only CCA roles, or would also serve as director of IT services. Ultimately it was FEMA Director James Lee Witt who decided that the CIO would also serve as Chief Operating Officer for IT services. This is a unique situation that was not found in the other case study agencies. In the other three agencies, a Director of IT Operations (or equivalent title) handles these responsibilities as a directly reporting subordinate to the CIO.

FEMA CIO functions continue to be executed in late 2000 through the IT Services Directorate. The Directorate's organization is provided in Figure K below. The FEMA CIO works with other FEMA directorates, federal agencies, and State/local governments to provide direction for integrating IT resources, automated data processing, communications, and information services necessary during disaster situations.¹²² The IT Service Directorate's functions and services include:

Functions: - CIO, Agency-wide Information Management Services,
 - IT Systems Engineering, IT Policy and Planning

Services: - IT Investments and Evaluations, IT Security,
 - IT Architecture, FEMA Switched Network,
 - Management and Operation of Information Systems

Figure K. FEMA CIO Organization Chart, December 2000



¹²² Source: FEMA Web Site: <http://www.fema.gov/about/infotek.htm>. July, 2000

FEMA Feedback on the CIO Position Model

Four key actor interviews were conducted at FEMA, with the CIO and three direct staff members: the Director of Data Standards, a senior IT programs analyst, and the Chief of the Systems Operation Division. The interviews were conducted at FEMA's headquarters building in Washington, D.C., and ranged from 30 to 60 minutes. In addition to validating the CIO Position Model and preliminary version of the FCPEM, several interviews involved extensive discussions of CIO functions at FEMA, the role of data standards in IRM, and the way technology is used in accomplishing the agency mission.

The initial version of the CIO Position Model (Figure L) and related key actor interview responses (Table 10) are provided for reference in discussing related feedback.

Figure L. Initial CIO Position Model

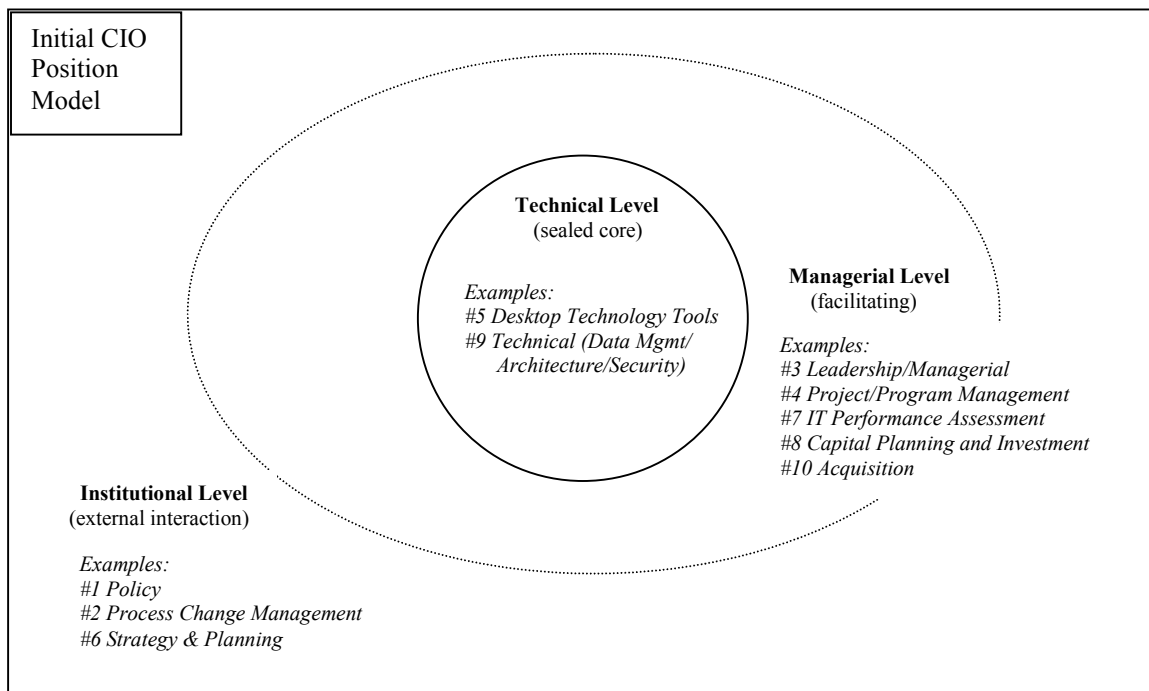


Table 10. FEMA Feedback on the Initial CIO Position Model

CIO Competency Area	Very Important	Somewhat Important	Not Important	Technical Level	Managerial Level	Institutional Level
Policy	4				1	4
Process/Change Management	4			1	3	1
Leadership/Managerial	4			1	4	3
Project/Program Management	3	1		2	3	
Desktop Technology Tools	2	2		3		
Information Resources Strategy & Planning	4				2	4
IT Performance Assessment: Models & Methods	3	1		2	3	
Capital Planning & Investment Assessment	4				3	3
Technical (Data Mgmt/Security/Architecture)	3	1		4	2	1
Acquisition	2	2		3	3	1

(4 FEMA Key Actor Respondents, Fall 2000)

1. Rating the Importance of CIO Competency Areas

In reviewing the CIO Position Model, most of the FEMA key actors felt that the following CIO competency areas were very important to accomplishing CIO responsibilities: Policy, Process/Change Management, Leadership/Managerial, Project/Program Management, IRM Strategy and Planning, IT Performance Assessment, Capital Planning, and Technical. They were divided between very important and somewhat important on the Desktop Technology Tools and Acquisition competencies.

Similar to feedback received at EPA, the FEMA key actors did not rate any CIO competencies as not important. Second only to Treasury, this feedback was the most oriented toward saying that these CIO competencies were very important. One FEMA key actor said that "All of the competencies are important but they are not handled that way, as they aren't staffed adequately; nor are changes in the agency culture occurring to recognize the need for executive competency in these areas."

Also, like the key actor feedback obtained at USDA and EPA, the competencies that were singled out at FEMA as having lower importance were those that could be perceived as having more of a line-management orientation (Acquisition and Desktop Technology Tools).

One key actor, commenting on his perception that CIO competencies in Acquisition, Capital Planning, and IRM Strategy were linked, observed metaphorically that "The CIO and CFO are to be married [by the CCA], but the date keeps slipping and they have not yet invited the capital planning portfolio, architecture, or training." This reflects the published view of OMB and GAO (commented on in Chapter 4) that the success of the agency CIO's facilitation of architectural and capital planning process is dependent on CFO support and participation, but that is lacking in many agencies.

2. Relating CIO Competency Areas to Organizational Levels.

The FEMA key actors tended to relate the Desktop Technology Tools and Technical competency areas to the technical level of the organization. They related the Process/Change Management, Leadership/Managerial, Project/Program Management, IT Performance Assessment, Capital Planning, and Acquisition competencies to the managerial level. They also related the Policy and IRM Strategy competencies to the institutional level.

Two of the four FEMA key actors rated nearly every competency as operating at multiple levels, while the other two key actors identified only one competency area as being multi-level (Capital Planning by one, and

Leadership/Managerial by another, both appearing at the institutional and managerial levels).

Regarding the technical level of the model, one key actor commented that the level is where the outputs of IRM processes are generated, and without these outputs there are no beneficial outcomes. She said further that CIOs and the Federal CIO Council don't recognize the many performance measures that actually exist at this level, or the pride of the personnel who developed them. She is an internationally recognized expert in large-scale database design and standards.

When asked, all four FEMA key actors stated that at a general level, this approach to modeling the CIO Position Model could be used to develop a representation of their CIO's position.

FEMA Feedback on the FCPEM

The initial version of the FCPEM (CIO Role Evaluation Matrix) is again provided in Table 11 on the next page for reference in the discussion of FEMA key actor feedback in this area.

Table 11. Preliminary FCPEM (CIO Role Evaluation Matrix)

	Clinger-Cohen Mandate	Proposed Evaluation Measure	Additional Source
1	Replace Agency Senior Official Title w/ CIO	Agency has established a CIO position	OMB Memo 96-20, EO 13011
2	Pay CIO at Level IV	CIO is a Level IV for pay	Title 44 USC Sec 5315
3	Advises Agency Head on IT acquisition/mgmt IAW PRA '95	CIO involvement in IT capital planning (I-TIPS portfolio/ A-11 process)	PRA '95, GPRA, OMB A-11, M 96-02, FARA
4	Develops/maintains an integrated IT architecture	Has published an enterprise information architecture.	CIO Council's FEAF, OMB M97-16 " & M96-02, A-130
5	Promote effective IRM processes	5% annual increase in agency ops due to increased IRM effectiveness ('96-'01)	GPRA, PRA '95
6	IRM is principle duty	Evaluate impact of any other duties (i.e., CIO is also CFO, or DAS M &A)	Agency policy and position description
7	Monitor/advise on performance of IT programs	CIO involvement in IT oversight (i.e., TRB Chairman, I-TIPS S/E/C)	ITMRA Section 5125, CIO Council, OMB, GPRA, PRA '95
8	Submit annual IT Strategic Plan	Submission of annual plan to OMB	OMB A-11, Part II
9	Assess IT personnel requirements & attainment	5% decrease in overall annual IT program costs ('96-'01)	EO 13111, Federal CIO Council
10	Rectify deficiencies; training & professional development	No. of deficiencies corrected.	Agency training goals, CIO Council, EO 13111
11	Report IRM capability improvement to agency head	5% target annual increase in agency operations	GPRA, PRA '95
12	CIO reports directly to agency head	% of CIO's that report directly to agency head	PRA '95, OMB M96-20

FEMA key actor feedback on this initial matrix fell into three general areas: CIO roles versus position features, the appropriate level of evaluation, and additional considerations for evaluation criteria.

Before these three areas are reviewed, it should be mentioned that the FEMA CIO provided the following written comments on the matrix, which were prepared in advance of the interview:

The first two measures are passed. FEMA replaced the Agency Senior Official with the CIO four years ago. The executive level for CIO is also a closed issue, dependent on the size of the agency and the duties assigned therein. Whether or not the CIO reports directly to the agency head is not a metric. Some larger agencies may decide to have multiple CIO's for individual bureaus or for other reasons. The metrics convey a rather passive role for the CIO. Personally, I play a very active role not just in the management but in planning and directing the programmatic and technology advancement that the agency is undertaking. The drive toward electronic government is moving apace, and the CIO's are playing an active and major role.

1. CIO Roles vs. CIO Position Features

The FEMA CIO pointed out that evaluation criteria for Roles #1, #2, and #12 do not pertain to CIO roles, but rather to features of the CIO position, as called for in the CCA. The presence or absence of a CIO position, pay at or above Executive Level-IV, and direct reporting to the agency head were the essence of these areas of evaluation in the initial CIO Roles Matrix (preliminary FCPEM).

More extensive analysis in these areas may not be required, as details of the CIO/agency head reporting relationship are not being investigated through the FCPEM method, nor are the privileges of being at Executive Level-IV. The one exception to this might be for the FCPEM to incorporate an evaluation criterion that calls for examination of the agency document that establishes the CIO position, in terms of who issued it and the contents of that document. What may be determined from this is agency head support for the position. For example, having the Assistant Secretary for Administration and Management issue a short memorandum to announce the creation of the CIO position has one level of impact, as contrasted with having the cabinet-level Secretary issue a policy directive that creates the CIO position and promulgates CCA responsibilities and peer relationships in detail. It could be argued that the latter scenario gives the CIO more credibility from the outset, and therefore more of a chance to succeed in the agency.

Feedback that the three "roles" of title, seniority, and reporting are actually just mandated features of the CIO position raises the issue of just how

prescriptive the CCA was in creating the federal agency CIO position. This is an interesting question because all three of the drafters of the CCA who were interviewed during this research said that they did not want to be too prescriptive in the mandates for the CIO position. It would appear that for these three elements of CCA Section 5125, the drafters actually were being prescriptive by specifying the title, seniority, and reporting relationship of the CIO position. In interviews with drafters of the CCA, they did not say that they were completely avoiding prescriptive features in the law, just that they did not want to do too much of it. The FEMA CIO seems justified in this case, in saying that measuring these three elements of the CIO position are unnecessary, as they are more of a prescribed feature. These three elements therefore may require mainly a verification of being present through the FCPEM, as opposed to CIO roles, for which the FCPEM provides normative evaluation criteria.

2. Appropriate Level of Evaluation.

One key actor said that the preliminary CIO Roles Matrix should reflect that the CIO operates at the highest level of the agency, in his words, the "policy level."

This person was the only key actor interviewed to suggest that the CIO should actually be senior to the CFO (the CCA borrowed from the CFO Act of 1990 in establishing CIO seniority at Level-IV). The rationale was that the CIO is developing and imposing the IRM policies that the CFO then keeps track of in terms of related financial investments. Crudely put, the difference being

described by the key actor is between CIO decision-making and CFO bean counting.

This line of thinking illustrates the tension that persists in both industry and government organizations between CFOs and CIOs, as was described in Chapter 4 and several case studies. My observation is that this tension persists mainly when the agency head/CEO does not take a firm stand to eliminate it, and also that the roots of the tension lie in executive power and resource struggles.

While my interviews at FEMA did not reveal any such tension in that agency, an example of it was observed at the Department of Transportation (DOT), where the CIO and CFO (and staffs) do not cooperate as intended in the CCA. As a result, in September 2000 DOT's CIO staff put on hold the implementation of a Capital Planning Manual due to a lack of concurrence on the draft from the CFO. This was not the CIO staff's first attempt at promulgating a capital planning policy for the entire agency. A consequence of this lack of CIO/CFO cooperation is that the DOT CIO is not able to execute his CCA responsibilities to facilitate the development of effective capital planning/investment processes and related program management oversight methods.

One other feedback item from a FEMA key actor related to the level of analysis. It was similar to the comment made at USDA that FCPEM should reflect that the CIO is a senior executive who rallies support for initiatives and creates/maintains a culture of change in the agency.

Beyond what was said on that subject in the USDA case study, I would observe that the insertion (or leveraging) of technology to improve organizational process is indeed at the heart of what the CIO position should accomplish. However change management as a role or concept is not specifically mentioned in the CCA, and therefore it may only be possible to address it obliquely in the FCPEM. Using new information technologies often means doing things differently, and this involves anticipating and controlling changes in the organization so as to deal with a wide range of IRM operations, process, and personnel training/retention issues.

3. Additional Considerations for Evaluation Criteria.

Other feedback on the FCPEM from FEMA key actors was that for Role #10 (rectify deficiencies in training and professional development), training is more important than correcting a certain number of personnel deficiencies. The suggestion, similar to that received at EPA, was to focus the evaluation criterion more on establishing an effective training and professional development program, which is an outcome of properly executing this CIO role, as distinct from counting the number of deficiencies corrected, which is an output measure that may not reflect the effectiveness of training programs.

On Role #11 (Report IRM capability improvement to the agency head), one key actor said that it would be hard to put a number on increases in IRM capability. The proposed criterion used the 5 percent annual increase in agency operations due to improvements in IRM (the "Sense of Congress"

statement in Section 5132). This is similar to the criterion proposed for CIO Role #5 (Promote effective IRM processes), and there is merit in the observation that as an evaluation criterion for either role, this 5 percent summation for operational improvement may hide the details of what goes into that improvement to the degree that it is a meaningless or even counterproductive measure. I also found that this Congressionally recommended objective is not receiving attention in any of the case study agencies. Another key actor commented on this evaluation criterion, saying that reporting IRM capability is much more than looking at a 5 percent target increase in agency operations, one must look at it in terms of the specific IT architecture and capital planning efforts and contributions.

Finally, on Role #12 (CIO reports directly to the agency head), feedback was received that the proposed evaluation method indicated a percentage of CIOs who reported directly to agency heads, while it would seem that this evaluation focuses on one agency at a time. Therefore, the evaluation method should look at only that CIO/agency head reporting relationship, not at some multi-agency percentage (even with sub-agencies under the same department).

Additional Observations on the CIO from FEMA Key Actors

In establishing the role of CIO and then filling it, FEMA's CIO said that he initiated the policies and procedures by which the agency adheres to the CCA, orienting them toward the acquisition, development, and evaluation of major IT

systems. He said, "I meet regularly with the (FEMA) Director to discuss the full range of IT issues affecting the agency, including decisions on budget requests and funding decisions." Indeed, the direct reporting relationship described by the FEMA CIO seems to be genuine and effective, as contrasted with the supposedly direct agency head reporting relationships that other case study CIOs have, which interview evidence revealed were only occasional contact.

According to one FEMA key actor, the CIO maintains a high departmental profile and is a true player in the inner circle of the FEMA Director. This person felt that success in executing the CIO position within FEMA is largely tied to maintaining positive working relationships with executive peers and the agency head, and to providing a collegial, positive work environment that has created a feeling of empowerment in key management staff.

Another key actor said that the CIO previously produced FEMA TV/radio spots aimed at children's safety that were shown by the Fire Administration. This informant felt that the CIO's background is perhaps where he developed what is seen as a people-oriented management style that has helped his staff in handling a multitude of dynamic IRM issues. This person also said, "The guts of the CIO position is in what IT can do, where it is going, the vision thing. Character must be there to carry it out." The same person went on to say that people like doing things when they are making a contribution, looking at possibilities, being artistic, using all their skills. At FEMA, this has started to make IT fun.

Case Study #4: Department of the Treasury

Agency Size and Mission

The Department of the Treasury was established in 1789 by the nation's first Congress, to advise President Washington on fiscal policy and to act as financial agent for the government. Alexander Hamilton was the first Secretary of the Treasury, serving from 1789-1795. It was his financial programs that created public credit and gave the country its initial financial machinery, including the first national bank. From this important beginning, the Treasury Department has grown in scope and size to now include the following functions:¹²³

- Managing federal finances.
- Collecting taxes, duties and monies paid to and due to the United States and paying all bills of the United States.
- Producing all postage stamps, currency and coinage.
- Managing Government accounts and the public debt.
- Supervising national banks and thrift institutions.
- Advising on domestic and international financial, monetary, economic, trade and tax policy.
- Enforcing federal finance and tax laws.
- Investigating and prosecuting tax evaders, counterfeiters, forgers, smugglers, and gun/distilling law violators.
- Protecting the President, Vice President, their families, candidates for those offices, foreign missions resident in Washington and visiting foreign dignitaries.

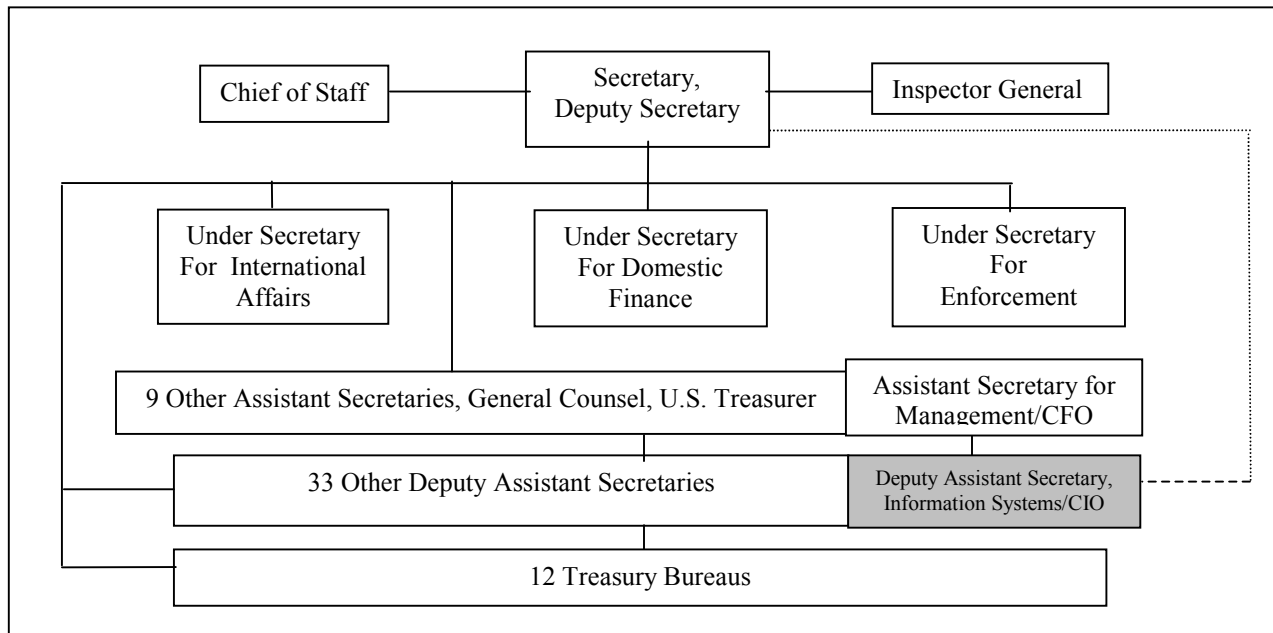
For Fiscal Year 1999, the Treasury Department and its twelve subordinate bureaus have a combined estimated budget authority of \$401 billion and employ approximately 148,000 full-time civilian employees, of whom nearly 98 percent are assigned to the bureaus (listed in Figure M below).

Figure M. Treasury Department Bureaus, December 2000

Bureau of Alcohol, Tobacco and Firearms	Bureau of Engraving and Printing	Bureau of the Public Debt
Community Development Financial Institutions	Comptroller of the Currency	Federal Law Enforcement Training Center
Financial Management Service	Internal Revenue Service	Office of Thrift Supervision
United States Customs Service	United States Mint	United States Secret Service

The Treasury headquarters offices are primarily responsible for the formulation of policy and management of the Department as a whole, while the twelve operating bureaus carry out the specific operations assigned to the Department. The high-level organizational structure of Treasury is outlined in Figure N.

Figure N. Treasury Department Organization Chart, December 2000



The CIO at Treasury also holds the title of Deputy Assistant Secretary for Information Systems. The Treasury CIO reports directly to the acting Assistant

¹²³ U.S. Treasury web site: <http://www.treas.gov>. July 2000.

Secretary for Management, who is also the CFO, as is indicated in Figure L. Figure K shows a dotted line from the CIO position to the Secretary of the Treasury position, which reflects an “occasional” direct reporting relationship with the agency head (a detailed organizational chart is provided in Appendix D.). Several key actor interviews confirmed that day-to-day CIO reporting is to the Assistant Secretary, while direct reporting to the Treasury Secretary is exercised only for special high-level issues such as the Y2K problem, some cybersecurity issues, and highly visible IT programs.

The Assistant Secretary’s Office of Management oversees all Treasury Department matters involving the internal management of the Department, with functions and authority being largely derived from the CFO Act of 1990 and the CCA. Oversight areas include human resources, management operations (such as property management, procurement, small business, reinvention, and security), information systems, and comprehensive administrative services to other departmental offices. Reporting under the Office of Management is the Office of the CIO, whose mission statement is as follows:

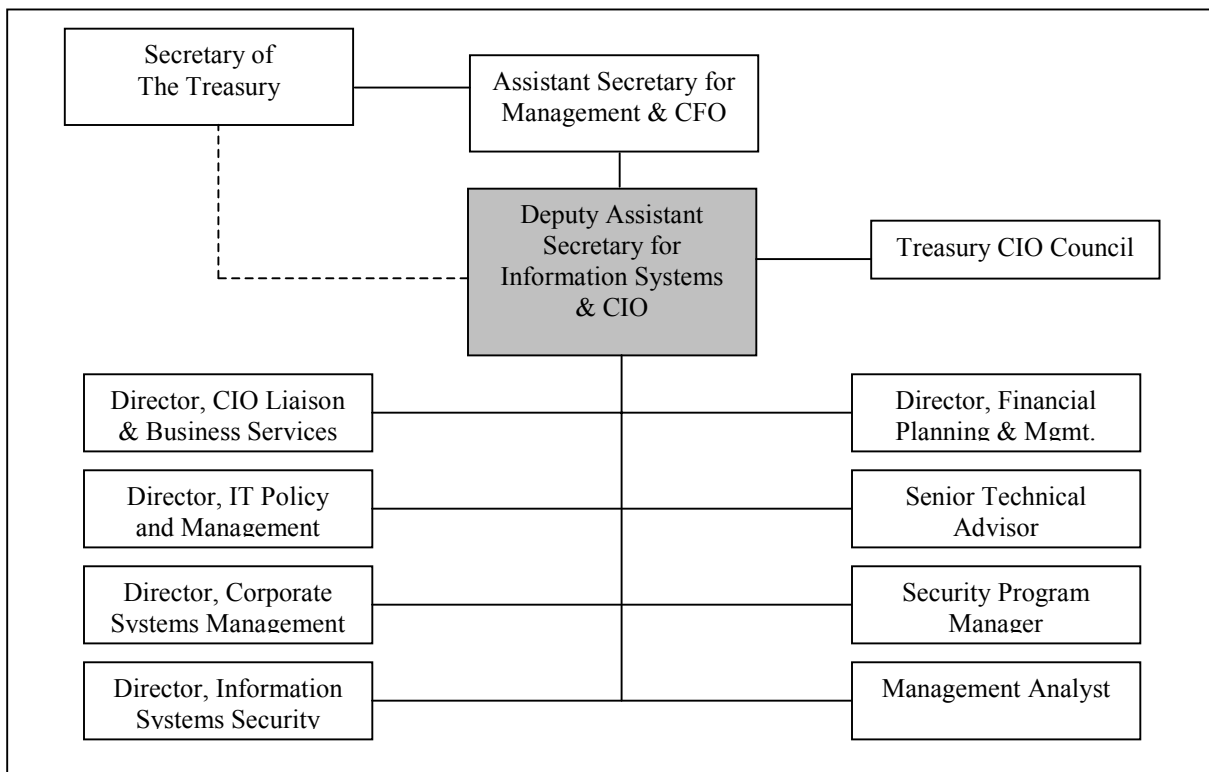
The mission of the Office of the Chief Information Officer (CIO) at the Department of the Treasury is to maximize the value returned from investments in Information Technology (IT). The CIO will accomplish this by developing and facilitating relationships among businesses and IT management and by defining a clear and credible vision of IT’s contribution to future business strategies. The CIO will be a visionary for the use of technologies. The Office of the CIO will provide leadership in ensuring the leverage and synergy of IT investments and opportunities for strategic business impact to the Department and the bureaus.¹²⁴

¹²⁴ Treasury Web Site; <http://www.treas.gov/cio/mission.html>. July 2000.

Documentation of the CIO Position at Treasury

The first “CIO-like” position at Treasury was created in a 1993 Treasury Directive with the title of “Senior Official for IRM,” reporting to the Assistant Secretary for Management. This position was created along with eleven bureau-level positions of the same title in an effort to consolidate and enhance control over IT management in the Treasury Department. In 1996, these position titles were changed to CIO, but the reporting structure remained the same. The scope of the position was changed to comply with the mandates of the CCA, and Director positions were made equivalent to Deputy CIOs, though not formally given that title. On April 13, 2000, Treasury Directive 81-01 re-promulgated this guidance (copy provided in Appendix D). Figure O on the next page shows the CIO staff reporting structure.

Figure O. Treasury Department Office of the CIO, December 2000



Treasury Feedback on the CIO Position Model

Four key actor interviews were conducted at Treasury, including two Deputy CIO equivalents, a senior program manager for IT Workforce Improvement, and a sub-agency's Director of Technology and Architecture. The interviews ranged from 45 to 90 minutes. In addition to validating the CIO Position Model and the preliminary FCPEM, several interviews involved extensive discussions of the CIO position, the role of information architecture in IRM, workforce planning, and sub-agency relationships with the OCIO.

The initial version of the CIO Position Model (Figure P) and related key actor feedback (Table 12) are provided below and on the next page for reference in the discussion of the model.

Figure P. Initial CIO Position Model

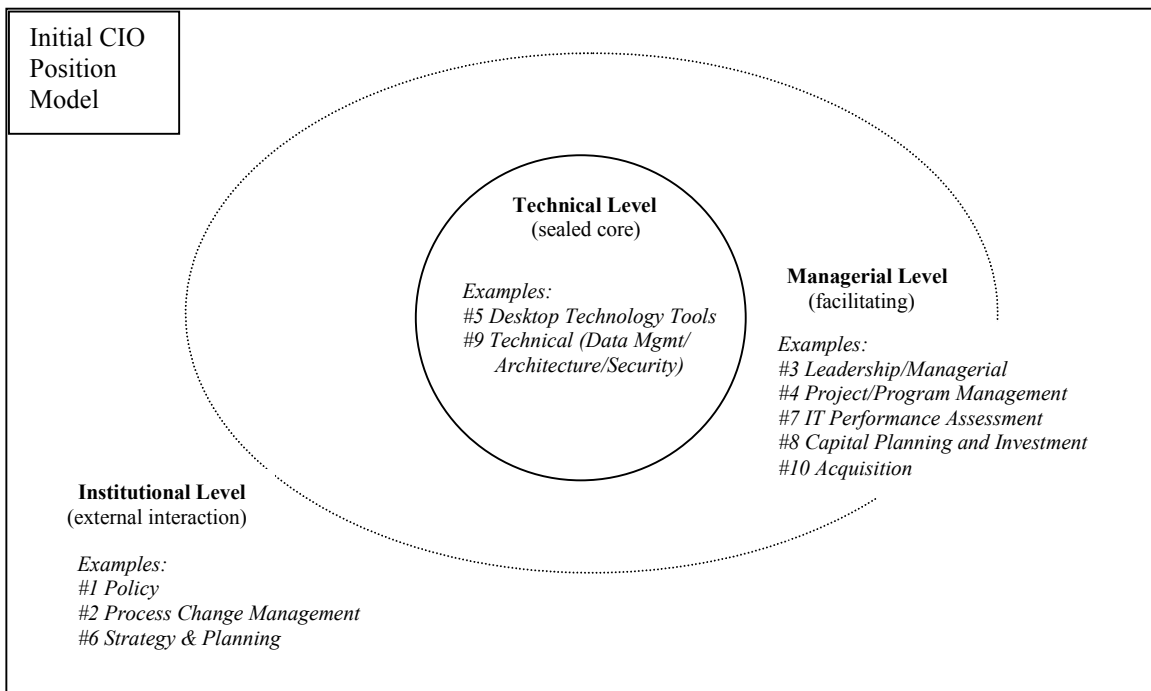


Table 12. Treasury Feedback on the Initial CIO Position Model

CIO Competency Area	Very Important	Somewhat Important	Not Important	Technical Level	Managerial Level	Institutional Level
Policy	3				2	
Process/Change Management	3			1	2	
Leadership/Managerial	3				2	1
Project/Program Management	3				2	
Desktop Technology Tools	3			1	1	
Information Resources Strategy & Planning	3			1	1	1
IT Performance Assessment: Models & Methods	3			1	1	
Capital Planning & Investment Assessment	3			1	2	1
Technical (Data Mgmt/Security/Architecture)	3			1	2	1
Acquisition	3			1	2	1

(3 Treasury Key Actor Respondents, Fall 2000)

1. Rating the Importance of CIO Competency Areas.

In reviewing the preliminary CIO Position Model, one of the four key actors declined to provide feedback and stated,

To evaluate this model [is] saying that technology is nice, but business skills, vision, networking with others, and investment skills are more important. This list is more for staff competencies than for the CIO.

This key actor was a Deputy CIO equivalent, who had been in that position at Treasury for eight months. Prior to that, she had been a sub-agency CIO at the Veteran's Administration in charge of one of the major health care networks in Kansas City.

The feedback on the model from one of the other key actors was that "the CIO is a strategic player, and all of these CIO competency areas are important." This person, who reports directly to one of Treasury's three Deputy CIOs, rated all ten areas as being very important, but also co-rated two areas as somewhat important: Acquisition and IT Performance Assessment.

The two other Treasury key actors also provided feedback indicating that all of the CIO competency areas were very important, and they did not rate any areas below this level. One key actor was a sub-agency's Chief Technology Officer, and another was a Deputy CIO at the departmental level.

2. Relating CIO Competency Areas to Organizational Levels.

The key actors related seven of the ten CIO competency areas to the managerial level, including: Policy, Process/Change Management, Leadership/Managerial, Project/Program Management, Capital Planning, Technical, and Acquisition. They related the Desktop Technology Tools and IT Performance Assessment competencies to both the managerial and the technical levels, and related the IRM Strategy and Planning competency to all three levels of the organization. When asked, all three of the key actors at Treasury who evaluated the CIO Position Model stated that it could be used to represent their CIO's position.

Treasury Feedback on the FCPEM

The initial version of the FCPEM (CIO Role Evaluation Matrix) is provided on the next page in Table 13 for reference in the discussion of Treasury key actor feedback in this area.

Table 13. Preliminary FCPEM (CIO Role Evaluation Matrix)

	Clinger-Cohen Mandate	Proposed Evaluation Measure	Additional Source
1	Replace Agency Senior Official Title w/ CIO	Agency has established a CIO position	OMB Memo 96-20, EO 13011
2	Pay CIO at Level IV	CIO is a Level IV for pay	Title 44 USC Sec 5315
3	Advises Agency Head on IT acquisition/mgmt IAW PRA '95	CIO involvement in IT capital planning (I-TIPS portfolio/ A-11 process)	PRA '95, GPRA, OMB A-11, M 96-02, FARA
4	Develops/maintains an integrated IT architecture	Has published an enterprise information architecture.	CIO Council's FEAF, OMB M97-16 " & M96-02, A-130
5	Promote effective IRM processes	5% annual increase in agency ops due to increased IRM effectiveness ('96-'01)	GPRA, PRA '95
6	IRM is principle duty	Evaluate impact of any other duties (i.e., CIO is also CFO, or DAS M & A)	Agency policy and position description
7	Monitor/advise on performance of IT programs	CIO involvement in IT oversight (i.e., TRB Chairman, I-TIPS S/E/C)	ITMRA Section 5125, CIO Council, OMB, GPRA, PRA '95
8	Submit annual IT Strategic Plan	Submission of annual plan to OMB	OMB A-11, Part II
9	Assess IT personnel requirements & attainment	5% decrease in overall annual IT program costs ('96-'01)	EO 13111, Federal CIO Council
10	Rectify deficiencies; training & professional development	No. of deficiencies corrected.	Agency training goals, CIO Council, EO 13111
11	Report IRM capability improvement to agency head	5% target annual increase in agency operations	GPRA, PRA '95
12	CIO reports directly to agency head	% of CIO's that report directly to agency head	PRA '95, OMB M96-20

Key actor feedback at Treasury on this initial matrix fell mainly in the area of additional considerations for evaluation criteria.

1. Additional Considerations for Evaluation Criteria

One key actor suggested that for Role #4 (Develops and maintains an integrated IT architecture), the evaluation criterion indeed focuses on whether the CIO has published an architecture or even a framework for creating the architecture. The comment reflects a recognition by this person that there is a wide range of progress in establishing agency architectures throughout the executive branch, in that some have completed and published them and others are still in the beginning stages four years after passage of the CCA.

The feedback on Role #5 (Promote effective IRM processes) was that agencies are increasingly establishing Investment Review Boards (IRBs) to

oversee the IT capital planning process, and evidence of IRB leadership by the CIO should be considered as an part of the evaluation element for this role.

On Role #6 (IRM is the CIO's principle duty), there was feedback suggesting that this be evaluated by looking at what the agency publishes on its public Internet web site in terms of "functional" statements that indicate what their CIO does.

In the area of Role #8 (submit an annual IT Strategic Plan), one key actor thought that looking at whether an agency had an IT Strategic Plan, and/or if it was submitted to OMB in accordance with OMB Circular A-11 was not enough to judge whether a CIO was complying with CCA's IT strategic planning mandate. The person stated that participation in the overall strategic planning process at the agency was the important aspect of this CCA mandate, not just the IT portion. Evidence of this might be better found in CIO membership on key planning, budget, and review boards of the kind that the most senior agency executives participate in.

Feedback was received on the mis-match of the evaluation criteria for Role #9 (Assess IT personnel requirements and attainment), as noted by key actors at the other case study agencies.

There was also feedback from one key actor (similar to USDA and FEMA) to indicate that evaluation measure #10 on IT training was too rudimentary, as it only suggested counting the number of IT workforce deficiencies corrected. A better evaluation might focus on improving IRM effectiveness throughout the

agency by creating professional development programs and completing all required IT training.

It was suggested (as it was by other agency key actors) that the evaluation of CIO Role #12 (CIO reports directly to the agency head) should not focus on counting the percentage of CIOs that report directly to the agency head, as only one per agency is being evaluated.

Additional Observations on the CIO from Treasury Key Actors

In commenting on changing the title and role of the former "Senior IRM Official" position to that of CIO, one key actor said, "This merely institutionalized what was already going on at the Department."

Since its creation in 1996, the Treasury CIO position has been filled twice with members of the Senior Executive Service. The first Treasury CIO was a political appointee; the current CIO, James Flyzick, is a career civil servant (who was elected by fellow federal CIOs to be the current Vice-Chairman of the Federal CIO Council).

Several key actors at Treasury commented that central to the effectiveness of this position is the CIO's working relationship with the Assistant Secretary of Management/CFO, to whom the CIO reports. That working relationship is reported to have been good for both of the Treasury Department's CIOs, due mainly to the personalities of the people involved. If it were not so, stated one key actor, the CIO's effectiveness would be diminished.

One key actor said that the current Treasury CIO maintains a high departmental and government-wide profile through frequent media interviews, many of which are related to his role as the Vice Chairman of the Federal CIO Council (elected by the members, who are fellow agency CIOs).

Several key actors stated that success in executing the CIO position within the Treasury Department is largely tied to the CIO's ability to maintain positive working relationships with executive superiors. The superiors of the Treasury CIO are both the CIO's direct reporting senior (CFO), and the Secretary of the Treasury, who is approached only after coordinating it with the CFO. This access is used only for high profile IT issues. Because of the dynamic, high profile approach that the current CIO brings to the position, as well as his strong previous IT and management background, there appears to be a significant degree of cohesion on the CIO's management team at the departmental level.

The same informant said he was not aware of a model of the federal CIO position, and that having such a model could benefit both career civil service and politically appointed CIOs. Along these lines, as part of the case study research at Treasury, I did find a "list" of CIO core competencies that Treasury had developed in 1997 as part of an IT workforce study, but there was no organizational context associated with this list.¹²⁵

¹²⁵ Department of the Treasury. Responding to the Crisis in Information Technology Skills: A Report to the Secretary of the Treasury. W. Frederick Thompson, Program Manager, IT Workforce Improvement. February 1999

Summary of Case Study Results

In all, seventeen people who work at the four case study agencies were interviewed to validate the CIO Position Model and the FCPEM CIO position evaluation method using the Key Actor Interview Guide. Not every key actor gave an evaluation of both the model and the preliminary FCPEM, due either to time constraints or (in the case of one person) to the choice not to review the model. Nine additional interviews were conducted outside of the case study agencies to obtain in-depth information on how the CCA was drafted as well as other CCA-related federal IRM policy.

A Summary of Feedback on the CIO Position Model

Nearly every one of the key actors who reviewed the CIO Position Model felt that in general it could be used to represent their agency's CIO position. Seven of the model's ten CIO competency areas were rated by a majority of the key actors as being very important to the functioning of the CIO position. Their feedback also indicated that all of the competency areas operate at more than one level of the organization. Half of the competency areas were viewed as operating primarily at the management level, followed by three at institutional level and two at the technical level. A summary of this key actor feedback is presented in Tables 14 and 15 on the next page.

Table 14. Summary of Case Study Key Actor Ratings of the Importance of CIO Competency Areas

(16 Key Actors Responding, Fall 2000)

CIO Competency Area	Very Important	Somewhat Important	Not Important
Policy	16		
Process/Change Management	14	2	
Leadership/Managerial	16		
Project/Program Management	11	5	
Desktop Technology Tools	6	8	2
Information Resources Strategy & Planning	14	1	1
IT Performance Assessment: Models & Methods	9	6	1
Capital Planning & Investment Assessment	16		
Technical (Data Mgmt/Security/Architecture)	12	2	2
Acquisition	7	8	1

Table 15. Summary of Case Study Key Actor Selection of Organizational Levels for CIO Competencies

(15 Key Actors Responding, Fall 2000)

CIO Competency Area	Technical Level	Managerial Level	Institutional Level
Policy		7	9
Process/Change Management	2	12	3
Leadership/Managerial	1	13	7
Project/Program Management	7	11	
Desktop Technology Tools	13	1	
Information Resources Strategy & Planning	1	9	8
IT Performance Assessment: Models & Methods	8	8	3
Capital Planning & Investment Assessment	3	10	10
Technical (Data Mgmt/Security/Architecture)	14	6	3
Acquisition	8	12	4

(Note: Many of the Key Actors selected more than one organizational level for each CIO competency area. I had not defined the categories as being mutually exclusive)

Key actor feedback on the importance of CIO competency areas to the success of the federal CIO (Table 14 data and their amplifying comments during the interviews) indicated that competencies which could be interpreted as requiring an understanding of specific computer applications or of particular management techniques (Desktop Technology Tools, Acquisition, and IT Performance Assessment) were rated as less important for a CIO compared to competencies that could be interpreted to involve more executive-level

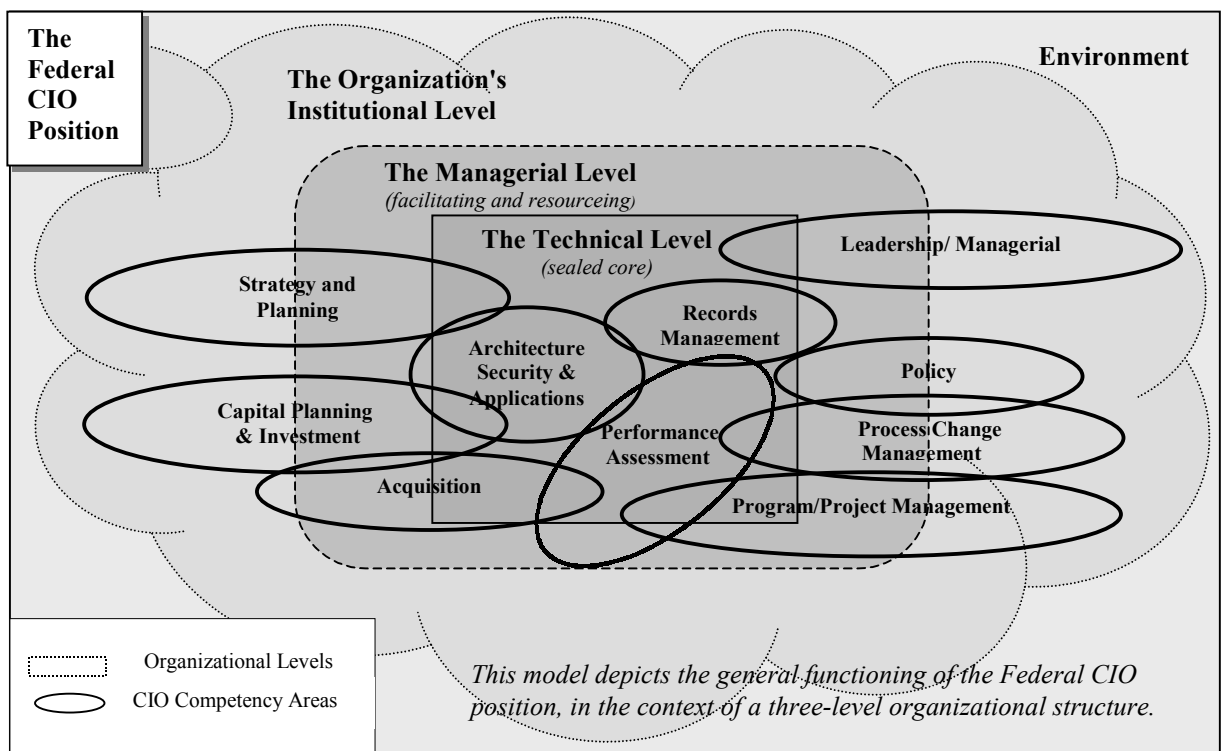
functions. These higher-level CIO functions could be categorized as those that provide leadership, decision-making, facilitation, or oversight to agency IRM activities (e.g., Policy, IRM Strategy, Capital Planning, Leadership/Management, Process/Change Management, and Program/Project Management).

The one CIO competency area that did not follow this pattern was the one called Technical. This competency area, as defined by the Federal CIO Council in 1998, actually encompasses CIO involvement in architecture, security, and data management, each of which could have been considered as a major CIO competency area in itself. In the fall 2000 update to the Federal CIO Council's list, security is broken out as a separate competency area. Because this "roll-up" area contains functions that have received attention from Congress, OMB, GAO, and the media in the past few years, it may have been viewed by key actors as very important to the CIO, in spite of not relating to executive leadership or decision-making functions.

While the group of key actors comprised several CIOs, Deputy CIOs, senior IRM executives, and mid-level IRM executives, no pattern in choosing the importance of CIO competency areas was seen that could be related to the level of the respondent. Of the two key actors that said all of the competencies were important, one was a CIO and one was a mid-level IRM executive at a sub-agency. The one person who said the model reflected mainly staff functions and not those of a CIO was a former sub-agency CIO and current department level Deputy CIO.

The two changes that were recommended by several key actors (and by one of the drafters of the CCA) were to add Records Management as a competency area and to drop Desktop Technology Tools. These changes were adopted after all of the interviews were completed. Figure M below depicts the final version of the Federal CIO Position Model (same as Figure C in Chapter 5).

Figure Q. Final CIO Position Model



A Summary of Feedback on the Preliminary FCPEM

The preliminary version of the FCPEM evaluation method was reviewed by eleven key actors for usability in describing the roles of their agency CIO. All but one of these key actors felt that with modification, the preliminary FCPEM could be used to evaluate CIO position establishment. One declined to complete

questions on models/matrices. Several key actors emphasized that feedback needed to be incorporated to make the FCPEM evaluation criteria more accurate.

Many of the suggestions for improvement were incorporated into the FCPEM after key actor interviews were completed (the final version of which is presented in Chapter 5, Table 5). This was done by collecting key actor feedback for each CIO role in the preliminary version and then distilling out duplication. Then I evaluated the feedback to determine if rewording, or a new focus for the evaluation criteria was needed for each role, based on the CCA's intent for the role that was identified in Chapter 5. Two new evaluation elements were added (#12 and 13) and two of the original elements were combined (#9 and 10). The description statement and/or evaluation criterion for each of the other ten elements was either reworded or had the evaluation focus adjusted to reflect key actor feedback. Table 16 on the next page summarizes these changes to the preliminary FCPEM, which resulted in the final form of the FCPEM.

Table 16. Summary of Changes to Preliminary FCPEM
(11 Key Actors Responding, Fall 2000)

	Original Version of the Clinger-Cohen Mandate	Original Version of the Evaluation Criteria	# Actors Agree	# Actors Disagree	Modification made in the Final FCPEM
1	Replace Agency Senior Official Title w/ CIO	Agency has established a CIO position	11	0	Reworded: More focus on a documented CIO position.
2	Pay CIO at Level IV	CIO is a Level IV for pay	9	2	Reworded: Less focus on pay, more on Executive Level IV.
3	Advises Agency Head on IT acquisition/mgmt IAW PRA '95	CIO involvement in IT capital planning (I-TIPS portfolio/ A-11 process)	9	2	Reworded mandate and moved it to be CIO Role #8.
4	Develops/maintains an integrated IT architecture	Has published an enterprise information architecture.	9	2	Reworded mandate to change evaluation focus to CIO facilitation. Moved to be #9.
5	Promote effective IRM processes	5% annual increase in agency ops due to increased IRM effectiveness ('96-01)	7	4	Reworded to add information collection focus in mandate.
6	IRM is principle duty	Evaluate impact of any other duties (i.e., CIO is also the CFO)	9	2	Retained as is. Changed evaluation to seek documentation of CIO duties. Moved to be #4.
7	Monitor/advise on performance of IT programs	CIO involvement in IT oversight (i.e., TRB Chairman, I-TIPS S/E/C)	8	3	Reworded: Added that the CIO also evaluates IT programs. Changed evaluation to reflect 10% variance limit. Moved to be #10.
8	Submit annual IT Strategic Plan	Submission of annual plan to OMB	10	1	Reworded to focus on CIO participation in strategic planning processes. Moved to be #11.
9	Assess IT personnel requirements & attainment	5% decrease in overall annual IT program costs.	3	8	Combined with mandate #10. Replaced evaluation criterion to reflect CIO facilitation of an IT Workforce Plan. Moved to be #12.
10	Rectify deficiencies; training & professional development	No. of deficiencies corrected.	9	2	Combined with mandate #9. Replaced evaluation to reflect CIO facilitation of an IT Workforce Plan. Moved to be #12.
11	Report IRM capability improvement to agency head	5% target annual increase in agency operations	6	5	Replaced evaluation Criterion to focus on an annual report to the agency head without the 5% target. Moved to be #13.
12	CIO reports directly to agency head	% of CIO's that report directly to agency head	10	1	Replaced evaluation Criterion to focus on documentation of direct reporting in a single agency. Moved to be #3.
13					Added mandate on CIO defining agency IT needs, from a closer analysis of the CCA. Made #6.
					Added mandate on CIO evaluation of proposed collections of information, from a closer reading of the CCA. Made #7.

Although it was beyond the scope of the research, which was designed to validate the FCPEM, information was gathered on the key actors' perception of the complexity of each CIO role mentioned in the FCPEM. This information

supports additional commentary on the federal CIO position that is provided in Chapter 8. The results of key actor feedback on CCA/CIO role complexity are provided in Table 17 below.

Table 17. Feedback on CIO Role/Goal/Complexity

(11 Key Actors Responding, Fall 2000)

	Clinger-Cohen CIO Role Area	Complexity Rating	Goal "For" or "Of"
1	Replace Agency Senior Official Title w/ CIO	N/A	For-12 Of-1
2	Pay CIO at Level IV	N/A	For-11 Of-2
3	Advise Agency Head on IT acquisition and management	H6, M6, L2	For-4 Of-11
4	Develops/maintains an integrated IT architecture	H12, L1	For-5, Of-10
5	Promote effective IRM processes	H7, M5, L2	For-8 Of-10
6	IRM is principle duty	H3, M7, L3	For-7 Of-8
7	Monitor/advise on performance of IT programs	H6, M6, L1	For-6 Of-10
8	Submit annual IT Strategic Plan	H5, M5, L3	For-10 Of-6
9	Assess IT personnel requirements & attainment	H5, M7, L1	For-5 Of-9
10	Rectify deficiencies; training & professional development	H5, M4, L4	For-3 Of-12
11	Report IRM capability improvement to agency head	H5, M10	For-9 Of-7
12	CIO reports directly to agency head	N/A	For-9 Of-5

H= High Role Complexity, M= Medium, L= Low. N/A= Not Applicable
 Note: some respondents indicated more than one rating or that an area is both a goal for and goal of the agency.

The following chapter presents conclusions and recommendations that are based on the interviews, case studies, research on the CIO position and the CCA, related federal guidance, and other interviews that illuminated the history and intent of the CCA.

CHAPTER 7 - CONCLUSIONS AND RECOMMENDATIONS

General Comments

The stated purpose of this dissertation is to develop a method for evaluating the establishment of CIO positions in federal agencies in order to determine if these agencies' implementation efforts were consistent with the intent of the Clinger-Cohen Act of 1996. The method will fill a gap in current policy evaluation literature and provide a means of assessing a bureaucratic position of growing importance in the federal sector.

The Federal CIO Position Evaluation Method (FCPEM) is the policy evaluation method that the research set out to develop. This method should be viewed as the result of an exploratory study; its validity has been established to the degree that four case studies, twenty-six interviews, and a review of related literature could provide.

Additional studies are needed to refine and extend the FCPEM until it has been reviewed with key actors in most if not all of the organizations listed in the CCA (nineteen more). It would also be worthwhile to use the FCPEM in other organizations in the federal executive branch that have established CIO positions. This would include other federal agencies, bureaus, commissions, and boards that may also claim CIO-related authority or example from the CCA.

Importance of this Research

This research is important to furthering the understanding of an executive position that is now common to many federal agencies. This executive CIO position is significant because as envisioned by the CCA, it oversees a growing agency IT infrastructure that is increasingly becoming the primary vehicle for inter/intra-government communication and for delivering services to the public. The policy evaluation method that was developed through this research (the FCPEM) can be used by analysts to determine if federal agencies are complying with the CCA in the way they created their CIO position.

While the main result of this research was a better understanding of CIO position implementation through the development of the FCPEM, another important benefit is enhanced understanding of federal IRM policy in general. As was described in Chapter 4, the 1990's brought an increasing amount of IRM-related law and guidance from Congress and the Clinton Administration. Yet there remains a lack of overall cohesion and integration within this area of public policy in terms of defining how best to use IT in delivering public services, securing public information, and improving government processes. In the absence of a coordinated body of policy, an alternative method for developing an integrated view of the area might be to look at how those policies are being implemented, to see if an organizing/focusing element might be present.

I would argue that a focal point for federal IRM policy execution exists: the agency CIO. Because the federal agency CIO is chartered by the CCA to lead IRM policy implementation, this position (as a topic of research) can be used as a "lens" to create a clearer view of otherwise disparate IRM policy pieces within an agency.

The following four areas of contribution from this research are identified as examples of how a focus on the federal agency CIO promotes a more holistic understanding of federal IRM policy implementation:

- Development of an IRM-related policy evaluation tool
- Modeling a new civil service IRM executive position
- Discussing the relationship of IRM to the budget process
- Documentation of an annual federal IRM policy cycle

These four research contribution areas are discussed further as follows.

(1) Developing a Policy Evaluation Tool.

The research provides the first normative evaluation method for the CIO roles mandated in the CCA.

The FCPEM evaluation method provides evaluation criteria for the entire range of IRM-related CIO duties described in the CCA and in other legislation that was linked to the CCA (e.g., PRA'95). The FCPEM method fills a gap in Clinton Administration and congressional guidance, in that no other compliance "checklist" exists at the time of this writing (February 2001). Agencies can use the FCPEM to determine if they are meeting the

intent of the CCA with respect to CIO roles. The importance of this is not so much to discourage agencies from ignoring these mandates, but to promote the implementation of an integrated set of IRM roles for the agency CIO that were based on fifteen years of best practices in private industry. Key actor interviews confirmed that most if not all of the CCA/CIO mandates are important and that their implementation should be evaluated in each agency.

(2) Modeling the Federal Agency CIO Position.

The research offers the first model of the federal agency CIO position. This model includes ten IRM knowledge areas for the CIO that relate to three levels of the agency.

I have found that graphic models help my understanding of abstract concepts. The federal agency CIO position has been described in documents and through lists of CIO competencies or duties, but never represented graphically as a set of knowledge areas operating at various levels of the organization. I therefore felt the need to develop this type of a graphic model of the CIO position to enhance my understanding of how it may relate to IRM Policy implementation, and how to evaluate it in terms of the CCA.

Having a graphic model of the CIO position during case study research promoted discussion and analysis (beyond getting feedback on this model). As with having an architectural blueprint at a construction site, I was able to point to various areas of the model and ask key actors about

what is occurring with that aspect of their CIO position, communicating the question more clearly than would have been possible if I simply had a list of CIO roles to refer to. There may be similar value for policy analysts as they use the model to enhance understanding of the federal agency CIO position for a variety of related studies.

(3) IRM and the Agency Budget Process.

This research provides a better understanding of the key relationship between the CIO and CFO, and of the contribution of IRM practices to the agency budget process.

Resources of many types are essential to a CIO's success. One of the most important is the funding needed to pay for the increasing agency IT requirement described above. In Chapter 4, it was mentioned that OMB had reported that for 2001 the Clinton Administration proposed spending \$40 billion on federal IT, a \$1.8 billion increase over the previous year. Note that in 1996 the total was \$27 billion, which accounted for 6.1 percent of the federal discretionary operating budget.

While OMB's IT spending figures show significant annual increases, those figures may not reveal the true rate of growth in federal IT expenditures that agency CIOs have to deal with. This is because IT may not even appear as a separate funding element within large agency projects (e.g., a farm loan program at USDA, coin collector re-sale/promotion program at the U.S. Mint, disaster response center at FEMA, or pollution regulation program at EPA). Agency executives who have oversight for significant

portions of the agency budget should be a part of the budget planning process; nevertheless, yet key actor feedback indicated that this is not the case for CIOs in many of the case study agencies.

Input to the agency budget process is not the only financial area with which the CIO is involved. As mentioned in Chapter 6, the CCA requires the head of each agency to implement effective capital planning and investment processes, and in consultation with both the CIO and the CFO to ensure that information systems provide financial and program performance data for the financial reports of the agency. While this seems like a straightforward mandate, key actors at several agencies reported that the relationship between CIOs and CFOs was not good. Developing cooperation and parity between CIOs and CFOs is essential to implementing the IT capital planning processes that are required of the CIO, as well as the accurate financial reports that are required of the CFO. Unfortunately, this research has also revealed that turf battles remain an impediment to allowing the CIO to fully participate in budget planning and financial systems support (e.g., at USDA the CFO owns the financially related IT systems). At Treasury, it was reported that the CIO reports to the CFO, and that they get along. This does not necessarily mean that the CIO gained IT budget authority, or has CFO support in implementing a capital planning process, both of which are needed to

bring proper oversight to this increasingly large and important area of agency spending.

One other aspect of this is the relationship of the OMB mandated/GAO endorsed IRM capital planning process to the fiscal year budget cycle. In that many federal agencies are still implementing capital planning processes there is not a pattern for when in the fiscal year select phase activities occur (the choosing of IT projects according to various criteria). At present, several agencies (e.g., HUD, Labor, and Energy) have a selection activity each spring for the fiscal "out" year that is approximately 15 months away. Similarly, when and how control phase activities occur relative to the budget cycle is unclear, with several agencies settling on quarterly or bi-annual reviews of their IT projects that are in progress (monitoring cost, schedule, and performance). I have asked several agencies and OMB personnel about evaluation phase activity, and the feedback is that little of it is occurring at this time (this being post-implementation reviews of operational systems for continuing value and performance). More understanding and alignment of the capital planning process and the fiscal year budget cycle across the executive branch may yield opportunities for inter-agency investment reviews and increased sophistication in the evaluation and control of investments in IT.

(4) Documentation of an IRM Policy Cycle.

This research provides the first graphic model of federal IRM policy as an annual cycle of activity.

The IRM Policy Model presented in Chapter 4 depicts a cycle of policy generation, promulgation, execution, and reporting, part of which occurs at each agency on an annual basis. Federal agency CIOs are a key player in this policy process.

The Policy Process Model is an additional way to graphically enhance the understanding of an otherwise disparate set of IRM activities. Case study research indicated that many of the aspects of the IRM policy cycle are not well coordinated, in spite of additional OMB guidance over the past four years. Further, at least one of the following elements of IRM policy (e.g., IT capital planning processes, enterprise business/technology architectures, IT program oversight controls, and workforce assessments) had not been fully implemented in each of the four case study agencies, as described in Chapter 6.

The IRM Policy Process Model is important in that it shows the activities that the CIO is involved with in a way that they all can be seen in relationship to each other. Some of the relationships involve hierarchies of policy, and some are sequences of related implementation activity. No other depiction of this scope or detail could be found during the research.

Conclusions

The FCPEM evaluation method was developed through research on the CIO-related mandates of the CCA, interviews with people involved in drafting the CCA, case studies of agencies listed in the CCA, and examination of concepts derived from the CIO Position Model and Federal Agency IRM Policy Cycle Model. The FCPEM was validated through feedback from key actors in case study agencies.

Based on the research findings, I have reached two conclusions, the first one regarding the FCPEM, and the second one related to the CIO Position Model.

Conclusion 1. The FCPEM CIO Evaluation Method can be used to evaluate agency CIO positions to determine if their roles comply with the intent of related mandates in the Clinger-Cohen Act of 1996.

Using the seven-step policy analysis process described in Chapter 3, CCA/CIO mandates were identified, their intent was determined, and evaluation criteria were assigned. Case study interviews validated the CIO position evaluation criteria and the FCPEM method.

The intended application of the FCPEM is for a policy analyst, agencies, oversight bodies, and/or stakeholders to use it as a thirteen element checklist, in order to determine if a federal agency is complying with the intent of CCA mandates in the functioning of that agency's CIO position. The evaluation criteria use yes/no answers, which is intended to enable those doing the analysis to state that the agency is in compliance

with the intent of the CCA in these functional areas of the CIO position. The FCPEM is not intended to be a pass/fail evaluation tool, but a method to elicit a detailed and categorized analysis of CCA compliance in how an agency created their CIO position.

The implication of areas of non-compliance with the CCA's CIO roles is that an agency is not following the law, and could therefore be subject to criticism in GAO audits, congressional hearings, or worse, have annual IT program budget requests disapproved by OMB (all of which have occurred in recent years). This OMB disapproval of IT funding (related to agency non-compliance with various aspects of the CCA and other IRM policy) has actually started to occur as of fiscal year 2000. According to William McVay, a senior policy analyst at OMB's Office of Information Regulatory Affairs (which reviews agency IRM funding requests), over \$1.4 billion was rejected from agency IT funding requests that year. He stated that this mainly is occurring when an agency cannot demonstrate that they have followed CCA in areas such as having an IT capital planning process in place to properly oversee a major investment of funds, or that the agency lacks an enterprise architecture to clearly define how the new IT system will contribute to agency processes in a way that is

meaningful and not duplicative.¹²⁶ Both of these examples focus on CIO roles as defined in Section 5125 of the CCA.

This research did not attempt to grade each criterion in terms of the severity of impact to the CIO position in its absence (e.g., is the absence of the CIO being at Executive Level-IV more severe in affecting the function of the CIO position than is the absence of the CIO developing and maintaining an enterprise architecture). This is an aspect of the FCPEM that should be developed in the future, and is listed later in this Chapter as a recommendation.

Conclusion 2. The CIO Position Model can be used to generically describe CIO positions in different types of federal agencies.

A model of the federal agency CIO position was created by relating professional competencies that a CIO should possess to the organizational levels that they operate at. This model was validated through case study key actor interviews as generally representative of the agency CIO position.

Having a model of what a CIO should know and where that knowledge is applied in the organization serves a different purpose than does the FCPEM, which evaluates the presence or absence of CIO roles as they were intended in the CCA. Having both the CIO model and the FCPEM

¹²⁶ Interview with William McVay at OMB/OIRA offices in the New Executive Office Building, Washington, DC, December 15, 2000

evaluation method assists the policy analyst in understanding both the nature and the purpose of the CIO position in federal agencies in a way that heretofore was not possible.

Recommendations for Follow-On Research

Recommendations from this dissertation fall into two categories: follow-on research on CIOs and the use of the FCPEM, and recommendations for specific agency actions regarding the CIO position.

Recommendations for follow-on research are as follows:

(1) Use the final form of the FCPEM to study the twenty-three agencies listed in the CCA to determine compliance with the CCA in their CIO positions.

Case study research in this dissertation served to develop, validate, and refine the FCPEM method of evaluating CCA compliance in federal agency CIO positions. Further study of this kind should perhaps focus first on using the final form of the FCPEM (Chapter 5, Table 5) to evaluate CIO mandate compliance in each of the twenty-three agencies listed in the CCA. No such study of this type has been done to date. The FCPEM could then be used in the many dozens of other federal executive branch agencies, commissions, and bureaus not mentioned specifically in the CCA, but which may be using the CCA as guidance for how their CIO position functions. It is also suggested that GAO may want to consider using the FCPEM to conduct an evaluation of all twenty-three agencies listed in the CCA to provide a comparison and an overall picture of CCA-CIO compliance.

(2) Estimate the severity of impact that the absence of compliance with one or more FCPEM criterion would have on the functioning of an agency's CIO position.

The thirteen CIO role evaluation criteria contained in the FCPEM encompass a complete picture of what the CCA intended for the agency CIO position. What was not determined was the estimated impact on the functioning of an agency's CIO position if one or several criteria were not being complied with. While the potential number of combinations of non-compliance among any thirteen items is an unwieldy number, the estimated impact of non-compliance for each criterion could be documented, along with selected combinations to provide basic information and to then illustrate how a policy analyst might assess other combinations.

This additional feature of the FCPEM would allow its use not only as a policy evaluation tool, but also as a diagnostic tool. For example, if compliance with the criterion focusing on CIO agency/head reporting were found to be missing, then an estimate of the impact of this gap on the CIO position would be available, drawing on case study research with the CCA agencies (and perhaps using industry best practices). If the non-compliance with the criterion concerning CIO participation in strategic planning were also found, then the singular impact of this absence could be provided, as well as the analyst's determination of the combined impact and what may have been a common cause for both areas of non-compliance. In this case, the CIO might be buried three levels down in the executive reporting structure and not only does not have direct

agency head access, but also is not invited to top-level strategic planning session. The impact of this structure could be that the potential use of IT is not as effectively articulated in strategic decision-making at the agency.

(3) Study the proposed "Federal CIO" position in order to identify the potential cabinet-level role that this person would play in addressing IT and IRM issues of a national scope.

While outside of the scope of this dissertation's agency-specific model of the CIO position, this model and the FCPEM may help to inform a study on the utility and role that a national-level "Federal CIO" might play in the executive branch. Additionally, aspects of the Parsons/Thompson model that operate at the institutional level in terms of external negotiations for resources and organizational participation in a wider social system may pertain to a model of the roles of the Federal CIO.

Should this national-level CIO position be created, many aspects of the Federal CIO's authority over agency IT activities and expenditures would also have to be resolved with both the Bush Administration and Congress. Further, the Federal CIO's ability to make policy relative to that which OMB provides (e.g., OMB Circular A-130 covering IRM practices) is not evident, nor is the Federal CIO's potential relationship with House and Senate committees dealing with IRM issues. Should the Federal CIO consolidate authority over \$40 billion in executive branch IT spending, the method of

prioritizing efforts between agencies is undefined and perhaps without a precedent to refer to.

(4) Test the applicability of a modified FCPEM to State and local level CIOs. Use the results to determine the nature and source of any differences in CIO functions between these levels of government.

State and local level CIOs deal with different legislative requirements and forms of government than those faced by federal agency CIOs. These differences would have to be incorporated into the evaluation criteria for a State and/or local level version of the FCPEM. Results from the use of the FCPEM with centralized versus decentralized forms of government, and with government bodies that have "head CIOs" (e.g., State CIOs) versus those with only agency level CIOs (federal), would make for interesting comparison.

(5) Test the applicability of the FCPEM in evaluating private sector CIOs and compare the results to FCPEM studies of public sector CIOs, including those at the State and local level.

Another potentially valuable area of research would be to use the FCPEM (in modified form) to determine the nature and source of general differences between public and private sector CIO functions. It is my observation that the basic function of most public sector agencies is to provide information and/or services, while the basic function of most private sector firms is to make a profit. These differences may have an effect on the way that CIOs function in the two respective sectors.

Specifically, the study could be extended to determine how the FCPEM could be modified to be used with private sector firms/CIOs. Use this use the private sector version of the FCPEM to evaluate private sector CIOs in what may be many of the same thirteen roles identified in this research. CIO role evaluation criteria would most likely change to reflect a movement away from the mandates of the CCA, and toward those goals that are particular to the private sector (e.g., develop an enterprise architecture not per the CCA, but to gain competitive advantage by knowing in more detail how the firm's IT infrastructure was situated).

A follow-on study could then be conducted to apply the private sector version of the FCPEM evaluate CIO positions in selected firms. This group of businesses might come from the Fortune 500 list, or something similar to maintain parity in size and financials with many of the federal agencies. Use the results not only to make comparisons between firms but also with what was found in federal agencies.

Extend the follow-on study to compare the roles of CIOs at the State, and local levels of government with the roles of private sector CIOs at large, medium and small firms.

(6) In the future, determine if coverage of the federal CIO has increased in academic and practitioner publications.

In three to five years, another literature survey should be conducted to determine if public administration and/or public policy journals have

increased their coverage of the federal agency CIO position. The practitioner publications and those covering business and management also should be reviewed. The review could be designed to also determine the amount of attention the private sector CIO position is receiving relative to the federal sector CIO from these bodies of literature.

(7) Study the social basis of CIO roles by examining whom the CIO interacts with on a regular basis and the interactive nature of these relationships.

As was mentioned in Chapter 3, social relationships are based on mutually agreed upon meanings of language and action. Studying the type and nature of CIO interactions in the conduct of the thirteen FCPEM roles may reveal additional information about the functioning of the position in federal agencies. How the CIO interacts with the agency head, CFO, other peers, subordinate IRM directors, and key technical staff would all be germane to the development of a better understanding of the CIO position.

Recommendations for Agency Follow-on Actions

Recommendations for agency actions are based on the assumption that compliance with the CIO mandates of the CCA is an agency objective and is in the best interest of the public. These recommendations are:

(1) Ensure that the CIO has implemented direct reporting to the agency head.

Direct reporting to the agency head was mentioned as being important to the success of the CIO by key actor research interviews at USDA, FEMA, and Treasury, including several current agency CIOs. Such direct access serves to keep IRM policy and strategy issues at the highest decision-making level. It also prevents the agency head from becoming isolated from issues that have the potential for high media interest (e.g., the loss of classified information, improper disclosure of public data, and increased Congressional/GAO/OMB scrutiny of IT program spending and performance). Feedback from the case studies indicates that the appropriate amount of direct agency head/CIO interaction may be different in various agencies, but this should not preclude that access from being established (documentation of the direct reporting relationship may be key to implementation). More frequent interaction between the CIO and other senior agency leaders is also considered to be important to the function of the CIO position. For example, at the Department of State, it may be impractical for the CIO to interact

regularly with the Secretary of State, but some level of interaction should occur to ensure that the Secretary directly hears about CIO challenges in leveraging technology to support mission accomplishment.

(2) Ensure that IRM is the CIO's principal duty.

This study has shown that the CIO position requires competency in at least ten areas including participation in high-level strategic planning and the personal facilitation of key processes (e.g., architecture, capital planning, records management, workforce planning). As indicated by the research of Charlotte Stevens¹²⁷, the time it takes public and private sector CIOs to properly attend to these duties is significant. I would argue that CIO duties are time intensive to the degree that it is infeasible that the CIO position could effectively be combined with another executive position of significant responsibility (e.g., CFO or Assistant Secretary of Administration and Management). While the political and/or power-concentration considerations may make it appealing to combine the CIO position with another position in the "inner-circle," the result inevitably is a CIO that is not sufficiently engaged in duties required by law, which may lead to ineffective oversight of key areas.

(3) Ensure that the CIO is chartered in writing with responsibility for the enterprise-wide IT architecture effort.

¹²⁷ Stephens, Charlotte, S. The Nature of Information Technology Managerial Work. New York: Quorum Books, 1995.

One of the important roles the CIO will play is facilitating the documentation of the "current" agency business/IT architecture and determining a "target" architecture (1-3 years away) that accommodates strategic plans, is compliant with OMB-recommended frameworks, addresses new technologies, and identifies systems standards. Having the responsibility and authority to do this is key for CIO success, as many sub-organizations and program offices will want to continue to develop information systems independently, thereby driving up costs and continuing to block integration across the federal government.

(4) Ensure that the CIO is a leader in IT capital planning processes.

Once the CIO has identified a target agency-wide business/technology architecture, leading the process (in partnership with the CFO and with the participation of other senior executives) of selecting IT investments that will achieve that architecture is key to success. In many agencies, capital planning efforts are not coordinated such that IT investments benefit the entire organization whenever possible. This undermines CIO efforts to eliminate duplication, drive down common infrastructure costs, increase interoperability, and consolidate workforce support requirements.

(5) Increase understanding of agency head IRM responsibilities under the CCA.

The CCA legislation specifically sought to make both the agency head and the CIO responsible for IRM improvements. This was done by the drafters of the CCA (per interviews with several of them) in order to promote compliance by not just making the new CIO the responsible party. Making the agency head responsible also increases the level of visibility for the mandates. Specifically, Section 5121 of the CCA identifies the agency head, not the CIO, as being responsible for the establishment of agency IT capital planning processes, IRM support for financial reporting processes, post-Brooks Act IT acquisition processes, and performance and results-based management of IT investments. Per Section 5125 of the CCA, the CIO is responsible for oversight in these areas, but not for the initial creation of these functions in the agency. How the agency head accomplishes this, and how the CIO is then brought into the process, is an area that merits further review.

(6) Ensure that CIOs have internal agency buy-in to require performance measures in every IT-related business process.

Whether it is a contractor support agreement, service offerings to the public, or the way that IT investment decisions are made, the CIO and other top agency executives must ensure that performance measures (metrics that provide feedback data) are present. This is so that the CIO and other executives have the information they need on IT systems development and operation to make effective decisions. Key actor

feedback indicated that useful data on IT programs was lacking, and that this could be traced to a lack of performance measures that were built into government management processes and/or contractor statements of work. If the CIO is to accomplish program oversight functions per the CCA, then this type of cost, schedule, and performance data must be generated for all IT program activities.

(7) Ensure that the CIO regards workforce planning as a high-priority IRM issue.

Recruiting, retaining, and training IT workers is an ongoing concern that can adversely affect IT operations and new program development if not attended to as a consideration of ongoing operations and within every new IT project. Worse, disgruntled employees can affect organizational morale, present an unfavorable image to citizen customers, and occasionally be a security threat. Case study research indicated that agencies are not regularly attending to IT workforce concerns in accordance with the provisions of the CCA. This includes an initial baseline survey of agency IT training requirements at all levels (executive, management, and staff), and the identification of a plan to rectify deficiencies and provide ongoing professional development.

In Summary

This research led to the conclusion that the CIO Position Model could be used to represent the federal agency CIO, and that the FCPEM method could be used to evaluate if that position was functioning in accordance with the CCA. If use of the FCPEM determines that agencies named in the CCA did not establish their CIO positions in accordance with the intent of the Act, then further analysis can proceed in a manner that focuses on where variance with the CCA occurred. Recommendations for further research promote understanding of possible sources and consequences of agency variance with CCA/CIO mandates and perhaps in helping federal agencies make necessary changes to achieve compliance in the CIO position.

In the final chapter of this dissertation, additional areas of interest are discussed regarding the federal agency CIO position and the expanded use of the FCPEM.

CHAPTER 8 - ADDITIONAL COMMENTARY

This chapter provides me with an opportunity to comment on several topics related to the federal agency CIO position that were either outside of the scope of the research effort, or are comments that extend beyond the findings of the case studies. These include making observations about the CIO roles specified in the CCA, identifying limitation in, and suggesting an expansion of the FCPEM, discussing complexity in the CIO position, and identifying some of the future challenges that federal agency CIOs will face.

Observations on CIO Roles in the Clinger-Cohen Act

In the area of extending beyond the findings of the case studies, I make two general observations and an observation for each of the thirteen CIO mandate areas in the CCA. The general observations are as follows:

General Observation #1: *The CCA was probably necessary to achieve government- wide adoption of agency CIO positions.*

No evidence was found of widespread federal agency interest in CIOs in the early to mid-1990s, when the position was being publicized in the private sector but before the CCA. However, several agencies established CIO positions before the CCA (USFS and NASA), and interview feedback indicated that some number of agencies might have adopted CIO positions without the mandate of the CCA. This action might have been caused by technical or organizational needs, or by observations of industry successes with the CIO position.

General Observation #2: There was some evidence that the size of the agency has an effect on CIO roles.

Case study research and my observations of CIO functions at other agencies mentioned in the CCA indicate that large federal departments operate at the top almost like private sector "holding companies". By this I mean that the very top officials (e.g., Secretary, Under Secretaries, Assistant Secretaries, CFO, CIO, General Counsel) are concerned mostly with issues of political or media interest, and limit policy work to that of coordinating high-level areas of management practice, or legislative compliance. They delegate to sub-agencies many of the duties of oversight and process such that a decentralized approach to management is created. In this type of operating environment, the department-level CIO may not be able to gain detailed visibility into IT program activity, or have the political strength and/or budget authority to enable them to execute CCA-mandated roles such as enterprise architecture development, capital planning, or IT workforce planning.

On the other hand, in smaller agencies that have fewer (if any) sub-agencies, a more centralized management approach is possible. This allows the CIO to be closer to IRM issues and program activities, making compliance with CIO roles more possible.

Both of the large case study departments had CIOs who had little or no direct authority over sub-agency IT activity. They exerted influence through interpersonal skills, attempts to affect the IT budget process, and the issuance of department-wide policy, that may or may not be able to be enforced.

The CIO role criterion-specific observations are as follows:

CCA/CIO Role #1 (Establish a CIO Position/Title):

Observation: All four case study agencies had designated a CIO in writing.

Analysis of agency documents and key actor feedback show that they all had established CIO positions, and that all four mention the CCA as the reference for this action. A copy of these CIO designation documents is provided in Appendix D.

CCA/CIO Role #2 (CIO Designated at Executive Level-IV):

Observation: All four agencies have CIOs who are members of the Senior Executive Service, but in only one case was information available indicating the CIO was at Executive Level-IV (USDA).

Part of the difficulty in this area is that it requires a confirmation of pay level; also, there was confusion among key actors as the relationship between federal government Executive Levels (five of them) and levels of the Senior Executive Service (six of them). The pay for Executive Level IV is the second lowest of five levels, yet it equates to the top two of six levels for members of the SES (\$127,500). Key actor feedback indicates that all four case study agency CIOs are either designated at Executive Level-IV or are SES 5/6, which I assert would meet the intent of the CCA. However pay records could/would not be made available to confirm this.

CCA/CIO Role #3 (CIO Reports directly to the agency head):

Observation: Two of the four case study agency CIOs report directly and routinely to the agency head (FEMA and EPA), and two CIOs have access to the agency head, but normally report to the deputy agency head (USDA and Treasury).

A majority of key actors felt that a lack of direct CIO-to-agency head reporting diminishes the ability of CIOs to exercise effective oversight over IT programs and to influence related organizational processes. Reasons for not having direct CIO-to-agency head reporting were reported by key actors to include having an externally-focused agency head, agency heads that do not understand the requirements of the CCA, and others who may perceive this policy as a technical matter. Politics and other executives' desire to maintain power by controlling access to the agency head were other reported factors.

CCA/CIO Role #4 (IRM is the CIOs principle duty)

Observation: All case study agency CIOs had IRM as their primary duty, but other agency CIOs do not.

Document reviews and interview feedback indicated that no case study agency CIO had significant duties other than IRM. Key actors felt that having such would detract from CIO position effectiveness, recognizing the number of CCA/CIO responsibilities and that the time it takes to accomplish them equates to a full-time executive position. Additional document and interview research beyond the case studies revealed that the current CIO positions at the Department of Labor and the Department of Justice mix that job with the key executive position of Assistant Secretary for Administration and Management, which is not in compliance with the CCA.

CCA/CIO Role #5 (CIO ensures efficient IRM processes, including reducing information collection burdens on the public):

Observation: It is listed in case study CIO designation and/or OCIO mission documents, but evidence of accomplishment is lacking.

Key actor interview feedback indicated that all four case study CIOs were concerned with ensuring efficient IRM processes, however very little direct documentary evidence of CIO activity in this area was found. The EPA CIO office web site states that "reducing the burden of collecting information" is a primary function, and they do have a formal information collection review process, but there is no evidence of CIO-facilitated method to ensure efficient processes or reduce the burden of information collection on the public.

CCA/CIO Role #6 (CIO supports defining the agency's program information needs, strategies, systems, and capabilities):

Observation: CIO visibility in this process appears to be lacking at EPA, but is present at USDA, FEMA, and Treasury.

There are several places that evidence of CIO activity might be seen, such as the agency's Annual Performance Plan, the agency's Strategic Plan, or the program selection phase of the capital planning process. Reviews of these documents in the four case study agencies revealed a mixed level of CIO visibility and agency-wide process for defining IT needs, strategies, systems, and capabilities. USDA, FEMA and Treasury had IT Strategic Plans that aligned with that agency's overall Strategic Plan. At EPA, the lack of CIO visibility is exemplified by the EPA Annual Performance Plan for 2000, which was produced by the CFO office, does not mention the role of the CIO, or how IT can/will be leveraged in accomplishing EPA's mission. It is also noted that the IRM Strategic

Plan is dated June 1995, and the EPA IRM Policy Manual that is currently listed on their web site is dated July 1987, almost a decade prior to the CCA.

CCA/CIO Role #7 (CIO heads a process to evaluate proposed agency collections of information):

Observation: All four case study agency CIOs have a process to evaluate proposed collections of information.

The Government Paperwork Elimination Act of 1998 required that in October 2000, each agency submit a plan for providing an electronic alternative for all transactions with citizens, other agencies, and business. This required a review of agency information collections that had been maintained in accordance with PRA'95 and the CCA. All four case study agencies (and all CCA-named agencies) submitted GPEA Plans, the preparation of which was led by the CIO. Key actor feedback indicated that except for this very prescriptive GPEA mandate, CIO involvement in this area might have been greatly reduced. One exception is EPA, whose CIO office manages a formalized Information Collection Request program that determines what information will be collected, why the information is needed, and the burden on EPA staff (in hours) associated with an information request from the public, industry, or special interest groups.

CCA/CIO Role #8 (CIO provides advice to agency head/management to ensure IT is acquired and IRM done in accordance with PRA'95 and agency head priorities):

Observation: CCA-mandated IT Capital Planning processes are only partially being complied with by case study agency heads and CIOs.

All four case study agency CIOs take part in or lead an agency IT Capital Planning and Investment Control (CPIC) process. However, key actor feedback indicated that none of these agency CPIC processes has resulted in all IT-related programs receiving select/control/evaluate reviews, as appropriate, depending on the stage of the effort (e.g., new programs would not be ready yet for after-action evaluation reviews).

CCA/CIO Role #9 (CIO develops, maintains, facilitates an integrated agency IT architecture):

Observation: CIOs in all four case study agencies are leading the development and implementation of integrated IT/Business architectures, but they are not complete and often lack an agency-wide scope.

Document analysis and key actor feedback indicated that none of the four case study agency CIOs had completed the development and implementation of an agency business/IT architecture, that includes documentation agency-wide of its four general layers (business, data, applications, technical) and a technical standards reference model. Key actors felt that this was due in part to the lack of authority from agency heads that would allow CIOs to force internal agency adherence to architecture methods/standards as a requirement for the funding of new IT programs. Another reason cited was a lack of government personnel knowledgeable in enterprise architecture methods.

CCA/CIO Role #10 (CIO monitors/evaluates IT program performance and advises continuation):

Observation: IT-related program monitoring by CIOs is lacking, due in part to a lack of information and oversight authority.

Only one of four case study agency CIOs has broad budget approval authority over IT programs (FEMA). Key actor feedback indicated that this reduces CIO effectiveness in controlling IT programs that are over budget, off schedule, and/or under-performing. As a result, key actors report that CIO implementation of required IT capital planning processes to select, control, and evaluate IT projects are lacking in scope, effect, and maturity. USDA has recognized this for the past three years, and after several failed attempts, gained CIO budget authority last year for IT programs in three of the twenty sub-agencies/offices.

CCA/CIO Role #11 (CIO participates in fiscal year Agency strategic planning and performance evaluation processes):

Observation: Three of four case study agency CIOs participate in high level agency strategic planning and performance evaluation processes.

Document analysis and key actor feedback indicated that only EPA was lacking in CIO involvement in high-level agency strategic planning. This may be related to the lack of having a single CIO at EPA, with the position having been filled by two acting "co-CIOs" since August 2000 when the CIO function was reorganized by EPA Administrator, Carol Browner.

CCA/CIO Role #12 (CIO assesses IRM skill requirements, develops strategies to rectify deficiencies with plans for hiring, training, and professional development):

Observation: Most case study agency CIOs are not assessing IRM skills.

Only one of four case study agency CIOs (Treasury) had assessed IRM knowledge and skill requirements as part of their annual strategic planning and

performance evaluation processes. The first such assessment was completed by this agency in 1999.

CCA/CIO Role #13. (CIO reports annual progress in improving IRM capability to the agency head):

Observation: Only two of four CIOs are reporting progress in improving IRM capability to the agency head.

The USDA and FEMA CIOs are reporting IRM improvement in a coordinated manner to the agency head. In the case of the USDA CIO, an annual IT Performance Plan from USDA OCIO is submitted, complete with goals, measures, and attainment results. The FEMA Annual Performance Plan for 2000 includes Goal E.6.1. Evidence of this kind of reporting could not be found for EPA or FEMA. The FEMA 2000 Annual Performance Plan included a major goal for upgrading IT (Goal P.3.1), but did not address IT holistically in supporting performance objectives; nor does the CIO document this contribution.

Limits of the FCPEM

The FCPEM is only a beginning in the development of a comprehensive tool for evaluating agency CIO positions. By restricting the evaluation criteria to the CIO's roles listed in Section 5125 of the CCA, the tool misses some potentially important factors that may affect the execution of those roles. These factors include role complexity, inherent agency resistance to a role, and the relation of a CCA/CIO role to more generally accepted view of the CIO position (in the public and private sector. For these reasons, an "expanded" version of the

FCPEM is being recommended for development as a follow-on activity to this research. Other limits of the present FCPEM are that it is not suited for use in evaluating State and local CIO positions, due to differences in mandates that charter those government positions. Also, the FCPEM is not oriented toward use in evaluating private sector CIO positions, due to its alignment with the requirements of federal law, as opposed to a contribution of value to a business' profit.

Comments on the expanded version of the FCPEM follow, with the note that these suggested enhancements are meant to further the use of the tool only in evaluating federal agency CIOs. Versions of the FCPEM suitable for State, local, and private sector use are beyond the scope of this dissertation.

An Expanded CIO Evaluation

The FCPEM identifies normative evaluation criteria for each of the thirteen CIO roles. However, it does not look at other potential aspects that could be used to evaluate the CIO position beyond the mandates of the CCA. In particular, CCA/CIO role complexity, role orientation (in terms of goals), and relationships between CCA roles and CIO Council CIO competencies are additional dimensions in which to evaluate CCA/CIO roles.

1. CIO Roles and Complexity

Addressing the complexity of CIO roles is prompted by my observations when I was serving in a CIO-like position, my observation of other CIOs, and my

reflections on the writings of Margaret Wheatley and Philip Kronenberg, who have commented on how complexity theory relates to management and organizational theory.

The results of this research begin to indicate that the federal agency CIO position involves six or more highly complex roles as well as several less complex roles (see Table 9 in Chapter 6). The potential for these roles to require concurrent CIO attention dramatically increases the level of complexity for the overall position. This is significant in that CIOs will most likely need to develop leadership and management styles that allow them to effectively deal with this ongoing barrage of complex activity.

Other top executive positions involve a wide range of responsibilities that create complex management environments similar to that of the CIO (e.g., CEO and COO of large firms). One method that top executives use to deal with complexity is to engage only in high-level goal setting and facilitation activities, leaving implementation details to management and staff. Another is to understand and accept that complex operating environments do not lend themselves to a prediction of outcomes for anything but simple, short-term efforts; as Philip Kronenberg argues, non-linear processes are a central reality (simple causes may produce more complex effects and visa versa).¹²⁸ Also, planning on "disruption events" from many quadrants is essential to creating a useful approach to the reality of CIO operating environments.

Utilizing risk management concepts to identify potential sources of disruption is a worthwhile CIO activity that is not practiced enough. The CIO and agency head need to realize that many things can happen which may be caused by events that are outside of the scope of normal consideration. The contribution of assessing complexity as a risk element is in then being able to mitigate a wider spectrum of disruption sources and accepting that this will not be a foolproof exercise. Things will still happen, and when they do, it is not necessarily the mark of poor CIO or agency head performance.

2. Seeing CCA/CIO Mandates as Organizational Goals.

In looking at the CCA/CIO mandates as roles, the implementation of which is presumably a goal of the agency, Parson's work is once more relevant. As part of his general model of social organizations, Parsons focused attention on the relationship between organizational goals and the larger societal environment. He argued that society views an organization's goals as its specialized function, and supports its activities to the degree that it values those goals.¹²⁹ In

differentiating organizations from other types of social systems, Parsons stated:

As a formal analytical point of reference, primacy of orientation to the attainment of a specific goal is used as the defining characteristic of an organization, which distinguishes it from other types of social systems.¹³⁰

¹²⁸ Kronenberg, Philip. "Chaos and Re-thinking the Public Policy Process". In Chaos and Society. A. Albert (Editor). New York: IOS Press. Pages 253-265. 1995

¹²⁹ Parsons, Talcott. Structure and Process in Modern Societies. Glencoe, Illinois: Free Press. 1960

¹³⁰ Thompson, James D. Organizations in Action. New York: McGraw-Hill, 1967.

Building on this notion, Thompson developed the concept of *goals of* versus *goals for* an organization. Thompson describes the term *goal* as referring only to "some imagined state of affairs which may conceivably be attained or approached (if not finite) at some future time."¹³¹ He considers *goals for* an organization as intended future domains for the organization that are usually multiple and are imposed externally by individuals or other "categories". *Goals of* the organization are future domains intended by those in the domain coalition, which almost always includes organizational members but may also incorporate significant outsiders.¹³²

Thompson also credits Richard Cyert, W.R. Dill, and James March for this view of organizational goals. Their theories hold that organizational goals are established not just by individuals, but also by interdependent individuals who collectively have sufficient control of organizational resources to commit them to certain directions and to withhold them from others. They argued that significant amounts of this activity are in the form of policy commitments.¹³³

Goal orientation would look at goals as being "for" an organization (externally induced) or "of" an organization (usually internally developed). Key actors were asked to rate each role area as a goal for or a goal of the organization, as seen in Tables 9 and 10. This feedback would begin to indicate that there are at least half-dozen highly complex roles that a federal agency CIO must perform, some

¹³¹ Ibid, page 127.

¹³² Ibid, page 128.

of them concurrently. This further indicates that the CIO position is one that requires a experience in a number of management and technical areas, as well as good organizational and interpersonal skills, not to mention leadership ability related to being able to define a vision for the CIOs contribution to mission accomplishment, and relate specific goals to the attainment of that vision.

3. Linking CIO Competencies to CCA/CIO Roles.

Providing linkage between the CIO position and its roles is another potential aspect to evaluation. This could be useful in discussions concerning CIO qualifications and knowledge and how this might relate to performing in the position. For the purposes of this discussion, I will only suggest the links between the CIO Position Model's competency areas and the CIO roles mandated by CCA, as I do not have research evidence at this time with which to support the presence of these relationships. For example, it is suggested that CCA/CIO mandated role #8 (CIO provides advice to agency head/management to ensure IT is acquired and IRM is done in accordance with PRA '95 and agency head priorities) might relate to six of the CIO Position Model's competencies, including Acquisition, Capital Planning and Investment Management, Leadership/Managerial, Process/Change Management and Project/Program Management. So, not only could CIO competency areas be related to the various levels of the organization at which they operate, but also they could

¹³³ Cyert, Richard, M., W.R. Dill, and James March. "The Role of Expectations in Business Decision Making." *Administrative Science Quarterly*. Volume 3, Pages 307-340, December, 1958

potentially be related to the specific CIO roles that they come to play in. When the aspects of complexity, goal orientation, and competency relationships are added to the FCPEM a fuller depiction of CIO roles is achieved, as shown in Table 18.

Table 18. An Example of the FCPEM
With Additional CIO Role Evaluation Criteria

	CIO Roles, Per the CCA (Section 5125)	The Evaluation Standard for Each CIO Role	Goal for/of Agency	Complexity of the CIO Role Area	Related CIO Competency	Additional Federal Reference(s)
1	Agency establishes a CIO position/title. 5125(a) (1) (A)&(B)	Was a CIO position formally designated and established?	For	N/A	N/A	OMB 96-02, EO-13011, PRA '95
2	CIO designated at Executive Level-IV 5125 (e)	Is the CIO a member of the Senior Executive Service, Level IV?	For	N/A	N/A	Title 44 U.S. Code Section 5315
3	CIO reports directly to the agency head 5125 (a) (1) (A)&(B)	Is direct CIO-agency head reporting established in writing?	For	N/A	N/A	PRA '95, OMB Memo96-02
4	IRM is the CIO's principle duty. 5125(c) (1)	Does the designation document make IRM the CIO's principle duty?	For & Of	N/A	N/A	OMB Memo96-02
5	CIO ensures efficient IRM processes, including reducing information collection burdens on the public 5125 a(1) (C)	Does the CIO facilitate reviews to improve IRM-related processes, including reducing the public information collection burden?	Of	High	1, 2, 3, 4, 7, 8, 9, 10	PRA '95, OMB A-130, GPEA, GAO Reports
6	CIO supports defining the agency's program information needs, strategies, systems, and capabilities. 5125 (a) (1) (C)	Is there a CIO & CFO facilitated process for identifying all agency program IT needs, strategies, systems, capabilities?	For	High	1, 2, 3, 4, 6, 7, 8, 10	PRA '95 OMB A-130 GAO Reports
7	CIO heads a process to evaluate proposed agency collections of information. 5125 (a) (2)	Does the CIO facilitate the evaluation of information collections independent of CIO program roles?	For	Medium	1, 2, 3,	PRA '95
8	CIO provides advice to agency head/management to ensure IT is acquired & IRM done IAW PRA '95 and agency head priorities. 5125 (b) (1)/5122(a)	Does the CIO facilitate an IT Capital Planning process, advise agency head/mgmt, & ensure IT is acquired & IRM/ITA are done IAW PRA'95 & agency head priorities?	For	High	1, 2, 3, 4, 8, 10	PRA '95 OMB A-130 OMB Memo96-02 FAR
9	CIO develops, maintains, facilitates an integrated agency IT architecture (ITA) 5125 (b) (2)	Does the CIO facilitate an ITA that ties to Capital Planning and follows OMB A-130/OMB 97-16 format/guidance?	Of	High	1, 2, 3, 5, 6, 9	CIO Council's FEAF, OMB Memo97-02 OMB Memo97-16 OMB A-130
10	CIO monitors/evaluates IT program performance & advises continuation 5125 (c) (2)	Does the CIO review IT programs for <10% variance in cost, schedule, performance?	Of	Med./High	1, 2, 3, 4, 7, 8, 9, 10	OMB A-11, OMB A-130, GPRA, PRA '95
11	CIO participates in FY agency strategic planning & performance evaluation processes. 5125 (c) (3)	Is there an agency IT Strategic Plan and is it reflected in the FY Strategic Plan and the Performance Report?	For	Med./High	1, 2, 3, 4, 6, 7, 8, 10	GPRA, OMB A-11
12	CIO assesses IRM skill requirements, develops strategies to rectify deficiencies, w/ plans for hiring, training, professional development 5125 (c) (3) (A), (B)&(C)	Does the agency have a CIO-facilitated IT Workforce Plan that addresses needed IRM skills, training, hiring, & professional development?	Of	Medium	1, 2, 3, 7	OMB A-11 OMB A-130, CIO Council
13	CIO reports annual progress in improving IRM capability to the agency head. 5125 (c) (3) (D)	Does the CIO report in writing to the agency head each year on how IRM capability is improving?	For	Medium	1, 2, 3, 7	OMB A-11, PRA '95

The FCPEM adopted the thirteen CIO role-related "mandates" in CCA Section 5125 in a straightforward manner, so that evaluation proceeds against an unaltered baseline of policy. However, Table 10's additional features (on role complexity, goal-orientation, and CIO competency relationships) are another original contribution of this research. In combination, they may allow for even more comprehensive and informed views of the federal agency CIO position and its roles if the "expanded" FCPEM was applied to the twenty-three highly diverse federal departments and agencies identified in the CCA as having to establish a CIO position.

For example, in this dissertation, CIO roles are viewed as also being organizational "goals." Thompson's differentiation of "goals for" versus "goals of" an organization is used as one way to view the origin of these roles in terms of whether there was an internal or external source for creating and maintaining that CIO role. If all thirteen CIO roles in the FCPEM are seen as "goals for" the organization, Thompson would argue that these goals therefore represent "intended future domains for the organization," and that these type of goals are often multiple and may be held by individuals having no affiliation with the organization. The perception by agency personnel of externally-induced goals as being a fitting description of one, many, or all of the CCA's CIO roles could influence how they feel about that goal and how much they attend to it and provide resources for its accomplishment (including funding, political capital, access to decision making forums, supporting staff, office space, allocation of

time, etc.). One could argue that because the CIO roles in the FCPEM are derived from the CCA, that they all are externally mandated goals for the agency organization. On the other hand, if an agency was actively pursuing the same or a very similar goal prior to 1996 when the Act became law, then could one say that this CIO role was primarily a goal "of" the organization. Finally, it should be recognized that the Constitution gives the Congress the power to make binding law, and regardless of whether agencies perceive a legal mandate as being in harmony with existing internal initiatives, they are to implement the law.

Future Challenges for CIOs

I believe that the following four issues are some of the most pressing that CIOs will face in the next five years:

- Full acceptance in the boardroom
- Information assurance
- Resource constraints
- Complexity

Acceptance. CIOs have won the battle for existence, but will continue to fight the battle for acceptance. Information is more highly valued as a strategic asset of the organization than in the past, but its oversight continues to be a battleground of opinion. Also, professional relationships among the very top echelon of executives are often formed and maintained around commonalities of background and experience. With the predominant paths to high corporate

and public office being in areas other than IRM, CIOs may continue to find themselves as outsiders who are allowed to remain within the inner circle only because of the value of the resource they represent.

Information Assurance. CIOs will be told that protecting the integrity and authenticity of information is their core function in the organization. How they do that is up to them. Cyber-security-related issues such as data privacy, protecting e-commerce and e-government transactions, and the use of technologies such as electronic or biometric personal signatures will be at the forefront of this area.

Resource Constraints. As the Information Age continues to mature, CIOs and other top executives in the next few years will continue to run short of time, money, skilled people, and workspace. The demand for more and more capable information systems on a global basis will continue to shrink the communication distance between people, but will increase the call for these key resources.

Complexity. The fourth major challenge, complexity, was discussed earlier in this chapter in terms of being an element of an expanded FCPEM. It is mentioned again mainly to emphasize that a central reality of the CIOs daily work is the requirement to attend to numerous diverse and important issues that are technically complicated and often politically charged. This creates an executive position of both significant power, and significant pressure. In that IT is

indeed becoming a primary vehicle for delivering public services, the success of agency mission accomplishment is increasingly dependent on CIOs. The CIOs ability to provide leadership, vision, and effective management in this critical and complex area of governance is perhaps the key factor in effectively leveraging technology to improve mission performance. How the CIO deals with the many potential sources of disruption to the execution of that vision is perhaps what will most differentiate idealistic leadership from realistic leadership.

In Closing

The goal of this study was to interpret the intent of the CCA with respect to establishing agency CIO positions, and to introduce a method for evaluating the compliance of related agency activity. The study validated the FCPEM evaluation method through case studies in four federal agencies.

In further interpreting research findings, the federal agency CIO position is seen as highly complex, operating at many levels of the agency organization, and suffering from an ongoing lack of agency head support and positional authority. Although all federal agencies named in the CCA have CIO positions, few if any agencies are complying with all of the CCA's mandates for CIO's.

By using this dissertation's FCPEM CIO position evaluation method (perhaps informed by the additional evaluation elements proposed in this final chapter), additional agency case studies can be conducted in a way that will provide a comprehensive assessment of compliance in federal agency CIO position establishment activities.

APPENDIX A
The Clinger Cohen Act of 1996, Section 5125

P.L. 104-106: SEC. 5125. AGENCY CHIEF INFORMATION OFFICER

(a) DESIGNATION OF CHIEF INFORMATION OFFICERS. – Section 3506 of title 44, USC, is amended

(1) in subsection (a)-

(A) in paragraph (2)(A), by striking out "senior official," inserting in lieu thereof "Chief Information Officer";

(B) in paragraph (2)(B)-

(i) by striking out "senior officials" in the first sentence and inserting in lieu thereof "Chief Information Officers";

(ii) by striking out "official" in the second sentence and inserting in lieu thereof "Chief Information Officer"; and

(iii) by striking out "officials" in the second sentence and inserting in lieu thereof "Chief Information Officers; and

(C) in paragraphs (3) and (4), by striking out "senior official" each place it appears and inserting "Chief Information Officer"; and

(2) in subsection (c)(1), by striking out "official" in the matter preceding subparagraph (A) and inserting "Chief Information Officer".

(b) GENERAL RESPONSIBILITIES. The Chief Information Officer of an executive agency shall be responsible for

(1) providing advice and other assistance to the head of the executive agency and other senior management personnel of the executive agency to ensure that information technology is acquired and information resources are managed for the executive agency in a manner that implements the policies and procedures of this division, consistent with chapter 35 of title 44, United States Code, and the priorities established by the head of the executive agency;

(2) developing, maintaining, and facilitating the implementation of a sound and integrated information technology architecture for the executive agency; and

(3) promoting the effective and efficient design and operation of all major information resources management processes for the executive agency, including improvements to work processes of the executive agency.

(c) DUTIES AND QUALIFICATIONS -- The Chief Information Officer of an agency that is listed in section 901(b) of title 31, United States Code, shall –

(1) have information resources management duties as that official's primary duty;

(2) monitor the performance of information technology programs of the agency, evaluate the performance of those programs on the basis of the applicable performance measurements, and advise the head of the agency regarding whether to continue, modify, or terminate a program or project; and

(3) annually, as part of the strategic planning and performance evaluation process required (subject to section 1117 of title 31 United States Code) under section 306 of title 5, United States Code, and sections 1105(a)(29), 1115, 1116, 1117, & 9703 of title 31, USC.

(A) assess the requirements established for agency personnel regarding knowledge and skill in information resources management and the adequacy of such requirements for facilitating the achievement of the performance goals established for information resources management;

(B) assess the extent to which the positions and personnel at the executive level of the agency and the positions and personnel at management level of the agency below the executive level meet those requirements;

(C) in order to rectify any deficiency in meeting those requirements, develop strategies and specific plans for hiring, training, and professional development; and

(D) report to the head of the agency on the progress made in improving information resources management capability.

(d) INFORMATION TECHNOLOGY ARCHITECTURE DEFINED. – In this section, the term "information technology architecture," with respect to an executive agency, means an integrated framework for evolving or maintaining existing information technology and acquiring new information technology to achieve the agency's strategic goals and information resources management goals.

(e) EXECUTIVE LEVEL IV. – Section 5315 of title 5, United States Code, is amended by adding at the end:

"Chief Information Officer, Department of Agriculture.

"Chief Information Officer, Department of Commerce.

"Chief Information Officer, Department of Defense" (* unless the official designated as the CIO of DOD is an official listed

"Chief Information Officer, Department of Education under section 5312, 5313, or 5314 of this title).

"Chief Information Officer, Department of Energy

"Chief Information Officer, Department of Health and Human Services

"Chief Information Officer, Department of Housing and Urban Development.

"Chief Information Officer, Department of Interior.

"Chief Information Officer, Department of Justice.

"Chief Information Officer, Department of Labor.

"Chief Information Officer, Department of State.

"Chief Information Officer, Department of Transportation.

"Chief Information Officer, Department of Treasury.

"Chief Information Officer, Department of Veterans Affairs.

"Chief Information Officer, Agency for International Development.

"Chief Information Officer, Environmental Protection Agency

"Chief Information Officer, Federal Emergency Management Agency.

"Chief Information Officer, General Services Administration

"Chief Information Officer, National Aeronautics and Space Administration.

"Chief Information Officer, National Science Foundation.

"Chief Information Officer, Nuclear Regulatory Agency.

"Chief Information Officer, Office of Personnel Management.

"Chief Information Officer, Small Business Administration."

APPENDIX B

SIGNIFICANCE AND KEY ATTRIBUTES OF AN EFFECTIVE CIO

(From GAO Report AIMD-96-78)

Note: This August 1996 GAO report focused on the structuring and performance of the NASA CIO position in the 1994-1995 timeframe, and comments on the provisions of the then new CCA (referred to as "ITMRA").

Recent reports, official policy guidance, and legislative acts identify CIOs as critical to ensuring agency-wide commitment to and successful implementation of IRM improvement initiatives.

Specifically, our Executive Guide: Improving Mission Performance Through Strategic Information Management and Technology (GAO/AIMD-94-115, May 1994), which was based on case studies of 10 leading organizations, outlines 11 fundamental IRM "best practices," including establishing a CIO and ensuring agency-wide commitment to and involvement in new processes for improved IRM. Our report noted that it is crucial to implement all of the practices as an integrated group. Implementing only some of the practices but not others could leave weaknesses in an organization's IRM activities and hinder the potential for obtaining significant benefits through the application of information resources. Further, the Office of Management and Budget's (OMB) Evaluating Information Technology Investments: A Practical Guide, published in November 1995, provides a systematic approach to managing the risks and returns of IT investments.

Finally, the Information Technology Management Reform Act of 1996 (ITMRA), effective August 8, 1996, requires that each federal department and agency appoint a CIO with responsibility for providing information and advice to senior officials on IRM issues. ITMRA also identifies the operative principles for establishing a supporting management framework to improve the planning and control of information technology investments. In April 1996, OMB issued preliminary guidance to clarify CIO responsibilities under ITMRA. This act amends the Paperwork Reduction Act of 1995, which requires a number of IRM practices to improve the productivity, efficiency, and effectiveness of government operations. Together, the two laws, the OMB guidance, and our Executive Guide identify a number of characteristics that are key to effective management of agency-wide information resources. For example:

(1) An agency should place its CIO at a senior management level, making the CIO an equal partner with other senior officials in decision-making with regard to IRM issues, and supporting the position with an effective organizational framework for leading agency-wide IRM initiatives. Specifically, agencies should:

- Appoint a CIO with expertise and practical experience in information and technology management;

- Position the CIO as a senior management partner reporting directly to the agency head;
- Ensure that the CIO is primarily responsible for IRM activities;
- Task the CIO to serve as a bridge between top management, line management, and information management support professionals;
- Establish a deputy CIO at the agency level and assign other CIOs as necessary in major organizational sub-components to Represent their IRM interests; and
- Develop strategies and specific plans for hiring, training, and professional development of personnel to achieve a highly qualified IRM workforce.

(2) The CIO should be supported with effective management controls, including:

- A sound and integrated information technology architecture to provide a framework for evolving or maintaining existing information technology and for acquiring new information technology to achieve the agency's strategic and IRM goals;
- An inventory of all agency information resources to facilitate management of these resources and support decision-making concerning additional investments;
- Management systems and procedures to ensure, in conjunction with the Chief Financial Officer (CFO), a full and accurate account of information technology resources and related expenses;
- Appropriate IRM policies, guidelines, and standards and a means of ensuring agency-wide compliance with and effective implementation of them; and
- A means of assessing and upgrading the skills of all agency personnel with regard to IRM.

(3) The CIO should be responsible for working with other agency officials to ensure the effective acquisition and management of information resources to support agency programs and missions. This includes:

- Promoting effective agency operations by implementing budget-linked capital planning for information technology

investments to support the agency's strategic plan;

- Actively participating with other agency managers in IT planning, budgeting, and investment decision-making;
- Promoting improvements in agency administrative and mission-related work processes before making significant IT investments;\6
- Developing performance indicators to measure the extent to which information resource investments support agency programs and missions; and
- Monitoring the performance of agency IT programs, evaluating them on the basis of applicable performance measures, and advising the agency head regarding whether to continue, modify, or terminate individual programs or projects.

While the CIO is to play an active role in managing and overseeing IT investments, it is the agency head's responsibility under the Paperwork Reduction Act and ITMRA to establish an agency-wide process and framework within which such IT management and oversight is conducted. In our view, this involves the creation of a high-level forum or board composed of the CIO, the CFO, and senior line managers, with responsibility for selecting, controlling, and evaluating information technology investments against established criteria. Since it is unrealistic to expect that this agency-wide board would review all IT investments across the organization, the agency head should establish criteria or thresholds for designating which investments could be delegated to the sub-component level for approval. The agency may want to consider establishing investment boards within the major sub-components similar to the agency-wide board to further facilitate investment management and decision-making.

\6 Where possible, the agency head is to ensure that agency work process performance is quantitatively benchmarked and analyzed against comparable processes in the public or private sector before revisions or significant IT investments are made.

APPENDIX C

Federal CIO Competency Areas¹³⁴

"The Clinger-Cohen Core Competencies have been endorsed to serve as a baseline to assist government agencies in complying with Section 5125(C)(3) of the CCA."

1.0 Policy and Organizational:

- 1.1 Department/Agency missions, organization, function, policies, and procedures.
- 1.2 Governing laws and regulations (e.g., Clinger-Cohen, GPRA, PRA).
- 1.3 Federal government decision-making, policy making process and budget formulation and execution process.
- 1.4 Linkages and interrelationships among Agency Heads, COO, CIO, and CFO functions.
- 1.5 Intergovernmental programs, policies, and processes.
- 1.6 Privacy and security.
- 1.7 Information management.

2.0 Leadership/Managerial:

- 2.1 Defining roles, skill sets, and responsibilities of Senior IRM Officials, CIO, IRM staff, and stakeholders.
- 2.2 Methods for building federal IT management and technical staff expertise.
- 2.3 Competency testing – standards, certification, and performance assessment.
- 2.4 Partnership/team-building techniques.
- 2.5 Personnel performance management technique.
- 2.6 Practices that attract and retain qualified IT personnel.

3.0 Process/Change Management:

- 3.1 Modeling and simulation tools and methods.
- 3.2 Quality improvement models and methods.
- 3.3 Techniques/models of organizational development and change.
- 3.4 Techniques and models of process management and control.
- 3.5 Business process redesign/reengineering models and methods.

4.0 Information Resources Strategy and Planning:

- 4.1 IT baseline assessment analysis.
- 4.2 Interdepartmental, inter-agency IT functional analysis.
- 4.3 IT planning methodologies.
- 4.4 Contingency planning.

¹³⁴ Source: Federal CIO Council Web Site: (<http://cio.gov>). September 1998

4.5 Monitoring and evaluation methods and techniques.

5.0 IT Performance Assessment: Models and Methods:

5.1 GPRA and IT: measuring the business value of IT.

5.2 Monitoring & measuring new system development: When/how to "pull the plug" on systems.

5.3 Measuring IT success: practical and impractical approaches.

5.4 Processes and tools for creating, administering and analyzing survey questionnaires.

5.5 Techniques for defining and selecting effective performance measures.

5.6 Examples of and criteria for performance evaluation.

5.7 Managing IT reviews and oversight processes.

6.0 Project/Program Management:

6.1 Project scope/requirements management

6.2 Project integration management.

6.3 Project time/cost/performance management.

6.4 Project quality management.

6.5 Project risk management.

6.6 Project procurement management.

7.0 Capital Planning and Investment Assessment:

7.1 Best practices

7.2 Cost benefit, economic, and risk analysis

7.3 Risk management—models and methods

7.4 Weighing benefits of alternative IT investments

7.5 Capital investment analysis – models and methods.

7.6 Business case analysis.

7.7 Integrating performance with mission and budget process.

7.8 Investment review process.

7.9 Intergovernmental, federal, State, and Local projects.

8.0 Acquisition:

8.1 Alternative functional approaches (necessity, government, IT analysis).

8.2 Alternative acquisition models.

8.3 Streamlined acquisition methodologies.

8.4 Post-award IT contract management models and methods, including past performance evaluation.

8.5 IT acquisition best practices

9.0 Technical:

9.1 Information systems architectures client/server, collaborative processing, telecommunications.

9.2 Emerging/developing technologies.

- 9.3 Information Delivery Technology (Internet, Intranet, kiosks, etc.).
- 9.4 Security policy, disaster recovery, and business resumption.
- 9.5 System life cycle approaches.
- 9.6 Software development.
- 9.7 Data management.

10.0 Desk Top Technology Tools

Note 1: No additional information is provided on this competency area by the CIO Council. An interview with Ms. Joyce France who was involved with the creation of this list indicates that this competency area was meant to direct CIO attention to standardizing the "desktop" application environment on the personal computers used in most agencies.

Note 2: In September 2000, this 1998 list was updated by the CIO Council to include two more CIO Competency Areas; IT Security, and E-Government. This change was made after the data collection/key actor interview activities were complete, so the change is not reflected in this research. My opinion is that IT security will operate primarily at the technical level of the organization, while E-Government is a strategic concern that may operate at all three levels, as the aspects of planning through implementation are addressed.

APPENDIX D

CASE STUDY AGENCY - CIO DOCUMENTS

1. Department of Agriculture
 - (a) Organization Chart
 - (b) CIO Designation Directive

2. Environmental Protection Agency
 - (a) Organization Chart
 - (b) CIO Designation Directive

3. Federal Emergency Management Agency
 - (a) Organization Chart
 - (b) CIO Designation Directive

4. Department of the Treasury
 - (a) Organization Chart
 - (b) CIO Designation Directive

Department of Agriculture - CIO Documents

(1) Organization Chart

(2) CIO Designation Directive

Environmental Protection Agency - CIO Documents

- (1) Organization Chart
- (2) CIO Designation Directive

Federal Emergency Management Agency - CIO Documents

(1) Organization Chart

(2) CIO Designation Directive

Department of the Treasury - CIO Documents

(1) Organization Chart

(2) CIO Designation Directive

APPENDIX E
KEY ACTOR INTERVIEW GUIDE

Ph.D. Dissertation Research Interview Outline

on
Evaluating the Implementation of Federal Agency
Chief Information Officer Positions

Thank you for taking the time to participate in my doctoral dissertation research interviews. The interview should take 25-30 minutes and is intended to validate models for the federal agency CIO position and its roles. This research uses the 1996 CCA (formerly "ITMRA") as the legislative source for what roles and responsibilities a CIO should be assigned in the agency. It also uses the Federal CIO Council's "Competencies" list in the model for the CIO position.

Your participation is important to the success of my doctoral dissertation research and I would like to thank you again for supporting me.

Sincerely,
Scott A. Bernard
Doctoral Candidate
Center for Public Administration and Policy
Virginia Polytechnic Institute and State University

Interview Outline

(Interview time frame 25-30 minutes)

Pre-Interview Information:

Position title, years in position, place in organization chart, CIO implementation policy memo.

Part 1. Key Actor Involvement in the CIO Establishment Process:

a. How was the CIO position established in your agency? _____

b. Did you have a role in establishing the CIO position? ___ Yes ___ No

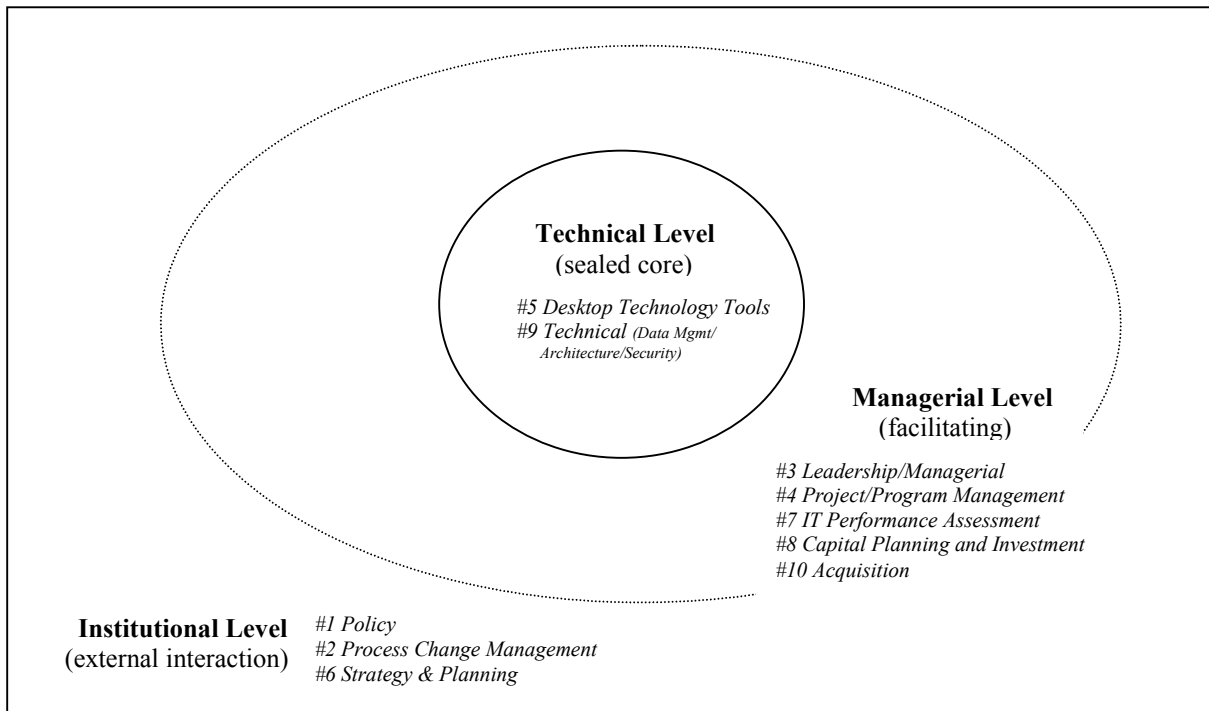
c. If so, what was that role? _____

Part 2. CIO Position Model.

Federal CIO Position Model

10 CIO Competency Areas (Source; Federal CIO Council)

Operating at 3 Organizational Levels (Source; Thompson, 1967)



Federal CIO Position Model (cont.)

Technical Level. A sub-organization whose "problems" are focused around effective performance of the technical function... the primary exigencies are those imposed by the nature of the technical task.

Example Core Processes: 5-Desktop Technology Tools
9-Technical/Data Mgmt/Security/Architecture

Managerial Level. Services the technical sub-organization by mediating with those who use its products, and procuring the resources necessary to carry out its functions.

Example Core Processes: 3-Leadership/Managerial
4-Project/Program Management
7-IT Performance Assessment: Models & Methods
8-Capital Planning and Investment Assessment
10-Acquisition

Institutional Level. A wider social system which is the source of the meaning, legitimization, or higher-level support which makes the implementation of the organization's goals possible.

Example Core Processes: 1-Policy
2-Process Change Management
6-Information Resources Strategy & Planning

- a. Please rate the importance you would give to each of the following CIO competency areas:
(Place an "X" in one box for each area)

CIO Competency Area	Very Important	Somewhat Important	Not Important
Policy			
Process/Change Management			
Leadership/Managerial			
Project/Program Management			
Desktop Technology Tools			
Information Resources Strategy & Planning			
IT Performance Assessment: Models & Methods			
Capital Planning & Investment Assessment			
Technical (Data Mgmt/Security/Architecture)			
Acquisition			

* Competencies source: Federal CIO Council, 1999.

- b. Please relate the CIO Competency Areas to a "level" of your agency, as defined below:
(Place an "X" in one "level" box for each competency area)

CIO Competency Area	Technical Level	Managerial Level	Institutional Level
Policy			
Process/Change Management			
Leadership/Managerial			
Project/Program Management			
Desktop Technology Tools			
Information Resources Strategy & Planning			
IT Performance Assessment: Models & Methods			
Capital Planning & Investment Assessment			
Technical (Data Mgmt/Security/Architecture)			
Acquisition			

* Organizational Model source: James Thompson, *Organizations in Action*, 1967.

Part 3. Federal CIO Roles.

Federal CIO Roles Model

1. Serve with the title of Chief Information Officer.
 2. Serve and be compensated at Level IV of the Civil Service (SES).
 3. Advise the Agency Head on IT acquisition and management.
 4. Develop and maintain an integrated IT architecture.
 5. Promote effective IRM processes.
 6. Have IRM as the CIO's principal duty.
 7. Monitor and advise the Agency Head on performance of IT programs.
 8. Submit an annual IT Strategic Plan to OMB.
 9. Assess IT personnel requirements and attainment thereof.
 10. Rectify deficiencies in IT training and professional development.
 11. Report IRM capability improvements to the Agency Head.
 12. Report directly to the Agency Head.
- Source: CCA, Section 5125

a. Do you agree or disagree with the proposed CIO role evaluation metrics/sources?
 (Place an "x" in either the Agree or the Disagree Box)

	Clinger-Cohen Mandate	Proposed Evaluation Measure	Source	Agree	Disagree
1	Replace Agency Senior Official Title w/ CIO	Agency has established a CIO position	OMB Memo 96-20, EO 13011		
2	Pay CIO at Level IV	CIO is a Level IV for pay	Title 44 USC Sec 5315		
3	Advise Agency Head on IT acquisition/mgmt IAW PRA '95	CIO involvement in IT capital planning (I-TIPS portfolio/ A-11 process)	PRA '95, GPRA, OMB A-11, M 96-02, FARA		
4	Develops/maintains an integrated IT architecture	Has published an enterprise information architecture.	CIO Council's FEAF, OMB M97-16 "& M96-02, A-130		
5	Promote effective IRM processes	5% annual increase in agency ops due to increased IRM effectiveness ('96-'01)	GPRA, PRA '95		
6	IRM is principle duty	Evaluate impact of any other duties (i.e., CIO is also CFO, or DAS M &A)	Agency policy and position description		
7	Monitor/advise on performance of IT programs	CIO involvement in IT oversight (i.e., TRB Chairman, I-TIPS S/E/C)	ITMRA Section 5125, CIO Council, OMB, GPRA, PRA '95		
8	Submit annual IT Strategic Plan	Submission of annual plan to OMB	OMB A-11, Part II		
9	Assess IT personnel requirements & attainment	5% decrease in overall annual IT program costs ('96-'01)	EO 13111, Federal CIO Council		
10	Rectify deficiencies; training & professional development	No. of deficiencies corrected.	Agency training goals, CIO Council, EO 13111		
11	Report IRM capability improvement to agency head	5% target annual increase in agency operations	GPRA, PRA '95		
12	CIO reports directly to agency head	% of CIO's that report directly to agency head	PRA '95, OMB M96-20		

b. Of these CIO roles and responsibilities, are there any that should not be there? _____

c. Are there others that should be there? _____

d. Please indicate the degree of complexity for each mandate (*High, Medium or Low*).
(Place a H, M, or L in the box)

e. Please indicate whether each mandate is a “*goal for*” or “*goal of*” the organization.
(Goals “*for*” an organization are *externally induced*. Goals “*of*” an organization are *internally developed*).
(Place a “F” or “O” in the box)

	Clinger-Cohen Section 5125 Mandate	Proposed Evaluation Measure	Additional Guidance/ Mandate Sources	Complexity (H/M/L)	Goal Objective (for /of)
1	Replace Agency Senior Official Title w/ CIO	Agency has established a CIO position	OMB Memo 96-20, EO 13011		
2	Pay CIO at Level IV	CIO is a Level IV for pay	Title 44 USC Sec 5315		
3	Advise Agency Head on IT acquisition and management	CIO involvement in IT capital planning (I-TIPS portfolio/ A-11 process)	PRA '95, GPRA, OMB A-11, M 96-02, FARA		
4	Develops/maintains an integrated IT architecture	Has published an enterprise information architecture.	CIO Council's FEAF, OMB M97-16 "& M96-02, A-130		
5	Promote effective IRM processes	5% annual increase in agency ops due to increased IRM effectiveness ('96-'01)	GPRA, PRA '95		
6	IRM is principle duty	Evaluate impact of any other duties (i.e., CIO is also CFO, or DAS M &A)	Agency policy and position description		
7	Monitor/advise on performance of IT programs	CIO involvement in IT oversight (i.e. TRB Chairman, I-TIPS S/E/C)	ITMRA Section 5125, CIO Council, OMB, GPRA, PRA '95		
8	Submit annual IT Strategic Plan	Submission of annual plan to OMB	OMB A-11, Part II		
9	Assess IT personnel requirements & attainment	5% decrease in overall annual IT program costs ('96-'01)	EO 13111, Federal CIO Council		
10	Rectify deficiencies; training & professional development	No. of deficiencies corrected.	Agency training goals, CIO Council, EO 13111		
11	Report IRM capability improvement to agency head	5% target annual increase in agency operations	GPRA, PRA '95		
12	CIO reports directly to agency head	% of CIO's that report directly to agency head	PRA '95, OMB M96-20		

Part 4. Other Items:

a. Are there any other items relative to CIO position establishment, roles, and responsibilities that you would like to comment on? _____

Thank you for participating in this interview.

APPENDIX F

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