MANAGING INFORMATION TECHNOLOGY IN THE FEDERAL GOVERNMENT:

NEW POLICIES FOR AN INFORMATION AGE

by

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(ABSTRACT)

The federal government relies extensively on information technology to perform its basic missions. This study is a formative program evaluation of the Office of Management and Budget's (OMB) primary policy for overseeing federal agency management of information technology. The goal of the research is to assess the effectiveness of OMB Circular No. A-130, "Management of Federal Information Resources," in shaping federal agency management of information technology.

As part of this evaluation, it was necessary to illuminate and interpret the policy framework used in the federal government for managing information technology. The results of this analysis show that the public laws shaping the policy framework include fundamentally different criteria for how federal agencies should evaluate investments in information technology. OMB's policy mirrors this lack of clarity and more generally reflects outdated views of information technology management techniques.

This policy framework provided a basis for judging

federal agencies' interpretation of OMB's policy as of September 1991. An analysis of 21 agencies' policies for managing information technology revealed an inconsistent adoption of the substantive requirements contained in the policy framework. The analysis of agencies' policies revealed four groupings that distinguished the differing degrees of consistency with the policy framework.

Based on the degree of consistency between agencies' policies and the policy framework, the analysis examined elements of the decision-making environments in four federal agencies. A comparison of these case study results showed that the effectiveness of OMB's policy for managing information technology depended on several variables, which include: (1) the consistency between agencies' policies and the policy framework, (2) whether and how information technology policy was enforced, (3) the role of oversight groups internal and external to the agency, and (4) the culture of the agency and agreement around core missions.

This evaluation research found OMB's policy for overseeing federal management of information technology outdated and incomplete. These weaknesses resulted in inconsistent application and enforcement of the OMB policy and the policy framework in the four agency cases examined. The study presents recommendations for how OMB can improve content and enforcement of its policy for overseeing federal agency management of information technology.

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I doubt I will ever work as a public servant in such a challenging and rewarding environment as the Office of Management and Budget (OMB). The people that make up this institution continue to challenge me personally and professionally. I had no choice but to grow as a person, a practitioner, and a scholar. Thanks to my supervisors at OMB who allowed me the time and energy I needed to complete my Ph.D. while working full time: Jack Donahue, Dave Muzio, Susan Jacobs, and Rich Kuzmack.

DEDICATION

I dedicate this work to three people who have profoundly influenced the production of this dissertation. To my mother, who taught me that education is a lifelong pursuit, whether you are a teacher or a student. To my friend Tim Paul Martin, whose memory helped me to complete my degree since he could not complete his. To my colleague Fred Fisher, who taught me the true meaning of neutral competence at OMB--not through his words, but by his actions.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

ADP	automatic data processing
ADPE	automatic data processing equipment
AIS	automated information system
APR	agency procurement request
APS	Automated Patent System
ASCS	Agricultural Stabilization and Conservation Service
ASD	assistant secretary of defense
BSP	Business Systems Planning
C^3I	command, control, communications, and intelligence
CCC	Commodities Credit Corporation
CHAMPUS	Civilian Health and Medical Program of the Uniformed Services
CIM	corporate information management
CHCS	Composite Health Care System
CPU	central processing unit
CSA	Computer Security Act of 1987
DASD	deputy assistant secretary of defense
DDI	director of defense information
DHCP	Decentralized Hospital Computer Program
DOD	Department of Defense
DPA	delegation of procurement authority

DSO	designated senior official
ELG	executive level group
FAR	Federal Acquisition Regulation
FEDSIM	Federal Systems Integration and Management Center
FIP	federal information processing
FIPS	Federal Information Processing Standard
FIRMR	Federal Information Resources Management Regulation
FY	fiscal year
GAO	General Accounting Office
GSA	General Services Administration
HUD	Housing and Urban Development
IMTEC	Information Management and Technology Division
IBM	International Business Machines, Inc.
IQA	information quality analysis
IR	information resources
IRM	information resources management
IRMS	Information Resources Management Service
IRS	Internal Revenue Service
ISP	information systems planning
LCM	life cycle management
MAISRC	Major Automated Information Systems Review Council
MIS	management information system
NAPA	National Academy of Public Administration
NIST	National Institutes of Standards and Technology

NOAA	National Oceanic and Atmospheric Administration
OIRA	Office of Information and Regulatory Affairs
OIRM	Office of Information Resources Management
OMB	Office of Management and Budget
OPBA	Office of Program and Budget Analysis
OSD	Office of the Secretary of Defense
OTA	Office of Technology Assessment
PCIMS	processed commodity inventory management system
PTO	Patent and Trademark Office
PMIS	public management information systems
PPBS	planning programming budgeting system
PPS	Presidential Priority System
PRA	Paperwork Reduction Act
SSA	Social Security Administration
TRIMIS	Tri-Medical Information System
URBIS	Urban Information Systems

CHAPTER 1 - THE PROBLEM AND ITS SETTING

> Information technology systems are the lifeblood of the
> Federal Government, sustaining vital functions such as
> tax collection, aid to our elderly and disadvantaged
> citizens, and national defense.[1]

Despite the growing reliance on information

technology,[2] federal agencies have experienced mixed results

trying to manage these resources. The importance of

information technology to public service delivery makes

managing information technology crucial to the federal

government. While federal agency efforts to manage

information technology generally work, the adverse publicity

surrounding problematic information technology projects is

prevalent enough to warrant concern. The General Accounting

Office (GAO) has examined many federal information systems

projects and concluded that "attempts to modernize the

government's information systems have produced few successes

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[1]General Accounting Office, <u>Meeting the Government's
Technology Challenge</u>, IMTEC-90-23 (Washington, D.C.: General
Accounting Office, 1990), 4.

[2]This research uses the term information technology to
include such terms as information systems, automated data
processing (ADP) systems, telecommunication systems, and
automated information systems.

and many costly failures."[3] Some press accounts assert that

federal agencies do not manage information technology

effectively.[4] The issue of information technology

management has become so prevalent that at least one

management consulting firm now markets its expertise in

detecting and preventing what it calls "Runaway Systems."[5]

Some organizations in the legislative branch also

believe that federal agencies are doing an inadequate job

managing information technology. A House Committee on

Government Operations report identified the problem this

way:

> The Committee remains concerned about the large Federal
> automatic data processing (ADP) systems being procured
> and developed that are experiencing hundreds of
> millions of dollars in cost overruns, years of schedule
> slippages, and few benefits to show following years of
> efforts.[6]

This assessment led the committee to place several

provisions in a bill to reauthorize appropriations for the

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[3]General Accounting Office, Meeting the Government's
Technology Challenge, 4.

[4]Gary H. Anthes, "A Federal Case: Why Uncle Sam Can't
Compute," ComputerWorld 18 May 1992, 1.

[5]KPMG Peat Marwick, "Early Warning System for the
Detection and Prevention of Runaway Systems" promotional
materials, 1989, Dallas, Tex.

[6]House Committee on Government Operations, Paperwork
Reduction and Federal Information Resources Management Act
of 1990: Report Together with Additional Views 101st Cong.,
2d sess., 1990, H. Rept. 3965, 36.

Office of Information and Regulatory Affairs (OIRA), the office in the Office of Management and Budget (OMB) responsible for information technology policy making, which would have proscribed OMB's policy making for information technology very specifically compared to current law. Although the bill did not become law, one provision would have required OMB to supplement its existing policy guidance by issuing a set of criteria for evaluating information technology investments.[7]

GAO has reported at length on the problem of federal agency management of information technology as well. In 1992, in response to a request by the same House committee, GAO compiled a summary listing 132 reports issued by the GAO's Information Management and Technology (IMTEC) Division between October 1, 1988, and May 31, 1991. This summary report cited deficiencies in the agency management of information resources that ran along ten major themes. Six of the ten themes identified by GAO dealt specifically with issues concerning the management of information technology, such as cost overruns, schedule delays, lack of information technology interoperability, and inadequate planning.[8]

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[7]Ibid.

[8]General Accounting Office, <u>Summary of Federal Agencies' Information Resources Management Problems</u>, GAO/IMTEC-92-13FS (Washington, D.C.: Government Printing Office, 1992), 1.

Within the executive branch, officials responsible for carrying out OMB's policies question their relevance and effectiveness. The General Services Administration (GSA) and OMB convened six study groups made up of agency information resources management (IRM) officials to examine federal information technology issues for the mid-1990s. Within the federal IRM community this gathering, and the resultant papers is referred to as the "In the Woods" conference. One "In the Woods" group produced recommendations under the heading of "Rethinking the Strategic Planning Process." This group stated the problem this way:

> It [the working group] found the existing Federal planning processes do not contribute materially to the management needs identified because (1) the existing Federal processes were developed to support primarily regulatory needs, and (2) the information resulting from these regulatory processes was incomplete and understated the value of Federal information resources in meeting the mission needs of the Government as a whole.[9]

Most of the findings of this group, based on the problem statement above, recommended that OMB revise its policy document governing agency management of information technology.

While the disparate members of the federal IRM

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[9]General Services Administration, _Preliminary Report of the Working Group to Rethink Strategic Planning_ (Washington, D.C.: General Services Administration, 1990), i.

community have coincidentally arrived at the conclusion that more comprehensive governmentwide policy making could lead to better agency action, it is not clear that public administration has many solutions to offer. The list of inadequacies in agency management of these resources seems to lend them to examination by the academic community. These management inadequacies include budgeting, planning, and evaluation for information technology projects. Yet, despite the large body of academic and practitioner work in these management competencies, public administration journals publish very little research on how to apply these skills to the management of information technology.

What research and writing does exist on the management of information technology, and in particular the evaluation of information technology investments, treats the subject broadly, and without reference to specific applications in the public sector. Two public administration scholars describe the state of research and practice like this:

> Commonly, the use of information systems seems indispensable for public program success in service delivery, oversight, policy formulation, and accountability functions. The knowledge and skills for effective evaluation of these crucial information systems are not nearly as pervasive as the systems or

the range of users.[10]

As the review of the literature will show, the existing
public administration research examines the impact of
information technology on state and local governments, with
very little work devoted to the federal government.

Growing interest in federal agencies' management of
information technology has prompted an examination of
possible causes for problems managing information
technology. The observations of members of both the
executive and legislative branches suggest they believe the
problems result from ineffective OMB policies created for
managing information technology. As this research will
explore, though, it remains an open question whether the
problem results from ineffective OMB policy or the
ineffectual application of that policy.

Significance of the Problem and Justification for Study

This perceived lack of effectiveness of OMB policy to
guide the management of agency information technology has
significant implications for the administration of federal
programs. The $22.1 billion the federal government
obligated for information technology in Fiscal Year (FY)

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[10]Kathryn E. Newcomer and Sharon L. Caudle, "Evaluating
Public Sector Information Systems: More Than Meets the Eye,"
Public Administration Review 51 (September/October 1991):
377.

1991 accounted for 4.9 percent of the federal operating budget. Since FY 1982 this proportion has grown steadily as real growth in information technology spending has increased and growth in the federal operating budget has not.[11] Without the successful management of information technology, many federal program delivery and administrative processes would not function. Several examples illustrate this point.

GAO attributed much of the publicized mismanagement at the Department of Housing and Urban Development (HUD) to inadequate financial information systems. The lack of effective information systems not only impeded program delivery, but also, GAO concluded, fostered an environment of program management susceptible to fraud.[12]

A report prepared by a panel of the National Academy of Sciences underscored how much the Social Security Administration (SSA) relies on information technology to process client's applications to the social security system. The panel's report pointed out that SSA would be unable to bring new applicants into the social security system if the automated system failed. SSA employees have become so

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[11]Office of Management and Budget, Information Resources Management Plan of the Federal Government (Washington, D.C.: Government Printing Office, 1992), I-4.

[12]General Accounting Office, HUD Reforms: Progress Made Since the HUD Scandal but Much Work Remains, GAO/RCED 92-46 (Washington, D.C.: Government Printing Office, 1992).

dependent on the automated system for completing and processing applications that they probably could not return to manual processing if some disaster disabled SSA's central computing facility that runs the applications processing program.[13]

Similarly, the Internal Revenue Service's (IRS) processing of citizens' tax returns is also critically dependent on information technology. In a well-publicized incident of federal information systems failure, IRS's Philadelphia Service Center could not process taxpayers' returns due to a software failure on the new mainframes that IRS had just installed. For legal purposes, IRS does not record the receipt of taxpayers' returns until automated processing is complete at one of ten service centers and then on the mainframe computers at IRS's Martinsburg Computing Center in West Virginia. Because of this breakdown of the information systems that process returns in Philadelphia, many taxpayers had to wait twice as long as usual to receive their tax refunds in 1986 because their returns had not been processed and "recorded" by IRS's

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[13]Board of Telecommunications and Computer Applications, National Research Council, <u>Systems Modernization and the Strategic Plan of the Social Security Administration</u> (Washington, D.C.: National Academy of Sciences, 1990).

definition.[14] As a result of mismanaging information
technology, IRS failed to fulfill one of its key mission
goals, which is to provide timely refunds of overpaid taxes
to taxpayers.

Purpose of the Study

This research addresses whether these well-documented
problems managing federal information technology result from
a lack of an effective OMB policy for managing information
technology in the federal government, an ineffectual use of
the available policy or a combination of these factors.
These problems stem, in part, from a lack of an effective
policy so this research explores its particular
shortcomings. Additionally, these problems result from a
lack of use of the existing policy so research examines what
factors impede the application and enforcement of the
policy.

This study is a program evaluation of OMB's policy
for overseeing federal agencies' management of information
technology. To test the connection between OMB and agency
action, this research examines the intervening control
mechanisms--agency policy and its enforcement. Although the
ultimate judgment of the efficacy of the OMB policy may be

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[14]General Accounting Office, <u>Computer Support for Tax
Processing Needs Require Continuing IRS Attention</u>, IMTEC 87-
1 (Washington, D.C.: Government Printing Office, 1987).

based on project outcomes, the analysis explores, as a first step, how agencies interpret OMB policy guidance for their own uses.

This dissertation research serves both the academic and the practitioner communities. For academics, the research broadens the existing research base on federal IRM policy--in particular the management of information technology. Public administration as an academic field has organized its teaching and research around the management of significant resources in the public sector. For human resources, we study personnel, organizational behavior, and leadership theories. Budgeting and financial management theories address the management of financial resources, including spending and collecting funds. Until recently, though, public administration theory has not devoted much energy to examining the management of information technology as a management competency in the field.[15]

For federal public administrators, this research project supplements existing policy prepared by the central management agencies for information technology (e.g., OMB, GSA, and the National Institutes of Standards and Technology (NIST) of the Department of Commerce). Typically, revising

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[15]Kenneth L. Kraemer and Alana Northtrop, "Curriculum Recommendations for Public Management Education in Computing: An Update," Public Administration Review 49 (September/October 1989): 447-453.

such policies takes significant amounts of time and may not keep pace with developments in either theory or practice. In particular, this research provides ideas for revising and improving OMB Circular No. A-130 (from now on called Circular A-130), which is supposed to contain OMB's policy for overseeing federal agency management of information technology.[16]

Research Tradition

From the outset, the intent of the author was to conduct an applied research project. The goal of the research is to examine a problem that has relevance for the management of federal resources. As an empirical piece of work in which the researcher observes the workings of organizations, this research effort follows a tradition that focuses on organizations as a whole and how they adapt to the environment in which they exist. This tradition includes the work of Robert Merton, Phillip Selznick, Alvin Gouldner, and Peter Blau. An often-cited example of this tradition is Selznick's case study, TVA and the Grass Roots.[17]

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[16]Office of Management and Budget, "Management of Federal Information Resources," OMB Circular No. A-130 (Washington, D.C.: Office of Management and Budget, 1985).

[17]Phillip Selznick, TVA and the Grass Roots (Berkeley and Los Angeles: University of California Press, 1949; repr., New York: Harper and Row, 1985).

This research follows in this tradition in that it examines organization processes in the larger context of the organization's environment. That is, the research is not about the processes of managing information technology, but about examining how agencies employ these processes in response to a policy framework created by public law and OMB policy. This research assumes that agencies and the staff in those agencies act based on prescripts laid down in law and regulation. Therefore, their environment shapes their action. The key to understanding this research tradition, though, is to recognize the uniqueness of organizations and how they relate to that larger environment--and how case study analysis captures and explicates that relationship.[18]

The author's assumptions about the nature of the social sciences reflect an objectivist view of public administration. This research assumes the ontological stance that reality is external to the individual.[19] That is to say, social observers can step back from the objects under study, including organizations, and observe behavior and action objectively. In this case, the reality is the effectiveness of the OMB policy observed through agency

[18]Charles Perrow, <u>Complex Organizations: A Critical Essay</u>, 3d ed., (New York: Random House, 1986), 157-177.

[19]Gibson Burrell and Gareth Morgan, <u>Sociological Paradigms and Organisational Analysis</u> (Exeter, N.H.: Heinemann Educational Books, 1979), 1.

interpretation and application.

This research project assumes that it is possible to observe organizational behavior with the goal of identifying underlying patterns and differences. Thus, the research embraces the positivist tradition of epistemology, in which it is possible to accumulate knowledge gradually through testing of hypotheses.[20] The research compares the results of case studies, which test research questions, to add to our understanding of how agencies carry out a particular type of policy.

The logical extension of these core assumptions leads the researcher to a particular type of research methodology. The objectivist view assumes that research depends on "systematic protocol and technique."[21] As opposed to being a constituent part of a group of subjects under analysis, this research assumes a certain distance between the researcher and the subject of inquiry. As a result, the researcher collects data through a questionnaire, data calls, and standardized interview scripts.

Organizational Orientation

This research was undertaken in the Washington, D.C., area, which houses the federal organizations that guide

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[20]Ibid., 5.

[21]Ibid., 6.

agencywide efforts to manage information technology. During
the research, the author worked at OMB. More specifically,
he worked in the Information Technology Management Branch of
OIRA. OIRA exercises OMB's responsibilities under the
Paperwork Reduction Act (PRA) and the Brooks Act to set
policy to oversee federal agency management of agency
information resources, including information technology.
From a position within OIRA, with responsibilities for
examining agency budget requests for information technology,
the researcher had access to both relevant data and
"players" in the study area. This analysis of agency budget
proposals included an examination of agency compliance with
OMB policies for managing information technology. This
research effort, therefore, reflects the author's experience
as a practitioner engaged in research as a participant-
observer.

The original impetus for the project was the stated
desire of OMB to revise all facets of Circular A-130.[22] A
major policy section of the circular involves the management
of information technology. This research supports the
formulation of OMB's revision of that portion of the
circular.

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[22]Office of Management and Budget, "Proposed Revisions
of OMB Circular No. A-130," Federal Register (29 April 1992)
vol. 57, no. 83, p 18296-18305.

Limits of the Study

As a prelude to the presentation of the main body of the research, this brief section outlines the limits of the study. The purpose is not to offer disclaimers at the outset, but more to advise the unsuspecting reader on what to expect and what not to expect. To date, as the review of the literature establishes, there is no research that addresses the management of information technology by federal agencies. Therefore, any study written at this point in the development of the literature should be considered exploratory.

Because of the lack of research and literature in this area, the author chose agencies selectively for inclusion in the analysis. This study deals only with those executive branch agencies that have significant information technology management programs. As a result, it is not appropriate to generalize the results of this study to all federal agencies. Additionally, the analysis excludes the legislative and judicial branches since neither public law nor OMB policy governs the management of information technology in these organizations. The analysis also uses the level of spending on information technology as a proxy for impact, an approach that one could argue is misguided. While it may be possible that agencies that obligate fewer dollars for these resources have significant information

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technology programs, budget size is the most readily available proxy at this time.

Readers should not assume that it is possible to generalize from this research across the universe of agencies considered. The goal of the research is to evaluate policy by illuminating patterns or consistency of implementation and enforcement through cross-case comparison. No attempt was made to choose subjects based on a random sample of projects or agencies. The author felt such a design would be premature given the lack of development in the literature to date.

This research does not purport to be longitudinal or to address the evolution of federal agencies' capacity to manage information technology over time. The research presents a picture of agency management capacity during a span of several years at most. While the decision to invest in a particular information technology project may span several weeks and months, the unit of analysis is the agency application of policy for one decision or set of decisions. As a result, this research does not address agency management capacity other than for the decision(s) under investigation.

CHAPTER 2 - REVIEW OF THE LITERATURE

The review of the literature consists of several
sections that bring focus to the research and writings that
precede this study. Specifically, this review explains how
this research builds on or departs from past research on the
management of information technology in the federal
government. Unlike the literature on other management
topics in public administration, the literature covering the
management of information technology lacks breadth and
maturity. The following quotation summarizes the state of
the literature as of 1990.

> Much of the literature still presents heresay,
> speculation, opinions, or evidence gathered by parties
> with vested political interests. Unfortunately,
> carefully conducted theoretical and empirical research
> studies are still scarce, and even those works are
> frequently plagued by incomplete, conflicting and
> counter intuitive results.[23]

Like public administration in general, this area of
management competency draws on several different
disciplines. Those disciplines that contribute to an

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[23]Ron Weber, "Computer Technology and Jobs: An Impact
Assessment and Model," Communications of the ACM 31 (January
1988): 68, quoted in Alana Northrop et al., "Payoffs from
Computerization: Lessons Over Time," Public Administration
Review 50 (September/October 1990): 505.

understanding of the management of information technology in
the federal government include business administration,
state and local government management, information sciences,
and federal public administration. This review of the
literature does not include a discussion of the pertinent
public law or OMB policy. The next chapter reviews and
analyzes these items to create a policy framework for
managing information technology in the federal government.

Instead of organizing the literature primarily by
discipline, this review proceeds in an order that reflects
the maturation of both information technology and the
attendant management philosophy over the last thirty years.
The organization for this review of the literature adapts a
chronology of maturation of theory and practice of what
Marchand describes as information management. Marchand
identified four stages of evolution for information
management, which includes the management of information
technology, beginning with a stage describing information
management practices before the use of information
technology beginning at the turn of the 20th century.[24]

This review of the literature adapts his model as an
organizing principle in several ways. First, since this

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[24]Donald A. Marchand, "Information Management:
Strategies and Tools in Transition," Information Management
Review 1 (Summer 1985): 27-34.

research deals with the management of information technology, the review does not include his Stage 1, which addresses the physical control of information before automation from the 1990s to the 1950s. Second, Marchand discusses the evolution of information management in terms of five distinguishing characteristics: (1) precipitating forces, (2) strategic objective, (3) basic technologies, (4) management approaches, and (5) organizational status. This review of the literature stresses how management approaches to and strategic objectives for information technology have evolved, placing little emphasis on the other three characteristics. Third, since Marchand covers information management, which is broader than information technology management, the names for the stages are not his.[25] Finally, the stages used to organize this review of literature reflect the stage of development of the literature, regardless of the date of its publication. In contrast, Marchand's stages are demarcated by time periods, assuming that all activity within a specified period of time conform to the same stage of development in management philosophy and practice.

Stage 1 - Management Information Systems

This stage, which Marchand labels "Management of

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[25]Ibid.

Automated Technology," spans the 1960s through the mid-1970s. At that time, people often used the term management information systems (MIS) to describe information technology. As this first section of the literature review shows, the management of technology dominated this era at the expense of management of information. Because the management of the technology was limited to the data center, there was little concern for relating those resources to other facets of management in organizations.

The management approaches for information technology in this era reflect the isolation of the information technology professional from broader functional and executive oversight. Organizations used information technology to automate back-room operations, with the primary goal being to improve the efficiency of clerical activities.[26] Management was internal to the data processing function and related to managing the development of applications and systems. Typically, these systems consisted of applications run by data processing professionals in centralized processing facilities that consisted of mainframe computers. Users had few direct contacts with these systems other than to fill out punch

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[26]Shoshana Zuboff, In the Age of the Smart Machine: The Future of Work and Power (New York: Basic Books, 1988), 133-124.

cards, perform manual key entry, and receive printouts from the data processing department. As a result, line functions in the organization rarely controlled their own computing resources.[27]

The early MIS literature dealt almost exclusively with private-sector applications. It was not until much later that public administration adapted MIS theory to public-sector theory and practice. In a special edition of Public Administration Review, Bozeman and Bretschneider articulated a case for a separate body of literature to address the unique information needs of public organizations. They proposed that this body of theory and practice fall under the heading of public management information systems (PMIS).

To support this argument, they asserted that MIS literature ignored variables external to the organization, such as the political environment and the annual appropriation process. The political control of public organizations, which entail uncertain and variable goals, means that public- and private-sector methods for

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[27]Russell Ackoff, "Management Misinformation Systems," Management Science 14 (1967): B147-156.

establishing performance indicators differ dramatically.[28]
Though private and public organizations can acquire the same
brands of hardware and software, different organizational
environments require unique system design techniques.
Though this notion of PMIS brought attention to the use of
information technology in the public sector, it had limited
applicability. Instead of viewing information technology as
a strategic resource for public sector organizations, this
perspective examined the development of one application at a
time.

Some public administration research on information
technology has examined the availability of information
technology at the state and local government levels. For
instance, the International City Management Association
(ICMA) surveyed local and county governments' use of
computers several times.[29] Kenneth Kraemer and his
associates at the University of California have published
several works resulting from the Urban Information Systems
(URBIS) research project. These initial efforts addressed
the use of information technology in local governments,

[28]Barry Bozeman and Stuart Bretschneider, "Public
Management Information Systems: Theory and Prescription,"
Public Administration Review 46 (Special Issue 1986): 475-
487.

[29]International City Management Association Local
Government Yearbook: 1986 (Washington, D.C.: International
City Management Association, 1986).

placing much less emphasis on the management of those resources or their strategic importance.[30]

In addition, some theoretical work in evaluating information systems has surfaced. Newcomer and Caudle provide some insights into how and why the evaluation of information systems in the public sector should go beyond mere return-on-investment criteria. In particular, they lay out a framework for evaluation that includes qualitative and quantitative measures and recognizes the multiple uses of most public information systems. Although this framework does not help agency decision makers choose between competing projects, it nonetheless broadens the theoretical base for evaluating individual systems projects.[31]

At least one text addresses the management of information technology in the public sector. Stevens and McGowan's work, Information Systems and Public Management, presents an overview of information systems management for public administrators from the local to the federal level. The book adapts contingency-based organization theory to explain how public organizations must process information effectively to respond to their environment. For the most

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[30]Kenneth L. Kraemer et al., Managing Information Systems: Change and Control in Organizational Computing (San Francisco: Jossey-Bass, 1989), 254-256.

[31]Newcomer and Caudle, "Evaluating Public Sector Information Systems."

part, the book focuses on managing single applications, making illustrative points through the discussion of three case studies at the end. Although it does cover a variety of topics, including management, policy, and technology, it does not provide an organizationwide or strategic view of managing information technology.[32]

Since the early 1980s, OMB has used its annual five-year plan to publish analyses and views of federal agencies' efforts to manage information technology. These analyses reflect an oversight perspective on what agencies should be doing to comply with OMB and GSA policy.[33] Therefore, OMB does not ground these publications in academic literature or theory.

Several years after the passage of the Paperwork Reduction Act (PRA), Congress's Office of Technology Assessment (OTA) published a report that included a chapter attempting to assess the status of information technology management in the federal government. Through a network of contractors, OTA collected data on the use of information

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[32]John M. Stevens and Robert P. McGowan, Information Systems and Public Management (New York: Praeger Publishing, 1985).

[33]See Office of Management and Budget, A Five-Year Plan for Meeting the Automatic Data Processing and Telecommunications Needs of the Federal Government Vol. 1: Planning Strategies (Washington, D.C.: Government Printing Office, 1984).

technology in thirteen cabinet departments and twenty

independent agencies. Using these data, OTA's report made

recommendations for future congressional oversight of

executive branch activities, including applications for

information technology, information dissemination, and

computer security. Because OMB had not written Circular A-

130 at the time of the OTA data call, the OTA report did not

address agencies' adoption of OMB policy. Although the

report discussed the possibility that the congressional

policy framework had been overtaken by advances in

technology, it did not make specific recommendations for

changes in law or OMB policy.[34]

GAO prepared a summary report that highlighted

information technology as a major management issue facing

the new Bush administration.[35] Their review of agency plans

and budgets led GAO to conclude that agency planning was

either nonexistent or ineffectual. GAO asserted that the

agencies' inadequate use of strategic planning for

information technology was leading to ill-focused

investments, plans that were not linked to the budget

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[34]Office of Technology Assessment, Federal Government
Information Technology: Management, Security and
Congressional Oversight, OTA-CIT-297 (Washington, D.C.:
Government Printing Office, 1986).

[35]General Accounting Office, Information Technology
Issues, GAO/OCG-89-6TR (Washington, D.C.: Government
Printing Office, 1988).

processes, and projects that lacked sufficient return to justify the investment.[36]

The Information Resources Management Service (IRMS)of GSA, exercising its Brooks Act authorities, oversees agency management of information technology. Based on this oversight experience, GSA (much like GAO) has published reports that attempt to generalize from its agency-specific reviews. GSA's publications, by design, are not anchored by a strong theory base. Instead, these documents tend to point out pitfalls for agencies to avoid and, to a lesser extent, identify "good practices."[37]

GSA published an analysis of what it calls "grand design" implementations for systems modernization. It found that all-encompassing projects that combined hardware replacement and massive software development often experienced schedule delays and cost overruns. GSA contracted with a consulting firm to produce a document outlining alternatives to such all-encompassing projects. While this product is not grounded in an identifiable theory base, it does provide case study analysis of how public- and private-sector organizations have broken information

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[36]Ibid., 9.

[37]See General Services Administration, Information Resources Management Service, A Guide for Requirements Analysis and Analysis of Alternatives (Washington, D.C.: General Services Administration, 1990).

technology projects into more manageable pieces to isolate
and minimize risks.[38]

This MIS philosophy fell prey to vocal criticism as
the developers rarely interpreted user needs accurately, and
even if they did, took so long to write the programs to run
the systems, that the original user requirements changed.
After corporate managers spent millions of dollars to buy
and subsequently upgrade MIS that did not provide the
expected results, this criticism became more widespread.
Frustration spread after John Dearden published an article
in the Harvard Business Review that claimed that MIS would
never meet managers' expectations or needs. He asserted
that

> The notion that a company can and ought to have an
> expert (or a group of experts) create for it a single,
> completely integrated supersystem--an MIS--to help
> govern every aspect of its activity is absurd.[39]

After fixating on the technology and the life cycle,
evidently organizations still did not build the information
systems they needed. A new, broader perspective for
managing information technology emerged as an alternative in
the early 1980s.

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[38]American Management Systems, Inc., Alternatives to
Grand Designs for Systems Modernization (Washington, D.C.:
General Services Administration, 1991).

[39]John Dearden, "MIS Is a Mirage," Harvard Business
Review 50 (January/February 1972): 90-99.

Stage 2 - Information Resources Management

In 1980, Congress passed Public Law 96-511, the PRA,[40] which created the term information resources management (IRM). The PRA articulated a need for the federal government to manage information and information technology as a resource, much like financial and human resources.[41] Though the PRA created requirements for managing information technology in the federal government, Marchand uses the term IRM to refer to a philosophy for managing information technology more generally.

Stage 2 for managing information technology reflects change in both the technical and the external environments of organizations from the mid 1970s to the mid 1980s. The technology began to move out of the data center with the arrival of minicomputers and the introduction of microcomputers. With this decentralization of computing power, management practices had to shift from the data center to include user organizations. Line organizations began to realize that they could use information technology for more than just back-room functions and acquired their own information technology when data processing

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[40]The Paperwork Reduction Act (PRA), U.S. Code, vol. 44, secs. 3501-20 (1986).

[41]Sharon L. Caudle, Federal Information Resources Management: Bridging Vision and Action (Washington, D.C.: National Academy of Public Administration, 1987), p. 3.

organizations could not keep pace with their needs. These changes, combined with the increasing level of spending on information technology in organizations, brought these resources to the attention of a broader range of managers.[42]

In response to this disillusionment with a management perspective focused on single applications or MIS, private-sector organizations and business schools began to think more about how to tie together disparate systems to form an organizationwide perspective. Often, data processing organizations call such perspectives "architectures." This view represented a departure from the earlier philosophy of managing information technology because it assumed that systems existed outside the physical and management control of a central data center.

McFarlan and McKenny's Corporate Information Systems Management: The Issues Facing Senior Executives also took an organizationwide view of managing information technology. It provided an overview of managing what they call "the Information Systems (IS) function." This work distinguished itself in recognizing that organizations, especially large ones, often manage many information systems projects at once. As a result, it dealt with issues arising from coordinating several systems projects, going beyond

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[42]Marchand, Information Management Strategies, 31-32.

exerting life cycle management control over individual projects.[43]

Throughout the text, the authors acknowledged that cultural (what they call environmental) factors often determine the effectiveness of control mechanisms for managing information systems. These factors include (1) the penetration of information systems in the working environment, (2) the level of maturity of information systems development efforts, and (3) the planning style. More specifically, McFarlan and McKenny asserted that the effectiveness of information systems planning depends on the perceived importance and status of the systems manager, the physical proximity of the systems group and the general management team, the corporate management style, and organizational size and complexity.[44]

Although the section is not very lengthy, the book does include a short discussion of the form and content of policy directives that the authors feel will contribute to the success of the information systems and the IS function. They describe the functions they believe a corporate IS policy group should perform. These functions include

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[43]F. Warren McFarlan and James L. McKenny, <u>Corporate Information Systems Management: The Issues Facing Senior Executives</u> (Homewood, Ill.: Richard D. Irwin, Inc., 1983).

[44]Ibid., 61-116.

serving as a technology facilitator, architecture drafter, and standards enforcer.[45]

One early framework for managing a collection of organization information systems came from the systems planning methodology developed by International Business Systems, Inc. (IBM): Business Systems Planning (BSP). BSP provided organizations, public or private, with a method for creating an information systems plan.

> Experience has shown that BSP can be applied to all institutions in the public sector and all industries in the private sector, because the requirements for developing information systems are similar no matter the business served or the products and services provided.[46]

While BSP does not address the planning or use of individual systems, it does create a framework for linking systems planning to the broader purposes of the organization.

IBM's intent in creating BSP was to develop a methodology for creating a plan that would overcome the historic weaknesses of information systems implementation, generally attributed to a lack of planning. In part, IBM built on its own attempts to deal with the plethora of systems that each of its own functions had developed over time. The keys to this new method, as IBM espoused them,

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[45]Ibid., 65.

[46]International Business Machines, Inc., "Preface," Business Systems Planning: Information Systems Planning Guide, 4th ed., GE20-0527-4 (Atlanta, Ga.: IBM, 1984).

were using top-down planning and analysis of organizational processes, relying on bottom-up implementation, translating organizational objectives into information systems requirements, and using a structured methodology.[47]

Over time, the BSP process matured in two ways. First, IBM developed an automated version of BSP that it called Information Quality Analysis (IQA). Similar to BSP, the IQA technique concentrates on ensuring that information systems plans relate to the business plan of the firm. The technique involves interviewing key top executives, distinguishing between essential and nonessential data, establishing points of auditability for data accuracy and timeliness, and designing system outputs that pay attention to the needs of the ultimate data consumer.[48]

Second, a more recent version of BSP includes an "enterprise analysis" phase. Earlier versions of BSP referred to "business" as the generic term for the organization entity under study, whereas it appears now that the term "enterprise" has taken on that meaning. This is the genesis for the term "enterprise" that has crept into the systems planning lexicon as a way to describe planning that spans all parts of an organization. Other than

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[47]Ibid., 55.

[48]Vacca, John, "IBM's Information Quality Analysis." Computerworld 18, no. 52 (December 10, 1984): ID/45-47.

changing the label for the organizationwide perspective from business to enterprise, the BSP has not changed much.[49]

Consistent with IBM's view that BSP methods apply to both public- and private-sector organizations, collections of articles and monographs on IRM issues for the generic IRM manager have appeared. For instance, Rabin and Jackowski edited a volume that touches on a variety of IRM issues, including information systems management, data administration, and applications such as decision support systems and data bases.[50] While sections of the volume deal with public-sector IRM, the balance of the work is so general that it is difficult to apply to any particular kind of organization. In particular, it devotes little attention to federal government theory or practice.[51]

GSA's Federal Systems Integration and Management Center (FEDSIM) has also published several guides on information technology management. These documents are similar to the IRMS documents in that they are grounded

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[49]Dick Schouw, Bernie Jeltema, and Linda Hanson, Business Systems Planning for Strategic Alignment (BSP/SA): Concepts and Overview (Los Angeles: IBM Advanced Business Institute, 1987).

[50]Donald A. Marchand and John C. Kresslein, "Information Resources Management and the Public Administrator," in Handbook of Information Resources Management, eds. Jack Rabin and Edward M. Jackowski (New York: Marcel Dekker, 1988), 395-456.

[51]Rabin and Jackowski, eds. Handbook.

primarily in practice instead of theory. However, the nature of their practice makes these documents quite different. Instead of conducting oversight like GSA's IRMS, FEDSIM (with some contractor support) provides federal agencies with technical support to plan and analyze information technology projects. As a result, its publications reflect its experiences preparing projects and documentation that comply with GSA and OMB policy requirements.

These publications, best described as handbooks, provide operational advice on how agencies can organize the IRM function and prepare basic documents required by OMB and GSA policy. For instance, FEDSIM published two versions of a handbook that laid out a process for preparing the five-year information systems plan required by the PRA. These guides are so "hands on" that they include appendices with layouts for particular parts of the document and a notional table of contents. In the second version of the handbook, FEDSIM made a particular effort to show how an agency might link the development of its five-year plan with budgeting, analysis, and life cycle management activities.[52]

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[52]See Office of Software Development and Information Technology, Strategic Information Resources Management Planning Handbook, Report OIT/FPSP-85/001 (Washington, D.C.: Government Printing Office, 1985) and revised version published in 1987.

Simultaneously, FEDSIM published a two-part guide on information systems planning. This guide differed from the handbooks in that it did not focus on the preparation of a five-year plan that would comply with the requirements of the PRA. The information systems planning handbook laid out a process for an agency to create both information and information systems architectures. This guide adapted, with minor changes to reflect some requirements of federal law, the BSP methodology.[53]

In response to a request from the House Committee on Government Operations, GAO's Information Management and Technology (IMTEC) Division compiled a report that highlighted some problems it consistently found in federal agency management of information resources. It identified eleven themes across 132 agency-specific reports that spanned the period between October 1, 1988, and May 31, 1991. Of those eleven themes, eight dealt with information technology management and two addressed agencywide management and control of information resources, including information technology and data management. GAO did not set out to find root causes to these broadly-defined problems,

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[53]See General Services Administration, Office of Software Development and Information Technology, Information Systems Planning Handbook Report OSDIT/FPSC-87/001 (Washington, D.C.: Government Printing Office, 1986) and Information Systems Planning Handbook: Phase II (Washington, D.C.: Government Printing Office, 1988).

but several plausible explanations surfaced in the report.

For management mechanisms such as life cycle management,

project evaluation, and coordination of information

resources, GAO found that agencies lacked sufficient policy

controls or did not effectively use the controls that

existed.[54]

Based on its experiences in reviewing agency-specific

information technology projects, IMTEC developed what it

described as a generic framework for developing systems

architectures. In the preface to the report, describing

this framework, IMTEC expressed hope that the framework

would help to address a prevalent problem of agencies trying

to manage information technology projects, which is the lack

of planning and analysis of alternatives. While this report

provided a very high level view of the steps an agency

should consider in developing a particular systems project,

it did not address how to provide cohesiveness to

information systems efforts across the agency.[55]

To date, only two academic studies have addressed the

implementation of the PRA by federal agencies. Sharon

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[54]General Accounting Office, Summary of Federal
Agencies' Information Resources Management Problems.

[55]General Accounting Office, Strategic Information
Planning: Framework for Designing and Developing System
Architectures, GAO/IMTEC-92-51 (Washington, D.C.: Government
Printing Office, 1992).

Caudle conducted the first study, documented in a report for the National Academy of Public Administration (NAPA). This report included the results of interviews with federal IRM officials in cabinet-level agencies, selected subagency organizational units, and the central oversight agencies. The author used these interviews to learn how agencies had organized to meet the mandates of the PRA and assess whether the principles contained in the act had begun to pervade agency attitudes and behavior. In addition, the study presented agency views on OMB's and GSA's policy-making mechanisms for overseeing implementation the PRA and the Brooks Act.[56]

By design, this research did not set out to evaluate federal IRM policy, and in particular did not concentrate on the information technology component of IRM policy. A major finding, and to some extent a weakness in how agencies had carried out the PRA, was that agency staff tended to equate IRM with managing information technology procurement. At the time of the study (1987), agencies' understanding of IRM had not matured to include information management and tended to reflect the training and experience of the computer specialists that populated the agency IRM offices.

Nonetheless, Caudle's study provides a groundwork for

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[56]Caudle, <u>Bridging Vision and Action</u>.

this dissertation research project. In particular, Caudle found that agency staff identified the strategic planning and budget processes as the "dominant IRM management control mechanisms." This attitude manifested itself in the respondents viewing information technology management as guiding a project through the acquisition approval process at GSA and the budget approval process at OMB. In the conclusion to the report Caudle recommended future research into control mechanisms for information resources and such mechanisms might differ from those used for financial and human resources.

The second study, conducted by Levitan and Dineen, also relied on interviews with selected federal IRM officials. This research differed from the NAPA report in that Levitan and Dineen first established a model of what they called "integrative IRM" and used that as a basis for assessing the state of the art of integration of federal IRM in 1985. In the authors' view, managing information technology is complex because such management issues tend to transcend normal organizational boundaries. Specifically, Levitan and Dineen cited strategic planning, implementation of technology, and interaction with the organizational constituencies as examples of integrative issues for federal IRM. Simply put, they pointed out that managing information resources is complicated because information resources

pervade all facets of organizational life. While the
authors cited no literature in constructing this framework,
it appears to reflect their experiences (Dineen cited
lengthy experience managing information technology in a
federal agency).[57]

Having constructed this "theoretical" model of the
integrative nature of federal IRM, the authors conducted
interviews with representatives from several federal
agencies and one bureau of a federal agency. The
researchers posed questions about whether managing
information resources in the organization extended beyond
information systems to include information management
(functions such as dissemination and records management for
instance) and whether notions of IRM extended to the
program offices.

The findings confirmed several of those cited by
Caudle in the NAPA report. For the most part, agencies had
not fulfilled the mandate of the PRA by integrating the
management of information systems and information. The
management of information systems overwhelmed most other
concerns in federal IRM offices represented in the
interviews, reflecting the experiences of those staff that

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[57]Karen B. Levitan and John Dineen, "Integrative
Aspects of Federal IRM," Information Management Review 1,
no. 4 (Spring 1986): 61-67.

had risen to management positions. Agencies relied on task forces to achieve integration of IRM issues across normal organizational boundaries. Levitan and Dineen found no consistent patterns of whether agencies had succeeded in integrating IRM as a management discipline in program operations. Without explaining this finding, or citing examples, they asserted that policy guidance and governmentwide plans published by the central management agencies for information technology did not address the integrative aspects of IRM.[58]

Bishop and her colleagues at Syracuse University prepared a compendium of views on federal IRM from the two aforementioned studies, and academic literature, and GAO, OMB, and GSA publications. This paper presented a matrix of various observers' critiques on the status of IRM in the federal government. Comparing these critiques, the Syracuse group identified strong agreement on several points: (1) there is an insufficient integration of IRM at the agency level, (2) there is insufficient integration of IRM with agency mission and program management, and (3) there is a need for better planning. Only one index dealt with the management of information technology, and the respondents split evenly on the issue of whether the IRM suffered from

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[58]Ibid.

an overemphasis on technology.[59]

Consistent with the maturing view of IRM, the research on local governments' use of information technology began to explore the benefits from investments in automation. An analysis of survey data collected from 46 U.S. cities found that payoffs accrued in fiscal control, cost avoidance, and improved service delivery mechanisms. This study also found that it took longer than anticipated to realize some benefits and that expected payoffs in better information for management and planning had yet to appear.[60]

Recent research has examined information technology as part of an examination of IRM in state governments. The Syracuse University School of Information Studies produced a nationwide study on the maturity of IRM in state governments. This study used data collected from a survey of 2,200 program managers and information systems directors to characterize their views on the state of the art across several IRM activities, including information technology

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[59]Ann Bishop, Philip Doty, and Charles R. McClure, "Federal Information Resources Management (IRM): A Policy Review and Assessment," in Managing Information and Technology: Proceedings of the 52nd Annual Meeting of the American Society for Information Science, eds. Jeffery Katzer and Gregory Newby (Medford, N.J.: Learned Information, 1989), 40-47.

[60]Alana Northrop, et al., "Payoffs from Computerization: Lessons Over Time," Public Administration Review 50 (1990): 505-514.

usage and acquisition. It did not however, discuss

management techniques for information technology or the

strategic role if information technology for stage

governments.[61]

A consistent theme emerges from the literature of

Stage 2. The application of theory and practice from this

era has been very uneven. The federal government, in

particular, still relies extensively on centralized,

mainframe information processing, which does not support the

sharing and integration envisioned by IRM proponents. A

lack of understanding of what IRM is continues to thwart the

adoption of the attendant management principles. Despite,

or perhaps because of, the limited success of IRM, a new era

for managing information technology is emerging rapidly.

Stage 3 – Managing Information Technology in an Information Age

While many organizations strive to make the

transition from Stage 1 to Stage 2, further developments in

managing information technology are forming the outline of a

new stage. Marchand calls this stage "knowledge management"

to highlight the shift in emphasis from the physical

management of technology and information to the management

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[61]Sharon L. Caudle, et al., <u>Managing Information Resources: New Directions in State Government</u> (Syracuse, N.Y.: Syracuse University School of Information Studies, 1989).

of the content of information. He contends this stage of development began in the mid 1980s and will continue through the 1990s. While the management of information content is emerging as a new skill, the successful application of information technology makes it possible to maximize the benefits of information content.[62]

At the outset, though, a more precise definition of the term "information age" is in order. The expression "Information Age" has crept into the day-to-day language used in the IRM community. The term is generally used to describe a future state where information will be quickly and universally accessible in electronic form. In reality, however, there is a lack of agreement on what the term means or what future conditions it purports to describe. The following discussion provides a brief description and interpretation of the history of the term information age and its potential meaning.

Hammer edited a book entitled, The Information Age: Its Development, Its Impact, which appears to be the first cited use of the term.[63] Hammer edited this book during his tenure as the Executive Secretary of the Information Science

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[62]Marchand, Information Management Strategies, 32-33.

[63]Donald P. Hammer, ed. The Information Age: Its Development, Its Impact (Methuchen, N.J.: Scarecrow Press, 1976).

and Automation Division of the American Library Association. The contributors to the book were either library science academics or practitioners. In his introduction to the text, Hammer defines the term somewhat, acknowledging that humans have used information throughout the civilized era. For the purposes of the book, he demarcated the information age "as being most reflective of the interests and passions of the 1965-1975 librarians and information scientists."[64]

Despite the disclaimer that any epoch could be labeled an information age, Hammer asserted that the particular characteristics of information during that era made it distinctive.

> information is now recognized as a commodity--a commodity that can be sold, given away, copied, created, stored, misinterpreted, distorted and stolen, among other things. In short, we now have a concept of its nature and properties that we were not aware of in the past. We now recognize that everyone has a right to use it, that it can be considered a utility, that its nature and structure must be better defined, and that a strong philosophical base must be prescribed for it.[65]

The book then proceeds to describe the "state-of-the-art" in the theory and application of automation to libraries, primarily the use of computers to support information retrieval, indexing, and card catalogues. Despite the fact that Hammer wrote what he thought was a retrospective,

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[64]Ibid., vii.

[65]Ibid., vii-viii.

others were not so sure.

In 1985, Dizard wrote the first edition of The Coming
Information Age: An Overview of Technology, Economics, and
Politics,[66] which implies by its title that our society has
not yet arrived in the information age. Even in the third
edition, published in 1989, Dizard says the book is "an
interim report." Interim, because we are only now entering
the most mature phase of an information age.[67] He goes on
to describe three stages of an evolving and maturing
information age.

The first stage of the information age began in 1977
with the publication of the Department of Commerce study
called the "primary information sector." This sector
consists of a few very large corporations that build and
operate the information and communications infrastructure
for the world. The distinguishing characteristic of the
stage was the emergence of this sector of the economy and
their plans to build a technology-based information
infrastructure.

As he wrote in 1989, Dizard felt the United States
were entering the second stage. He believed this second

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[66]Wilson P. Dizard, Jr., The Coming Information Age: An
Overview of Technology, Economics, and Politics 3d ed.,
(White Plains, N.Y.: Longman, 1989).

[67]Ibid., 1.

stage will be characterized by the maturity and further
emergence of an information economy, both in the private and
public sectors. Dizard envisioned that government agencies
and large corporations would increasingly rely on
"ubiquitous personal computers" to automate all facets of
the work environment, thereby "making them essentially
computer-based communications centers."[68]

The third stage, which he believed would arrive in
the 1990s, would entail the mass availability of information
technology and technology-based information services to
consumers in their homes. This third stage will be made
possible by the existence and use of a broad network of
networks for sharing information between individuals--not
only large organizations and businesses. Many of these new
services will be made available, not through the personal
computer, but with appliances already available in many
homes--the television and the telephone.

To a great extent, this third stage of the
information age is becoming a reality quicker than even
Dizard might have envisioned. It became a visible enough
issue that the Clinton administration has described a
technology initiative that promotes the use of information

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[68]Ibid., 7.

technology at several levels.[69] For the purposes of this
research, one vision for the federal government's use of
information technology is especially pertinent.

The Clinton administration envisions the federal
government will use information technology to make agencies
more responsive and service-oriented. Instead of using
automation to make government operations more efficient for
internal processing, agencies would use information
technology to reach out the public to provide more timely
and higher quality service. The technology initiative
describes how the government will place a greater reliance
on information technology making the federal government more
responsive to the publics it serves.[70]

Therefore, this portion of the literature review
focuses on those management models that discuss how
organizations can create an information technology
infrastructure that supports this new vision. The
differences in philosophy between information age management
and IRM make even a brief discussion fruitful. One
difference is a more robust understanding in the information
age of how important the technological infrastructure is.

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[69]Office of Science and Technology Policy, Technology
for America's Economic Growth, A New Direction to Build
Economic Strength (Washington, D.C.: Government Printing
Office, 1993).

[70]Ibid., 20-21.

Emerging and maturing technologies such as graphical user interfaces, client server computing, and work stations create a foundation for more substantial user involvement in management.

Corporate information management (CIM) is the most prominent addition to the literature on how to manage information systems from an organizationwide perspective. Although the Department of Defense (DOD) has made the CIM acronym well known in the federal IRM community, many CIM ideas come from the writings of Paul Strassman.[71] Strassman served on the Executive Level Group (ELG) for Defense Corporate Information Management that created the charter for CIM under the leadership of then-Deputy Secretary of Defense Donald Atwood. His most recent book includes a chapter consisting of a 137-item policy checklist, most of which is found in the ELG report.[72]

While Strassman's policy checklist is too long to discuss in detail, several themes that emerge extend the notion of managing information systems from an organizationwide perspective. Strassman stresses that the

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[71]Paul A. Strassman, The Business Value of Computers: An Executive's Guide (New Caanan, Conn.: Information Economics Press, 1990).

[72]Executive Level Group for Defense Corporate Information Management, A Plan for Corporate Information Management for the Department of Defense (Washington, D.C.: Department of Defense, 1990).

policies for managing information systems should place responsibility in the hands of the users--not the IRM specialists. Policies in the checklist supporting this theme include economic analysis that promotes trading off between information resources and other resources and providing mechanisms that charge users for information and information systems. He also introduces the notion that organizations should examine and redesign work processes before automation to ensure that automation does not speed up archaic and unneeded functions. The unifying theme presented by his list of policies is to ensure that investments in information systems add measurable value to the core missions of the organization.[73]

Strassman's concepts had yet to be tested in the public sector when he wrote The Business Value of Computers, some analogous thinking emerged in the public sector. Without identifying it as such, Strassman's approach of aligning information to achieving organizational missions falls under the rubric of strategic management. Strategic management represents an effort by private and public sector managers to make strategic planning more useful in meeting the short-run needs of organizations.

Much like Strassman, business authors writing about

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[73]Strassman, Business Value of Computers, 493-510.

strategic management talk about aligning corporate resources

and missions to take advantage of opportunities in the

market. Strategic management emphasized looking at resource

allocation processes and support systems to see how they

added value to a business.[74] One example of a strategic

management approach used by a consulting firm specializing

in organization effectiveness is McKinsey's 7S Model, which

identifies the following factors as contributing to

organizational effectiveness: structure, strategy, systems,

style, staff, skills, strategy, and shared values.[75] Much

like the McKinsey model, private sector models of strategic

management explicitly include and highlight the role of

information technology in strategic management processes.[76]

   While public administration has begun to embrace the

strategic management philosophy, several adaptations were

necessary to apply the concepts to public sector

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[74]Frederick W. Gluck, "Strategic Management: An
Overview," in James R. Gardner, Robert Rachlin, and H.W.
Sweeny, eds. Handbook of Strategic Planning (New York: John
Wiley, 1986), 1-36. See also Arnaldo C. Hax and Nicholas S.
Majluf, Strategic Management: An Integrative Perspective
(Englewood Cliffs, N.J.: Prentice-Hall, 1984).

[75]Ibid., 23.

[76]See Paul S. Adler, D. William McDonald, and Fred
MacDonald, "Strategic Management of Technical Functions,"
Sloan Management Review 33 (Winter 1992): 19-37 and Peter S.
DeLisi, "Lessons from the Steel Axe: Culture, Technology,
and Organizational Change," Sloan Management Review 32 (Fall
1990): 83-93.

organizations. In the public sector, strategic management involves "the joining together of external demands, constraints, and mandates with agency-specific goals, objectives, and operational procedures."[77] The key adaptation results from the different character of the external environment of public-sector organizations, which, "rather than maneuvering in markets, public organizations act within relatively complex, multilateral power, influence, bargaining, voting, and exchange relationships."[78]

Once accommodating for this difference in external environments and the uniqueness of civil service traditions in internal environments, one might presume that strategic management in public-sector organizations would encompass the same set of resources. But, while human resources play prominently in discussions of public-sector strategic management, information technology has fallen inexplicably by the wayside. This is somewhat ironic given that the impetus for viewing human resources as a strategic resource

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[77]Jerry L. McCaffery, "Making the Most of Strategic Management and Planning," in Robert E. Cleary, Nicholas Henry, and Associates, Managing Public Programs: Balancing Politics, Administration, and Public Needs (San Francisco, Calif., 1989), 197.

[78]Barton Wechsler and Robert W. Backoff, "Policy Making and Administration in State Agencies: Strategic Management Approaches," Public Administration Review 46 (July/August 1986): 321.

comes from "modern production systems" that require new knowledge skills.[79] Even more troubling, the most well-known text on strategic planning in the public sector does not even mention a role for managing information systems as a strategic resource.[80] Despite this lack of emphasis in public administration literature, strategic management of information systems is receiving some attention in the practitioner community for the federal government.

GAO's IMTEC recently provided Congress with a transition report for the incoming Clinton administration that touches on information resources as a strategic management responsibility. This latest transition report on federal IRM issues adds several new items to the Bush administration report for Congress and OMB to consider in their policy making. GAO stresses a principle from DOD's CIM--that agencies should streamline work processes before applying automation. Additionally, the report points out the current lack of incentives for agency project managers to report management problems truthfully to oversight organizations such as GAO, Congressional committees, and

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[79]Eugene B. McGregor, Jr., "The Public Sector Human Resource Puzzle: Strategic Management of a Strategic Resource," Public Administration Review 48 (November/December 1988): 941-950.

[80]John M. Bryson, Strategic Planning for Public and Non-Profit Organizations (San Francisco: Jossey-Bass, 1989).

OMB. GAO describes this problem as inherent to complex

systems modernization projects. In the report, GAO also

questions whether changes to acquisition management and

budgeting policies might encourage problem identification

and resolution instead of the current practice of

encouraging project managers to gloss over problems until

they become so large that a project fails.[81]

To probe further into the causes of agencies' well-

documented problems in managing information technology,

IMTEC convened a panel of experts to discuss perceived

barriers to effective management of information resources.

This panel, made up of private-sector and federal agency IRM

managers, identified institutional barriers as a significant

impediment to effective management of information resources.

These institutional barriers include shortcomings in agency

content and use of internal policy in areas such as life

cycle management, performance measurement, and strategic

planning. The panel report also stresses that some of these

institutional barriers result from inconsistently applying

IRM policies across all bureaus of an agency.[82]

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[81]General Accounting Office, Information Management and
Technology Issues, GAO/OCG-93-5TR (Washington, D.C.:
Government Printing Office, 1992).

[82]General Accounting Office, Perceived Barriers to
Effective Information Resources Management: Results of GAO
Panel Discussions, GAO/IMTEC-92-67 (Washington, D.C.:
Government Printing Office, 1992).

As this review of the literature points out, various disciplines address policy for federal IRM policy, but little of this literature treats federal management of information technology in any depth or with much rigor. Although PMIS literature presents an outgrowth of the more extensive writings on MIS in the private sector, it is not grounded in empirical research at the federal level. This dissertation research represents the first effort to assess federal agency management of information technology systematically. In particular, it is the only study to examine the effectiveness of agency application of Circular A-130 for the management of information technology.

By definition, any examination of Circular A-130 finds itself grounded in the tradition of Stage 2 IRM. When OMB released Circular A-130 in 1985, IRM was state-of-the-art as a management philosophy for information technology. Any proposals to revise and improve Circular A-130 must look beyond IRM, however, recognizing that the rapid rate of technological change may be leaving IRM intellectually moribund. Debating about what constitutes the information age is not productive at this point. The administration of public programs reflects the reality of an information age. One challenge of this research project is to internalize the vision created by nascent literature on managing information technology in an information age. Doing so will enable

Circular A-130 to address today's issues and to anticipate

tomorrow's.

CHAPTER 3 - RESEARCH DESIGN

The research question is: Does OMB Circular No. A-130, "Management of Federal Information Resources," effectively shape federal agency management of information technology? Therefore, this dissertation is evaluation research. While evaluation research does not constitute a particular research method, it nonetheless provides an organizing set of principles that have methodological implications. The lack of prior theoretical and empirical exploration of this topic required preliminary steps prior to "going into the field" to observe agency implementation of OMB policy.

This chapter begins by describing how program evaluation theory shaped the research design by breaking that design into three major elements. These elements include (1) creating an analytical framework for conducting the evaluation, (2) assessing the role of agency policy making in carrying out OMB policy, and (3) conducting a comparative case study analysis of agency application of its policy in varied settings.

Program Evaluation Technique

Within public administration, the pursuit of program

evaluation grew out of a frustration that public

organizations often lacked a basis for measuring relative

success or failure. Put another way,

> the purpose of evaluation research is to measure the
> effects of a program against goals it set out to
> accomplish as a means of contributing to subsequent
> decision making about the program and improving future
> programming.[83]

This research design addresses OMB's efforts to oversee the

management of information technology in federal agencies

through Circular A-130 and provides a basis for improving

that policy.

Within the rubric of program evaluation, several

types of research exist, each with implications for research

design. To understand the approach used in this study, the

reader should know what kind of evaluation this is not. This

research does not purport to assess the ultimate

effectiveness of Circular A-130 in promoting the efficiency

and effectiveness of agencies' application of information

technology to federal programs. Such research projects fall

under the heading of summative program evaluation.[84] As the

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[83]Carol H. Weiss, Evaluation Research: Methods of Assessing Program Effectiveness (Englewood Cliffs, N.J.: Prentice-Hall, 1972), 4.

[84]Thomas D. Cook, Fay Lomax Cook, and Melvin M. Mark, "Randomized and Quasi-Experimental Designs in Evaluation Research: An Introduction," in Evaluation Research Methods: A Basic Guide, ed. Leonard Rutman (Beverly Hills, Calif.: Sage Publications, 1982), 103-139.

review of the literature pointed out, insufficient research
exists to conduct such an analysis at this time.

Therefore, the term "formative" evaluation best
describes this dissertation research. Such an evaluation
achieves one purpose of this research project, which is to
provide ideas for revising and improving OMB Circular A-130.
Formative evaluations "provide a program director or manager
with ways to improve the program or its management."[85] They
may also lay the groundwork for subsequent analysis, such as
a summative evaluation.

This evaluation follows the evaluation approach
advocated by Joseph Wholey, a program evaluation scholar and
practitioner. He has served as the assistant secretary for
program analysis and evaluation at the Department of Health,
Education, and Welfare. Wholey's work flows from the
tradition of "utilization-focused evaluation," a term
developed by Michael Quinn Patton. This tradition of
evaluation research sets out to produce analysis that will
be used by policy makers, not used as desk ornamentation.[86]

Beyond creating a method for conducting program
evaluations, Wholey sought to create a new ethos of
accountability in public-sector organizations. This new

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[85]Ibid., 104.

[86]Michael Quinn Patton, Utilization-Focused Evaluation
(Beverly Hills, Calif.: Sage Publications, 1978).

ethos recognizes that proponents of bureaucratic management

often view success as adherence to prescribed process

instead of meeting articulated goals. Attention to process

instead of results has the effect of undermining public

confidence in government institutions that do not deliver

services effectively. Wholey's "results-oriented

management" approach forces public administrators to focus

on organizational outputs and performance in evaluation

instead of adherence to process.[87]

One reason bureaucracies tend to rely so heavily on

process is a lack of consensus on or even knowledge of

organizational goals and objectives. This often-cited lack

of consensus on organizational goals prompts Wholey to

recommend exploratory evaluations before launching a formal

evaluation. Evaluators conduct an exploratory evaluation or

"evaluability assessment" in cooperation with the program

managers and the evaluation users. Therefore, the

evaluability assessment process becomes the first step in

either formative or summative evaluations.[88]

To support the development of this kind of program

evaluation, this research consists of three analytic

chapters. Chapter Four, "Policy Framework for Managing

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[87]Joseph S. Wholey, Evaluation and Effective Public Management (Boston: Little, Brown, 1983), 4-8.

[88]Ibid., 16-95.

Information Technology: Structure and Analysis," analyzes the basic laws and policies, describing and interpreting the policy framework that establishes the purposes for managing information technology in the federal government. Chapter Five, "Agency Policies: Content and Analysis," surveys all major federal agencies to determine the extent to which they have adopted the policy framework in their own policy making. Chapter Six, "Agency Case Studies: Finding and Comparison," presents case studies of four selected agency decision making processes in order to provide a cross-case comparison of the factors that influence the application and enforcement of policies for managing information technology.

Grounding Circular A-130 in a Policy Framework

Do the evaluation criteria and other management policies in Circular A-130 adequately consider the complexity of the federal environment as envisioned in public law? Prior to evaluating agency application of OMB policy, it is necessary to assess how that policy interprets the applicable public law.

The first analytical chapter of the dissertation research consists of an evaluability assessment as described by Wholey. It builds on the literature review to establish the legal foundation for managing information technology in the federal government. A review of the pertinent law

establishes the legal requirements OMB must address in Circular A-130. These laws provide OMB with the mandate and substance for OMB's role in formulating and overseeing governmentwide policy on information technology management. The evaluability assessment continues by comparing Circular A-130 with these legal requirements. This comparison grounds Circular A-130 in a broader legal framework by asking whether OMB's current policy reflects all legal requirements.

This comparison also assures that the subsequent review of agency policy reflects the reality that OMB may not have provided implementing policy for some public laws. The resulting policy framework, displayed in a matrix, depicts the key elements of public law and OMB policy that Circular A-130 should have included. This framework, by identifying differences between the law and OMB's implementing policy, also provides the basis for making subsequent judgements about agencies' policy making.

Assessing Agency Policies

Does the alleged ineffectiveness of Circular A-130 discussed in Chapter One result from inadequacies of the circular exposed in Chapter Four, ineffectual agency interpretation of that policy, or a combination of these two factors? The research design presumes that agencies do not

apply the policy framework directly, thereby making it necessary to examine intervening agency policy documents. As a result, the field research unfolds in two stages. The first stage, presented in Chapter Five, compares agency policies and procedures for managing information technology with the policy framework. It also provides the basis for identifying potential candidates for case studies, the next stage of the field research.

Formulating the Data Call

The researcher collected information about the major federal agencies' information technology management policies through a data call that OMB sent to agencies' designated senior official (DSO) for information resources management (IRM), as defined by the Paperwork Reduction Act (PRA)[89] (See Appendix A). Data call is a term used by OMB and other federal agencies to describe a data collection effort. In effect, OMB requires or "calls" relevant federal agencies to provide agency-specific data about a particular policy issue. For this research, the data call provided a perspective on the content and form of agencies' policies for managing information technology. It did this by requesting two kinds of data.

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[89]The PRA requires that each agency head designate "a senior official" to carry out the responsibilities of the act.

First, the data call asked agencies[90] to provide

copies of the formal policy directives they have issued to

direct subcomponents' management of information technology.

The data call also included a request for operational

directives in case the IRM organization stipulated both the

principles and the processes for managing information

technology. Together, these agency policy documents and

operational directives provided the basis for determining

the consistency of agency policy with the policy framework.

Second, the data call asked agencies to answer

several questions that provided background information on

the policies that might not be readily apparent from reading

them. To minimize the burden of the data collection on the

responding agencies, the data call encouraged respondents to

answer the questions by referring to relevant portions of

the policies and procedures provided. The content of these

questions was drawn from requirements for agencies

established in the policy framework. The purpose of asking

for the agencies to provide narrative explanations was to

understand how the agencies complied with the policy

framework in procedural terms in case the policies and

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[90]For the purposes of this analysis, the term "agency"
refers to the highest level of a federal organization, for
example, the Department of Agriculture, which contains
several components that others may call agencies, such as
the Farmers Home Administration.

directives did not explain that kind of explanation.

For instance, Questions c and d asked the respondents to discuss why they believed their policies complied with the requirement of Circular A-130 to maintain long-range planning processes that support mission needs. These questions cited examples of well-known techniques from the public and private sectors that arguably could have provided mechanisms for the agency to comply with OMB policy. In particular, Question d asked about elements of an agency strategic plan that information technology planning might support since OMB policy does not require strategic planning as a stand-alone product.

Question e asked for a discussion of how the agency ensured the linkage of agency budget and planning for information technology. In particular, this question focused on how the agency decision-making processes brought together the concerns of the agency's IRM and budget organizations. Because the IRM and budget staffs for agencies sometimes report to different policy officials, this question probed who had the "final say" or whether a some form of oversight group provided a forum for reaching a consensus.

The final question addressed how agencies evaluated investments in information technology. Again, this concern mirrored one of the elements of the policy framework for

managing information technology. As discussed in the next chapter, existing public law and OMB policy provide agencies with choices on the criteria they can choose from. In particular, it was important to see which criteria agencies chose in their policy making.

Additionally, a further goal in constructing the data call was to minimize the effect of "gaming" the responses. The narrative questions in the data call provided a source for cross-checking agency reporting against the policy extant on the date of the data call. This was necessary because it was unlikely that an agency would report to OMB that its policy for managing information technology did not comply with existing law, regulation, and OMB policy. No matter what the agency wanted OMB to think about their policy, asking for a copy of the policy left it to the researcher to judge the consistency of agency policy with policy framework.

The Data Call

OMB sent the data call to agencies' DSO on July 8, 1991, and requested responses by September 6, 1991. The universe of potential agencies responding to the data call included federal agencies subject to OMB's policy and budget control. These agencies included executive branch agencies and independent regulatory agencies listed in the PRA and

the Brooks Act. Part of the policy framework for information technology management is found in Section 43 of OMB Circular No. A-11 (See Appendix B),[91] so agencies not governed by the provisions of the circular were excluded.

Applying these selection criteria left many potential agencies for investigation. Using fiscal year (FY) 1991 data, forty-eight agencies reported data in response to section 43 to Circular A-11 and were subject to OMB's PRA and Brooks Act oversight. To devote attention to those agencies that managed most of the federal government's information technology resources, OMB sent the data call to agencies that planned to obligate over $50.0 million in the President's FY 1991 budget.

An investigation of the agency data reported to OMB in FY 1991 shows that the excluded agencies did not manage a significant portion of the governmentwide total spending on information technology. Although the $50.0 million threshold excluded twenty-five of the possible forty-eight agencies for investigation, the remaining twenty-three agencies accounted for $20.0 billion of the $20.5 billion (97.6 percent) in information technology spending requested by those forty-eight agencies in the President's FY 1991

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[91]Office of Management and Budget, Preparation of Agency Budget Requests, OMB Circular No. A-11, rev., Transmittal Memorandum No. 62 (Washington, D.C.: Office of Management and Budget), 141-144.

budget. Appendix C provides the list of the twenty-one

agencies that responded to OMB's data call.

As noted earlier, the definition of the term agency

follows the formulation of the PRA. Therefore, the Marine

Corps and Army Corps of Engineers did not respond separately

to the data call although they reported their information

technology spending data separately to OMB on Section 43 of

Circular A-11.

Analysis of Agency Responses to the Data Call

The analysis of the agency responses to the OMB data

call consisted of two steps. Since the first two questions

merely requested copies of agency policies and directives,

the analysis began with a tabulation of some general

characteristics of the agency policies. These

characteristics included the age of each policy, the basis

for the policy in theory and practice, and the linkages to

other management mechanisms in the agency. The agency

policies and procedures and the agency responses to the

questions posed in the data call provided the basis

determining this information. Subsequent analysis

presented in Chapter Five aggregates these general

characteristics and displays them in a governmentwide

matrix.

The next step in the analysis of agency policies was

to examine the extent to which agencies adopted the content of the policy framework for information technology management in their own policy making. The content of agency policies and procedures was compared against key requirements of the policy framework created in the evaluability assessment. This comparison showed whether agency policies conformed to or exceeded the mandatory elements of the policy framework.

Besides linking the agency policies and procedures to the policy framework, the analysis of the data call responses also served as a screening device for the selection of several agency decision making processes for case study research. This analysis identified key differences among agencies' policies consistency with the policy framework for information technology management. While this analysis of agency responses to the data call did not serve as the sole determinant for picking case study examples, it provided the formal organizational context for selecting the case study examples.

The Role of Comparative Case Study Analysis in the Study

Finally, the dissertation includes a chapter that reports the results of follow-up field research on four of the agencies that responded to the data call. This analysis addresses the question of what organizational variables

contribute to or detract from the effective application of Circular A-130 in specific agency settings. Variables under investigation included the consistency of agency policy with the policy framework, role of internal IRM oversight groups, involvement of external oversight organizations such as GAO or OMB, degree of bureau independence from agency staff offices, and ability of IRM staff to enforce policy through other decision making mechanisms. More generally, the case study analysis provided the basis for identifying possible improvements in the content and application of Circular A-130.

This case study analysis investigated the extent to which agency practice differed from the OMB and agency policies. Organization theory literature illustrates that agencies are likely to rely on both informal and formal decision-making processes to manage information technology decisions.[92] The use of comparative analysis also explored the existence of certain organizational or environmental variables that may have contributed to differing application of Circular A-130.[93]

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[92]For example, Chester I. Barnard, <u>The Functions of the Executive</u>, 30th anniversary ed. (Cambridge, Mass.: Harvard University Press, 1968).

[93]Matthew B. Miles and A. Michael Huberman, <u>Qualitative Data Analysis: A Sourcebook for New Methods</u> (Newbury Park, Calif.: Sage Publications, 1984), 151-209.

The Selection of Case Study Agencies

To test for these relationships in varied settings, the case study examples were selected using the matrix presented below in Table 1.

Table 1 - Agency Consistency with the Policy Framework

High Consistency	DOD: Mixed Consistency	Non-DOD: Mixed Consistency	Low Consistency
Commerce, GSA, Health and Human Services, Justice, Transportation, Treasury	DOD(Air Force), DOD(Army), DOD(Navy), DOD(Office of the Secretary of Defense)	Agriculture, Education, Environmental Protection Agency, Energy, HUD, Interior	Labor, National Aeronautic and Space Administration, State, Tennessee Valley Authority, Veterans Affairs

The matrix provided in Table 1 helped identify candidates for case study analysis as follows. The categories shown in the table group the agencies by the extent to which agency policy was consistent with the mandatory requirements of the policy framework for information technology management. These assessments resulted from the analysis of the agency responses to the OMB data call. They served as a starting point for determining whether an agency "passed on" the principles contained in the policy framework, and therefore had applied Circular A-130 effectively. This grouping of the case study candidates reflects the major distinguishing characteristic that arose from the analysis of agency responses to the OMB data call. Agencies clearly adopted facets of the policy framework for information technology management very unevenly, resulting in the four broad categories shown in Table 1.

The mandatory policy requirements identified in the policy framework in Chapter Four refer to those topics that agency policy making for information technology management must address to ensure consistency with the relevant public law and governmentwide policy. Since the research question driving this study asks whether the federal government's major policy document for information technology management shapes agency action, one key variable is whether agencies

know what the governmentwide policy is. The following

quotation states how the examination of this variable across

case study examples fits into the context of this portion of

the research.

> ...the problem is seeing processes and outcomes that
> occur across many cases or sites, and understanding how
> such processes are bent by specific local contextual
> variables.[94]

Implicitly, the matrix in Table 1 introduced a

variable besides the degree to which agency policy is

consistent with the mandatory policy elements of the policy

framework for information technology management. It became

clear during the construction of the matrix that the only

organizational factor that stood out, besides consistency of

agency policy with the policy framework, was that all of the

DOD agencies fell into the mixed-consistency category. For

that reason, the matrix separates DOD and non-DoD agencies

with mixed consistency with the policy framework.

By coincidence, OMB maintains with DOD a unique

relationship for budget formulation that required the case

study investigation to consider the DOD agencies as a

separate category. Typically, the head of a federal agency

presents a budget proposal to OMB after his or her budget

staff has reviewed requests from the various bureaus and

staff offices. The review and approval process proceeds

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[94]Ibid., 151.

serially in these instances. In contrast, OMB conducts a

"joint" review with the Office of the Secretary of Defense

(OSD) during the formulation of the president's budget.

Therefore, the review and approval process operates in

parallel. In addition, the sheer size and complexity of

the DOD budgets result in OMB performing a higher level of

review of the DOD budget than it would conduct on a non-DOD

agency.

Participants in Case Study Discussions

The starting point for collecting case study data was

the staff of designated senior officials (DSOs) for IRM.

They represent the IRM community to the rest of the agency

and often to the central management and oversight

organizations such as OMB. Generally, they rise through the

career civil service based on their experience in managing

information technology in the federal government. As a

group, these professionals form the most visible part of the

federal IRM community.

The case study interviews began with this group

because these staff people interpret and write the agency-

specific policies that carry out the policy framework for

information technology management. The case study

interviews began with the agency IRM staff, in part, for

reasons of access, since OMB interacts with them regularly.

In addition, they have the responsibility for enforcing OMB information technology management policy through agency-specific policy. As a result, they understand the relationship between agency decision making and OMB policy requirements better than any other group in an agency. Additionally, their day-to-day relationships with program staff provided access to data about specific information project decisions.

After talks with the IRM staff, the case study discussions branched out to include the other agency-level staff that must comply with or enforce the governmentwide and agency-specific policy. One affected stakeholder who must prove compliance is the project sponsor. Although the IRM organization may sponsor some crosscutting projects that support users throughout the agency (such as telecommunications capabilities), program staffs typically sponsor major information technology projects in the agency. For example, the IRS or Customs Service of the Department of Treasury are "program" sponsors that require information technology to achieve their respective missions.

The case study interviews did not include staff members from legislative branch organizations. At the time of the study, OMB's oversight committees in Congress (the House Committee on Governmental Operations and the Senate Committee on Governmental Affairs) were considering bills to

reauthorize appropriations for the Office of Information and Regulatory Affairs (OIRA). These bills included provisions to change the scope and means of OIRA's oversight over agency management of information technology. Recall from introductory chapter that congressional reports accompanying these bills criticized OMB's policy for managing information technology.

Institutional constraints dictated it would be imprudent for an OMB employee to ask Congressional oversight committees questions on the adequacy of OMB's enforcement of Circular A-130 during the consideration of these bills. As a result, the case studies depict the role of legislative branch oversight from the perspective of the executive branch, and therefore only provides one view of the congressional role oversight agency information technology management activities. This lack of balance in the interviews is a limitation of the research design dictated by the institutional setting for the dissertation research.

An explication of the policy framework for information technology management and the analysis of the agency policies made it clear that information technology management policy intersects with several other management processes. As a result, the IRM organizations did not have sole responsibility for ensuring compliance with the policy framework for information technology management. The agency

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budget offices often played a role in reviewing major information technology initiatives for suitability for funding according to governmentwide and agency-specific policies. Additionally, the agency procurement and contract offices sometimes played a role in reviewing the project documentation for compliance with the policy framework.

In all cases, the need to interview staff outside the IRM and program staff offices depended on the nature of the project and split of organizational responsibilities in the agency. Sometimes, responsibilities for oversight and analytical roles were spread throughout offices under an assistant secretary. Conversely, some IRM office's performed most of the review and oversight on information technology projects.

Issues Discussed in Case Study Interviews

Two different concerns shaped the content of the questions making up the questionnaire for the case study analysis. First, the research question and related issues required that the case study analysis get closer to the reality of policy application. It might be possible for an agency to report that their policy is consistent with the policy framework. Consistency between the policy framework and agency policy is of little consequence, however, if the agency policy is not applied in agency decision making. As

a result, the ultimate judgement of the effectiveness of the policy framework, which A-130 should embody, must stem from how its interpretation in agency policy making shapes decisions on specific information technology projects.

The second concern was to identify those organizational and cultural factors that influence the application of the OMB and agency policy. The effectiveness of OMB policy relates as much to how the agency chooses to enforce the policy as the content of the policy itself. It may be possible for agency IRM office to assert that a particular information technology project complies with provisions of OMB or agency policy. That assertion of compliance does not necessarily translate into enforcement of policy principles. Enforcement of OMB policy entails different forms of approval for compliant projects and disapproval for non-compliant projects based on agency application of OMB's policy. Some questions, therefore, related to what non-IRM management control processes enable the organization to ensure compliance with the requirements of Circular A-130. Identifying what worked and what did not provides a basis for making recommendations for changing OMB's current policy.

CHAPTER 4 - POLICY FRAMEWORK FOR MANAGING INFORMATION
TECHNOLOGY: STRUCTURE AND ANALYSIS

This chapter builds on the literature review to
establish an analytic framework for assessing federal
agencies' policies for managing information technology. An
analysis of OMB's application of these laws through its
governmentwide policy making follows the analysis of public
law. Together, these analyses provide a basis for
evaluating federal agency application of OMB's policy
making. The analysis of public law and OMB policy results
in the creation of an policy framework for the management of
information technology in the federal government. To date,
such a policy framework does not exist in the public
administration literature.

For purposes of this research, the policy framework
discussed in this chapter serves two purposes. One, the
policy framework describes the extant public law and OMB
policy shaping federal agency management of information
technology. It brings together and interprets the public
law and public law in place. Two, the policy framework also
presents a normative set of principles that agencies
"should" apply. It is not necessarily the policy framework
perceived or used by the agencies. This research does make

the case, though, that the policy framework created through this research is the one federal agencies should use. This policy framework for managing information technology in the federal government should, therefore, provide decision rules to guide agency action. As a result, it serves as the analytic basis for evaluating agency policy-making and decision-making processes.

Review of the Relevant Federal Law

Congress has enacted several laws that build the legal foundation for managing federal information technology. The Paperwork Reduction Act (PRA)[95] and the Brooks Act[96] serve as the most significant pieces of public law governing the management of federal information technology. Each law specifies a set of responsibilities, and in some laws, a standard of performance, for exercising those responsibilities. To bound this analysis, the discussion focuses on those management processes that produce discrete outputs (observable manifestations to show fulfillment of responsibilities), such as planning, budgeting, reporting, or evaluation. A discussion of several related laws, to the extent they have relevance for

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[95]PRA, secs. 3501-3520.

[96]The Federal Property and Administrative Services Act (Brooks Act), U.S. Code, vol. 40, secs. 759 and 487 (1987).

the management of information technology, completes this section of the chapter.

Brooks Act

The Brooks Act gives a troika of agencies--GSA, the Department of Commerce, and OMB--the task of making policy for the acquisition and operation of what the act refers to as automatic data processing equipment (ADPE). Consistent with A-130, this research uses the term "information technology" to include ADPE, which OMB defines as hardware, software, telecommunications, and services (such as operations, maintenance, and repair).[97]

The Brooks Act gives OMB the responsibility for overseeing the management of federal information technology by specifying that the authorities conferred upon the Secretary of Commerce and the Administrator of the General Services Administration (GSA) are "subject to the direction of the President and the fiscal and policy control of the Office of Management and Budget."[98] OMB exercises its policy control through the review of the draft agency regulations promulgated under authorities granted by the Brooks Act. It also reviews the budget requests and program and policy activities for those offices in GSA and the

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[97]"Circular A-130," sec. 6(i).

[98]Brooks Act, sec. 759.

Department of Commerce that have responsibilities under the Brooks Act.

The Brooks Act grants the Administrator of GSA the responsibility and authority to acquire and operate information technology for agencies and oversee agency acquisition and operation of information technology. Any federal agency wishing to acquire information technology for its own use must gain GSA's permission, called a delegation of procurement authority (DPA), to do so.

Congress, through the Brooks Act, concentrated all purchasing authority for information technology in the federal government in GSA. Federal agencies cannot acquire information technology, as defined by the Brooks Act, without a delegation of procurement authority (DPA) from GSA. The delegation consists a letter from GSA that empowers the designated senior official for IRM requesting agency to solicit bids for information technology goods or services from private sector vendors. These delegations take several forms.

GSA grants agencies "regulatory delegations," often referred to as "blanket delegations," for information technology acquisitions below $2.5 million over the life

cycle of an acquisition.[99] Based on periodic reviews, GSA

may raise the level of a blanket delegation to recognize

agency management capacity. GSA recently raised the blanket

delegation for the Department of Treasury to $10 million as

the result of a GSA review of Treasury's management and

acquisition practices.[100] Agencies receiving a blanket

delegation have prior approval from GSA for these

acquisitions and do not need to justify them on a case-by-

case basis.

Blanket delegations differ significantly from the

approval process GSA requires of a federal agency for those

information technology acquisitions that exceed the agency's

blanket delegation level. An agency must prepare an Agency

Procurement Request (APR) for each acquisition that exceeds

the dollar threshold of the blanket delegation. The APR

initiates a federal agency's formal request to GSA for a

DPA. GSA gives its approval to these requests by granting

delegations to the agency designated senior official (DSO)

for IRM. In special cases, when an agency employee gets

concentrated acquisition training from GSA (called Trail

Boss training), GSA will grant the DPA directly to the

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[99]General Services Administration, "Federal Information
Resources Management Regulations," (FIRMR) 44 CFR 201-
20.305-1.

[100]Francis A. McDonough to Steven W. Broadbent, 23 Dec
92, General Services Administration, Washington, D.C.

"Trail Boss" instead of the DSO.[101]

The Trail Boss has been certified by GSA to have the qualifications and training to lead the acquisition subject to less oversight from GSA and the designated senior official than otherwise is the case. For instance, it is possible for an agency to get a Trail Boss DPA prior to having fully defined at the requirements for the information technology the agency wishes to buy. Normally, an agency must include such a requirements analysis, which states the mission, technical, and economic justification for the items to be procured, as part of the agency procurement request.[102]

Based on the standards and guidelines developed by the National Institute of Standards and Technology (NIST), the Secretary of Commerce promulgates standards on federal information technology. These standards are mandatory on federal agencies to the extent that the Secretary of Commerce "determines necessary to improve the efficiency of operation or security and privacy of Federal Computer Systems."[103] A similar standard comes into play when the Secretary of Commerce may waive standards in instances in which he or she finds that applying a standard on a system

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[101]GSA, FIRMR, 44 CFR 201-20.305-3.

[102]GSA, FIRMR, 44 CFR 201-20.305-3 and FIRMR Bulletin C-5.

[103]Brooks Act, sec. 759 note.

operator is not offset by governmentwide savings.

Beyond laying out responsibilities for OMB, GSA, and the Department of Commerce, the Brooks Act establishes criteria for evaluating proposals to acquire and operate information technology. The valuative terms used in the act include "least costly alternative," "economic and efficient," and "efficient and effective."[104] Clearly, the overriding goal of the Brooks Act is to ensure the economic and efficient acquisition and operation of information technology.

Paperwork Reduction Act

For OMB, the PRA adds to the policy oversight and review requirements created by the Brooks Act. In particular, the PRA gives OMB a positive responsibility to develop policy for the management of information technology throughout the federal government. Provisions of the PRA also require OMB to help agencies acquire and use information technology through the review of agency budget requests, other plans, and analysis that support information technology projects.[105]

Beyond assigning these responsibilities to OMB, the PRA establishes evaluation criteria to guide OMB's policy

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[104]Brooks Act, sec. 759.

[105]PRA, sec. 3504.

making. Section 3501 of the PRA, which states the purpose

for the law, expands on the criteria established by the

Brooks Act to include the following goals for federal agency

use of information technology:

a) improve service delivery and program management;
b) increase productivity;
c) improve decision making;
d) reduce waste and fraud; and
e) reduce information processing burden for the
federal government and for the publics that provide
information to the federal government.[106]

The PRA also creates a reporting requirement that

applies both to OMB and to all federal agencies covered by

the act. When the PRA passed in 1980, it called for OMB, in

consultation with GSA, to prepare a five-year plan for

meeting the information technology needs of the federal

government. Then, the 1986 amendments to the PRA required

each covered agency to prepare and annually update a five-

year plan for meeting the information technology plans of

the agency "in accordance with appropriate guidance provided

by the Director."[107] The PRA does not specify the content of

these plans in either instance.

Related Information Management Laws

Other public laws, such as the Computer Security Act

of 1987, the Privacy Act, and the Computer Matching Act,

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[106]PRA, sec. 3501.

[107]PRA, sec. 3506.

have bearing on the agency management of information technology. Although these statutes also create OMB and agency requirements for managing information technology, they are less significant than the Brooks Act and the PRA because they build on the core responsibilities of the two seminal laws. This section discusses some procedural and reporting requirements that these laws impose on federal agencies.

The Computer Security Act directs information technology managers to protect sensitive information contained in federal computer systems. Although the Computer Security Act builds in many ways on the authorities and responsibilities of the Brooks Act, it uses a broader definition of information technology to encompass more systems.[108] One additional term, sensitive information, as defined by the Computer Security Act, also makes the applicability of the act very broad.

> The term 'sensitive information' means any information,
> the loss, misuse, or unauthorized access to or
> modification of which could adversely affect the
> national interest or the conduct of Federal programs,
> or the privacy to which individuals are entitled . . .
> [109]

Most agencies find that almost every system under their

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[108]The Computer Security Act of 1987, U.S. Code, vol. 40, sec. 759 (1987).

[109]Ibid.

purview is subject to the requirements of this act because

so many computer systems contain sensitive information.

The Computer Security Act contains only one

evaluation standard that has implications for management of

information technology. Several sections of the act discuss

the need for "cost-effective" security and privacy of

sensitive information in federal computer systems. More

specifically, for each computer system covered, the act

stipulates that federal agencies shall

> . . . establish a plan for the security and privacy of
> each Federal computer system identified by that agency
> pursuant to subsection (a) that is commensurate with
> the risk and magnitude of the harm resulting from the
> loss, misuse, or unauthorized access to or modification
> of the information contained in that system.[110]

Additionally, the Computer Security Act places a reporting

requirement on agencies that they include a summary of these

computer security plans in the five-year plans required by

the PRA.

The Privacy Act requires the federal government to

protect an individual's right to privacy when government

information identifies as an individual. Unique identifiers

of an individual, defined a "record," may include data

elements such as the individual's name or identifying number

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[110]Ibid.

(e.g., case number), or even a photograph.[111] Privacy Act

requirements pertain to paper-based and automated

information activities and therefore do not affect

information technology planning uniquely. Nonetheless,

information technology managers must understand the due

process requirements associated with the creation of a

system of records under the Privacy Act and plan for the

required public comment period.[112]

The Computer Matching Act, which amends the Privacy

Act, specifically addresses computer matches, and clearly

involves information technology. As defined by the Computer

Matching Act, a matching program is the "computerized

comparison of two or more automated systems of records."[113]

By definition, therefore, the Computer Matching Act applies

to automated systems. Like the Privacy Act, this act deals

primarily with notifying and gaining the consent of the

citizen for the federal government's use of personal

information. This Act requires some level of security for

personal information during the matching process, but is

intended primarily to ensure the protection of due process

rights for citizens, and therefore does not represent an

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[111]The Privacy Act of 1974, U.S. Code, vol. 5, sec. 552
(1974).

[112]"Circular A-130," Appendix I.

[113]The Privacy Act, sec. 552a.

additional management requirement beyond that of the Computer Security Act or the Privacy Act.

OMB Policy

Due to the language contained in the PRA, OMB is the highest executive branch policy maker for information resources management, which includes information technology. This section of the chapter identifies the OMB policy documents that specify agency oversight and action for the management of information technology. See Appendix E for a brief explanation of the form and content of OMB's policy making documents.

Circular A-130

OMB exercises its oversight responsibilities for information technology in several ways, but the primary policy for information technology management is OMB Circular No. A-130, "Management of Federal Information Resources," issued on December 25, 1985. Although OMB has amended and added to the circular to deal with such issues as the Computer Matching Act and the 1986 amendments to the PRA for information dissemination, the core policies for overseeing federal agency management of information technology have remained constant since OMB issued Circular A-130 in 1985.

Circular A-130 articulates governmentwide IRM policy, dividing the policy discussion in section 8 of the circular

into two parts. This division reflects conceptual and policy considerations requiring different emphasis when managing information technology versus information. The following discussion of Circular A-130 deals only with section 8b, "Information Systems and Information Technology Management." It relies, in part, on Appendix IV of the circular, which provides an analysis of key sections of the circular, including section 8b.

The opening section of section 8b lays out the characteristics of agency planning processes for information technology. It describes the planning process that agencies should employ, but not the content or format of an agency plan. The first policy principle in section 8b of the circular says that agencies should

> establish multi-year strategic planning processes for acquiring and operating information technology that meet program and mission needs, reflect budget constraints, and form the bases for their budget requests.[114]

Consistently throughout, the circular mentions that agency operation of information technology should be "cost-effective." This applies, in particular, as a standard of analysis when: (1) comparing between contract and inter-agency sharing as a means of acquiring information processing capability, (2) comparing acquiring commercial

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[114]"Circular A-130," sec. 8b(a).

off-the-shelf software between developing custom software and, (3) dictating whether agencies should prescribe the use of particular processing facilities. The circular also reiterates criteria found in the Brooks Act that the acquisition of information technology should minimize cost to the government. Other OMB policy on computer security reiterates this point by including the phrases "cost-effective" and "commensurate with risk" to describe the "risk-based standard" for computer security planning.[115]

Two statements in the circular make it clear that agencies have a positive responsibility to create and enforce agency policies that carry out the requirements of A-130. The circular's section 9, "Assignment of Responsibilities," echoes the requirements of section 3506 of the PRA, which also lays out agency responsibilities for carrying out the law. Specifically, the circular says

> the head of each agency shall: . . .
> (2) Ensure that the information policies, principles, standards, guidelines, rules, and regulations prescribed by OMB are implemented appropriately within the agency;
> (3) Develop internal agency information policies and procedures and oversee, evaluate, and otherwise periodically review agency information resources management activities for conformity with the policies

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[115]Office of Management and Budget, "Guidance for Preparation of Security Plans for Federal Computer Systems That Contain Sensitive Information," OMB Bulletin No. 90-08 (Washington, D.C.: Office of Management and Budget, 1990).

set forth in this Circular; . . .[116]

Agencies, therefore, have primary responsibility for
ensuring that their policies conform to those principles and
policies laid out in Circular A-130 and Circular A-11, which
is discussed in the following section.

Circular A-11

While Circular A-130 does not explicitly address how
agencies should evaluate potential information technology
investments, OMB does devote significant policy attention to
this topic in its budget formulation policy. Under
authority provided by several public laws,[117] OMB annually
updates OMB Circular No. A-11, "Preparation of Agency Budget
Requests," which contains specific guidance on agency
preparation of budget requests to the President each fall.
Section 43 of Circular A-11 deals exclusively with agency
spending on information technology.

Section 43 includes several analytical and reporting
requirements for information technology projects. It goes
beyond telling agencies how to prepare exhibits to support
their budget requests for information technology; it also

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[116]"Circular A-130," sec. 9(a).

[117]OMB derives its budget formulation and review
authorities from laws dating back to the Budget and
Accounting Act of 1921 up through the Budget Enforcement Act
of 1990. See U.S. Code, vol. 2, sec. 621.

includes supplementary requirements on conducting benefit-

cost analysis for information technology initiatives.

> Initiatives are expected to show a ten percent return
> on investment, that is, a positive net present value
> using a ten percent discount rate. Initiatives not
> meeting this standard shall include substantial
> additional justification for funding based on a
> specific, documented statutory requirement, or
> quantifiable but non-economic improvement to the
> agency's ability to perform its mission.[118]

Additionally, section 43 requires that agencies

submit benefit-cost analyses to OMB with agency budget

requests for information technology initiatives when costs

will exceed $25 million over the life cycle. These economic

analyses serve as budget justification materials to support

a request for financial, human, and information resources.

OMB reserves the right to request a benefit-cost analysis

for any information technology initiative contained in an

agency budget request, no matter whether it exceeds the $25

million life cycle threshold.

This section of Circular A-11 also says that any such

benefit-cost analysis must clearly articulate underlying

organizational and technical assumptions, provide a

comparison of at least three technical alternatives, and use

sensitivity analysis as a hedge against uncertainty. This

portion of the OMB policy also mentions that NIST's Federal

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[118]Office of Management and Budget, Circular A-11, sec. 43.2(c)

Information Processing Standards Publication (FIPS Pub) 64 provides one acceptable format for presenting benefit-cost data to meet the section 43 requirements.[119]

Grounding Circular A-130 to the Policy Framework

Status of Public Law

One observation that emerges from reading the public law is the apparent contradiction between the goals of the PRA and Brooks Act. The Brooks Act articulates a narrow view of the role for information technology by stressing how it should promote economy and efficiency. In part, this philosophy reflects uses for information technology when the law was drafted. Mainframe computers were the predominant form of information technology when the Brooks Act was enacted. These resources were so expensive Congress wrote the Brooks Act to ensure that agencies pooled them, with the assistance of GSA, to avoid unnecessary duplication. Since information technology did not support mission-critical applications, there was little practical need to consider service delivery benefits when buying information technology.

The PRA, by comparison, takes a broader view of the

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[119]Department of Commerce, National Bureau of Standards, Guidelines for Documentation of Computer Programs and Automated Data Systems for the Initiation Phase, FIPS Pub 64 (Washington, D.C.: Department of Commerce, 1979).

role of information resources and, in particular, information technology. Whereas the Brooks Act seems primarily concerned with control of a scarce resource, the PRA attempts to create a new conceptual framework for defining a set of resources agencies should manage. This new framework includes managing information resources as if they were budget dollars or staff years supporting program delivery. The purposes section of the act, quoted earlier, clearly goes beyond the economy and efficiency tenets of the Brooks Act.

The preceding analysis provides a basis for evaluating OMB and agency policies for managing information technology. To the extent that these laws stand at the highest level of government policy making, they create responsibilities for agencies, establish evaluation criteria for complying with the law, and specify products that manifest agency compliance with the law. This analysis of public laws sets the stage for moving down to the next level of policy making and administrative discretion.

Status of OMB Policy

Comparing Circular A-130 with the relevant public laws reveals as much about the dissimilarities as the similarities between the two. The enactment of the PRA in 1980 created a tension for OMB's policy making in Circular

A-130 in 1985. Was OMB supposed to hark back to the cost-minimizing tradition of the Brooks Act? Alternatively, should OMB take the PRA updated goals for acquiring information technology, which included improving program management and decision making, reducing information collection burden on the public, and increasing productivity? OMB's answer emerges when comparing A-130 with the public law.

An examination of the planning policy contained in Circular A-130 raises several issues. First, neither the definition section nor Appendix IV of the circular explain what OMB means by the terms "strategic" or "multi-year." It remains to the reader to divine their meaning since they are used together. Given that the term "strategic" often refers to a long-term time horizon, one presumes that OMB's use of the term refers to the highest level of agency planning versus a bureau or program level. There is no indication whether two-year or ten-year might more appropriately comply with the multiyear requirement. The effect of this vague language is to give agencies broad latitude in deciding how to comply with the policy.

Second, budget considerations seem to overwhelm using information technology planning to support agency missions. Two of the planning requirements stress the relationship to the budget process, and only one addresses mission support.

97

Appendix IV, which only discusses OMB's five-year planning efforts, cites the PRA selectively in defining the purposes of planning for information technology. The appendix asserts that the PRA requires OMB to "promote the use of the technology to improve governmental efficiency and effectiveness."[120] In fact, though, the PRA includes several information technology functions for the OMB Director, one of which is to promote the use of information technology to "improve the effectiveness of the use and dissemination of data in the operations of Federal programs."[121] OMB neglected to cite these broader purposes for information technology in Circular A-130.

To the extent that OMB historically has approved less money than agencies have requested to include in the President's budget, the relationship of the planning process to the budget process has mixed implications. Both the policy and the appendix make it clear that information technology and the resulting plans should drive the agency budgeting for these resources. Beyond the budget year for the President's budget, OMB often allocates less than agencies request, thereby restraining costs for information technology projects regardless of merit.

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[120] "Circular A-130," Appendix IV.

[121] PRA, sec. 3504(g)4.

98

Alternately, the close link between the planning and budgeting processes may help agency IRM organizations. For instance, having plans drive budgets sets up OMB's ability to exercise its policy oversight over agencies' information technology activities through the review of budget requests. As an example of how this linkage could work, OMB would not fund a budget request for an information technology project unless the project was justified in the agency's approved five-year information technology plan. Requiring that agencies' plans serve as the basis for budget request enables agency IRM organizations to exercise oversight similar to the authority the PRA provides to OMB.

Third, since OMB published the Circular in 1985 and Congress passed the Computer Security Act in 1987, A-130 does not include that law's requirement for computer security planning. While OMB provided interim policy carrying out the Computer Security Act in OMB Bulletin 90-08, it stressed the creation of plans for individual computer systems. Neither of OMB's bulletins on computer security planning incorporated the requirement of the Computer Security Act that effectively amended the PRA by requiring a summary of agency computer security plans in the

agency five-year information technology plan.[122]

Fourth, another glaring omission of A-130 is any explicit discussion of how agencies should evaluate investments in information technology. Despite the clear language in the PRA stating the purposes for agencies to invest in information technology, OMB does not carry the spirit of this language into Circular A-130. Recall that the PRA cites improvements to service delivery and program management as the key purposes for acquiring information technology. The closest Circular A-130 comes to reiterating this philosophy is in the last entry in section 8b, which says that agencies shall

> seek opportunities to improve the operation of
> government programs or to realize savings for the
> government and the public through the application of
> up-to-date information technology to government
> information activities.[123]

As discussed earlier, OMB policy making is not totally silent on this issue since Circular A-11 does include policy language for evaluating proposed investments in information technology. While the language in section 43 of Circular A-11 does not explicitly embrace the philosophy

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[122]See Office of Management and Budget, "Guidance for the Preparation and Submission of Security Plans for Federal Computer Systems Containing Sensitive Information," Bulletin No. 88-16 (Washington, D.C.: Office of Management and Budget, 1988), and "Guidance for Preparation of Security Plans," OMB Bulletin No. 90-08.

[123]"Circular A-130," sec. 8b(18).

100

of promoting service delivery found in the PRA, Circular A-11 permits agencies to propose such information technology initiatives. Unlike Circular A-130, it provides unambiguous guidance on what evaluation criteria agencies should use to evaluate information technology investments.

A Policy Framework for Managing Information Technology

The preceding legal and policy analysis has explicated the goals, discussed responsibilities, and stated desired outcomes for federal agency management of information technology. It reviewed the basic authorizing law and its interpretation in OMB's governmentwide policy making. This analysis provides a governmentwide policy framework for managing federal information technology by interpreting and integrating public law and OMB policy guiding federal agency management of information technology.

This policy framework goes beyond a mere description of laws and policies, though. It provides the normative basis for evaluating agencies' policy and operational directives. It presents a combination of OMB policies and those legal requirements that Congress created since OMB published A-130 in 1985 that agencies should adopt in their policy making governing the management of information technology. Table 2 presents these analyses in the form of a summary of legal and policy requirements for managing

information technology in the federal government.

Table 2 presents analyses that address the first issue relating to the research question, which probes the adequacy of the Circular A-130 policy for OMB oversight of federal agency management of information technology. To judge adequacy in this context, one must consider whether the circular is complete when compared to the requirements of public law, whether it includes understandable evaluation criteria to guide agency decision making, and whether it reflects the complexity of the current technical and organization environment agencies must work within.

Table 2 - Summary of Policy Framework for Managing Information Technology

Mandatory Policy Elements	Source of Mandatory Policy Element
Prepare and annually update a five-year information technology plan.	Paperwork Reduction Act
Establish multi-year strategic planning processes for acquiring and operating information technology that meet program and mission needs.	Circular A-130
Include a summary of computer security plans in the five-year plan.	Computer Security Act
Planning processes should reflect budget constraints.	Circular A-130
Planning processes should form the bases for budget request.	Circular A-130
Agencies are required to prepare benefit-cost analyses for all information technology initiatives.	Circular A-11
Such benefit-cost analysis must clearly articulate underlying organizational and technical assumptions, provide a comparison of at least three technical alternatives, and use sensitivity analysis as a hedge against uncertainty.	Circular A-11
Information technology initiatives are expected to show a ten percent return on investment. Initiatives not meeting this standard shall include substantial additional justification for funding based on a specific, documented statutory requirement, or quantifiable but non-economic improvement to the agency's ability to perform its mission.	Circular A-11

Despite the addition of new legal requirements since 1985, OMB has not updated the circular since originally issued. Supplemental guidance provided through OMB bulletins only nominally updated the circular. Additionally, OMB's reliance on bulletins to update the circular requires agencies to meld several policy documents to understand all of OMB's governmentwide policy for information technology.

The circular treats information technology as the only resource to be managed, rather than one of several resources (e.g., information technology, financial, and human) that public administrators can bring to bear on program delivery. In addition to viewing the management of information technology as separate from other resources, the circular primarily promotes efficiency and economy. Although OMB developed the circular to carry out the requirements of the newly enacted PRA, it reflects the traditions of the Brooks Act.

In writing Circular A-130, OMB never resolved a tension between the Stage 1 tradition of the Brooks Act and the Stage 2 aspirations of the PRA. This tension results from the overlap of policy coverage between the PRA and the Brooks Act overseeing OMB's policy making responsibilities for information technology in the federal government. As Congress contemplated the passage of the Paperwork Reduction

Act in 1980, the legislative history documents Congressional reasons for this overlap between the PRA and the Brooks Act.

In the report accompanying the Senate version of the bill, the Senate Committee on Governmental Affairs explained its intent in incorporating Brooks Act responsibilities for overseeing information technology policy in the PRA.

> S. 1411 incorporates the objectives of the Brooks Act to (1) procure ADP resources economically and efficiently as possible and (2) procure only those resources which are needed and can assist in the management of Government programs.[124]

This report language indicates the committee was aware of how the two laws overlapped in this area. Nevertheless, this awareness did not prompt the committee to resolve the inconsistency between criteria for evaluating information technology contained in the Brooks Act and the PRA.

As a result, the lack of any explicit criteria for evaluating information technology investments leaves Circular A-130 incomplete. While it is possible to supplement Circular A-130 with the policy from section 43 of Circular A-11, placing the return-on-investment policy in a budget circular sends a mixed message. It is conceivable that agencies would interpret the placement of this policy statement in Circular A-11 to mean that they only had to

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[124]Senate Committee on Governmental Affairs, Paperwork Reduction Action 96th Cong., 2d sess., 1980, S. Rept. 930, 9.

prepare benefit-cost analyses for budget justification
purposes, not as a more general management tool.

Circular A-130 reflects the management philosophy and
techniques of when it was originally drafted. In 1984, IRM
theory and practice were still quite new, and Circular A-130
represented forward thinking then. Using the stages of
management described in the review of the literature,
Circular A-130 falls squarely between Stages 1 and 2.
Though it purports to integrate the management of
information and information technology, the policy section
of the circular is cleaved in half in recognition of the
different management traditions. Even within the policy
section for information technology, most of the policies
deal with the management of technology without establishing
clear linkages to program delivery and management.

CHAPTER 5 - AGENCY POLICIES: CONTENT AND ANALYSIS

This chapter presents an analysis and discussion of agency policy making for managing information technology. Answering the research question of whether Circular A-130 shapes agency management of information technology begins with an assessment of how agencies apply OMB policies. To judge the effectiveness of Circular A-130 it is necessary to assess whether agencies apply the circular directly or as interpreted through agency policy making. Therefore, this chapter presents an assessment of the consistency of federal agency policies with the policy framework for information technology management presented in the previous chapter.

This chapter is based on an analysis of the data collected from the 1991 data call on information technology management policies that OMB sent to the agency designated senior officials (DSOs) for information resources management (IRM) (presented at Appendix A). Besides establishing a linkage between the agency policies and the policy framework for managing information technology, the analysis of the data call responses serves as a screening device for selecting candidates for the comparative case studies presented in the next chapter. The analysis of agency

responses to the data call provides the formal
organizational context for policy application and
enforcement, which is one factor that shapes how effectively
an agency applies Circular A-130.

Reading the agency policies and procedures returned
to OMB in response to the 1991 data call proved more
informative than reading the agencies' responses to the
questions asked in the data call. Sometimes the responses
flatly contradicted the stated policies of the agencies that
they themselves provided! Nonetheless, the analysis and
discussion presented in this chapter reflect insights gained
from both sources.

Background Information on Agency Policies

Part of the analysis of agencies' policies for
managing information technology was to determine some
general characteristics of those policies. Although the OMB
data call did not ask agencies to describe all
characteristics of their policies for managing information
technology, background data were gleaned from the responses
to the data call.[125] Table 3 presents a summary of these
data.

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[125]Agency responses to memorandum from James B. MacRae,
Jr., to Selected Agency Senior IRM Officials, 8 July 1991,
"Data Collection on Agency Information Technology Planning
and Budgeting Practices," Information Technology Management
Branch, Office of Management and Budget.

Table 3 - Agency Policies: Background Information

Characteristics	Majority of Responses	Minority of Responses
Agencies with formal policies	18 agencies sent copies of a policy	3 agencies did not send copies (2 had policies but did not send copies)
Date policy guidance issued	10 agencies issued policies since 1989	8 agencies issued policies before 1989
Annual update of operational guidance through annual data call	17 agencies put out operational guidance annually, including the agency that lack formal policy	2 agencies do not have operational guidance; 1 uses a handbook; and 1 has combined policy and operational guidance
Source of agency management policy	18 agencies use in-house methods (10) or GSA's Information Systems Planning Method (8)[126]	1 agency, which did not have a formal policy, cited a process created by a consultant

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[126]General Services Administration, Information Systems Planning Handbook and Information Systems Planning Handbook: Phase II.

Age of Agency Policies

Most agencies used a mix of formal policy and
operational guidance to manage the use of information
technology in the organization. A little more than half the
agencies submitting formal policies had updated their
policies in the last several years; the remainder of the
updates predated 1989. The analysis uses the date of policy
issuance as an indicator of the currency of the policy. The
use of 1989 as a cutoff date reflects an estimate of a
sufficient amount of time for an agency to incorporate
changes resulting from the 1986 amendments to the Paperwork
Reduction Act (PRA) and the Computer Security Act of 1987.

Thus, many agencies provided dated policies in
response to the data call. In part, the age of agencies's
policies may reflect the fact that OMB has not revised
Circular A-130. However, OMB's failure to revise Circular
A-130 does not totally relieve agencies of the
responsibility to update their policies to conform with
changes in law. Additionally, OMB has provided interim
guidance through OMB Bulletins that agencies could draw on
for revising their own policies.

OMB released policy statements after Circular A-130
was signed in 1985 to cover a number of information
resources management topics, including the management of
information technology. Some policy statements took the

form of an OMB Bulletin. For instance, OMB Bulletin No. 90-08, "Guidance for Preparation of Security Plans for Federal Computer Systems that Contain Sensitive Information," contained the following statement

> This Bulletin will remain in effect until it is superseded by a revision to OMB Circular No. A-130 and incorporated into standards or guidelines to be issued by NIST.[127]

OMB reiterated legal requirements for information technology management in other policy documents. OMB Bulletin No. 91-10, "Information Resources Management (IRM) Plans Bulletin," reminded agencies about the 1986 amendments to the PRA.

> The 1986 Amendments to the Paperwork Reduction Act require that each agency "develop and annually revise a five-year plan, in accordance with appropriate guidance provided by the Director [of the Office of Management and Budget (OMB)], for meeting the agency's information technology needs."[128]

Another issue that arises about policies dating back to the early 1980s is that the agencies may not still use the oversight mechanisms cited. This was especially true for the older policies that mentioned specific positions or offices for inclusion in oversight boards. The narrative descriptions of decision-making processes provided by

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[127]Office of Management and Budget, "Guidelines for Preparation of Security Plans for Federal Computer Systems."

[128]Office of Management and Budget, "Information Resources Management (IRM) Plans Bulletin," OMB Bulletin No. 91-10 (Washington, D.C.: Office of Management and Budget, 1991), 3.

agencies indicate that many oversight groups described in policy have been changed substantially or have fallen into disuse. Two examples illustrate these changes in oversight groups more specifically.

Enclosures to the Navy's response to the 1991 OMB data call included references to two planning boards that appear to serve the same planning review and oversight function.[129] That letter to OMB mentioned a "DON Strategic IR [information resources] Planning Board" that developed a strategic plan for the management of Navy information resources for 1991. Enclosure 3 to the letter listed the membership of a "DON IR Planning Board." Enclosure 5 to that letter included a letter from the NAVY IRM office concerning a meeting of the Navy IR Planning Committee, referencing a 1985 Navy policy.[130] The Navy's 1985 policy for information resources planning, enclosure 2 to the letter cited above, relies on an IR Planning Committee to

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[129]Rear Admiral R.M. Moore, SC, U.S. Navy, "Data Collection on Agency Information Technology Planning and Budgeting Practices," to Director, Office of Management and Budget, 24 October 1991, Office of Management and Budget, Information Technology Management Branch, Washington, D.C.

[130]Nina Cornett "Information Resources (IR) Planning," to a distribution list of Navy offices, 28 December 1989, Office of Management and Budget, Information Technology Management Branch, Washington, D.C.

review information systems plans of Navy offices.[131] Without

having revised the 1985 policy, the Navy had renamed and

reconstituted an information systems oversight board at

least three times based on the letter provided to OMB

between 1985 and 1991.

The Department of Labor response to the OMB data call

indicated a similar evolution of roles, responsibilities,

and membership in its information systems oversight process.

In the cover letter forwarding Labor's response to OMB, the

Director of the Labor IRM office discussed how the Program

Review Budget Committee provided review and oversight over

Labor agency information systems budget and plans as part of

the budget formulation process.[132] An attachment to the

letter, written in 1987, discusses the department's

information technology management policy. This 1987 policy,

still in place at the time Labor responded to OMB's data

call in 1991, discusses an "IRM Executive Steering

Committee" and a "IM/ADP Technical Committee" which had

oversight over agency-wide information systems planning and

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[131]Secretary of the Navy, "Information Resources (IR)
Program Planning," SECNAV Instruction 5230.9A, 16 October
1985, Office of Management and Budget, Information
Technology Management Branch, Washington, D.C. , 7-8.

[132]John Dineen, "Department of Labor Information
Technology Planning and Budgeting Practices," to James B.
MacRae, 4 September 1991, Office of Management and Budget,
Information Technology Management Branch, Washington, D.C.

use issues. The approval process for information systems plans and budgets provided in the 1991 letter made no reference to the two groups established in the 1987 departmental policy. The fact these two groups were not mentioned in the 1991 letter suggests that either the two groups either no longer existed or played a substantive role in the department's oversight process for information systems.

Operational Guidance

Although not all agencies reported so, a reading of agency policies showed that seventeen agencies relied on some form of operational guidance to supplement the main policy documents. Operational guidance, as distinct from formal policies, typically stress how the agency should complete reporting requirements instead of stipulating normative policy requirements. Whereas agencies updated their formal policies for managing information technology infrequently as discussed above, agency information resources management offices issued operational guidance to agency offices annually. Of those seventeen agencies, two used operational guidance even though they did not provide copies of their formal policies. Another two agencies did not report on operational guidance and one agency reported that its policy document also served as operational

guidance. One agency sent a copy of a handbook that served as operational guidance.

For those seventeen agencies that sent copies of operational guidance, the nature of the guidance varied greatly. Nine of the seventeen used an annual data call to collect data from agency sub-units and to update budget data required by section 43 of Circular A-11. In most (sixteen) cases, agencies used the operational guidance to direct the preparation of information technology plans for subagency units or specific sites. These kinds of guidance were very process oriented and did not provide a substantive frame of reference for creating a true agencywide plan. By default, the agency-wide plan could be no more than the agency IRM organization putting a cover letter on a collection of bureau plans.

Three of these sixteen agencies provided a broader context for planning that included forecasts of technology, policy, or changes in the agency environment. These agencies used operational guidance to forecast changes in technology or in the agency environment to provide context for updating agency plans and budgets. This more substantive guidance provided a greater basis for bureaus and field organizations to plan from a common set of principles and assumptions.

Source of Agency Policies

The final general characteristic analyzed was whether the agency grounded its information technology management policy in a preexisting methodology. In particular, one question in the data call asked whether the agency adapted a management methodology created for the private sector or whether it created a policy based solely on its interpretation of the policy framework for managing information technology. This question responds to the assertion made by the "In the Woods" paper prepared by IRM officials from executive branch agencies discussed in Chapter 1. That paper asserted that governmentwide policy forces agencies to engage in planning for "regulatory purposes" versus using planning to meet the decision-making and resource allocation needs of the agencies.[133]

Overwhelmingly, agencies used in-house staff to develop their own interpretation of the policy framework. Eight of the eighteen agencies that relied on in-house staff to develop their information technology management policy said they used or adapted GSA's Information Systems Planning (ISP) methodology discussed in Chapter 2. Only one agency, which did not have a formal policy, said they adopted a management framework from private-sector practices.

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[133]GSA, <u>Working Group to Rethink Strategic Planning</u>, i.

The extent to which agencies reported relying on GSA's ISP method deserves elaboration. A closer reading of the policies allegedly modeled after this method revealed that the policies capture very little of its substance. This finding is significant because the ISP method does not focus on compliance with regulatory processes such as GSA or OMB policies. Instead, the GSA handbook describes how agencies can organize a study process to create planning documents that articulate agencywide information and information technology architectures that link to agencywide missions and goals. In addition, GSA's ISP model is a very tight adaptation of IBM's Business Systems Planning model. None of the respondents suggested they knew that GSA's method had its genesis in IBM's Business Systems Planning.

If agencies had adopted the GSA ISP method, as they asserted, their policies would have dealt more with architectures than with regulatory processes such as gaining a delegation of procurement authority (DPA) from GSA. This point, in addition to the data displayed in Table 3, confirms the finding made by the "In the Woods" group. Agency policy making focuses more on the regulatory process required to prepare the required five-year plan or to gain GSA DPAs. Even in those cases in which the agency purported to rely on the ISP method, the processes the agencies created to meet these regulatory requirements obscured the

more substantive planning processes and products called for
by the ISP process. Most troubling, though, is the
possibility that agencies responded that they relied on
GSA's method without knowing what it was. The implication
is that agencies cited a method intended to define
information resource architectures without understanding the
implication of the model.

Consistency Between Agency Policies and the Policy Framework

To fulfill its responsibilities under the policy
framework for information technology management, an agency's
own policies should address the mandatory factors depicted
in Table 2. A brief description of the results comparing
agency policies with each element of the policy framework
follows Table 4. Table 4 provides a summary of the
consistency between agency policies and the policy framework
for information technology management.

Table 4 - Agency Policies Compared to the Policy Framework

Mandatory Policy Element (Source of Policy Requirement)	Number of Agency Policies Appearing Consistent	Number of Agency Policies Not Appearing Consistent[134]
Multi-year planning process is linked to strategy (A-130)	11	10
Planning reflects budget constraints (A-130)	11	10
Plan serves as basis for budget request (A-130)	12	9
Prepare and annually update a five-year plan (PRA)	11	10
Five-year plan includes a summary of computer security plans (CSA)	3	18
Require benefit-cost analysis with 10 percent return on investment (A-11)	13	8 (7 mentioned efficiency or effectiveness)

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[134]Includes policies for which it was difficult to determine consistency.

Multiyear Strategic Planning Process

The extent to which agencies complied with the
planning provisions of Circular A-130, calling for agencies
to employ multiyear planning processes for acquiring and
operating information technology, varied a great deal. All
four of the DOD respondents fell into the group of eleven
agencies whose policies provided for a multiyear strategic
planning process for information technology. In their
responses, the four DOD respondents discussed the role that
information technology management plays in the planning
programming budgeting system (PPBS) process. The linkage
between the information technology planning and the PPBS
process make such planning both strategic and multiyear.
For the ten agencies that did not comply with this
requirement, the planning processes created by the policies
covered from three to five years, but were not strategic as
it was difficult to find out how they integrated subagency
or project-specific plans into an agencywide plan.

It was not surprising that four of the agencies
complying with this portion of the policy framework came
from DOD. Almost by definition and by application, PPBS
helps to ground all resource decisions made by DOD agencies
in a multiyear strategic planning process. Even if the
information technology policy did not exhibit these
characteristics, merely relating it to the PPBS process

would make it comply with Circular A-130. However, at the
time of the data call, the office of the secretary of
defense response did not include a strategic information
technology planning process or plan that tied together the
efforts of the DOD agencies and the three military services.
Nonetheless, the multi-year focus and explicit link to DOD's
mission makes these processes strategic.

By comparison, non-DOD agencies generally lacked a
readily identifiable strategic planning process, such as
PPBS, that would serve as a framework for multiyear
strategic planning for information technology. This may in
part have reflected the lack of a legal or OMB requirement
for agencies to conduct strategic or "business" planning.
While some agencies stressed the need to link information
technology planning to agency strategy, this linkage
typically took place at the program or subagency level, so
that the agency as a whole lacked a strategic vision for
information technology.

Relating Planning and Budgeting

The results were equally mixed for the other two
major requirements for agency information technology
planning processes. A little over half (eleven) of the
responses demonstrated that information technology planning
reflected budget constraints. Less than half (twelve)

responded that the result of the planning process served as the basis for the agency budget request. Except in one agency, where the plan did not serve as the budget request, the same eleven agencies complied with both these elements of the policy framework.

For those agency policies that did comply, there was an explicit desire for the agency planning to serve as an analytic check point during the agency budget process. This checking would take the form of requiring that the IRM office approve a plan for a project before the agency budget request was submitted to OMB. Reading about coordination processes agencies undertook to create this linkage made it clear that agency IRM and budget organizations have to work very closely for this coordination to occur.

The agencies that did not meet these two requirements maintained that their planning efforts were not related to the agency budget formulation process. There was no indication of how information technology planning reflected guidance provided by the President's budget or the appropriations process. Of those remaining agency policies not yet discussed, two policies made a specific point of having program managers plan without consideration of fiscal constraints, reflecting a stated desire to get a "realistic view" of planning without regard to budget constraints imposed by OMB or Congress.

Annual Update to the Five-Year Plan

To fulfill one element of the policy framework, agency policies had to include a statement that the planning process resulted in the preparation and annual update of a five-year plan that met the requirements of the PRA. Eleven of the responding agencies' policies included such a statement. The DOD respondents included a requirement to update their plans every other year, as did one other non-DOD agency. Five other agencies were silent on the issue. Of the three agencies that lacked formal policies, one called for plan updates through the annual data call; the remaining two did not fill the policy void in that way.

Although almost half the responding agencies did not comply with this requirement, some were disqualified on a technicality. DOD services and agencies updated their plans every other year instead of annually. If plans were to relate to the budget process, DOD could not update their plans annually.

Computer Security Act Requirements for Five-Year Plans

Only three of the responding agencies' policies had a requirement that their five-year plan include a summary of computer security plans. Two of the agencies that updated policies since 1989 included this requirement. One agency that did not provide a formal policy nonetheless included

123

this requirement in the agency's annual data call that provided operational guidance.

As mentioned earlier, the Computer Security Act of 1987 effectively amended a requirement of the PRA by stipulating that an agency's five-year plan include a summary of the agency's computer security plans. Neither Circular A-130 nor the OMB Bulletin that served as interim guidance to agencies mentions this change. Few agencies have revised their policies recently enough to incorporate this change.

Benefit-Cost Analysis and Return on Investment

Although the requirement to perform benefit-cost analyses for information technology initiatives is found in Circular A-11 instead of Circular A-130, more agencies complied with this portion of the policy framework than with any other requirement. The criteria agencies used in their policies for evaluating investments in information technology varied between being quite specific to being vague. Over half the agency policies cited some notion of economic return on investment, using the time value of money over the life cycle, to decide which projects to fund or pursue.

Other agency policies included noneconomic criteria, such as the relationship of the proposed investment to

program needs, compliance with agency or governmentwide standards, and maintainability. In several instances, policies relieved project managers of the responsibility of showing a positive return on investment if the system helped to meet statutory or regulatory requirements, consistent with OMB policy contained in section 43 of Circular A-11. The agency policies that did not comply with the Circular A-11 requirement did not cite the principles of return on investment or the ten percent threshold for such returns.

For those eight agencies that did not comply with the Circular A-11 requirements, several elements were missing. In seven cases, the policy emphasized least cost and efficiency without any mention of benefits. These policies perpetuated the evaluation criteria articulated in the Brooks Act without considering the elements of the PRA that OMB included in Circular A-11. More troubling were those agencies that listed criteria such as return on investment and minimizing cost, but did not say which decision criteria were most important. Many agency policies included a laundry list of criteria that did not prove that the agency understood or took very seriously the requirement to perform return-on-investment analysis.

Management Mechanisms Not Required by the Policy Framework

Many agencies use other management mechanisms besides

those required by the policy framework. Although the data

call did not specifically request policy documents on these

topics, many agencies either provided copies of or discussed

related policies. Table 5 summarizes these data on

management mechanisms not required by the policy framework.

Table 5 - Management Mechanisms Not Required by the Policy Framework

Management Mechanism	Number of Policies That Included Management Mechanism	Number of Policies That Did Not Include Management Mechanism
Project-level life cycle management policy or guidelines	10	11
High-level or senior oversight group	9	12
Post-implementation review	9 (post-implementation or GSA IRM review)	12
APR approval process for acquiring FIP resources	6	15

Project-level Life Cycle Management Policy

Almost half the agencies supplemented their
agencywide planning policy with a separate policy or
guideline that covered project-level life cycle management
(LCM). These LCM policies included the Major Automated
Information Systems Review Council (MAISRC) process of DOD.
In DOD, the LCM document was agency policy and had as much
weight as other management policies for information
technology. Other agencies offered guides that did not
serve as binding policy. It was not clear, based on reading
of the agency responses to the OMB data call, whether
agencies with life cycle management policies followed those
policies.

In all cases, the agency presumed that project
managers should use a linear LCM model. The best example is
DOD's MAISRC, which requires the approval of certain
analytical documents at predetermined milestones. Such
management techniques are referred to as a linear LCM model
because a project manager has to complete one milestone
review before moving on to the next set of tasks. These LCM
philosophies do not encourage, and may discourage,
revisiting previous decisions or working on several sets of
milestones simultaneously--hence the term linear.

Agencies that supplemented their information
technology management policy with LCM guidance varied on how

the policy was carried out. Several agencies gave project managers some discretion in applying LCM models and sometimes required them only for "major" information systems. The definition of the term "major" varied across agencies. Some agencies relied on the definition contained in A-130, which emphasizes managerial importance, while others used a life cycle cost threshold.

High-Level or Senior Oversight Groups

Nine of the agencies described a high-level review group, consisting of either policy-level or senior career officials. The purposes for establishing these groups and their decision-making capabilities varied greatly. Some met only to work on the agency five-year plan. Others were chartered to take on a broader variety of tasks, including making recommendations on funding specific projects, coordinating agencywide policy, or overseeing the LCM process for particular projects.

Often, it was difficult to figure out whether review groups created some time ago were still active or playing the same role originally envisioned by the policy statements. Agencies' descriptions of information technology planning and budget processes did not always match policy documents. Sometimes, the narrative of the agency response to the OMB data call referred a group with

129

another name than in the agency policy. More frequently, the agency narrative on budgeting and planning coordination did not mention a group chartered in the agency policy provided.

Post-Implementation Review

Fewer than half (nine) of the responding agencies' policies addressed evaluations after the implementation phase of an information technology project. Agency post-implementation review policies took two basic forms: Five had policies that took an audit approach to the reviews, asking questions about achieving user satisfaction, completing the project on schedule and within budget, and adhering to standards. Four agencies reported on post-implementation reviews as the final phase of a LCM method. These policies addressed issues of continuing need for the project, whether the system met user needs, and whether the system still operated cost-effectively with up-to-date technology.

These post-implementation reviews took several forms. Several agencies included their participation in GSA's annual IRM review program as a post-implementation review policy.[135] Other agencies specifically targeted systems for

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[135]GSA runs an IRM Review program that annually examines agencies' efforts to comply with the DSO for IRM's responsibilities under section 3506 of the PRA.

periodic review to assess the continuing need for the systems. If the review revealed a continuing need for a system, some policies called for an obsolescence review to learn whether a system upgrade could improve system performance or decrease cost of operation.

Approval Process for Acquiring Information Technology

Less than half (six) of the responding agencies discussed the approval process for acquiring information technology in their management policy. These policies provided integration of the acquisition approval process with resource allocation such that a program sponsor could not get acquisition authority--a DPA from GSA--without an approved budget or plan for the project. For the remaining fifteen agencies, it was not possible to tell how the acquisition approval process related to other information technology management policies.

Of the twenty-one agencies, fifteen split their information technology acquisition policy from the management policy, a finding that supports the hypothesis of "In the Woods" working group on strategic planning that planning processes only meet regulatory processes. This split presents the possibility that the oversight is not coordinated and integrated. As a result of this lack of integration between the APR approval process and the agency

131

management policies, agency IRM staff may be deprived of an effective enforcement mechanism on management policy issues. Lacking the ability to reward policy compliance with an agency procurement request--or withhold an APR for lack of compliance--IRM policy enforcement must occur through the budget processes.

General Discussion of Agency Policies

Have agencies adopted enough of Circular A-130 and other OMB policies to assess their effectiveness in managing information technology? Some agencies apparently do not feel they have to maintain formal policies. Other agency policies are so inconsistent with the policy framework for information technology one wonders about agencies' understanding of Circular A-130 and related public laws and policies. The general lack of consistency of agency policies with key parts of the policy framework, which includes Circular A-130, makes it difficult to judge the effectiveness of the circular. Two inconsistencies that emerged from analyzing the data on agencies' policies for managing information technology suggest an analysis and discussion of agencies' policies is insufficient for judging the ultimate impact of Circular A-130.

First, inconsistencies between the content of their policies and descriptions of agency practices brings into

132

question how faithfully agencies use their own policy. For example, the description of agency practice for information technology budgeting and planning was often inconsistent with requirements contained in the policy. Agency narratives described processes for coordination that exceeded the requirements of the agency policy. The most common inconsistency between policy and reported practice was the use of oversight groups. These discrepancies raised the possibilities of inaccurate reporting, dated policies becoming irrelevant, or extensive informal coordination beyond what the policy required. The discussion of agency practices in the next chapter shows that, in some cases, agency IRM organizations are holding project managers to higher and more recent standards of management practice than found in agency policy making.

Second, inconsistency between agencies' reported versus the actual policy for managing information technology raised issues about which version of the policy--reported or actual--are enforced. Agencies' written responses to the OMB data call, the reported policy, used current buzzwords such as "enterprise" planning and "Critical Success Factors," even when these ideas could not be found in the agency policies. Despite the popularity of these new management practices, neither OMB policy nor agency interpretation of OMB policy reflected these recent

innovations on how to manage information technology. This discrepancy between stated and reported policy was especially true in the case of the DOD response, which mentioned many principles of its corporate information management (CIM) program that had not yet been codified in DOD directives.

It is interesting to consider which of the elements of the policy framework was followed most frequently. Agencies' policies were consistent most often with the policy framework element to conduct benefit-cost analyses. This relatively high level of consistency may reflect the potential enforcement provided through the OMB budget review and formulation process. While the other elements of the policy framework are more difficult to check and enforce, OMB can visibly deny funding requests for proposed information technology investments if a completed benefit-cost analysis is lacking

Additionally, agencies used management mechanisms not required by the policy framework nearly as much as the mandatory elements. The same nine or ten agencies that maintained policies consistent with the policy framework also went beyond those required elements. The remaining agencies' policies neither were consistent with the required elements of the policy framework nor included additional management control mechanisms.

This brings us to the need to examine how agencies applied their policies for managing information technology. Several agencies with policies identified as highly or mostly consistent with the policy framework have experienced well-publicized problems with information technology planning and project management. These problems have occurred even in those agencies that maintain policies extending beyond the policy framework. Within the same agencies, different bureaus have diametrically opposed experiences managing information technology projects, raising questions about whether the application of policy may be more important than the policy itself.

CHAPTER 6 - AGENCY CASE STUDIES: FINDINGS AND COMPARISON

This chapter expands on the analysis of agency policies to probe for underlying trends and explanations. The chapter begins with four case studies of agency application and enforcement of policies for managing information technology. Each case study provides insights, through an examination of a particular decision and the agency's decision environment, into the organizational and environmental variables that support or impede the effective application of Circular A-130. The final part of this chapter presents a cross-case comparison that analyzes variables that influence policy application and enforcement among the four cases. Common findings across the cases are used to help to identify opportunities for improving agency application of policy framework for information technology, including Circular A-130.

It is important to note that these case studies depict a set of policies, organization structures, and decision environments at a particular point in time. The election of President Clinton after the data on agency policies were collected has prompted a near total turnover in the policy officials serving as agency designated senior

officials (DSOs) for information resources management (IRM).
Additionally, several of the agencies have changed their
policies or organization structures. As a result, these
case studies reflect events and conditions as of 1991 and
the preceding years, and not necessarily as of the
completion date of this dissertation.

Commerce - Automated Patent System

This case is an example of the group of agencies that
maintained policies that were largely consistent with the
mandatory requirements of the policy framework for
information technology. The case is set in the Patent and
Trademark Office (PTO) of the Department of Commerce.
Commerce consists of several prominent bureaus such as the
Census Bureau, the International Trade Administration, the
National Institute of Standards and Technology (NIST), and
the National Oceanic and Atmospheric Administration (NOAA).
Because each bureau has a unique mission, the only things
the bureaus have in common are the policy and administrative
infrastructure. From an information technology perspective,
for example, there is little need for the Census Bureau to
share census data with NOAA, which is primarily concerned
with managing data about the weather. In FY 1991, the
Department of Commerce obligated over $500 million for
information technology.

Organization Structure

The Commerce Office of Information Resources Management (OIRM) reported to an assistant secretary for administration, who was a political appointee. Offices that participated in the oversight of information technology under this assistant secretary included budget, procurement, planning and organizations, and OIRM. OIRM staff members exercised oversight through "desk officer" assignments. Desk officers reviewed bureau plans, agency procurement requests (APRs), requirements analyses, acquisition plans, and budget requests for information technology. This desk officer role provided the staff person with an integrated view of each bureau's information technology activities. An OIRM staff person might serve as the desk officer for one or more bureaus, depending on the size and complexity of the bureau's information technology program.

Although the budget and procurement offices had the final say on some information technology matters, the IRM staff contributed to these offices' decision making. For instance, OIRM made recommendations to the budget office on funding for information technology based on a comparison of agency budgets with agency information technology plans. OIRM had decision making authority on technical and policy issues regarding information technology. As an example,

OIRM staff members conducted technical reviews, which covered compliance with Federal Information Resources Management Regulation (FIRMR) and agencywide technology standards, in support of the procurement office's APR approval process.

At various times, offices under the assistant secretary for administration have maintained forums for bringing together the various agency-level staff offices that have responsibilities for information technology oversight and review. The intent of these efforts has been to coordinate and inform rather than to serve as decision-making forums. Interest in and activity of these forums varies based on the interest of the particular assistant secretary for administration.

Budget and IRM staff described the culture of the staff offices under the assistant secretary for administration as not being strong on policy enforcement or rigorous analysis. Historically, the bureaus described the contents of their budget requests and did not provide supporting analysis. As a result, decisions were generally based on advocacy and political clout of bureaus rather than compliance with agency policy. The agency budget staff did not normally present alternatives to the bureaus' budget requests. At the time of the decision making discussed below, a special branch that performed analysis and

evaluation of major projects existed in the budget office.
This group supplemented the budget analyst(s) normally
assigned to review a bureau's budget request. This branch
analyzed issues or projects that cut across bureau lines or
involved technical content requiring special expertise.

Agency Policy Making

The major agency policy document for managing
information technology was written in 1986.[136] The Commerce
IRM staff relied on its own expertise and experience to
draft the agency policy, drawing on a working group made up
of the department's IRM and operating-units' staff.[137] The
policy provided for the issuance and maintenance of the
Information Technology Management Handbook that laid out
operational policy direction to guide information technology
activities in the agency.[138] The overarching goal of the
policy was to integrate budgeting, planning and acquisition
review, and oversight.

The agency supplemented the handbook with a data call

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[136]Department of Commerce, "Management of Information
Technology," Departmental Administrative Order 212-2
(Washington, D.C.: Department of Commerce, 1986).

[137]Reed Phillips to James B. MacRae, Jr., 18 September
1991, Office of Management and Budget, Washington D.C.

[138]Department of Commerce, Office of Information
Resources Management, Information Technology Management
Handbook, rev. ed., (Washington, D.C.: Department of
Commerce, 1991).

to bureaus as part of an annual agency-wide information technology planning process. This annual data call requested the bureaus provide an update to what Commerce policy calls "concept studies" for information technology projects.[139] Bureaus updated their plans annually by reporting accomplishments in the concept studies, making changes in assumptions, or revising projected resource requirements. Project schedules were updated based on changes in funding, events in the acquisition process, or other factors arising during the planning period or foreseen for the future.[140] It also required the bureaus discuss computer security requirements for each concept study. The Department used these annual updates to the concept studies as the basis for preparing the agency's information technology plan each year.

The handbook, issued by Commerce's OIRM, specified the content and organization of bureaus' information technology plans and concept studies. Additionally, OIRM possessed formal approval authority for the bureaus' plans.[141] The handbook required that each bureau prepare an

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[139]Reed Phillips to IRM Senior Officials, Department of Commerce, 13 February 1991, Office of Management and Budget, Washington D.C.

[140]Reed Phillips to James B. MacRae, Jr.

[141]Commerce, Information Technology Management Handbook, Section 6F.01.

information technology plan that included a section that

addressed environmental changes. Those changes could come

from a variety of sources including those internal to the

organizational unit, and may also have reflected external

factors such as agency directives, governmentwide policy, or

changes in law. Technology assessments could also serve as

an environmental factor that shaped how the bureau uses

information technology to meet its mission.[142]

The handbook laid out clear criteria for evaluating

bureaus' proposed investments in information technology.

This handbook states that:

> information technology resources are to be acquired,
> managed and used in the manner most beneficial to the
> Government, cost and other factors being considered.[143]

These criteria struck a balance between the economy and

efficiency concerns of the Brooks Act and the service

delivery goals of the Paperwork Reduction Act (PRA). The

policy contained in the handbook extended beyond laying out

planning requirements. The handbook incorporated policies

from the Federal Acquisition Regulations (FAR), the FIRMR,

and Federal Information Processing Standards (FIPS) Pubs.

Although the bureau plans are unconstrained by out-year

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[142]Commerce, <u>Information Technology Management Handbook</u>,
Attachment 6-A, Section F.

[143]Commerce, <u>Information Technology Management Handbook</u>,
Section 3.01.

budget ceilings, agency-approved bureau plans served as the basis for budget requests to OMB in the fall.

Neither the handbook nor the annual update to bureau concept studies addressed the need to perform post-implementation reviews. Commerce's letter to OMB did discuss post-implementation reviews, which bureaus conducted as part of the agency's IRM review program. The letter stated evaluation criteria used during these reviews included: (1) the degree of functionality delivered, (2) whether the project was completed on schedule and (3) whether the project was delivered within budget.[144]

Application of Policy

This case examines the decision making and policy enforcement surrounding a high-visibility application development project in PTO called the Automated Patent System (APS). Interviews in the agency suggest that PTO is considered a small bureau within Commerce. In this setting, smaller means fewer dollars and less prestige. For FY 1991, for instance, PTO obligated a little over $358 million compared to NOAA, which obligated nearly $1.5 billion.[145] This lack of budget stature typically resulted in the most

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[144]Reed Phillips to James B. MacRae, Jr.

[145]Office of Management and Budget, Budget of the United States Government: Fiscal Year 1993 (Washington, D.C.: Government Printing Office, 1992), Appendix One-386-396.

junior person on the agency budget office staff being assigned to analyze this PTO's budget. Interviews also indicated that budget size and status often predicted the political clout of a bureau within the agency. For instance, smaller, more obscure bureaus generally did not have the political power base to combat agency-wide policies.

The PTO has three core missions that it supports through its information technology investments. First, PTO examines applications for patents to determine whether an inventor is entitled to patent. Fulfilling this portion of PTO's mission involves examination of patent applications, a quasi-judicial review process for appeals of denied applications, and the printing of issued patents. In FY 1991, PTO received 167,715 applications and printed 92,474 patent grants.[146] Second, PTO examines applications for trademark to determine whether the criteria for the federal registration of a trademark have been met. PTO's work in this area includes review of trademark applications and a printing of issued trademark registrations. In FY 1991, PTO received over 120,365 applications for trademark and printed over 37,957 trademark registrations.[147] As an outgrowth of

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[146]Ibid.

[147]Ibid.

144

these two missions, PTO maintains an active information
dissemination program that constitutes the third mission.
PTO provides to the public, upon request, materials and
services necessary to assist the public in researching
patent and trademark applications. As part of the
dissemination program, PTO makes copies of existing patents
and trademark registrations.

The APS project involved automating a very paper-
intensive process, sometimes described as a "white-collar
sweat shop." Anticipated benefits from the project included
enhancing service to the public through better information
management, improving staff productivity by eliminating
unnecessary paper handling, improving quality through better
data integrity, and speeding up information dissemination.[148]
Because of the fundamental way the automation was changing
the PTO's work processes, this project involved substantial
employee retraining and organizational change.

Though PTO is a relatively small bureau in the
agency, the decisions surrounding the development of this
system garnered much attention from oversight agencies. OMB
highlighted the importance of this effort by including it on

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[148]Department of Commerce, Patent and Trademark Office,
"Decision Paper: Shall we proceed with the APS program?,"
April 1990, Department of Commerce, Washington, D.C.

the list of Presidential Priority Systems for several

years.[149] Congress, buttressed by GAO reports, found

problems with project management such as cost overruns,

schedule delays, operational shortcomings, and lack of

control over development contractors.[150]

As a result of pressure from OMB, which raised

questions about the operational and financial viability of

the project, the bureau and agency convened the Industry

Review Panel--a group technical experts from government and

private industry to assess the project's management. This

was an extraordinary step. Of the hundreds of information

technology projects federal agencies manage each year, very

few agencies agree to assessments done by high-profile and

independent experts.

In the spring of 1990, in preparation for the FY 1992

budget process, this project faced several decisions about

the scope of future development efforts. The PTO had to

gain support within Commerce and from external stakeholders

on whom funding depended--namely, Congress and OMB. An

analysis prepared by PTO staff presented two alternate

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[149]See, for instance, Office of Management and Budget,
Management of the United States Government: Fiscal Year 1987
(Washington, D.C.: Government Printing Office, 1986), 70.

[150]General Accounting Office, ADP Acquisitions: Patent
Automation Encountering Major Planning and Procurement
Problems, IMTEC 86-19 (Washington, D.C.: Government Printing
Office, 1986).

scenarios: (1) deploying existing systems capabilities to the balance of the production staff (effectively freezing the existing capability) or (2) expanding and improving on the existing capability.[151] The decision-making process sought answers to the question of whether the projected benefits for the systems enhancements justified the significant investments the bureau envisioned over the next several years.

During this period, the PTO attempted to bypass the agency policy by requesting increased funding without having an updated plan approved by OIRM. OIRM and budget staff enforced agency policy so that project funding remained level versus increasing over the previously approved amounts. PTO staff appealed this action to the deputy secretary, who upheld the recommendation of the staff offices enforcing the agency policy. Contrary to the culture of the organizations within the office of the assistant secretary for administration, the budget and IRM staff recommended an alternate funding stream for the project, which was less than PTO requested. On the strength of the analysis done by the Commerce IRM and budget staff, the bureau's appeal was denied.

The implications for not following agency policy

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[151]PTO, "Shall we proceed with the APS program?," 5-6.

varied from bureau to bureau, though. It was very difficult to enforce policy issues for the more powerful bureaus if the decision became "political"--especially when bureau staff were able to contact staffers of congressional committees, who would "protect" the bureau from department-level "meddling." These dynamics led one interviewee to say that the "department is inconsistent" in enforcing policy among the bureaus.

During this decision-making process, the PTO did not maintain its own written policy. Although PTO attempted to create its own policy document at one point, it did not complete that document due to a lack of management interest. The Commerce policy for managing information technology did not require agency approval of bureau policy so there was no basis to ensure the consistency of agencywide and bureau policy. Since then, the bureau documented the technique it used for managing the project.[152] Formalizing the technique in a policy document institutionalized a process that worked and provided a defense against oversight groups that otherwise might argue that project management was "undocumented" and therefore nonexistent.

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[152]Department of Commerce, Patent and Trademark Office, Managed Evolutionary Development Guidebook: Process Description and Application (Arlington, VA: Patent and Trademark Office, 1993).

Discussion

This example of the use of IRM policy and review
groups provides some insights into how the agency exercised
its IRM oversight responsibilities. It appeared that the
agency occasionally energized these groups in response to
congressional concerns that agency-level oversight of the
bureaus' information technology projects was insufficient as
in the case of the APS at PTO. Commerce went so far as to
convene the Industry Review Panel to provide oversight from
outside of the department. Neither the agency policy or
handbook chartered any oversight group to evaluate bureau
management of information systems projects. Despite the
intent to strengthen oversight, the "operating rules" for
these groups did not support such a role. The IRM and
budget staff received instructions to avoid creating
controversy. Reportedly, during meetings of the "oversight
group," senior officials gave staff the "fish eye" if they
asked critical or analytical questions. Staff interpreted
these signals of disapproval as an indication that these
forums were not appropriate for asking probing questions.

The existence of such oversight groups had the
potential to undermine agency-level effectiveness enforcing
information technology management. When the agency held
discussions at the oversight group meetings and did not
raise objections, even if all participants knew such

behavior was unacceptable, the bureau gained leverage. The IRM and budget staff could not raise policy concerns later without creating the impression that they were undermining higher level decisions. In effect, bureaus used the lack of disagreement in the oversight groups as tacit approval to keep budget and IRM staff at bay.

For the most part, the real decision making went on through the less formal and less visible coordination taking place during the budget formulation process. IRM and budget staff felt that their ability to influence decision making lay outside these "formal" forums. For example, desk officers in the agency IRM conducted on-site visits where they discussed policy issues with bureau staff, but these visits did not necessarily result in a written or formal report. The less visible the decision in a political sense, the more they could exercise policy and budget oversight. Alternatively, if the decision attracted political interest, decision making took place at a level higher than staff offices. In these instances, decision making was collegial--as opposed to adversarial--with less concern for adherence to policy principles.

A comparison of the differing effects of high-level involvement is instructive. Department of Commerce interviewees reported that oversight forums that lacked substantive content and did not make real decisions, and in

fact, undermined the regular staff-level oversight processes. Since no decision making took place, by design, it became possible to interpret the "non-decisions" several different ways. Alternately, when the decision-making forum was real, as the budget process was, it reinforced the policy principles at stake and the staff enforcing the policy. Sending messages through enforceable policy decisions greatly affected a bureau's inclination to follow agency policy.

The example of PTO's attempts to skirt agency policy makes it clear that even in some highly visible decisions, the agency policy worked effectively. In the instance of the bureau appeal to the deputy secretary, the IRM staff reported that the high-level denial of the bureau appeal "got the bureau's attention." Since then, PTO has "generally been more cooperative." This incident proved that there were clear consequences for a bureau that did not follow the agency policy because there was political support to provide lower funding for the bureau's project.

The IRM staff identified the budget approval and APR review processes as the most effective means for providing agency leverage for policy oversight of the bureaus. Generally, OIRM staff felt they had the most influence during the planning phases of an information technology project, for several reasons. One was that once a bureau

received funding in their operating budget year after year,
it became difficult to take that funding away. In effect,
the only budget resources "on the table" were incremental
increases since the budget review did not generally examine
base funding. Only in rare instances would the agency IRM
and budget staff reduce base funding for a project because
of a lack of compliance with policy. Also, as a project got
closer to implementation, the operational imperative made it
nearly impossible to stop the project even if it had gone
awry. At most, the IRM staff felt they could "slow down"
troubled projects by delaying acquisitions and spending
requests to gain compliance with policy.

The decision to fund the expansion of APS discussed
earlier occurred when the funding for the project came from
a one-year appropriation. This meant that actors, including
Commerce budget and IRM offices, OMB, and the appropriations
committees, all provided review and oversight through the
budget formulation process. Except for the congressional
committees, these groups also provided oversight and
approval during the budget execution process. However, in
the last two years, PTO gained authority to use
nonappropriated funds from a revolving fund to support the
project. The IRM, budget, and program staff all agreed that
this made oversight nearly impossible. This situation
extends the idea that the IRM and budget staffs influence

only those decisions that require budget resources above the baseline.

Interviews with agency staff in the budget and IRM organization indicated this decision-making process for funding the expansion for the APS in the PTO represented the difficulties they face often trying to enforce agency information technology policy. It was not unusual for bureaus, like PTO, to attempt to gain funding support for a information technology project without having completed the required analyses. As in similar cases in Commerce, the success of OIRM enforcing departmental policy depended on the ability to use the budget process to reduce the bureau's funding request as a means for forcing policy compliance.

In some respects, though, this example is atypical from other decision-making processes for approving funding for a bureau information technology project in Commerce. At time of the decision discussed in this case study (1990), OMB's Presidential Priority System (PPS) consisted of a list of eight projects.[153] Even though PTO was considered relatively small compared to Commerce's other bureaus, the decision surrounding the APS were subject to much greater scrutiny due to the designation as a PPS project. An

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[153]Office of Management and Budget, Budget of the United States Government: Fiscal Year 1991 (Washington, D.C.: Government Printing Office, 1990), 282.

153

interview with an agency-level analyst stated this was an

example of where "exceptional cases of outside criticism,

such as negative press coverage, a bad GAO report, or a

congressional inquiry," the agency would exercise oversight

over a bureau.

Defense - Composite Health Care System

This case is set in the Department of Defense (DOD),

which consists of the U.S. Navy, including the U.S. Marine

Corps, the U.S. Air Force, and the U.S. Army (called

services for purposes of this discussion), and many DOD

agencies (e.g., Defense Logistics Agency, Defense

Intelligence Agency, etc.). Each service possesses a strong

mission and organizational identity apart from DOD as a

whole. The services and DOD agencies have bases and field

sites throughout the country and the world. This example

represents one defense agency from among the DOD services,

which all adopted policies that were unevenly consistent

with OMB's policy framework. In FY 1991, DOD obligated over

$9.6 billion for information technology among the military

services and other Defense agencies.

Organization Structure

DOD is unique under the Paperwork Reduction Act as

the law provides for a designated senior official (DSO) for

IRM in the office of the secretary of defense (OSD) and in

each of the three military services.[154] This research

examined the organizational structure only at the OSD level,

which experienced a major organizational change the year of

the OMB data call. This change fundamentally relocated the

position of DSO for IRM from the assistant secretary of

defense (comptroller) to the assistant secretary of defense

(command, control, communications, and intelligence (C^3I)).

Under the newer structure, two senior managers

reporting to the assistant secretary of defense (C^3I)

oversaw the IRM organization, which was split by function.

OSD interviewees said the organization made an explicit

decision to not use a desk officer scheme for overseeing

service activities. Several of those staff interviewed felt

that the undesirable potential to "go native," becoming an

advocate for a service, outweighed the benefits of agency-

specific knowledge across several management processes.

This philosophy extended so far that the policy making and

standards staff worked under a staff office separate from

the deputy assistant secretary of defense (DASD)

(information systems).

The DASD (information systems) exercised oversight of

military services' information technology programs on a day-

to-day basis, reviewing and approving work products that

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[154]PRA, sec. 3506(b).

required interaction with central management agencies such as OMB and GSA. These review processes included the Major Automated Information Systems Review Council (MAISRC) process, the coordination of the budget review process with the comptroller organization, and the long-range IRM planning function.[155] The specifics of the MAISRC review process are discussed in more detail in the agency policy section that follows.

The other portion of the IRM organization reported to the director of defense information (DDI), which was a staff office to the assistant secretary of defense (ASD) C^3I. The DDI staff worked on nonprocess issues such as setting agencywide policies, defining technical architectural standards, and defining work process redesign policies. Although the two chains of command within the OSD IRM organization were clearly separate, the staffs worked cooperatively on policy and oversight issues.

Because the services each have a DSO, they did not work through OSD to gain a delegation of procurement authority (DPA) from GSA. As a result, the services had the ability to send an APR directly to GSA. The services did not exercise centralized control over the APR review

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[155]Department of Defense, "Automated Information Systems (AISs) Strategic Planning," Department of Defense Directive 7740.2 (Washington, D.C.: Department of Defense, 1987).

156

process, which enabled project managers to seek DPAs

directly from GSA without prior approval from the service or

OSD IRM organization.

Agency Policy Making

This analysis addresses OSD policies, not those of

the services or other DOD agencies. As is the case with all

agencywide policies in DOD, the services had the option to

interpret the OSD policies to fit their mission needs and

culture. When the services chose to carry out the OSD

policy through service-level policies, OSD reviewed these

so-called implementers for consistency with OSD policy.

Despite this OSD review process, the services policies

varied widely in terms of both consistency with the OMB

policy framework and the level of specificity.

The OSD policies affecting the management of

information technology spanned several documents and topics.

Policies for managing information technology reflected an

in-house interpretation of the policy framework and did not

reference any private-sector methods. Much like OMB policy

documents, OSD policies stated policy principles in

"directives" and supplemented them with procedural guidance

in "instructions," which services and agencies could

interpret. Agencywide strategic planning and budgeting

processes, defined through the Planning, Programming, and

Budgeting System (PPBS),[156] were a significant overlay for all information technology management policies. All other management policies fit into the PPBS framework, especially those relating to planning and resource allocation.

The substance of the OSD management control and oversight process for information technology was found in the life cycle management (LCM) policy establishing the MAISRC.[157] Although there was a separate policy for information technology planning,[158] the LCM policy addressed most requirements of the policy framework for information technology. This LCM policy established a high-level project management and review process, which was run by the MAISRC. This council, which was chaired by the comptroller (who was the DSO for IRM at the time of the OMB data call), consisted of representatives of the major staff offices within OSD (i.e., Comptroller, C^3I, Program Analysis and Evaluation, Operational Test and Evaluation, Acquisitions

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[156]Department of Defense, Assistant Secretary of Defense (Comptroller), "The Planning, Programming, and Budgeting System," Department of Defense Directive 7045.14 (Washington, D.C.: Department of Defense, 1984).

[157]See Department of Defense, "Automated Information System (AIS) Life-Cycle Management Review and Milestone Approval Process," Department of Defense Instruction 7920.2 (Washington, D.C.: Department of Defense, 1990), and "Life-Cycle Management of Automated Information Systems (AISs)," Department of Defense Directive 7920.1 (Washington, D.C.: Department of Defense, 1988).

[158]DOD Directive 7740.2, "AISs Strategic Planning."

158

Policy, and Program Integration) and representatives from

each service.

The following is a brief synopsis of the MAISRC LCM

control process for automated information systems (AISs).

> Under recently revised DoD LCM policies, there are five
> phases (numbered zero through four) in the life cycle
> of an AIS. These are Needs Justification, Concept
> Exploration and Definition, Design and Validation,
> Development, Deployment, and Operations and Support.
> The basic control mechanism is the LCM Milestone. All
> new AISs and existing AIS modernizations are subject to
> milestone approval at each phase of the LCM process.
> These approvals are based on review that address the
> activities that have been performed in the preceding
> LCM Phase and the plans for the next LCM phase.[159]

The MAISRC process required sponsoring services to gain

approval to proceed with AIS projects at predetermined

"milestones." The MAISRC policy laid out each of those

milestones, which marked a movement between phases in the

life cycle of a MAISRC program, and the required analysis in

great detail. This policy did not apply to automated

information systems imbedded in a weapon system or used

exclusively in a cryptological activities.[160] Interviewees

described the cryptological projects, often sponsored by the

DOD intelligence community, as "black" programs, meaning

that they were not subject to the typical "sunshine" of

public oversight processes.

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[159]Cynthia Kendall to James B. MacRae, Jr., 27 September
1991, Office of Management and Budget, Washington D.C., 6.

[160]DOD Directive 7920.1, p. 1.

The MAISRC policy pertained to "major" AISs, defined

as those projects whose costs exceeded $100 million between

the need justification and deployment phases, cost more than

$25 million in any one year, or were designated as being of

special interest by OSD regardless of cost.[161] Staff members

from the group that served as the secretariat for the MAISRC

estimated that MAISRC programs (their term for projects)

accounted for approximately twenty percent of the DOD

spending on information technology in a given year.

Based on the quality of the products a service

presented to OSD in early milestone reviews, the service

could gain milestone delegation authority. Milestone

delegation authority relieved the service from having to

gain approval from the MAISRC for proceeding from one phase

to another in the life cycle. Thus, demonstrated good

management by the service allowed greater autonomy from

detailed OSD oversight. Delegated milestone review still

required quarterly reporting to the MAISRC office, however.

For those AIS projects under direct MAISRC oversight, the

MAISRC could require "in-process" reviews between regular

milestone approvals if a MAISRC program was experiencing

trouble. If a delegated AIS project exceeded predetermined

tolerances for measures like cost and schedule, OSD could

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[161]See DOD Instruction 7920.2, Enclosure 2, p. 1 and DOD
Directive 7920.1, p. 6.

suspend the delegation and bring an information technology

project back under direct MAISRC milestone control.[162]

Congress provided support to this decision-making

forum in appropriations law dating back to FY 1987. The

following language made it illegal for a program manager to

obligate funds for activities that the MAISRC had not

approved.

> None of the funds appropriated or made available by
> this Act may be obligated for acquisition of major
> automated information systems which have not
> successfully completed oversight reviews required by
> Defense Department regulations.[163]

The following illustrates how this appropriation language

would work in practice. A program manager of a MAISRC

program could not obligate funds for activities in Milestone

4, deployment, until the MAISRC had reviewed and accepted

its accomplishments for Milestone 3, development, and the

plans for Phase 4. This appropriation language gave the

MAISRC milestone review process the force of law.

Even without the backing in statute, the MAISRC

process had the potential to wield a great deal of power.

Beyond granting delegated milestone review authority to the

services, the MAISRC made decisions on budget formulation

and other resource allocations. The MAISRC process did not,

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[162]DOD Instruction 7920.2, p. 10.

[163]Department of Defense Appropriations Act, 1993,
Public Law 102-396, sec. 8028.

however, cover the review of APRs going to GSA. While the MAISRC could cut off funding for a contract once awarded, this decision-making body could not prevent a MAISRC program from gaining a delegation from GSA or awarding a contract for lack of conformance to DOD policy. The significance of this lack of authority was that the MAISRC was limited to one of the two major enforcement mechanisms (budget approval and APR approval) discussed in the previous chapter.

Nonetheless, lack of compliance with MAISRC guidance could result in a cutoff of funding or a limitation on asking contractors to do work, even under existing contracts. With this potential power, though, came the responsibility that the sanctions be applied selectively. The participants in the MAISRC process and the supporting staff office weighed the political costs of "stepping in front of a speeding train" as one person put it.

Among those staff members interviewed on how the MAISRC worked, there was clear consensus that the process was better served if decisions were made prior to the milestone review meeting. Generally, the benefits to the MAISRC process resulted from the staff work leading up the meeting. Putting a program on the MAISRC schedule for a formal review served as an action-forcing event that required the program management staff to "get their papers in order" to demonstrate the program was well managed. The

definition of good staff work in these situations was to
make sure the formal meeting would ratify staff-level
agreements. The "system" broke down if the principal
decision makers went into a milestone review meeting without
agreement on whether a program had demonstrated sufficient
management competency to proceed to the next milestone.

All those interviewed, including current and past
program managers, said that the documentation required for
the MAISRC milestone review should be a natural output of a
well-managed program. As a result, the preparation for a
milestone review did not have to be "a drill" in which the
program management staff had to prepare documents like a
benefit-cost analysis or an analysis of technical
alternatives just for the MAISRC. Without exception, those
DOD staff members interviewed stated that good program
managers typically had such materials at least
conceptualized, if not "on the shelf." One OSD staff member
used the following analogy to describe how the MAISRC
documentation requirements were grounded in common sense.

> After all, you do not allow a builder to start applying
> mortar to the bricks until the mason has a permit and
> plans look like they make sense.

For information technology programs with life cycle
costs less than $100 million, the dollar threshold at which
a program was covered by the MAISRC process, policy
oversight was left to the services. Even though the

services maintained their own versions of the MAISRC policy, reportedly not all services actively applied those policies. The services tended to use their own review processes to ensure that program managers had the necessary documentation to succeed at the OSD MAISRC. Although there was a requirement that a service-level MAISRCs approve a program prior to OSD MAISRC milestone review,[164] OSD interviewees stated the services did not subject program managers to a service-level MAISRC review prior to the OSD MAISRC review.

At the time of the OMB data call, the DOD policy lacked one major element of the policy framework. Although the policy has been changed subsequently, in 1991 it did not provide for a planning process that would bring together an agencywide view of information technology planning. Each service provided a plan under the policy, but OSD did not provide an overview that related the planning efforts of the services to agencywide strategies or approaches for information technology. Nonetheless, the agency's strategic planning and budgeting processes did ensure that plans were multiyear, served as the agency budget request, and reflected budget constraints as required by Circular A-130.

Application of Policy

The MAISRC program selected as a case study was well

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[164]DOD Instruction 7920.2, p. 5.

under way at the time of the study. The Composite Health

Care System (CHCS) was undergoing in-process review between

Milestones 3 (development) and 4 (deployment). The

precursor to the CHCS program dated back to the early

1970s.[165] The goal of the CHCS program was to

> improve the effectiveness and economy of the health
> care delivery administered by the Military Departments,
> through the application of standardized automatic data
> processing (ADP) techniques to health care information
> systems.[166]

The purposes of CHCS included the delivery of medical

services and management information reporting through 29

integrated modules.

CHCS was intended to support physicians in DOD

medical treatment facilities, both hospitals and clinics, by

providing on-line access to patients' medical records. The

system was also supposed to automate other hospital

functions such as pharmacy, laboratory, radiology, nursing,

and inpatient and outpatient clinical services. The

benefits from automating these functions included increased

efficiency of medical treatment facilities, improved service

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[165]General Accounting Office, <u>Better Communication,
Cooperation and Coordination is Needed in the Department of
Defense Development of its Tri-Service Medical Information
System Program</u>, LCD-76-117 (Washington, D.C.: Government
Printing Office, 1976.

[166]Department of Defense, "Tri-Medical Information
System (TRIMIS) Program," Department of Defense Directive
6000.5 (Washington, D.C.: Department of Defense, 1976), 1.

delivery to patients, and higher quality care to patients. The resulting productivity improvements would allow DOD military treatment facilities to serve more patients, thereby avoiding charges to the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). CHAMPUS reimburses families of uniformed military service members for health-care services costs to see non-DOD providers when they cannot get care through the DOD health-care system.[167]

When the contract was awarded in 1986, the estimated life cycle costs exceeded $800 million. OMB identified this project as a "significant information systems project" as part of the FY 1986 budget.[168] CHCS was subject to MAISRC oversight because of its life cycle cost.

This project was unique, although not atypical, within DOD in several regards. First, CHCS supported a similar function for all three services. A user could go to a medical care facility supported by this system on any military base in the world and find the same system regardless of whether it was an Army, Navy, or Air Force operation. Typically, a military service sponsored a MAISRC

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[167]Department of Defense, Defense Medical Systems Support Center, "System Decision Paper: Composite Health Care System" (Washington, D.C.: Department of Defense, 1989).

[168]Office of Management and Budget, Management of the United States Government: Fiscal Year 1986 (Washington, D.C.: Government Printing Office, 1985), 52.

program instead of a organization made up of representatives of all three services. Since the program office consisted of staff members from all services, it did not maintain its own policies and relied directly on OSD policy. As a result, it was impossible for the MAISRC to delegate milestone review to a particular service.

Second, the agency used an acquisition technique described in OMB Circular No. A-109, "Acquisitions of Major Systems."[169] This circular says the government may select several vendors from among the offerors and pay them to conduct operational tests of their proposed software and hardware solutions prior to awarding the contract. For this project, the government paid for four vendors to conduct "extended benchmark tests" with live data in DOD facilities. Very few agencies except for DOD use this circular to acquire information systems since it is written to govern acquisitions such as weapon systems more so than information technology.

Because of perceived management problems, such as the unnecessary development of custom software and potential cost overruns, Congress has devoted specific interest to CHCS. As part of the annual oversight process, Congress

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[169]Office of Management and Budget, "Acquisition of Major Systems," OMB Circular No. A-109 (Washington, D.C.: Office of Management and Budget, 1975).

included language in the FY 1986 authorization law that effectively delayed the acquisition of CHCS, pending the completion of an evaluation. DOD was prohibited from completing the acquisition of CHCS until it evaluated a custom-designed CHCS, a private sector alternative, and a system called the Decentralized Hospital Computer Program (DHCP) developed by the then Veterans Administration. This language required DOD to conduct operational testing and evaluation of these competing systems (CHCS, DHCP, and a private sector alternative) and report to Congress on the results of those tests. This same law required GAO monitor DOD's evaluation and report to Congress on their findings.[170]

This 1986 law, and similar language put into the following year's authorization, specified which vendors DOD should evaluate as part of the competition called for in Circular A-109. This had the effect of requiring that one bidder would use a specific programming language, Mumps, used in VA's DHCP.[171] Due to escalating costs beyond original estimates, Congress placed an obligation cap of $1.1 billion in 1986 dollars for the life cycle expenditures

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[170]Department of Defense Authorization Act of 1986, Statutes at Large, 99, secs. 718-720.

[171]Department of Defense Authorization Act of 1987, Statutes at Large, 100, secs. 3900-2.

for the system in FY 1987.[172]

Interviews with the CHCS program management office
said they used their own staff and a home-grown database
model to prepare the required benefit-cost analysis rather
than rely than contractor support. Although the program
management office was working to incorporate the results of
operational testing into the model, GAO and the MAISRC
review documentation expressed reservations about the
credibility of the analysis.[173] The validity of potential
costs and benefits of the program was an issue that the
MAISRC had worked with the CHCS program on over several
milestone reviews. Other issues that the MAISRC provided
feedback to CHCS on included the appropriate level of
security to protect sensitive data in the system and the
adequacy of the program's telecommunications plan for
handling the anticipated volume of data transfer required by
the system.[174]

Over time, the relationship between the program

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[172]Congress, House, Committee on Appropriations, Report
to Accompany the Department of Defense Appropriations Act of
Fiscal Year 1987, 99th Cong., 2d sess., 1986, H. Rept. 793,
18-19.

[173]See General Accounting Office, Composite Health Care
System Is Not Ready To Be Deployed, IMTEC-92-54 (Washington,
D.C.: Government Printing Office, 1992).

[174]Duane P. Andrews to Assistant Secretary of Defense
(Health Affairs), "MAISRC In-Process Review of the Composite
Health Care System," 5 June 1991, Washington, D.C.

office and the MAISRC oversight staff changed dramatically. The current program management staff acknowledged their predecessors attempted to keep oversight organizations from knowing too much about the status of the automation effort during the early years of the program. Apparently, the previous program management staff informed oversight organizations of problems or changes in plans "at the last possible moment," and even then usually under duress.

The current program management staff speculated that some of the undue interest from Congress and GAO stemmed, in part, from this hostile attitude towards external oversight. This speculation was based on a feeling that oversight organizations such as GAO did not want to be denied what they believed to their legitimate role in holding a MAISRC program accountable to Congress or to the Secretary of Defense. Under such conditions of mistrust and disagreement about the scope of appropriate oversight, the oversight dialogue could move away from a discussion of substantive problems with the program and move towards a power struggle among particular individuals.

In contrast, during the interviews conducted for this research in 1991, the CHCS program management office and the MAISRC oversight staff members spoke about each other with mutual respect. It was clear that the CHCS and the program oversight staff in OSD maintained an ongoing dialogue rather

than just talking formally around the time of a milestone review. This is not to say that the two groups always agreed on everything, but it appeared that the disagreements had at least taken on a more civilized tone than reportedly had been the case in the past. OSD staff attributed this change to new leadership in the CHCS program management office.

In general, the CHCS program management staff were very purposeful in their efforts to be as open as possible with oversight groups, acknowledging that there was a calculated risk in being "too honest." To the extent oversight organizations have to report issues such as schedule delays or cost overruns they find during their reviews, it is conceivable more "problems" may become public knowledge because the program management staff have adopted a philosophy of full disclosure. Nevertheless, the CHCS program management staff interviewed felt that oversight organizations would ultimately put less of a drag on the program if they kept oversight organizations informed of both good news and bad news throughout the project's life cycle.

Discussion

Despite the recent upheavals in the OSD IRM organizational structure that occurred in 1991, the MAISRC

171

process created a potentially powerful decision-making forum. Since the MAISRC oversaw resource allocation decisions and the execution of procurement plans, it was able to reward good behavior and punish miscreants. There was little question that program managers faced sanctions for not complying with the substance and procedures of the MAISRC policy when the OSD staff and members of the MAISRC wanted to enforce it. Without exception, though, all those interviewed said that political considerations sometimes played a role in the enforcement of this policy.

In this context, it was bureaucratic politics versus partisan politics that influenced the decision-making process. For instance, most information technology programs reportedly did not comply exactly with the requirements of the MAISRC policy. As a result, one staff member said it was always possible to "find justifications" to use the MAISRC process to "punish" particular program areas for reasons that might not have much to do with enforcing information technology management policies. Interviewees described instances where a decision maker on the MAISRC might raise objections about a information technology project, in part, to retaliate against another decision maker that had prevailed in another decision-making forum.

Alternatively, several OSD staff members spoke very pragmatically about not fighting battles they had no hope of

winning. If it appeared that a milestone review decision

might be made on political instead of policy grounds, OSD

staff "rolled over" to preserve the "integrity of the

process." In their view, it was important to raise policy

issues only when they could make the policy "stick." To do

otherwise, which would entail losing a policy fight in a

very public forum, would effectively dissipate the impact of

raising policy issues through the MAISRC process.

The issue of program size and prominence arose in

several conversations as a factor related to the services'

and OSD's ability to oversee a AIS project. Staff members

interviewed indicated that staff-level oversight tended to

be more effective as exemplified by the statement, "we were

hell on the little guys." In the context of the interview

when this point came up, "little guys" included those AIS

projects that had relatively low life cycle costs (compared

to MAISRC programs) or lacked a powerful sponsor/advocate

with the Department.

However, below the lifecyle cost threshold where the

MAISRC policy applied, high-visibility programs, especially

those with powerful sponsors, were more difficult to

oversee. The imperative to support the mission of the

service overrode information technology management policy

considerations that were typically viewed as procedural and

not adding value. In these cases, it was difficult for OSD

staff to confront a recalcitrant project manager without the clout of the MAISRC process.

This lack of oversight of non-MAISRC program is troubling given that, by OSD staff estimates, as much as 80 percent of the DOD annual budget for information technology was not covered by the MAISRC process. The vast majority of the management of information technology programs rested with the services and DOD agencies. Interviews of OSD IRM staff characterized one service's management philosophy by saying that the service applied its own policy only when a program was in "trouble." Trouble, in this context, typically meant that outside oversight organizations like GAO or GSA had published a critical report or that a congressional committee had reduced funding below that requested in the President's budget.

This is not to say that all service-level oversight always was inadequate. Interviewees said it was, however, inconsistent. Discussions with OSD staff indicated the strength and rigor of the oversight varied greatly among the services. For those services with strong oversight of non-MAISRC programs, OSD IRM involvement seemed less necessary. In those cases, though, in which the services' oversight was applied only selectively, the OSD IRM office served as a source of management oversight outside the sponsoring service. The OSD IRM staff offices provided this oversight

174

by working through the annual budget process to perform project and policy oversight.

DOD was unique among federal agencies with major information technology programs in the extent to which OMB provides oversight of individual projects. For non-DOD agencies, OMB conducted oversight through the formulation of the President's budget and could serve as the management of last resort prior to congressional review. But, because of the size of the DOD budget and the mechanics of the joint OSD/OMB review of the DOD budget request during the fall budget season, OMB has not historically reviewed budget requests for DOD information technology programs in great detail.[175]

Generally, congressional involvement in the oversight of major information systems was positive. The perennial language in the DOD appropriation law, which gave the MAISRC review process the force of law, added clout to an already potent decision-making forum. Having this kind of backing from the Congress made a difference to the MAISRC staff. When asked to describe OSD's oversight role, one staff person said, "We uphold the law!" It is possible that Congress could be characterized as committed to the MAISRC

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[175]The joint review process between the Office of the Secretary of Department and the Office of Management and Budget is discussed in "The Planning, Programming, and Budgeting System," Department of Defense Directive 7045.14.

as a management principle as long as it did not adversely affect an information technology program of a powerful member.

While the legal backing of the MAISRC process made it particularly difficult to bypass the milestone review process, parochial concerns sometimes complicated this broader-based interest in OSD oversight. It was always possible for an interested actor, like the program manager or the incumbent contractor, to get a congressional staff member to insert language into a bill that would severely limit the discretion of the MAISRC. The only impediment to such interference with the MAISRC process was that typically all congressional stakeholders had to tacitly agree on the matter in order for it to stay in a bill that would be sent to the president for signature.

In the case of CHCS, it is possible to argue that congressional micromanagement made it difficult for the MAISRC process to work. Specifying the particular type of acquisition strategy and programming language represent significant incursions into what are normally considered to be agency prerogatives. Additionally, the program management team said that congressional oversight did not always place consistent expectations on them, making it very difficult to move ahead without upsetting someone. Because of the overlap of Committee jurisdictions, it was possible

for an information technology program to be subject to oversight of both the House and the Senate Appropriations Committee, either the House or Senate Armed Services Committee, and the House Government Operations and Senate Governmental Affairs committees, which have oversight jurisdiction over the Brooks Act and the PRA.

Despite the visibility and potential clout of the MAISRC process, it appeared the management of particular information technology programs often depended on the project management team. The potential holes in the oversight process appear to have been large. First, oversight depended on the dollar value of the program, which drives the applicability of the MAISRC review process. Second, oversight also depended on which service sponsors a program, given the apparent variability of oversight among the services. Third, even if all the oversight mechanisms were in place within the DOD, it was still possible to undermine the MAISRC oversight process by gaining specific language in public law.

Agriculture - Processed Commodity Inventory Management System

This case is set in the Department of Agriculture, which comprises over thirty bureaus that provide a variety of services to the public. Although the bureaus have varying missions and client bases, many clients receive

177

services and benefits from more than one of the bureaus,
which are organized along program lines. The degree of
overlap among some bureaus and their clientele is
illustrated by the proposal to create a Farm Service Agency
to carry out the functions of the Agricultural Stabilization
and Conservation Service (ASCS), the Farmers Home
Administration, and the Soil Conservation Service in the FY
1994 budget.[176] This example represents the non-DOD agencies
that incorporated the policy framework for managing
information technology into their own policy making with
mixed consistency. In FY 1991, Agriculture obligated over
$640 million for information technology.

Organization Structure

The Agriculture IRM office was split between a policy
directorate, which included IRM oversight functions, and an
operations directorate, which oversaw the agencywide data
processing centers. At the time of the data call, the IRM
organization grouped its staff by functional specialty.
Instead of having agency-specific "desk officer"
responsibilities, each division within the policy
directorate dealt with a specialty such as
telecommunications, technical services, or planning and

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[176]Office of Management and Budget, Budget of the United
States Government: Fiscal Year 1994 (Washington, D.C.:
Government Printing Office, 1993), Appendix-314.

standards. Staff assignments in the IRM policy directorate

related to writing policies or coordinating processes rather

than overseeing bureaus' activities or a particular

technical topic. The operations directorate within IRM

represented the agency before GSA for gaining DPAs, and

coordinated their review of agency APRs with the technical

review division of the IRM policy directorate.[177]

Unlike other federal agencies, the Agriculture budget

and program analysis office was organizationally separate

from the other agencywide staff offices. The budget office

reported directly to the deputy secretary, while the IRM

organization reported to an assistant secretary. Despite

the prominence of the budget staff on the organization

chart, this office coordinated bureau budget requests for

the agency and reportedly did not perform analysis or engage

in oversight. Agency staff who participated in the

interviews agreed that the budget office played a minor role

in substantive decision making in the agency.

Bureaus in the agency, which have line authority for

program delivery, established IRM review boards as the

result of the agency policy. These boards, made up of staff

and program officials in bureaus, met to discuss IRM

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[177]Department of Agriculture, "Office of Information
Resources Management Organization Chart" (Washington, D.C.:
Department of Agriculture, 1991).

planning issues. The activity and clout of these groups

varied greatly by bureau. In some bureaus, they were quite

active and made substantive decisions. In other bureaus,

these groups had stopped meeting regularly as of 1991. It

became clear through the interviews that, in general, the

bureaus controlled the resource allocation processes and the

agencywide staff offices did not.

Agency Policy Making

Agriculture's policy for managing information

technology, written in 1989, took the form of an agency

regulation.[178] Its primary focus was to create a long-range

planning process for the agency that brought together the

plans of the bureaus. An annual data call requesting

updates to bureau plans served as the operational guidance.

The annual data call provided some background and concepts

to help shape the formulation of the bureau plans, but

focused mostly on the format of bureau plans.[179]

Agriculture's operational guidance and practice

created a process for linking the plan to the agency budget

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[178]Department of Agriculture, "Departmental Long-Range
IRM Planning," Departmental Regulation 3111-1 (Washington,
D.C.: Department of Agriculture, 1989).

[179]Department of Agriculture, Office of Information
Resources Management, "Agency Guide to Long-Range Planning:
FY 1991 Planning Cycle for FY 1992-1996 IRM Plans"
(Washington, D.C.: Department of Agriculture, 1991).

formulation process through the review of that data bureau

submit for section 43 of Circular A-11.

> In FY 1991, OIRM participated with the Office of Budget
> and Program Analysis (OBPA) during the agencies' FY
> 1993 budget development and internal Departmental
> approval process. Agencies submitted advance copies to
> their IRM A-11 Exhibits 43A and 43B, Report on
> Obligations for Information Technology Systems to OIRM.
> OIRM reviewed these Exhibits 43A and 43B and the
> agencies' FY 1992-1996 IRM Long Range Plans, also
> submitted in July. This allowed senior OIRM staff
> members to perform an early review of IRM reports in
> conjunction with the agencies' budget requests prior to
> the budget meetings.[180]

The operational guidance also required that the IRM plans be

consistent with the agency "business plan" and extend beyond

the immediate budget year, thereby making them multiyear.[181]

The agency created its policy in-house, based on its

own interpretation of the policy framework for managing

information technology. One goal of the planning process

and the agencywide plan called for in the policy was to

express to oversight organizations such as Congress and OMB

how IRM supported the achievement of agency goals.

Historically, the agency provided the section 43 data to the

appropriations committee staff at the time the President

submits the budget to Congress.

As of September 1991, when Agriculture responded to

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[180]John L. Okay to James B. MacRae, Jr., 25 September
1991, Washington, D.C.

[181]"Agency Guide to Long-Range IRM Planning."

the OMB data call, the agency policy did not include any

provision for coordination of information technology

projects across bureau lines. Once the agency IRM office

approved a bureau IRM plan, this gave a bureau "autonomy"

from the agency for managing their information technology

activities. Bureaus gained even more autonomy by gaining

technical approval from the agency for specific acquisitions

of Federal Information Processing (FIP) resources. Even if

an acquisition did not require a DPA from GSA, the agency

policy said the bureau had to have technical approval to

acquire the FIP resources.

Agriculture used a unique parallel review process

for conducting APR review and oversight. Although any

federal agency may use this process through a program run by

GSA,[182] Agriculture was the only agency running an active

program at the time of the study.[183] Instead of having

various offices within the bureau, agency staff offices, and

then GSA conduct a serial review of documents, these groups

worked together to conduct their reviews at the same time,

thereby making the review parallel. The combined team,

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[182]General Services Administration, Go for 12 Program:
An Interim Report on the Elimination of Bottlenecks in the
Acquisition Process (Washington, D.C.: General Services
Administration, 1987).

[183]Fred L. Sims, Deputy Assistant Commissioner of
General Services Administration, Office of IRM Policy, phone
conversation with author, Washington, D.C., 24 March 1993.

called an Acquisition Review Team, was chaired by a senior
bureau program advocate of an information technology
project.

Application of Policy

The Processed Commodity Inventory Management System
(PCIMS) project has had a long history in Agriculture. The
project dates back to the 1970s, when the ASCS launched and
then abandoned an effort to develop a new system relying on
bureau and agency staff. PCIMS is intended to automate a
manual process for managing inventories of commodities for
the agency. As an indication of the strategic importance of
the information system, the value of the commodities
inventory managed by the system in a particular year far
outweighs the life cycle cost of the information technology
project.

After several unsuccessful attempts, ASCS decided to
let a contract to develop a system and in 1983 awarded a
contract to a systems integrator to complete a variety of
tasks. These tasks included preparing requirements
analysis, alternatives analysis, and software development
and maintenance. Original estimates for the development of
the system equaled less than $10 million dollars. By 1990,
the projected costs to complete the project exceeded $120

million.[184]

The complexity of the development effort grew after contract award as two other bureaus (the Food and Nutrition Service and Agricultural Marketing Service) expressed an interest in using and overseeing the development of the system. By 1990, the bureaus had installed one major application two years late and had not yet installed the other, which was six years late. Ongoing problems with this project led Congress to request audits by GAO. Several GAO audits and resulting testimony before oversight committees in Congress raised concerns about the sponsoring bureau's ability to manage information systems development and enhancement projects.[185] The GAO reports cited problems such as poor project management, significant cost overruns, insufficient capacity management, and inadequate consideration of user needs.[186]

The project manager oversaw this effort based on

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[184]General Accounting Office, Management Improvements Essential for Key Agriculture Automated Systems, IMTEC 90-85 (Washington, D.C.: Government Printing Office, 1990).

[185]Congress, House, Government Information, Justice, and Agriculture, Hearings before the Subcommittee of the Committee on Government Operations Agricultural Stabilization and Conservation Service Computer Systems: Building Another Hubble,? 101st Congress, 2d sess., 18 September 1990, 3-14.

[186]GAO, Management Improvements Essential for Key Agriculture Automated Systems.

professional experience and training more than the
enforcement of policy. Neither the agency IRM staff nor the
project management staff were certain which bureaus
participating in this automation effort maintained their own
management policy for information technology. As is the
case throughout Agriculture, the agency-level oversight of
this project was minimal at most, leaving the project
manager a great deal of autonomy. The project manager
confirmed that this void of effective policy left this
project, and probably most others in the agency, subject to
whatever management principles the project management team
could bring to bear.

Because of the uniqueness of this effort among the
three bureaus, the project management staff worked under two
levels of oversight. A staff-level group, consisting of
staff from each bureau and the project manager, was
responsible for the operational oversight of the project.
However, this group could not always come to closure on
contentious issues that cut across bureau lines. Therefore,
a policy-level group, consisting of the commissioner from
each bureau, served as an appellate board for the staff
level group. The group of commissioners also made the
resource allocation, program priority, and funding
decisions. Two of the participating bureaus paid their
portion of the project costs into Commodities Credit

Corporation (CCC) revolving fund, with multiyear spending authority, which was overseen by the ASCS. Lacking these coordinating groups, the Deputy Secretary would have been the first position within the department hierarchy that could have resolved contentious issues between the parties, which worked for different under secretaries.

Discussion

Although the agency policy reflected most principles of the policy framework, it did not appear to affect the behavior of project sponsors in the bureaus. Several factors contributed to the lack of effectiveness in enforcing the agency policy for managing information technology.

Despite the statements in the letter sent from Agriculture to OMB in 1991, the IRM organization did not play a meaningful role in the resource allocation process in the agency. At the time of the letter the IRM organization was initiating a relationship with the agency budget organization, but it was not well established at that time. The lack of a formal or informal working relationship with the budget organization up through 1991 contributed to this lack of involvement in the agency budget process. More important, though, the agency-level budget process did not control bureau resource allocation either. The bureaus

drove the decision-making process with little, if any, substantive input from agency-level staff offices.

Since the budget office lacked decision-making authority over bureau resource allocations, the problem of relevance was even greater for the IRM organization. Within the IRM organization, the ambiguous staffing assignments reinforced the appearance that the IRM staff served as process gatekeepers instead of substantive participants in decision making. Moreover, staff assignments did not create opportunities to develop bureau-specific or technology-specific expertise. As a result, the IRM organization could not have provided the analytical basis for challenging bureau positions even if they had participated in the agency decision-making processes.

There were no resource implications to the bureaus for ignoring agency policy for managing information technology for this project. Once a bureau project received its DPA through the parallel review process, the agency-level oversight could only come through the budget process. Since the PCIMS funding came from the CCC revolving fund, it was possible for the project office to spend funds without agency-level budget or policy oversight. Because none of the three bureaus working on the project maintained, or brought to bear, their own management policies for information technology, the project management team relied

187

on their own professional experience and training to oversee the project.

Congress played a role in supporting the bureaus' independence from agency-level oversight. The appropriations committee funded bureau projects as requested, and until recently, the agency had never faced serious budget constraints that would have required the staff's substantive input. Whenever the agency tried to exercise oversight over the bureau, the committees typically sided with the bureau, funding bureau projects not included in the agency's request to Congress included in the President's budget. This effectively negated the credibility of the agency staff to enforce decisions.

Larger forces in the agency culture made it difficult to enforce any agency-level oversight. A strong identification with bureau mission, at the expense of agency mission, further frustrated agency efforts to enforce policy. Interestingly, when Congress admonished the bureau for the poor management of the project, neither the oversight committee nor GAO mentioned that the agency had neglected its responsibility. Congress leveled all criticism at the bureau, even further reinforcing the lack

of a substantive role for the agency.[187]

This was especially true for IRM policy, which the bureaus viewed as an impediment to fulfilling their mission, and was not worth the additional time it took. Interviews conducted at Agriculture suggested that bureaus only worked through the agency IRM office because they had to. Department of Agriculture bureaus, like in most agencies, could not go directly to GSA to gain a DPA from GSA. Since GSA granted DPAs to the agency designated senior official, the agency served as a gatekeeper for DPA transactions. The problem from the bureaus' perspective is that agency provided little substantive feedback on these transactions. All the bureaus got were delays in the approval process. Even though the parallel review process for APRs, which result in the granting of a DPA, is quicker than in other agencies, bureaus still believed the agency-level IRM office was merely an impediment to completing their mission.

Despite the lack of effectiveness of the agency-level budget and policy oversight processes, some tools for exercising oversight were in place. The parallel review of bureau APRs streamlined the process of gaining a DPA from

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[187]JayEtta Z. Hecker, General Accounting Office, testimony before the House Subcommittee on Government Information, Justice, and Agriculture of the House Committee on Government Operations, 101st Cong., 2d sess, 18 September 1990.

GSA by creating a multidisciplinary team that could work out issues collaboratively. By reducing the time it normally takes to gain an DPA from GSA, the IRM office built some goodwill with the program bureaus, which generally did not see what value the agency staff provided otherwise.

The technical approval process for acquisitions provided some leverage to the agency IRM office. Recall that bureaus had to obtain a technical approval even if the acquisition did not require a DPA from GSA. In those instances when the agency IRM organization used the technical approval process to force the bureaus to provide necessary and reasonable analysis, the program staff interviewed at the bureau level acknowledged this kind of oversight was constructive. Even with this potentially effective tool, the IRM organization could only delay a technical approval by requesting further analysis or documentation. Staff participating in the review of technical approvals felt this process lacked political backing and strong basis in policy for enforcement since the IRM office said they could not turn down a request for technical approval. As a result, the IRM office very rarely slowed technical approvals to enforce agency IRM policy.

The normal lack of coordination among the bureaus exacerbated the weaknesses of the oversight environment for the PCIMS project. Only within the previous three years had

190

the bureaus created an interbureau project management team.
Even then, disagreement on program management issues tended
to spill over into information technology issues. For
instance, if the bureau staff could not agree on program
issues relating to inventory management, reaching a
consensus on information technology issues would become more
difficult.

The key finding from examining this case is how
important it is to enforce the policy. Ability to enforce
policy comes from participating in decision-making processes
such as formulating the agency's budget request to OMB.
Since the important decision making took place at the bureau
level, the IRM office was relegated to coordinating
processes such as collecting data and plans for the central
management agencies. The lack of a strong agency-level
budget and policy review process left the agency IRM office
without one enforcement mechanism for overseeing bureau
management of information technology. Although the agency
IRM office did have the technical approval process for
reviewing bureau acquisition plans, the agency did not
apparently use this process for policy enforcement with any
regularity. Having a generally good policy is of no value
if there are no requirements to follow the policy and no
consequences for ignoring it. In such an environment, it
was impossible to see if Circular A-130 supported principles

of the policy framework was effective since it had rarely
been tried.

State - Mainframe Replacement Acquisition

This case is set in the State Department, which has a
large and dispersed field organization, but a very
homogeneous mission. Although there are several large
bureaus in State (e.g., Economic and Business Affairs,
Consular Affairs, and Intelligence and Research), they
support similar policy and program goals. This example
represents the group of agencies whose policies were largely
inconsistent with the policy framework for managing
information technology. In FY 1991, the State Department
obligated approximately $345 million for information
technology.

Organization Structure

During the last several years the IRM organization at
State Department has undergone drastic changes. Before
1989, IRM functions were split primarily among three
different deputy assistant secretaries under the assistant
secretary for diplomatic security affairs, who was the
agency's DSO. In 1989, the IRM offices were consolidated
under three deputy assistant secretaries and transferred to
another bureau headed by the assistant secretary for
administration, who had other major responsibilities and

192

became the DSO. The assistant secretary for administration
and the office of finance and management policy, which
housed the agency's budget office, both reported to the
under secretary for management.

Within this new organizational structure, the IRM
organization was divided by functional area of
responsibility. The IRM organization included a planning
group that did planning and resource allocation for
information technology. The standards group in the IRM
organization wrote agencywide IRM policy. Staff members
within the IRM organization did not have "desk officer"
responsibilities for program bureaus where one person was
responsible for all IRM activities in a bureau. The
planning group worked with agency budget staff during the
budget formulation and execution processes each fiscal year.
Staff members in the planning group had responsibilities for
many projects and processes, in part because the staff was
small.

Though it was not established in agency policy, the
deputy assistant secretary for IRM chaired an IRM steering
group. The steering group consisted of representatives from
the major offices within IRM and served as a decision-making
and resource allocation forum. Over time, the participants
and their level of seniority changed, but the basic purpose
of reaching a consensus on resource allocations decisions in

the organization did not. The scope of the resources controlled by the steering group was limited to those controlled by the IRM organization. Information technology resources controlled by other bureaus, which had their own assistant secretaries, were not affected by the IRM decision-making process. However, the IRM organization controlled approximately 70 percent of the $345 million obligated on information technology in FY 1991 by the State Department. This high level of direct control over the agency's information technology spending contrasts with the other three cases investigated where "line" bureaus controlled the majority of their agencies' information technology spending.

Agency Policy Making

Of the agencies responding to the OMB data call, State provided the most informal set of policies. Informal in this context means the extent to which the policy was documented in agencywide directives. In response to the data call, the agency did not send any policy documents, saying that it relied on a collegial decision-making process to exercise its policy oversight.[188]

Discussions with staff from State uncovered that the

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[188]Sheldon J. Krys to James B. MacRae, Jr. 19 September 1991, Office of Management and Budget, Washington, D.C.

Foreign Affairs Manual did in fact contain information

technology policies at the time of the data call in 1991.[189]

As a matter of practice, though, the IRM organization did

not use or enforce these policies. These policies, which

dated back to the 1960s and 1970s, dealt with operational

issues of how to use information technology, not how to

manage it. Because these policies were so old, they did not

discuss the need to gain a DPA from GSA to acquire

information technology. Members of the IRM staff explained

that they were actively revising this section of the Foreign

Affairs Manual. Since these old policies had fallen into

disuse, they felt it would be more honest to acknowledge how

the "collegial process" worked instead of sending a set of

outdated policies that no one in the agency followed.

The following discussion portrays the resource

allocation process that emerged from a reading of the

response to the data call and from discussions with the

staff. While the resource allocation process did not

provide an agencywide perspective on planning, resource

allocation or policy enforcement, it did apply to the

seventy percent of the agency information technology

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[189]Department of State, "Foreign Affairs Manual:
Information Management," vol. 5 (Washington, D.C.: State
Department, n.d.).

spending controlled by the IRM organization.[190] The

remaining thirty percent of State's spending on information

technology was outside the IRM organization's financial

control, and as a practical manner, was not subject to

central oversight in the agency.

The IRM planning group sent out an annual data call

that encompassed the resource needs for the programs within

the IRM organization.[191] It went out soon after the

president transmitted the budget to Congress in February,

served as the basis for executing the upcoming year's

appropriations, and drove the formulation process for the

budget request to OMB in the fall. The resource allocation

process consisted of project managers submitting a program

budget that arrays projects in priority order, much like a

zero-based budgeting process.

In response to the annual data call, program offices

within IRM submitted their resource plans to the IRM

planning staff for analysis and consolidation during the

spring and early summer. The IRM steering group held a

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[190]During interviews at the State Department, several
staff members mentioned this seventy percent figure as the
proportion of the agency budget for information technology
controlled by the IRM organization. Data provided by the
IRM planning group confirmed this fact for FY 1991.

[191]Assistant Secretary of State for Diplomatic Security,
Department of State, "Instructions for FY92 Plans, FY93 Plan
& Budget Request, and Five Year Projection," Office of
Management and Budget, Washington, D.C.

series of executive planning sessions to decide which of the requested projects would be included in the upcoming budgets. These IRM resource allocation decisions served as the basis for the budget request to OMB and determined how the appropriation for the year would be spent. The output of this decision process run by the IRM staff served as input to the agency budget process. Generally, the budget process in the agency required that the head of the agency approve funding increases for projects that exceeded the previous year's spending. As a result, the IRM organization exercised a great deal of influence over the seventy percent of the agency's information technology spending under their direct review and oversight.

Decision making in the agency was very reactionary. One major mission of State is to respond to emerging foreign policy issues and crises confronting the country. As a result, short-run considerations overwhelmed strategic planning. Therefore, the resource allocation process did not extend typically beyond formulation for the budget year included in the president's budget as one means for dealing with the turbulence in the organization's environment.

Application of Policy

An acquisition to replace mainframe central processing units (CPUs) served as the example illustrating

the discussion on how the agency exercised policy oversight and enforcement. Essentially, this project was an acquisition to replace hardware. Because the goal of the project was to replace, expand, and upgrade mainframe CPUs, it did not involve software development. The strategic importance and relative cost of this investment made it a high profile project in State. Despite this high profile, interviews within the agency felt it depicted how decisions affecting the management information technology generally took place. The agency confronted this issue as part of the FY 1993 budget process and completed a benefit-cost analysis during calendar year 1991.[192]

At the time of the acquisition, parts of the IRM organization were still spread out in the agency. The IRM staff, the bureau for diplomatic security, and the financial management staff were the major users of the mainframes and therefore the project sponsors. The assistant secretary for diplomatic security, the DSO for IRM at that time, served as the primary program sponsor among the three mentioned. GSA delegated acquisition authority to an IRM staff person through the Trail Boss program, meaning the project manager had undergone special training for running such an

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[192]Booz-Allen & Hamilton, Inc., prepared for Department of State, Bureau of Diplomatic Security, Information Management, ADPE Modernization Program: Benefit-Cost Analysis (Washington, D.C.: Department of State, 1991).

acquisition. This kind of delegation provided the project manager with dedicated staff support and allowed that person some latitude in managing the project. Primarily, this latitude took the form of signature authority to obligate funds.

The agency relied heavily on contractors and another agency to support the analysis and planning for the acquisition. The consulting firm Booz-Allen & Hamilton, Inc. prepared the benefit-cost analysis for the project as part of a larger strategy for updating the computing environment of the agency.[193] For guidance on the form and substance of the analysis, the benefit-cost analysis cited section 43 of Circular A-11, Federal Information Processing Standards Publication (FIPS Pub) 64, and a guide on how to conduct such analysis prepared by the Department of Energy.[194] The benefit-cost analysis did not cite the requirements of any State Department policy.

The State Department project manager for the

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[193]Booz-Allen & Hamilton, Inc., prepared for Department of State, Bureau of Diplomatic Security, Information Management, ADPE Modernization Program: Strategic Analysis of Alternatives (Washington, D.C.: Department of State, 1991).

[194]Department of Energy, Assistant Secretary for Management and Administration, Analysis of Benefits and Costs (ABC's): A Manager's Guide to Analysis of Benefits and Costs, DOE/MA-0342 (Washington, D.C.: Department of Energy, 1988).

mainframe CPU acquisition said that the Federal Systems Integration Management Center (FEDSIM) of the GSA provided technical support throughout the acquisition. The agency used an interagency agreement with GSA to obtain the expertise of FEDSIM, which specializes in managing information technology, to "run" the acquisition. FEDSIM wrote the request for proposals, evaluated the proposals, and conducted technical and financial evaluation of bidders' proposals. State Department staff provided general project oversight for issues of scheduling and resource allocation.

Throughout the course of the project, executives from the three sponsoring organizations relied on an ad hoc group to "hammer out a consensus" on the shape and direction of the effort. A working-level group provided staff support and analysis to this effort, enabling the principals to make final decisions on resources and priorities. This group dissolved at the completion of the request for proposal documentation. Although the impacts of this project cut across bureau lines, it was subject to the decision-making authority of the IRM steering group.

The IRM organization played both formal and informal roles in the oversight for the mainframe acquisition project. Formally, the chair of the source selection evaluation board, who made recommendation on which vendor proposal to accept, was a part of the IRM organization.

This person served as the project manager and was the GSA-trained Trail Boss. Additionally, the IRM policy group provided an informal review of the APR before procurement staff sent it to GSA. This limited role of the IRM staff reflected the lack of actively enforced policy, which would have required a formal review of the APR by the IRM organization.

Discussion

This example of an informal policy-making and enforcement environment raises several issues about the effectiveness of OMB policy making. In the most positive light, one can view this agency's actions as largely responsive to OMB policy in content, but severely lacking in procedural compliance. The most obvious gap in substantive compliance was not including all of the agency's information technology resources in the resource allocation process. Fortunately, this IRM organization controls most of the agency's information technology resources, in contrast to other agencies, where the program bureaus tend to control those resources. It is important to note that while the policy enforcement was not formal, neither was it weak.

The operational planning process, which allocated resources within the IRM organization, was real. It clearly drove the budget process. As one staff analyst in the IRM

organization explained, "Planning does not have weight without consequences." This process clearly had consequences by supporting the IRM steering group. Though the composition of the group changed over time, all of the affected bureaus attended the IRM steering group sessions because the decision making affected their spending plans for information technology.

Several factors helped the seemingly informal enforcement process work in this agency. The notion of decision making through consensus building was clearly embedded in the culture of the organization. While it sounded as if it took a long time to coordinate new policies or make resource decisions, once staff committed to a decision, it carried legitimacy. As a result, achieving a consensus through informal staff networks and ad hoc groups made up for lack of formal policy.

One element of that consensus-building process was the need to have some formal legitimacy for "sitting at the table" where decisions were being made. Clearly, the IRM organization had no interest in making policy or resource allocation decisions by administrative fiat. The budget organization had even asked the IRM staff for "yea or nay" recommendations on information technology projects proposed by program bureaus outside IRM's normal purview. While the IRM organization participated in the review of budget

proposals from other program bureaus, the IRM staff cited a lack of formal authority to approve those proposals. Instead, IRM staff made recommendations or gave technical advice on the viability of the requested project funding to the budget office.

Apparently, to have attempted to participate in that decision-making process without formal authority would have jeopardized the effectiveness of the informal networks. The informal network consisted of staff members from the IRM office and the budget office, for instance, working together, sharing information based on personal or professional relationships. As an example, a staff person from the IRM organization might suggest to a budget colleague that a budget request from a bureau for information technology was not technically sound, and therefore should not be funded. Even though the IRM organization might influence a budget decision in this way, there was no piece of paper formally recording the advice shared between the staff members of the two organizations.

Another cultural artifact became apparent during the interviews. In the other agencies, program staff identified strongly with a bureau mission instead of an agencywide mission. But this agency's IRM staff seemed to measure their professionalism by displaying a "can do attitude" in supporting the head of the agency and fulfilling its

mission. This underlying sense of agreement about the
agency's mission, and how staff supported it, may have made
it easier for the informal consensus-building process to
work. When groups came together to make decisions, it did
not sound like there was disagreement on what the purposes
of the agency were. More typically, the issues requiring
resolution dealt with different means for supporting the
agency mission.

It is ironic that the agency representing the group
with the "weakest" policy, as measured by being most
inconsistent with the policy framework, displayed decision
making consistent with the principles of the policy
framework. The agency is taking steps to extend the control
mechanism of the IRM organization's operational planning
process to the other bureaus. Interestingly, the important
part of the process is formalizing, though the agency policy
manual, the informal process in place. The key to the
effort, though, is to gain agencywide agreement that the DSO
for IRM has the authority to review operational plans for
the whole agency, not just IRM.

Cross-Case Comparison

Across the four cases, the effectiveness of agency
application of the policy framework depended clearly on
several crucial variables. These variables include: (1)

degree of consistency the policy framework, (2) whether and how information technology policy was enforced, (3) the role of oversight groups internal to the agency, (4) the role of oversight organizations external to the agency, and (5) the culture of the agency and agreement around core missions. The following discussion will address each of these variables in turn.

Consistency with the Policy Framework

The findings across the cases indicate that consistency with the policy framework alone does not determine the effectiveness of agency policy. The diametrically opposed experiences at the Departments of State and Agriculture made this abundantly clear. At the Department of Agriculture, having a policy largely consistent with the policy framework had little or no effect due to a lack of effective enforcement. In contrast, at State, the lack of current, formal policy only limited the IRM organization's ability to use their management control processes for information technology outside the IRM organization.

Consistency with the policy framework was important though. This was especially true since three of the four agencies examined in the case studies enforced their own policies and the public law and governmentwide policy that

make up the policy framework. Even though State did not have formal policies, its "collegial decision making process" supported the principles of the policy framework nonetheless. This is not to say that agencies did not hold project managers accountable for adhering to the principles of the policy framework. The point is that project managers were held accountable to those principles as articulated in the agency-level policies--not public law nor Circular A-130. Therefore, agency policies or actions had to be consistent with the policy framework for OMB's policies to be taken into consideration at the agency level. This finding raises an issue of whether one way to ensure compliance with the policy framework is to check agencies' policies for consistency with OMB policy, assuming that OMB's revisions to Circular A-130 will make it consistent with the policy framework.

Policy Enforcement Mechanisms

Agency IRM organizations had very mixed experiences enforcing the principles of the policy framework. As discussed in the review of agency policies in Chapter Three, agencies have two primary means for leveraging oversight of bureau management of information technology. One, agency-level IRM organizations represent the bureau before GSA to gain DPAs. Two, they can also influence the budget

formulation and execution processes as a means of rewarding compliance with information technology policies.

Agency IRM staff did not seem able to often overturn decisions of powerful bureaus or agencies across the four agencies in the case studies. At most, the IRM organizations could slow down information technology projects some by delaying acquisition approvals, as was the case of the Departments of Agriculture and Commerce. In the DoD, the MAISRC did not have this authority, leaving only the budget process for leveraging information technology management policy issues.

The agency-level IRM organizations were more successful exercising policy oversight through the budget process than through the acquisition approval process. They did not exercise that authority independently though. Without acting with the support of the agency budget organization, the IRM organization did not appear able to influence resource allocation decisions in their agencies. This became clear when interviewees in the Departments of Agriculture, Defense, and Commerce all said that if a project sponsor derived funding through non-appropriated funds they effectively lost oversight leverage. The effectiveness of State's policy oversight process could be linked directly to their involvement and control of the resource decisions for the portion of agency information

207

technology they controlled.

It is interesting to note that only Commerce employed a desk-officer oversight scheme in their IRM organization. One analyst in the Commerce's IRM organization knew all about the PTO's information technology program, for instance, allowing them to leverage oversight through plan review, budget approval, or acquisition review. In the other three agencies, coordination within the IRM organization was necessary to provide oversight on issues including planning, acquisition, and budget review. At Agriculture, in particular, the lack of a single locus of oversight seemed to diminish the programmatic knowledge of bureaus that might have allowed them to participate more substantively in agency decision-making processes.

A more subtle, but equally important, issue is the isolation of the agency IRM staff that attempted to enforce the requirements of the policy framework. Fulfilling the Circular A-130 requirements for planning and budgeting information technology was different from participating in agency decision-making processes. Circular A-130 does not create a requirement for the management of information technology to relate to other management processes in the agency. It was possible for agencies to produce IRM planning products that complied with requirements of the policy framework but they did not relate to "real" agency

decision making.

This brings into question whether specialization and lack of integration of IRM into other agency management processes have contributed to a lack of effectiveness oversight the elements of the policy framework. Ironically, the State Department's IRM organization's informal, but highly effective, resource allocation process for information technology provided more oversight leverage than agencies with more formal policies. Generally, agency IRM staff people did not lack the tools to enforce policy. What they lacked was the political backing within their agencies to use the tools they had.

Internal Oversight Groups

The effectiveness of agency oversight and review groups depended on whether such groups made real decisions. If a group made resource decisions, it enjoyed de facto legitimacy within the agency. It mattered less whether a group was created by a formal policy as in the case of State's IRM steering group. DOD's MAISRC process enjoyed the strongest backing in policy with some elements of its oversight written in to annual appropriations law. Although the State Department's IRM steering group was not founded through a agency-wide policy, its role in budget formulation and execution processes gave it great legitimacy

nonetheless. Based on these two examples, oversight groups
that made decisions on resource allocation and acquisition
decisions proved to be effective in supporting agency
policies for managing information technology.

Process-oriented or information-sharing groups
displayed the potential to undermine agency policy
enforcement. At Commerce, several efforts to use such
groups, even when established with the backing of political
appointees, frustrated staff-level efforts to enforce the
principles of the policy framework. The key difference
between the Department of Commerce groups and the two
mentioned above was the substantive content of their
meetings. By design, the Commerce groups met to share
information. The bureaus could argue with agency-level IRM
and budget staff that the oversight groups heard a
presentation on a bureau project and did not object,
sometimes undermining staff-level efforts to enforce policy.
The fact the oversight group met, even if it did not make
decisions, sent signals of implicit agreement with a
bureau's proposal to participants and observers.

External Oversight Organizations

Oversight organizations such as Congress, OMB, and
GAO played a role in determining the effectiveness of agency
policy enforcement. As with internal oversight groups,

involvement by any of these actors was rarely neutral.
Oversight groups external to the agency either supported or
undermined principles of the policy framework. Each of
these external actors influenced compliance with the policy
framework in different ways, varying in their visibility and
means of involvement.

Of the four cases, OMB played the most visible role
in the APS project at Commerce. The designation of APS as a
Presidential Priority System provided OMB with a high
visibility means to play a role supporting the agency-level
oversight of the project. OMB supported Commerce's IRM
office in the creation of the blue-ribbon panel that
evaluated the APS project and also by reinforcing the
requirement to prepare a benefit-cost analysis in order to
receive funding.

In the other three cases, OMB's role was much
different. At State, the project manager and a member of
the contractor's staff performing the benefit-cost analysis
consulted with OMB on policy requirements for gaining
approval for the project. Beyond that, none of the
interviews indicate that OMB played a significant role.
Interviews at DOD and Agriculture indicated that OMB did not
often play a role in decisions related to these specific
projects. At DOD, this lack of involvement mirrored a more
general approach that OMB did not provide system-specific

oversight.

GAO also plays a role supporting the principles of the policy framework. At Commerce and Defense, GAO's role surfaced in discussions of how adverse publicity might prompt more vigorous oversight within an agency. Agency-level interviewees in both agencies indicated that an unfavorable report about a bureau's information technology project gave them more leverage to second-guess bureau decisions and actions about a project. This leverage came, in part, from GAO's role providing information to Congressional committees that could be used in oversight hearings as was the case in PCIMS and CHCS.

The various committees in Congress having oversight over a particular information technology project definitely played a role in supporting the principles of the policy framework. At Commerce, congressional involvement provided legitimacy to agency-level oversight of bureau activities. Conversely, at Agriculture, external intervention that allowed bureaus to circumvent agency policy undermined both the policy framework and those organizations attempting to enforce it.

At DOD, the results of congressional involvement were more mixed. The support for the MAISRC process provided solid backing the OSD IRM organization. Conversely, detailed report language from oversight committees were seen

by some interviewees as limiting the discretion of the MAISRC and therefore undermining its effectiveness. In the case of CHCS, Congress was controlling the MAISRC process through very prescriptive language in law. Neither Congress nor GAO played a visible role in the mainframe acquisition at State.

Across the cases, comments in interviews indicated that in those instances where an external group like GAO, Congress, or OMB got involved, the visibility of project oversight rose. Also, as in the case of DOD and Commerce, public attention from outside groups gave agency-level IRM oversight organizations leverage over normally recalcitrant bureaus or services. If two or three of these outside groups attempted to oversee a single project, these groups reportedly gave conflicting feedback to the project management team on whether their activities were consistent with the policy framework. This finding argues that these oversight organizations must come to agreement on the goals for agency management of information technology. Such agreement could help avoid sending agencies mixed messages, thereby making it possible to hold agencies accountable to an agreed-upon set of policy requirements.

As much as the role of external oversight groups was important, the potential lack of such oversight proved interesting too. In those cases where oversight was left to

agency-level oversight processes, the effectiveness of that oversight varied greatly among the agencies examined in the case studies. In cases where neither OMB, GAO, nor Congress played a major role in budget review--DOD in particular and projects funded through other than annual appropriations in general--oversight typically fell to the project management team or leader.

Agency Culture and Mission Agreement

Agency tradition and culture played a vital role in the effectiveness of enforcing the policy framework for information technology. One critical element of these traditions was agreement about agency mission. The findings from the State Department demonstrated that informal policies and enforcement mechanisms worked effectively in an agency with a strong sense of common purpose. A collegial decision-making process further buttressed the effective enforcement of the informal policy for managing information technology.

Agency cultures that promoted bureau mission and autonomy at the expense of agency mission undermined the effectiveness of information technology policy. Bureau independence in such cultures meant that agency staff offices did not participate in the real decision making, thereby weakening the agency's ability to enforce policy.

214

This was especially true at Agriculture, where the power of the bureaus weakened the effectiveness of agency-level information technology policy that was mostly consistent with the policy framework. The fact that policy framework requires that information technology planning processes support agency missions is rendered moot by the lack of an OMB requirement for agencies to use strategic planning to agree on their mission.

The next chapter brings together findings presented in chapters four, five, and six.

CHAPTER 7 - CONCLUSIONS

> "He'll sit here," Truman would remark (tapping his desk
> for emphasis), "and he'll say, 'Do this! Do that!' *And
> nothing will happen*. Poor Ike--it won't be a bit like
> the Army. He'll find it very frustrating."[195]

Much as President Truman predicted for his successor,

General Eisenhower, OMB must understand that giving orders

differs greatly from having orders carried out. While OMB

does not give orders per se, it does set governmentwide

policies on many issues, expecting that federal agencies

will follow those edicts. But as this research points out,

much happens between OMB writing a policy and agencies

applying it.

This final chapter outlines the implications of this

research for public administration theory and practice. One

purpose of this research is to provide suggestions to OMB's

efforts to update and improve the information technology

portion of Circular A-130. However, as the research points

out, the ultimate effectiveness of the circular depends on

actors outside of OMB's control, such as Congress and the

federal agencies that carry out the requirements of the

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[195]Richard E. Neustadt, <u>Presidential Power and the
Modern Presidents: The Politics of Leadership from Roosevelt
to Reagan</u> (New York: The Free Press, 1990), 10.

circular. The discussion of implications for theory includes a look back at how the research relates to the literature reviewed in the second chapter and a look forward to how future research in public administration can build on this dissertation.

Implications for Practice

As the policy framework makes clear, OMB is not supposed to manage information technology for the federal government. OMB is, however, supposed to interpret the mandates presented in public law and then oversee agencies' efforts to carry out responsibilities spelled out in the policy framework for managing information technology presented in Chapter Four. Therefore, any attempt to improve the effectiveness of Circular A-130 depends on change at all three levels of this chain of action that flows from Congress through OMB to the agencies.

The Congressional Role: Consistency of Principle and Action

The legislative branch must create an environment that supports the enforcement of the principles contained in Circular A-130. While it seems superfluous to ask Congress to create an environment that supports public laws it has passed, this research demonstrates that over time and across committee jurisdictions, the legislative branch does not necessarily speak with one voice. The potential for

dissonance first arises in the creation of the policy
framework.

Even though the Paperwork Reduction Act (PRA)
effectively amended OMB's oversight responsibilities
contained in the Brooks Act, these two laws created a
contradictory set of criteria for evaluating information
technology. Congress must decide whether it expects OMB to
enforce the economy and efficiency perspective of the Brooks
Act or move towards the service delivery goals of the PRA.
Achieving consistency will require agreement between the
Senate Committee on Governmental Affairs and the House
Committee on Government Operations--the two committees that
have oversight jurisdiction for the Brooks Act, the PRA, and
OMB.

Various actors within the legislative branch play a
significant role reinforcing the elements of the policy
framework for managing information technology. Although the
two committees just mentioned have primary jurisdiction and
responsibility for congressional action on the management of
information technology, this research points out that other
committees also play an active role. Any agency's
information technology project is subject to legislative
branch oversight from six committees--House Government
Operations, Senate Governmental Affairs, both appropriations
committees, and both authorizing committees--and possibly

more.

As discussed earlier, though, the committees support the principles of the policy framework to varying degrees. For instance, the appropriations committees (House and Senate) and their various subcommittees wield tremendous power over the agencies they write funding bills for. In the case of DOD, the appropriations committees consistently placed language in DOD appropriations bills that supported the Major Automated Information Systems Review Council (MAISRC) process and gave it the force of law. For the Department of Agriculture, the appropriations committees' tendency to support the bureaus in disputes with the agency staff offices (both budget and IRM) makes it virtually impossible for the agency to enforce the use of good management principles for information technology.

Congress also has to support the principles of the policy framework through its investigations and public law. The GAO, Congress's investigatory organization, provides a great deal of the raw material and analysis that fuels congressional action. As a result, GAO plays a part in congressional oversight that cannot be ignored. The potential exists for an executive branch agency, including OMB, to be caught in a cross fire of conflicting interpretations and applications of the policy framework within the legislative branch alone.

The OMB Role: Rewriting Circular A-130 for an Information Age

Even though the analyses presented earlier demonstrated that policy content is not the most important determinant influencing the effectiveness of Circular A-130, it plays an important role nonetheless. Each analytic chapter pointed out the weaknesses in either the content, application, or enforcement of Circular A-130. It is within OMB's power to change all three of these conditions.

Policy Content

The need to interpret and integrate a policy framework for managing information technology in the federal government testifies to the lack of substantive coverage of Circular A-130. If the circular reflected all the requirements of public law, it might have been possible to evaluate agency policy making without building a framework around the circular to compensate for its shortcomings. At the very least, OMB must update the circular to reflect new legal requirements of the 1986 amendments to the Paperwork Reduction Act and the passage of the Computer Security Act.

Viewed against the review of the literature, the circular also shows weaknesses in its management philosophies. Recall that the review of the literature provided a basis for comparing literature and policy against three stages of maturity for managing information

220

technology. As the previous chapters point out, Circular A-130 lags sufficiently behind the current literature that it reflects the management control philosophies of management information systems and information resources management. The circular does not come close to providing a policy context for managing information technology for an information age.

The fact that half the agencies' policies included management techniques not covered by OMB policy also indicates the narrow focus of the circular. Agencies use of project-level life cycle management techniques overseen by high-level oversight groups such as DOD's MAISRC offer a glimpse of how organizations that view information technology as a strategic resource should manage important investment projects. Such management control mechanisms would help put information technology under oversight processes comparable to the budgeting of financial resources and the allocation of human resources in public organizations. OMB's revisions to Circular A-130 should require the creation of management control mechanisms similar to the MAISRC that would have control over the resource allocation decisions and acquisition approvals for information technology projects.

The emergence and widespread use of technologies such as personal computers and distributed architectures present

planning, evaluation, and budgeting issues the circular does not anticipate. More important, the circular does not address changes in management philosophy that view information technology as a strategic resource that supports agency missions. The circular promotes investments in information technology as a tool that improves the efficiency of administrative tasks and little more.

OMB must clearly state what evaluation criteria agencies should use when analyzing information systems projects. First, OMB must move the policy language on benefit-cost analysis currently contained in section 43 of Circular A-11 into Circular A-130 as part of a broader discussion of evaluation and management control. This will signal that agencies should use benefit-cost analysis on an ongoing basis for management control and not just for budget justification purposes.

Criteria for evaluating information technology in Circular A-130 should reaffirm the goals of investing in information technology stated by the PRA. This will require Circular A-130 to move beyond the economy and efficiency criteria cited in the Brooks Act to include improving program delivery to the public, reducing paperwork burden, and making program administration more efficient. OMB should further buttress this new emphasis by discussing how agencies should evaluate proposed information technology

investments. Recognizing the strategic importance of
information technology requires that evaluation criteria
include program measures such as the timeliness and quality
of claims processed, the number of burden hours reduced, or
the reduced costs to maintain more up-to-date administrative
processes.

Application of the Policy

The analysis of agency policies pointed out the
variability among agencies in applying principles of the
policy framework in their own policies. In some cases,
agencies did not feel compelled to maintain up-to-date
policies. Or, as found at the Department of State, the
agency felt no compunction admitting their formal policy had
fallen into disuse.

Through discussions with agency staff during the case
studies, it became clear that agencies rely on their own
directives to enforce the principles contained in the policy
framework. This practice reflects the reality that agency
staff in remote offices, whether in Moscow, Russia, or
Moscow, Maine, do not keep a complete and unabridged set of
OMB policies on their desks. One certain way to improve the
probability that agencies will apply the policy framework
for managing information technology is to ensure agencies'
policies include the key principles of Circular A-130, once

revised to reflect the principles of the policy framework.

Clearly, OMB cannot presume that the Circular A-130 requirement to maintain agency policies will be followed automatically. The analysis of agencies's information technology policies makes it clear that OMB should not take it for granted that those agencies that maintain policies will do so consistent with the policy framework. OMB should ensure agencies' policies for managing information technology reflect the requirements of Circular A-130 and the principles of the policy framework contained therein. One step is to make the document easier to understand and adapt for agency policy making by grouping the circular's policy statements by themes. This will help bring focus to the principles of the policy framework that agencies should emphasize in their policy making. OMB must also consider whether it needs to play a more active role in ensuring the consistency of agencies' policies with the policy framework since, during the time of this research, it left agencies wide latitude to determine the content of their policies for managing information technology.

Policy Enforcement

OMB must examine whether the principles of the policy framework are applied consistently through the enforcement of Circular A-130. The cross-case comparison demonstrated,

in the case of the Automated Patent System, that OMB can use its budget review process to great effect enforcing policies such as Circular A-130. In the other three cases, OMB had taken a less active part in shaping the agency decision-making processes. At the State Department, where the informal budget and policy review process worked effectively, OMB was able to have an indirect effect on the decision-making process. Even in this example, State Department adopted principles of the policy framework for managing information technology as demonstrated by the benefit-cost study for the mainframe acquisition and the approval through the department's budget process.

The funding levels and mechanisms for information technology projects also influence whether the projects come to the attention of oversight organizations inside and outside an agency. In all case studies, agency oversight staff agreed that information technology projects "buried in baseline budgets" did not receive attention in agency or OMB budget review. Also, funding a project through a revolving fund that did not require annual appropriations allowed projects to avoid oversight by agency and OMB analysts. Using the perceived cost of an information technology project, as measured by the level of "new" appropriations, might be creating huge gaps in oversight.

In those two cases where OMB played no budget or

policy role, the agencies had to rely on their own management control processes. OMB's lack of detailed involvement in DOD's budget formulation process, for instance, raises the possibility that non-DOD agencies receive more scrutiny than DOD during OMB's fall budget and policy review. OMB's oversight role in non-DOD agencies also appears to be uneven as it only played an active role in the decision making for the Automated Patent System at Commerce.

Without an active role by OMB, oversight of these projects external to the sponsoring agencies then falls to Congress. The legislative branch, with or without OMB, has the potential to fill these voids in executive branch oversight of agency information technology projects. As discussed earlier, though, congressional action does not always support the principles of the policy framework for managing information technology. Given the selective, and sometimes inconsistent, involvement of both OMB and Congress, the responsibility for the proper stewardship of these important resources should rest with the agencies themselves.

The Agency Role: Using the Tools Presented by the Policy Framework

While the case study analysis confirmed some weaknesses in the application of Circular A-130, it also

underscored the validity of some of the principles of the policy framework. In particular, the case study analysis made clear that information technology planning should be linked to agency budgeting and strategic planning processes. That is, agencies' information technology management policies must create linkages to agency resource allocation processes. Creating such linkages will make information technology management "real" in agencywide decision making rather than the irrelevant pursuit of an obscure staff office. In particular, linking the management of information technology with the budgeting and acquisition approval processes will provide agency oversight staff with the ability to impose sanctions for lack of compliance with policy for information technology management.

One surprising finding from the case study analysis was the importance of an agreed-upon mission for the agency. At the State Department, the agency staff's single-minded efforts to support the secretary and the foreign policy mission of the agency helped to focus information technology management, even with the lack of a formal strategic planning process and working management policy for information technology. By contrast, at Agriculture, the unique bureau missions supported by congress rendered an agency policy, which was mostly consistent with the policy framework, ineffective. Having to debate the mission of the

agency makes it difficult to agree on how to invest in
information technology. Such conditions have the potential
to create a number of divergent views of agency mission,
producing equally divergent strategies and plans for
deploying information technology.

Implications for Theory

In addition to the contributions to practice just
described, this dissertation provides insights into several
facets of the theory base of public administration. This
section of the chapter discusses these contributions and
concludes by examining how subsequent research efforts might
build on the findings presented in this dissertation.

Contribution to the Theory Base

Unfortunately for the field of public administration,
contributing to the theory base pertaining to the management
of information technology in the federal government does not
take much effort. As the review of the literature makes
clear, this dissertation is the only piece of public
administration research that has addressed the management of
information technology from a governmentwide perspective at
the federal level. As such, this research extends Caudle's
work on federal IRM to include information technology.

Whereas Caudle's work and Levitan and Dineen's
article on IRM integration looked at penetration of IRM

concepts at selected agencies and bureaus, this research

includes a comprehensive examination of federal agency

policies for managing information technology. It also

exposes several factors that influence the application of

policies for managing information technology at the agency

level. Extending Caudle's research by examining specific

instances of policy enforcement, this dissertation advances

the field of public administration's understanding of the

information technology portion of IRM at a greater level of

specificity.

To date, research in information sciences have

focused only OMB's role shaping federal policy for

information management. The work of Bishop et al. and

Hernon and McClure have addressed federal IRM policy as if

the only role for information technology was to promote the

dissemination of government information. The creation of

the policy framework for managing information technology in

the federal government complements information science

research on OMB's IRM policy making. A combination of the

information science research on information policy and this

dissertation's emphasis on information technology policy in

the federal government begins to provide a more balanced

view of IRM policies in the federal government.

Prior studies on information technology have

addressed the use, but not the management, of information

technology in the public sector. Kraemer et al. have laid a good foundation in this area by examining of the breadth of automation in public sector organization, primarily at the local level. These efforts have examined the automation of administrative functions (i.e., accounting and payroll processing) rather than program delivery tasks (i.e., case management and benefits delivery). As a result, this dissertation represents the first effort in public administration research to recognize the interrelationship between the management of information technology and broader program management.

This research points out the need to consider how integral information technology has become to administering public programs. It is no longer sufficient to relegate this management domain to the "computer people." Since governance is an information-rich endeavor, all public administrators need to understand the management techniques for the infrastructure that collects, processes, stores, and disseminates information about public programs. Recognition of the critical importance for the management of information technology to deliver public programs requires a reexamination of what constitutes core management competencies for public administration. This research should start a debate about whether the management of information technology should be viewed as a competency as

important as the management of human and financial resources within public administration.

Business schools have studied the management of information technology more broadly than schools of public administration have. In particular, business administration leads public administration in identifying the strategic role of information technology in supporting organizational missions. Stassman's work begins to address the strategic importance of information technology for public sector organizations, but it discusses corporate models of management almost to the exclusion of public sector examples. This research adapts some information technology management concepts from business administration as a way to bring a strategic focus to the management of information technology in the public sector.

The closest public administration comes to this business administration perspective is the subfield of strategic management. To date, though, strategic management research on the public sector by McCaffery, McGregor, and Bryson have focused more on strategic planning and human and financial resources management. This research raises the issue of whether strategic management of public-sector organizations needs to include information technology. High-level attention to all strategic resources improves the alignment of organization capabilities with missions and

ensures that "computer" planning and management issues are not disconnected from organizationwide decision-making forums.

Opportunities for Future Research

This research explores how federal agencies interpret and apply OMB policy set forth in one circular, but it raises questions about the tone and content of all OMB policies. Future research should assess how federal agencies apply and enforce other OMB policy documents. If agencies tend to enforce their own interpretations of OMB policy, instead of enforcing circulars as written, this has implications for OMB's policy making. Arguably, OMB should concentrate on stating policy principles that agencies can understand and adapt for their own organizations' cultures. Future research should explore the effectiveness of OMB policy documents that tell agencies which policy principles to apply in agency policy making as opposed to assuming agencies' apply and enforce the circular directly.

Similarly, this research brings into question the efficacy of separating management review and oversight from well-established decision-making forums such as budgeting. Future research should examine the effectiveness of agency-level oversight and enforcement of other management policies besides those concerning information technology. Such

research should address whether policy enforcement using budget and acquisition approval processes is unique to information technology management or applicable to other management policies.

Most important, though, is the desperate need for more systematic research on the information technology in public-sector organizations. Public administration must recognize the importance of managing information technology. The field needs to explore the appropriateness of granting the management of information technology, and information resources more generally, equal status with financial management and human resources management as a management competency. This exploration can come at the level of strategic management for organizations or management competency for individuals.

There are several ways future research might build on the empirical data analyzed in this study. One approach would extend on this research by spending more time with program sponsors across a wider range of agencies or several projects within the same agency or bureau. The goal of such research would be to explore or confirm the existence of other variables that contribute to or impair the effective management of information technology in the federal government. It would also prove instructive to examine how public-sector organizations at the state and local levels

address the management of information technology.

A cultural issue arose that may have influenced policy enforcement, but requires further analysis. This cultural issue is the extent to which agency IRM organizations are empowered to engage in substantive oversight of bureau information technology activities. Except in DOD, where oversight was grounded in the MAISRC process, agency IRM organizations did not speak strongly or act effectively on overseeing bureaus' information technology plans and actions. To the contrary, some agency IRM staff people described their role as helping bureaus and not creating controversy by engaging in vigorous oversight. Staffing patterns may also play a role. Although no clear pattern emerged suggesting that desk officer assignments in IRM offices improved agency-level oversight, one wonders how else an oversight organization can operate. Without extraordinary cooperation among staff people with procedural responsibilities for control mechanisms (e.g., plan review, acquisition review, and budget review), how could an IRM staff analyst leverage these control mechanisms to bring a recalcitrant bureau into compliance?

Alternatively, future research could involve a more in-depth analysis of federal agency application of the policy framework. Such an analysis would include validating costs and benefits of investing in information technology.

This would go beyond the application of Circular A-130 to include a summative evaluation of the public laws and governmentwide policies for managing information technology. Given the dearth of research on the management of information technology in public administration, any contributions would aid efforts to ensure the stewardship of these important resources.

The Final Word

Agencies' uneven interpretation and application of Circular A-130 have frustrated OMB's efforts to oversee federal agencies' management of information technology. This answers the research question posed by this dissertation research. Circular A-130 effectively shapes the management of information of information technology in federal agencies to a mixed degree at best. For the variety of reasons discussed earlier in this chapter, OMB's policy is not serving its intended purposes.

Clearly, Circular A-130 requires updating and improving. Circular A-130 reflects the legal, technical, and management requirements for using information technology in the federal government that made sense ten or fifteen years ago. The condition of ubiquitous personal computers, as Dizard called them, and their acceptance into the everyday life of federal agencies and their effected publics

235

necessitates a dramatic change to the substance of OMB's policy for managing information technology. In some cases, agencies' policies reflect more a more up-to-date understanding of the new role of information technology in federal agencies. Given the importance federal agencies place on the effective management of information technology to administer vital programs, this state of affairs cannot continue.

This chapter has presented proposals for improving the content and application of OMB's policy overseeing federal agencies' management of information technology. These proposals for revising Circular A-130 reflect the need for OMB to produce a governmentwide policy that at least reflects the principles found in the policy framework created earlier in this dissertation. OMB's revisions need to extend beyond the principles of the policy framework, though, to reflect the reality of the current environment for managing information technology. A new Circular A-130 needs to provide federal agencies with the policy basis to operate public programs and organizations in an era of pervasive information and information technology.

A revised Circular A-130 must also provide a vision for federal agencies as they move from a technology base and management philosophy grounded in concepts of management information systems and information resources management to

a more mature notion of an information age. This more
mature notion recognizes as information technology becomes
even more widely available and used by the public, citizens
will demand changes in the way they interact with their
governments. Increasingly, citizens will ask, if not
demand, to "do business" with the federal government
electronically. This includes such functions as providing
information to the government through electronic instead of
paper means, providing access to government information
electronically, and allowing citizens to check on the status
of benefits applications through means such as electronic
mail and bulletin board systems.

Moving from paper-based public organizations to
information-rich organizations, where most information is
collected, processed, stored, and disseminated
electronically, will have profound impacts on federal
agencies. OMB has to provide a means for agencies to adapt
to these changes in their environment by providing an up-to-
date, and in some ways, a forwarding looking policy for the
management of information technology. This dissertation
provides one way for OMB to fulfill that responsibility.

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247

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APPENDIX A - OMB Data Call to Federal Agencies[196]

Content: Agencies shall provide the information requested
below: (To the extent that the copies of directives the
agencies provide to OMB contain all or part of the
information requested in questions c through f, it is
sufficient to reference the pertinent section of the
directives in response).

a)   Two copies of the agency policy directive for IT

       planning;

b)   Two copies of the agency operational directive for IT

       planning (if separate from the policy guidance);

c)   A discussion of the planning methodology used in

       developing the agency planning directives. Please be

       specific about whether these methodologies are based

       on a widely recognized IRM planning methodology such

       as GSA's Automated Information Systems planning

       method, Enterprise-wide Systems Planning, Critical

       Success Factors, proprietary vendor products or a

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[196]James B. MacRae, Jr., to Selected Agency Senior IRM
Officials, 8 July 1991, "Data Collection on Agency
Information Technology Planning and Budgeting Practices,"
Information Technology Management Branch, Office of
Management and Budget.

planning methodology created in the agency;

d) A discussion of how the methodology deals with such complexities of the Federal IRM environment as multiple oversight organizations, conflicting and divergent client needs, annual appropriations, IT human resources issues and the time necessary to conduct procurements;

e) A discussion of how the IT planning and budgeting processes are integrated prior to the submission of the OMB Circular No. A-11 budget request in the fall. This discussion should cover the composition of high-level policy, planning or budgeting review boards, as well as identify which part of the organization approves final budget decisions for IT prior to presentation to the head of the agency; and

f) A list and discussion of the criteria the agency uses to evaluate proposed information technology investments. Prospective criteria might include factors such as return on investment, least cost, or state-of-the-art technology. Please list and discuss criteria the agency uses to evaluate information technology investments once installed. Retrospective criteria might include degree of functionality delivered, project completion within schedule or project delivered within budget. Along with the list

251

of criteria, please include a list of the specific

• measures used in the evaluation process.

APPENDIX B - OMB Circular No. A-11, Section 43

Data on Acquisition, Operation, and Use of Information Technology Systems

43.1. General.

Data on acquisition, operation, and use of information technology systems are collected for oversight of the acquisition and use of automatic data processing, telecommunications, and other information technology to manage information resources, as required by the Paperwork Reduction Act of 1980. These data are also used for analysis in support of the Chief Financial Officers Act of 1990.

An original and two copies of the following reports are required from agencies that obligate more than $2 million in any of the years PY, CY, or BY for information technology activities:

—a separate report on obligations, budget authority, and outlays for specific information technology systems for each major automated information system with life cycle costs exceeding $25 million (see section 43.2(a));

—an agency acquisition plan, where the cumulative costs of acquisition exceed $5 million during CY through BY+4 (see 43.2(b));

—a benefit-cost analysis for major information technology initiatives (see section 43.2(c)); and

—a summary report on obligations for information technology systems for the agency as a whole (see section 43.2(a)).

Amounts will be shown in thousands of dollars. With the exception of the summary report on obligations for information technology, all materials are required to be submitted with the initial budget submission. The summary report is required to be submitted 30 days after the President's budget is transmitted to Congress.

Where necessary, materials submitted with the initial budget submission should be revised to reflect final decisions and submitted with the summary report.

43.2. Materials required.

(a) Report on obligations for information technology systems.—Agencies will submit a separate report in the format of exhibit 43A for each major automated information system for which the estimated total life cycle cost from conception through implementation will exceed $25 million. The report will provide information on workyears, obligations, budget authority, and outlays for information technology activities. It should include obligations for voice and data telecommunications requirements (regardless of whether or not they are associated with an automated system), obligations for data processing requirements, and obligations for information technology to support financial management systems as defined in OMB Memorandum 91–09.

The report will include: obligations for planning, including requirements, feasibility, and benefit-cost studies; obligations for system design, development, and acquisition; and obligations for installation, operations, maintenance, and support. The data should include all automatic data processing equipment as the term is defined in section 111 of the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 759) and applicable GSA regulations.

Agencies that obligate more than $2 million in PY, CY, or BY will also prepare a summary report in the format of exhibit 43A that provides information on information technology activities for the agency as a whole.

Explanations of the information requested are shown below, along with the object class in which the items are classified (see section 35.4):

Item	Explanation	Object Class
1. Capital investment	Obligations incurred for real and personal property purchased by the Federal Government including any obligations for site construction/modification, purchase of software, and purchase of equipment related to Government financed information technology systems.	
A. Purchase of hardware	Purchase of electronic equipment for the storage, processing, movement, or display of information, including central processing units; disk, tape, and optical storage devices; input/output devices; microcomputers, minicomputers, and related equipment; local area networks (LANs), private branch exchanges (PBXs), modems, multiplexers, telephones, facsimile machines, and message processors; maintenance and test equipment; and embedded software (firmware) which is not severable from hardware obligations. Includes radio and television equipment only to the extent that such equipment is defined as automatic data processing equipment in GSA regulations. Does not include furniture, typewriters, copiers, calculators, and microfilm/microfiche equipment.	31.0
B. Purchase of software	Purchases (including one-time obligations for long-term licenses) of all system and application software that exceed $25,000, including operating systems and embedded software (when severable from hardware obligations) and software for communications.	31.0

Item	Explanation	Object Class
C. Site or facility	Site construction, or modification required in support of information technology systems (e.g., raising floors, moving walls, air conditioning, uninterruptible power sources, etc.).	32.0
2. Personnel	Workyears and related obligations for civilian and military personnel compensation, personnel benefits (including overtime/shift pay) and travel for personnel whose principal duties are directly related to information technology systems. Agencies should report workyears and related obligations based on their best estimate of the time spent on information technology functions by all personnel connected with these functions (e.g., policy and management, systems development and operations, telecommunications, computer security, contracting, secretarial support, etc.). If user organizations have personnel principally assigned to information technology support functions for the user organization, workyears and obligations for these personnel should be included. However, workyears and obligations should not be reported for personnel in user organizations who simply use such systems incidental to the performance of their primary functions.	
A. Compensation, benefits, and travel	Total obligations for all civilian and military personnel compensation, personnel benefits, and travel as defined above.	11.1 through 12.2, 21.0
B. Workyears	Total workyears of all civilian and military personnel whose principal duties are defined above.	
3. Equipment rental, space, and other operating costs	Obligations for equipment rental, space, and other operating costs incurred for Government-owned, Government-operated facilities. Also include obligations for any Government-provided facilities, hardware, or supplies incurred as a part of commercial service/network arrangements.	
	Obligations for contracts solely for support services to carry out agency requirements, whether performed on Government premises or at contract facilities, should be reported under item 4 except to the extent that Government facilities, hardware, or supplies are provided. Obligations incurred for such Government-provided facilities, hardware, or supplies should be reported under this item.	
A. Lease of hardware	Basic lease and extra use charges for all directly leased equipment. Obligations for leased services which include charges for equipment should be reported under item 4, rather than this item. Obligations for hardware maintenance and for related training and technical assistance, when significant and readily identifiable in the contract or billing, should be reported under item 4D.	23.3
B. Lease of software	Obligations for directly leased software. Include obligations for software that is leased as a part of a hardware lease when significant and readily identifiable in the contract or billing. Obligations for software maintenance and for related training and technical assistance, when significant and readily identifiable in the contract or billing, should be reported under item 4D.	23.3
C. Space	The lease of space required for operations (i.e., specially prepared space) and office space for personnel (consistent with the reporting in items 2A and 2B). Include the provision of basic utilities and housekeeping services (e.g., rental payments to GSA). Any similar Government-furnished space and related utilities and housekeeping services for contractor personnel should also be reported under this item.	23.1, 23.2
D. Supplies and other	Other in-house operating expenses (e.g., supplies, noncommercial training for in-house personnel, etc.) directly related to information technology activities and not otherwise explicitly reported under other items. Includes off-the-shelf software purchases of $25,000 or less.	25.0, 26.0
4. Commercial services	Obligations for network services or facilities where payments are made directly to private industry, including obligations associated with Government-owned contractor operated (GOCO) facilities (exclusive of Government-furnished space or equipment), for facility management contracts, for teleprocessing services program contracts with payment directly to the private vendor, or for similar contract arrangements. Obligations for contract services where payments are to other Federal agencies (e.g., payments to GSA for FTS 2000 or TSP) should not be reported under this item (see item 5).	
A. ADPE time	Contracts to provide computer system time and other services that are a part of such contracts (e.g., data base maintenance, applications assistance, etc.).	25.0
B. Voice communications	Contracts for voice or analog data (up to 4.8 kbps) communications service (including dedicated transmission and Telex service) and for associated features, such as conference calling, call forwarding, NSEP, etc. Include obligations for DSN, FTS 2000, WITS, POTS, etc., only when such obligations represent contracts of the agency directly with private vendors.	23.3
C. Data communications	Contracts for switched, packet, and dedicated data communications services, for integrated digital service, and for video transmission service. Include obligations for communications services that are not readily divisible between items 4B and 4C. Include obligations for DDN, FTS 2000, etc., only when such obligations represent contracts of the agency directly with private vendors.	23.3
D. Operations and maintenance	Contracts to provide services associated with the operations of existing systems. Include obligations for GOCOs (exclusive of Government-furnished space or equipment). Include systems hardware and software maintenance, capacity and facility management, data entry support, maintenance/operation of tape/disk libraries, etc. Include maintenance furnished as a part of software purchases and license arrangements or for rental/lease contracts when significant and readily identifiable in the contract or billing.	25.0
E. Systems analysis, programming, design, and engineering	Contracts to provide applications and/or systems development support, such as applications systems design, analysis and/or programming services, and contracts for the design and/or development of services, networks or facilities.	25.0

Circular No.
A-11 (1991)

Item	Explanation	Object Class
F. Studies and other	Contracts to provide services such as management or feasibility studies; technology forecasts; requirements definition; consulting services; commercial training; and any other information technology related services directly obtained from commercial sources but not reported in other categories.	25.0
G. Significant use of information technology	Obligations for information technology in contracts other than those reported above, where such contracts "make significant use of ADP equipment," as that phrase is defined in GSA's regulations.	25.0
5. Interagency services	Obligations for payments and offsetting collections between executive branch agencies for information technology services. Within DOD, the military services and the Office of the Secretary of Defense are to be considered agencies for this purpose. For all other agencies, internal service arrangements should be reported as intra-agency services (see Item 6). Include transactions for systems design/analysis, programming, FEDSIM, the cost of interagency sharing agreements (see OMB Circular No. A–130), Government training, the GSA equipment lease program, payments to GSA for FTS 2000, TSP, FDPCs, etc.	
A. Payments	Obligations to other agencies within the executive branch for services.	23.3, 25.0
B. Offsetting collections	Offsetting collections from other agencies within the executive branch for services.	
6. Intra-agency services	Obligations for payments and offsetting collections for all information technology services within agencies. Include working capital fund transactions for ADP and telecommunications services.	
A. Payments	Obligations for all services provided by any other bureau, administration, or office within the same agency.	23.3, 25.0
B. Offsetting collections	Offsetting collections for all services provided to any other bureau, administration, or office within the same agency. If the sum of obligations for payments and offsetting collections for intra-agency services for the agency as a whole do not equal zero, a footnote should be added that provides an explanation.	
7. Other services	Includes obligations for payments and offsetting collections (see section 14.1(d)) for all information technology services provided to or received from the judicial and legislative branches of the Federal Government (including GAO and GPO), the Postal Service, State and local governments, universities, international organizations such as NATO, etc.	
A. Payments	Obligations to establishments outside the executive branch for services.	23.3, 25.0
B. Offsetting collections	Offsetting collections from establishments outside the executive branch (including non-government sources) for services.	
8. Totals A. Obligations	Include total obligations for acquisition, operation, and use of information technology reported in lines 1–7.	
B. Budget authority	Include total budget authority (net) that finances information technology activities reported above.	
C. Outlays	Include total outlays (net) from activities related to information technology reported above. Note.—Budget authority and outlay data should be reported if the exhibit is prepared for a major system. If net budget authority and outlays are zero, indicate by using leaders (...). Budget authority and outlay entries are not required for the agency summary report.	

(b) **Agency acquisition plan.**—Each agency will submit an agency acquisition plan, in the format of exhibit 43B, that identifies and describes anticipated acquisitions of equipment and services, where the cumulative cost (for items 1, 3A, 3B, and 4, as defined in section 43.2(a)) of the acquisition exceeds $5 million during the period CY through BY+4. Obligations for acquisitions should be identified for each year from CY through BY+4 and should equal the total of amounts for these acquisitions in items 1, 3A, 3B, and 4.

(c) **Benefit-cost analysis for major initiatives.**—Agencies will submit detailed life-cycle benefits and costs for major information technology initiatives contained in the budget request. These analyses must be submitted before any such initiatives can be considered for funding.

Agencies are required to prepare benefit-cost analyses for all information technology initiatives at a level of detail appropriate to the size of the investment the project will require. Submission is routinely required only for major initiatives as defined below. However, OMB may require submission of the benefit-cost analysis for any information technology initiative contained in the agency budget request.

A major information technology initiative is one for which the cost of system development and acquisition (including aggregated totals of like items such as microcomputers) from conception through implementation will exceed $25 million or the cost in any year will exceed $10 million.

Benefit-cost analysis submissions will follow these guidelines:

—The analysis should include detailed annual benefits and costs over the entire system life. One acceptable format is shown in Section 4.3 of Federal Information Processing Standards (FIPS) Publication No. 64, "Guidelines for Documentation of Computer Programs and Automated Data Systems for the Initiation Phase" available from the National Technical Information Service, U.S. Department of Commerce. System life begins when funds are first obligated for the initiative and ends at the projected end of the useful life of the system (normally after three to six years of operation).

—Initiatives are expected to show a ten percent return on investment, that is, a positive net present value using a ten percent discount rate. Initiatives not meeting this standard shall include substantial additional justification for funding based on a specific, documented statutory requirement, or quantifiable but non-economic improvements to the agency's ability to perform its mission.

—Analyses must include explanation and discussion of benefit-cost figures, including clearly identified explanations of technical and organizational assumptions, a set of at least three technically feasible alternatives to the recommended approach that includes a minimum "baseline" approach and a scaled-down approach, and the use of sensitivity analysis as discussed in FIPS Publication No. 64 as a hedge against uncertainty.

144

APPENDIX C - Agencies Responding to Data Call

Department of Agriculture
Department of Commerce
Department of Defense (Office of the Secretary)
      Department of the Air Force
      Department of the Army
      Department of the Navy
Department of Education
Department of Energy
Department of Health and Human Services
Department of Housing and Urban Development
Department of Interior
Department of Justice
Department of Labor
Department of State
Department of Transportation
Department of Treasury
Department of Veterans Affairs
Environmental Protection Agency
General Services Administration
National Aeronautics and Space Administration
Tennessee Valley Administration

APPENDIX D - Issues Addressed in Case Study Interviews

Organization Structure

1) Does the IRM organization perform these information technology management review processes or do organizations outside of IRM do this work for:

    a) budget

    b) technical review (hardware, standards, architecture)

    c) planning

    d) FIRMR acquisition?

2) Is there a policy-level or senior-career-level oversight group now in place that helps to oversee issues concerning information technology management?

    a) If yes, what kinds of decisions does it "play" on? Life cycle management, evaluation, funding?

    b) Provide an example of how such a review board intervened in an information technology project to change its course (either to speed it up, slow it down, or request more analysis). Is the effectiveness of these management review structures dependent on strength of personalities or position in the organization?

259

3) If the answer to Question 1 is no, why did previous
efforts fall into disuse?

    a) change in personnel?

    b) change in policy?

    c) agency subcomponent complaints about
micromanagement?

    d) other?

Application of Policy

4) Please provide a specific example of how the agency
applied its current management policy or guidance. If
possible, provide paper that manifests a decision.
(Examples could include: inclusion in budget to OMB,
decision paper, executive summary of cost-benefit analysis,
or analysis supporting APR to GSA).

5) To what extent is the current policy used to shape
project planning or funding at the subagency level? Is the
policy reinterpreted or applied as is?

6) Is the policy observed only to "enforce" decisions made
on other grounds? Do program or political considerations
sometimes override the requirements of the policy? What, if
any, are the implications of not following the agency
policy?

Content of Policy

7) Do you have any thoughts on why agencies wrote their
policies to exclude major portions of the policy framework

for information technology management? Are these
inconsistencies between agency policy and the policy
framework attributable to a lack of knowledge of the breadth
of existing policy, a lack of knowledge of its relevance for
agency policy making, or a lack of understanding of its
substantive content?

8) Should any such information technology management policy
presume "one best way" to manage a project, or should it
offer the flexibility to promote other methods as long as
key elements of accountability or analysis are there?

9) Should the governmentwide policy framework for managing
information technology stipulate desired outputs and
outcomes, or should it specify processes agencies should
follow to comply with existing law?

APPENDIX E - OMB's Policy-Making Mechanisms

As a general practice, OMB does not promulgate
regulations in the same way as most federal agencies. OMB
uses circulars as a standing policy documents that apply to
all executive branch agencies. "Circulars are used to
communicate guidance, instructions, and information to
Executive Branch agencies when the nature of the subject
matter requires continuing emphasis and attention."[197] As a
matter of course, OMB revises its circulars infrequently.
These revisions involves extensive public review and
comment, much like other agencies' rule-making processes.
OMB Circular No. A-130, "Management of Federal Information
Resources," was first released in 1985 after two and one-
half years of public comment and has yet to be completely
rewritten as of the end of 1992.[198]

Bulletins differ from circulars in several ways and
often support the larger policy principles stated in

[197]Office of Management and Budget, Administration
Office, OMB Employee Guide (Washington, D.C.: Office of
Management and Budget, 1992), 18.

[198]J. Timothy Sprehe, "Developing Federal Information
Resources Management Policy: Issues and Impact for
Information Managers," Information Management Review 2
(Winter 1987): 33-41.

circulars. "Bulletins are used to communicate guidance, instruction, and information to Executive Branch agencies when the nature of the subject matter is transitory or requires one-time action."[199] The contents of bulletins vary; a bulletin may consist of a data call or contain policy statements. Bulletins often apply to fewer agencies than circulars and have specific sunset dates.

Several examples illustrate this distinction. In the annual Information Resources Management Plans Bulletin, OMB sends out a data call to selected federal agencies on their IRM activities.[200] Alternatively, a bulletin can serve as an interim policy document, as does OMB Bulletin No. 90-08, "Guidelines for Preparation of Security Plans for Federal Computer Systems That Contain Sensitive Information," which "will remain in effect until it is superseded by a revision to OMB Circular No. A-130."[201]

Finally, OMB also periodically formulates policies and collects data from agencies. Sometimes these policies take the form of policy letters or memoranda to department

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[199]OMB, OMB Employee Guide, 18.

[200]Office of Management and Budget, "Information Resources Management (IRM) Plans Bulletin," OMB Bulletin No. 90-10 (Washington, D.C.: Office of Management and Budget, 1991).

[201]Office of Management and Budget, "Guidelines for Preparation of Security Plans for Federal Computer Systems."

and agency heads. "A Memorandum to Heads of Executive

Departments and Agencies is used to announce temporary

policies or to revise or reemphasize existing policies."[202]

One relevant example for this study is the letter signed by

then-Deputy Director Joe Wright on OMB's policy for

conducting cost-benefit analysis to support budget requests

for information technology projects.[203]

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[202]Ibid., 19.

[203]Office of Management and Budget, <u>Memorandum for the Heads of Executive Departments, Establishments, and Independent Agencies</u>, "Preparation of Benefit-Cost Analyses for Major Information Initiatives Contained in Budget Requests," by Joseph R. Wright, Jr., M-86-23 (Washington, D.C.: Office of Management and Budget, 1986).