

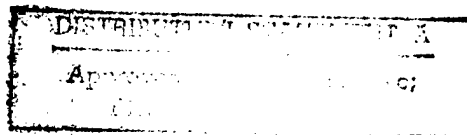


U.S. AIR FORCE
INFORMATION RESOURCES MANAGEMENT:
AN EXPLORATORY STUDY OF POLICY

THESIS

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1st Lt, USAF

AFIT/GIR/LAS/98S-9



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THESIS

Presented to the Faculty of the Graduate School of Logistics and Acquisition

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Information Resource Management

Brian S. Munoz

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Brian S. Munoz

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Abstract

Information superiority and dominance is identified as Department of Defense and US Air Force critical success factors for mission effectiveness. Thus, effectively managing information and the resources which support it is a concept in which the Federal Government has a keen interest. Information Resources Management (IRM) was established within the Department of Defense (DoD) in 1983 as a tool for better managing its information in the wake of automated information processing and sharing. Over the past 15 years, numerous changes to law, policy, and other directive or guidance material have made the task of implementing an effective IRM program difficult. In light of these numerous changes since the inception of IRM in the DoD, this thesis qualitatively analyzes law, policy, and doctrine to offer a holistic explication of IRM Policy within the current USAF context.

Individual and aggregate analysis of Federal, Department of Defense, and Air Force information resources management policies and directives under study for this research suggest a fairly coherent IRM policy framework. Final analysis of this research revealed that for information resources management to be truly effective, it should be approached as a philosophical concept considered in all aspects and levels of information systems and technology management.

U.S. AIR FORCE
INFORMATION RESOURCES MANAGEMENT:
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I. Introduction

Overview

"Information technology influences every Air Force activity. It is part of our environment from office to cockpit, and from sensor to shooter. Superior information technology leads to superior weapon systems. As information technology improves, we will be able to perform our mission and support functions better, faster, cheaper, and smoother - - even in the face of continued downsizing. The information technology community will redesign its business processes as the community seeks to provide its users with responsive, affordable service. This will require significant changes in culture, organization, training, and processes" (AFITM:1).

A blueprint for effective and efficient use of information and information technology is a primary goal for the United States Air Force today. Information Superiority is identified as one of six USAF Core Competencies considered critical for mission effectiveness (Global Engagement). Effectively managing information and the resources which support it is a concept in which private industry and Government alike have a keen interest. Information Resources Management (IRM) was established within the Department of Defense (DoD) in 1983 as a tool for better managing its information in the wake of automated information processing and sharing. Over the past 15 years, numerous changes to law, policy, and other directive or guidance material have made the task of implementing an effective IRM program difficult. In light of these numerous changes since the inception of IRM in the DoD, this thesis qualitatively analyzes current

law, policy, and doctrine to offer a holistic explication of IRM Policy within the current USAF context.

To effectively analyze the complexities involved with this issue, it is necessary to study the fundamental concepts of information resource management and what constitutes policy, especially within the federal management sector. After analysis of these terms individually, they are analyzed together, within the context of federal policy and other officially sanctioned documents that offer guidance and directives for information resources management within the United States Air Force.

Information Resources Management (IRM)

Information resources management has emerged from the complexities associated with managing both the information and information technology resources of an organization given today's automated office and business environment. In the most basic sense, IRM has been defined as "the concept that information is a major corporate resource and must be managed using the same basic principles that are used to manage other assets such as, employees, materials, equipment, and financial resources" (McFadden & Hoffer, 1994: 6). This definition offers the insight that information in and of itself should be treated as a resource. That is, the planning of information technology (IT) activities and processes of an organization should consider the actual information it is to process before system design and implementation decisions are made. In an organizational setting, IRM "takes a broad view of the enterprise and does not focus too narrowly on the needs of a particular department or work group" (van den Hoven, 1995:

69). Given that information is a resource that can be managed, and that it holds value in an organizational context, management of information and information resources necessitate attention in any organizational setting.

Evolution of IRM

Business managers and strategists have, and will continue to, look at ways that information technology can create or contribute to a competitive business advantage (Brancheau et al., 1996; Gallivan, 1994; Niederman, et al., 1991; Wassenaar, 1990). Thus, the creation of the Management Information Systems (MIS) environment, from which IRM was born. This relatively new field has struggled from its inception to attain the well-defined structure and acceptance that other disciplines have achieved. Keen (1980) states that the difficulty in trying to obtain a correct “fit” for MIS (and IRM) may be due in part to “a combination of successful innovations in technology and, until recently [1980], only partially successful efforts to harness them...” Keen’s comments seem to hold true today as well. Today, 1998, innovations in technology are as strong and frequent if not more so than those occurring at the time of Keen’s writing. Organizations still struggle to find the best managerial “fit” for these rapid technological advances (Brancheau et al., 1996; Gallivan, 1994; Niederman, et al., 1991).

The advent of MIS, or using information resources and technology to gain competitive advantage and streamline business processes, has brought about new challenges to the way in which organizations adopt, implement, and use IT to attain their organizational goals (Gallivan, 94; 475). Often the quest for improving information related processes leads to organizational and managerial change. Michael Gallivan

(1994) identifies four areas that summarize the main reasons for IT/IS management change:

1. Business cost pressures -- focus on reducing the firm's operating costs
2. Business service pressures -- focus on better quality and customer service to external customers
3. Technology Push - focus on the availability of new information systems platforms, tools and standards
4. IS Service Pressures - focus on improving the effectiveness of delivering services to users

The implications of these change drivers creates the necessity for IS professionals to deliver systems better, cheaper, and faster than previously (Gallivan, 1994: 67).

However, in an environment which seeks continual pursuit of "better, faster, and cheaper" performance, IT/IS managers must consider that frequent changes in focus on key management issues, may mitigate the attainment of the tenets of management—planning, organizing, directing, and controlling—making the already complex role of IS managers even more difficult due to the constant state of change.

Public vs. Private Sector

The evolution of MIS and IRM within the private sector has played a major role in how the government manages its information systems. As the DoD has progressed through post Cold War downsizing, many of the prevailing private sector management trends to integrate information systems management and planning principles into the daily operating environment of the government have been adopted in hopes of a more

efficiently run organization in a time of manning and funding reductions (Exec Order 13011; ITMRA; PRA; VISTAS). Information resource management is defined within the government with more detail than that found in private industry. Department of Defense Directive 8000.1 states that IRM is

The planning, budgeting, organizing, directing, training, promoting, controlling, and management activities associated with the burden, collection, creation, use and dissemination of information by agencies and includes the management of information and related resources such as FIP [Federal Information Processing] resources. (DODD 8000.1: 7)

The Air Force further refines this definition of IRM to “the process of managing information resources (information and related resources such as personnel, equipment, funds, and related technology) to accomplish agency missions and improve agency performance” (VISTAS: 2). Through these definitions of information resources management, one can see that the Government is trying to formalize the management of its information resources.

As Federal information resources management techniques move toward private industry techniques (Executive Order 13011; ITMRA; PRA), one cannot forget that although their practices are closely related, Federal sector IS/IT management is distinctly different from the private sector environments. The public sector not only has to deal with the industry related issues of IS/IT management, but also the added burden of political, legal, and organizational constraints inherent in bureaucracies (Caudle, et. al. 1991). In addition to the constraints inherent in bureaucracies, Federal IT/IS managers must comply with laws and directives such as the Paperwork Reduction Act, the

Information Technology Management Reform Act, and the OMB Circulars, which their private sector counterparts do not.

Policy

Because this thesis analyzes IRM within the context of policy, the basic components that constitute policy must be defined. Nakamura and Smallwood (1980) present a model that graphically represents the complex environment of policy. The model illustrates the interactivity of formation, implementation, and evaluation as the essential components of the policy process. For effective policy implementation, each component must link (communicate) bi-directionally with each other (Nakamura & Smallwood: 1980, 27). A diagram depicting this three-pronged model follows:

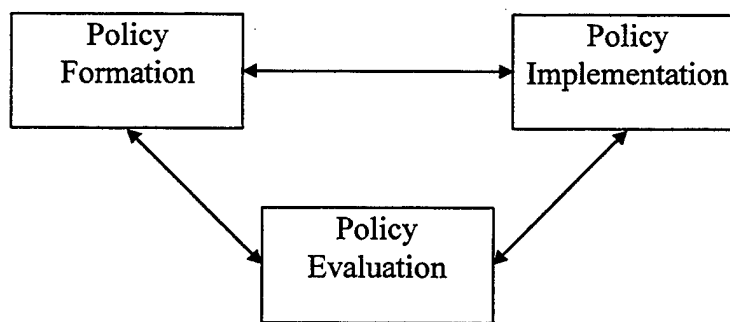


Figure 1. Policy Model (Nakamura & Smallwood)

As depicted by the diagram, each component must interact and communicate effectively with the others for policy to function as intended.

Regardless of private or public sector employment, all managers are faced with complying with organizational policy. Bates & Eldredge (1984) define organizational policy as a “management tool for assuring that problems will be solved within acceptable constraints.” More explicitly, the role of policy in an organization serves two purposes: first, to serve as guides to decision making and second, to serve as standing plans for situations that are repetitive or recurring. The absence of policies tends to create inconsistencies. Moreover, “policies are a method of fostering uniformity of decision making, which is the best insurance against the dangers of inconsistency” (Bates & Eldredge, 1984: 211). Nakamura and Smallwood (1980) present the following criteria for successful policy formulation:

1. Policy goals are stated clearly
2. These goals are precise enough to be measurable
3. Implementation activities are directed toward achieving these goals
4. Objective measures that relate implementation activities to goals exist or can be created
5. The data necessary to verify these measures are available

Information and Policy

The need to manage information resources and the role of policy within an organizational context have been discussed, but what about the mix of these? Elizabeth Orna (1990) presents a framework for developing organizational information policies.

According to Orna, information policy should be based on the organization's objectives (which directly support their strategy) and focus on the following:

1. The objectives of using information in relation to corporate objectives
2. The resources of information and the resources for managing it, which the organization needs in order to achieve its objectives
3. The people who manage information and their responsibilities
4. The systems and technology for managing information to support people in achieving their objectives
5. Criteria for assessing the costs and benefits of information to the organization
6. Criteria for monitoring and evaluating information activities

In addition to the criteria listed above, it should be noted that top management support is critical to the success of information policies (Martin, 1989:104; McFadden & Hoffer, 1994: 29).

A common methodology for integrating information technology into organizational policy is the concept of information systems planning (Martin, 1989; Wassenaar; 1990). Arjen Wassenaar (1990: 47) states that "information systems planning is fundamentally a decision making process resulting in agreements about the direction and structure of the future of the information processing system." Further, Wassenaar outlines the integration of business strategic planning with information systems planning to generate what he terms strategic information systems planning. According to Wassenaar, the main outcomes of strategic information systems planning should be:

1. Mission, goals, critical success factors, and problems
2. Organizational goals in relation to the most important business functions

3. Business strategy points relevant to (structuring) business information systems
4. Internal and external opportunities for IT applications
5. Assessment of IT opportunities
6. Summary of the most important IT application areas and their critical success factors

This approach by Wassenaar offers a means to focus on information systems planning while matching IS/IT goals with organizational goals and critical success factors.

The Problem

As discussed, the definition of information resources management is relatively new and somewhat broad. The environment in which information resource managers operate is often uncertain. Further, public sector information resource managers are faced with the added constraints inherent in bureaucratic organizations. Specific guidance on the process (es) of how IRM should be implemented and executed seems to be negligible and difficult to quantify. Moreover, formulating, implementing and evaluating policy are complex processes. Given the broadly defined construct of IRM and the complexity of the policy process, there have been many attempts to offer guidance and directives to form Federal and DoD policy of IRM. Additionally, there has been much change in the information technology management environment. Business process reengineering, Total Quality Management, and strategic planning are a few examples of recent management techniques trying to optimize on the advantages that information technology can bring to an organization (Martin 1989; Wassenaar, 1990). To deal with these changes in the

Federal IT management arena, more specific directives have appeared in an attempt to formalize the role of IRM.

Research/Investigative Questions

This continuum of adding more directives and guidance in attempts to further define and formalize how information resources should be managed within the DoD, and more specifically the U.S. Air Force, has led to the following research questions. Given the various guidance and directives, do the numerous directives join to make a coherent policy? Further, are there disparities in guidance? With these questions in mind, the following investigative questions were formed as a reference base to analyze the current IRM policy environment.

1. What are the explicit and implicit implications for USAF IRM policy of the material under study?
2. What is necessary within the Air Force context for effective IRM policy formulation and implementation?

Scope

The focal points for this research consist of Department of Defense and Air Force Chief Information Officer (CIO) and information resource management programs. Specific components of study include official doctrine documents, strategic plans, existing policies, and other applicable directives such as the Paperwork Reduction Act of 1995 (PRA), the Information Technology Management Reform Act (ITMRA), and Executive Order 13011.

Results from the study will be in the form of recommendations for increased IRM policy effectiveness and suggested future research topics in this relatively new and rapidly changing arena. The expected benefit is a blueprint of the various policy, guidance and directive parameters concerning information resources management within the US Air Force.

Structure of Thesis

This chapter introduced an exploratory study of Department of Defense and Air Force information resource management policy. Established in this chapter was the necessity to investigate current Air Force IRM policy and supporting documentation. Chapter II outlines the methodology used to carry out this thesis research. Chapter III analyzes documents, directives, policies, and legal material for implications on the role of IRM in the USAF context. Finally, chapter IV presents a discussion of the results of the qualitative analysis accomplished in Chapter III and offers suggestions for future related research.

II. Methodology

Overview

The type of data to be analyzed for this research largely determined the method of data collection and analysis. Because the construct of study (IRM Policy) is primarily established through written law, directives, memoranda, and other textually based media, a qualitative approach to analysis was determined to be the best method of choice. A survey of Federal or DoD information resources management leaders was determined to be unsuitable for this study because data collected in this manner would have measured *interpretation* of the construct rather than analyzing the construct in its own right. Moreover, to collect data in the form of a survey would invite biased interpretations from the respondents due to their current position and past experiences in the field of information technology/resource management. Antithetically, a careful qualitative analysis of the construct limits the bias and interpretation of the study to the researcher alone. Thus, the researcher believed that a qualitative approach was best suited for the content and textual analysis inherent in the study of literature.

Data Collection

Data collection for this study consists of both primary and secondary data from IRM related literary sources. Sources of primary data are in the form of published documents, directives, policy letters, memoranda, and other Federal, Department of Defense, or Air Force official textual information which adds to the definition or

parameters of managing information resources. Because Air Force wide policy is largely formed, implemented, and evaluated at the Air Staff level and above, searches for primary data were constrained to documents originating at or above the Air Staff level. The primary mode for researching and obtaining these documents was Internet searches of Defense Technical Information Center (DTIC) archives, and exploration of the AF CIO, DoD CIO, and White House web pages. The primary sources of data for this study are:

1. Paperwork Reduction Act of 1995
2. Office of Management and Budget Circular NO. A-130 – Management of Federal Information Resources
3. Information Technology Reform Act of 1996
4. Executive Order 13011 of July 16, 1996 – Federal Information Technology
5. Department of Defense Doctrine 8000.1 – Defense Information Management Program
6. Department of Defense Information Technology Management Strategic Plan
7. US Air Force IRM Strategic Plan - VISTAS
8. US Air Force Information Technology Management Plan

These primary sources of data are the main components analyzed for understanding, meaning, and interrelation with each other.

Secondary data sources were referenced to obtain an historical academic background on information resources management issues in both industry and public sector information management/technology. Secondary data sources consulted were in

the form of scholarly journal literature and IRM related educational text. The information gained from the study of the secondary data served as supplemental information to the primary data sources. That is, where the primary data sources were the sources of analysis, the secondary data sources provided information regarding parameters affecting information resources management issues. This information was largely in the form of previous research in areas affecting information resource or technology management.

Data Analysis

Archival data was analyzed to form a baseline definition of information resources management. Current legal and directive texts (the primary data sources listed previously) were analyzed for understanding and meaning. Content analysis of each document consisted of searching the texts under study for salient themes and patterns from which inferences were made (Marshall and Rossman; 1995). A coding scheme of key terms pinpointing data of possible collection quality was developed to assist in identifying and understanding themes and patterns that emerged from the data. Using this scheme, key terms such as information resources, information management, information technology/systems (IT/IS) management, information policy, and IT/IS policy were searched for. In keeping with hermeneutic analysis techniques, as terms of possible data quality were read, preliminary analysis of the text was accomplished to ascertain usefulness. If the text under study at the moment was determined to be of data quality, that section was highlighted or underlined for future reference and analysis. Further, as recurring themes or patterns were detected, notes were made so that further

iterations of analysis could be accomplished to better understand the material. After each source document was analyzed, the collective documents were compared for continuities, collaborative themes and patterns, and textual similarities. Several iterations of reviewing the primary source documents individually then collectively were necessary to fully identify and understand the data under study. This iterative analysis allowed individual documents to be incorporated into a meaningful whole.

III. Primary Data Sources

Overview

Each of the primary data sources listed in Chapter II is discussed in the following paragraphs. Further, each source is presented in terms of impact on or implications for the Federal information resources management environment. Aggregate analysis and interpretation of these primary data sources is discussed in the subsequent chapter.

Paperwork Reduction Act of 1995

The Paperwork Reduction Act (PRA) of 1995 is a revision to chapter 35, Coordination of Federal Information Policy, title 44 of the United States Code, previously known as the Paperwork Reduction Act of 1980. The revisions in 1995 more clearly define the previous act and add verbiage that directs the appointment of a senior level executive of each federal agency to be the focal point for information resources management and policy issues. A summary of the purposes outlined in the PRA follows.

1. Minimize the paperwork burden for all concerned parties resulting from the collection of information by or for the Federal Government
2. Ensure public benefit and maximize the utility of the information used by or for the Federal Government
3. Make uniform Federal information resources management policies and practices as a means to improve the productivity, efficiency, and effectiveness of Government programs
4. Improve the use and quality of Federal information to strengthen decision making and accountability
5. Minimize the lifecycle costs of information to the Federal Government (lifecycle of information = the creation, collection, maintenance, use, dissemination, and disposal of information)

6. Strengthen partnerships between the Federal Government and state, local and tribal governments
7. Effectively use information technology to facilitate the sharing and dissemination of public information
8. Ensure the lifecycle process of information by or for the Federal Government is in accordance with applicable laws
9. Ensure the integrity of the Federal Statistical System
10. Effectively use information technology to improve Federal agencies mission performance
11. Improve accountability and responsibility of information resources management policies and guidelines of all Federal agencies to Congress and the public

This list outlines the overall guidance for the use of information, effective management of the information lifecycle, application of information technology, and information resources management policy within the Federal Government. Analysis of this document is limited to aspects that offer insight to, guidance on, or impact Federal information resources management policy.

The PRA defines information resources as “information and related resources, such as personnel, equipment, funds, and information technology” (PRA: Sec. 3502.6) and information resources management as “the process of managing information resources to accomplish agency missions and to improve agency performance...” (PRA: Sec. 3502.7). The largest single contributor of the PRA to how the Federal Government establishes an effective information resources management policy program is through the establishment of the Office of Information and Regulatory Affairs (OIRA). This office

has a presidential appointed administrator who reports to the director of the Office of Management and Budget (OMB). The principle function of the OIRA is to "develop, coordinate, and oversee the implementation of Federal information resources management policies, principles, standards, and guidelines..." (PRA: Sec. 3503). The Paperwork Reduction Act offers the following guidance to the OIRA in carrying out Federal IRM policy.

1. The policies, standards and guidelines developed must be uniform across the Federal Government
2. Common standards for information collection, storage, processing, communication, security, interconnectivity, and interoperability must established
3. IRM practices should be improved through initiation and review of legislation, regulations, and best practice development and implementation
4. Program and management functions should be integrated with information resources management functions
5. Information technology policies, standards, and guidelines should be developed in coordination with the National Institute of Standards and Technology (NIST) and the General Services Administration (GSA)
6. Monitor effectiveness of, and compliance with established policies and guidelines
7. Call for individual Federal Agency IRM plans, programs, and budgets
8. Promote the use and interagency exchange of IT within the Federal Government to increase productivity, efficiency, and effectiveness of Federal programs

The Act offers guidance to each Federal agency for development of more detailed and specific policy. Of note is that in section 3506, the act puts the responsibility of implementing and carrying out information resources management activities in the hands

of each agency head. Moreover, the Act directs the appointment of "a senior official who shall report to directly to such agency head to carry out the responsibilities of the agency" as detailed in the PRA. Further, the senior official appointed to carry out these duties "shall head an office responsible for ensuring agency compliance with and prompt, efficient, and effective implementation of the information policies and information resources management responsibilities established" under the act. Aside from the direction the PRA gives to overall IRM policy and guidance, each agency is directed to establish and conduct formal training programs that will educate management officials on information resources management.

The Paperwork Reduction Act of 1995 offers much more guidance and direction on other matters pertaining to information collection, dissemination, and privacy; however, as stated previously analysis is limited to information resources management related issues.

OMB Circular No. A-130

The Paperwork Reduction Act identified the Office of Management and Budget as the primary agency responsible for Federal IRM policy. In compliance with the guidance and directives outlined in the PRA, the OMB issued Circular No. A-130 to establish Federal information resources management policy and direction. This document provides concrete direction for Federal agencies in support of PRA mandates. As is also the case with the PRA, Circular No. A-130 offers much direction to the areas of information collection and dissemination. However, as noted earlier with the PRA, my analysis

continues to focus on the information resources management aspects of this document also.

Section 7 of Circular No. A-130, sets the tone for the document and the subsequent policy and directives it prescribes. As basic considerations, the document recognizes that information is a valuable resource and identifies the Federal Government as "the largest single producer, collector, consumer, and disseminator of information in the United States." (OMB: 4). Circular No. A-130 establishes five main categories of information resources management related policy. "Evaluation and Performance," the first category, directs the accomplishment of a cost-benefit analysis for each information system in the Federal Government to assess return on investment of these systems. The second category, "Strategic Information Resource Planning," is intended to ensure information resources promote the fulfillment of an agency's mission. More specifically, this policy states that information technology should link to projected mission needs. "Information Systems Management Oversight", as the third category, creates the oversight necessary for information systems lifecycle success. That is, ensuring that an information systems meets (and continues to meet) mission needs and that maintenance and training on the system is carried out effectively and efficiently. The fourth policy category, "Use of Information Resources," provides guidance for top level management of Federal information systems dealing primarily with security and interagency information systems sharing and interoperability. Also directed in this category is the establishment of management and technical frameworks which link mission needs, information content, and information technology capabilities for both strategic and

operational IRM planning. The final policy category outlined by Circular A-130 is "Acquisition of Information Technology." This category provides policy direction regarding procurement and acquisition of Federal information technology and systems. The only specific guidance within the document for the Department of Defense states that the "Secretary of Defense shall develop...uniform Federal telecommunications standards and guidelines to ensure national security, emergency preparedness, and continuity of government."

Information Technology Management Reform Act (ITMRA)

The Information Technology Management Reform Act of 1996 holds two main themes for the information resources management field. The first theme directs the focus of Federal information technology management to the capital planning aspects of information resources to enhance the marginal return on IT investments and reduce IT related acquisition expenditures. The second IRM related theme behind the enactment of the ITMRA was to establish performance-based measurement processes for Federal information systems to assess effectiveness, efficiency, and productivity. For information resources management this means that the resources used for processing information must be analyzed based on cost and performance – that processes must be put in place that will ensure that managers quantify information resources along these lines. Further, the ITMRA specifies that information systems and technology acquired by the Federal Government are analyzed for maximum value and minimum risk before investment is accomplished.

In order to ensure that Federal Agencies maintain the focus necessary to meet the requirements mandated by the ITMRA, the Act stipulates that each agency will appoint a Chief Information Officer (CIO). This, in effect, more clearly defines the requirement of the Paperwork Reduction Act to appoint a senior official to carry out these duties. The ITMRA defines these responsibilities as:

1. Providing advice to the head of an agency and other senior management personnel of the executive agency to ensure that IT is acquired and information resources are managed in a manner that implements the policies and procedures of both the ITMRA and PRA
2. Developing, maintaining, and facilitating the implementation of a sound and integrated information technology architecture for the executive agency
3. Promoting the effective and efficient design and operation of all information resources management processes for the executive agency, including improvements to work processes of the executive agency

Executive Order 13011- Federal Information Technology

In July of 1996, President Clinton issued Executive Order 13011. This order prescribes Federal information resources management policy based on the main legislative and directive materials discussed previously: The Paperwork Reduction Act of 1995, OMB Circular A-130, and the Information Technology Reform Act. In addition to reinforcing the mandates outlined in these source documents, Executive Order 13011 calls for a Government-wide information infrastructure and expanded interagency cooperation and coordination with IRM related activities. The means by which such cooperation and coordination is to be accomplished and maintained is through the establishment of a Chief Information Officer's Council. The Deputy Director of the

OMB chairs the council, while the Vice Chair is a rotational position, elected by a vote of the 30-member council. Membership consists of the CIOs of each of the 28 major Federal executive agencies, plus 2 other agency CIOs. The main tenants of the CIO Council are to:

1. Develop recommendations for Federal IT policy
2. Improve IRM through the collaboration of shared practices and experiences
3. Identification and sponsorship of IRM related opportunities
4. Assess/address IRM related hiring, training, and professional development needs of the Federal Government
5. Provide recommendations/advice to agency heads and OMB Director
6. Seek the advice of other Federal agencies, boards, and councils, and industry and academia on matters of concern to the council

Executive Order 13011 also establishes two bodies to ensure compliance with the mandates of the source directives to this order. The Government Information Technology Services Board is to “ensure continued implementation of the information technology recommendations of the National Performance Review and to identify and promote the development of innovative technologies, standards, and practices among agencies and state and local governments and the private sector” (Exec Order 13011: Sec.4.a). The Information Technology Resources Board is to “provide independent assessments to assist in the development, acquisition, and management of selected major information systems and to provide recommendations to agency heads and the OMB...” (Exec Order 13011: Sec.5.a).

DoDD 8000.1

The Department of Defense acted in 1992 to provide further guidance to the Paperwork Reduction Act of 1980. However, due to revision to the PRA in 1995 and the enactment of the Information Technology Reform Act of 1996, the content of DoD Directive 8000.1 is largely of historical impact in regards to information resources management issues. The directive speaks to a structure and organization that has changed dramatically over the past six years. The changes such as the integration of the information management and communication officer career fields have, and will continue to, change the theoretical approach to how the Air Force manages it's information resources.

DoD Information Technology Management (ITM) Strategic Plan

Although not established as a Department of Defense directive, the DoD Information Technology Management (ITM) Strategic Plan fills the void left by not having a revision to DoDD 8000.1. Additionally, the Information Technology Management (ITM) Strategic Plan fulfills the requirement to submit an information resources strategic plan as outlined in both the Paperwork Reduction Act and OMB Circular No. A-130. The ITM Strategic Plan "provides overall direction and guidance for managing the Department's information resources." The plan establishes the following four goals that characterize critical success factors necessary for information resources management to effectively link to the mission requirements of the DoD.

1. Become a mission partner
2. Provide Services that satisfy customer information needs
3. Reform IT management processes to increase efficiency and mission contribution
4. Ensure DoD's vital information resources are secure and protected

The plan further defines each goal, providing specific objectives necessary for goal attainment. For each of the four goals, the plan provides a description explaining the goal, anticipated outcomes of goal attainment, and performance indicators used for assessing goal attainment. Additionally, the primary performance evaluation office is identified and examples of models of excellence for each goal area are provided.

VISTAS – 1995 USAF IRM Strategic Plan

The United State Air Force Information Resources Management Strategic Plan, also known as VISTAS, is the IRM policy and guidance document for the Department of the Air Force. This document integrates the policies, mandates, and directives of the previously discussed Federal and DoD IRM related documents. VISTAS offers guidance and direction for an effective and efficient information resources management program within the USAF context. An Air Force IRM vision of, “Decision makers with the right information – anytime, anywhere, on demand” is established in Vistas (Vistas: 8). To serve as the means to attain this vision, Vistas provides these four goals:

1. Provide decision makers with on-demand access to reliable and sufficient information

2. Increase effective and efficient use of information as an Air Force resource
3. Develop a broad-based, Air Force-wide understanding of the value of information resources management
4. Redesign and improve processes before applying technology

Each goal is supported by a list of objectives, which, if achieved, should pave the path to goal attainment.

VISTAS analyzes the current Air Force IRM environment by SWOT (Strengths, Weaknesses, Threats, and Opportunities) analysis. SWOT analysis is a useful tool for planners and decision-makers; it provides a clear picture of a given situation so that a more thorough understanding of the problem can be realized before important decisions are made. As a follow-up to the SWOT analysis, VISTAS provides a risk assessment. This risk assessment weighs the possible outcomes of not implementing a successful IRM program within the Air Force. The assessment is useful in projecting implications for not meeting the higher order directives previously discussed.

Air Force Information Technology Management Plan (AFITM)

In 1997, the Chief Information Officer (CIO) of the Air Force developed a follow up plan to VISTAS. The new plan named the Air Force Information Technology Management Plan (AFITM) reflects the integration of the communications and information management philosophies, joining information technology planning with information management planning. Just as the DoD ITM fulfilled requirements set forth by the Paperwork Reduction Act and OMB Circular No. A-130 to submit an information

resources strategic plan, the AFITM does so for the Department of the Air Force. Not only does the AFITM meet these requirements, more importantly it establishes a communications and information operating philosophy of:

1. Make Air Force missions and business operations better
2. Build communications and information architectures
3. Reengineer processes so they become models of performance and efficiency
4. Develop and nurture strategic partnerships to achieve vision, goals, and objectives

As indicated above, the AFITM is modeled to take higher level military philosophy from documents such as Global Engagement, and Joint Vision 2010 and combine them with directive documents such as those outlined in this thesis. The outcome of the AFITM, meeting current information resources management directives while paving a road map for the future, serves as Air Force's guiding document for the communications and information environment. The Air Force Information Technology Management Plan also outlines the AF CIO structure and functions, and defines the Air Force communications and information mission, vision, and purpose. These are quoted below.

Mission:

Our mission is air and space operations. Our contribution is communications and information

Vision:

An Air Force that works better and costs less - through the smart use of information technology

Purpose:

To provide the right information, in the right format, to the right place, at the right time -- regardless of the environment

Similar to the DoD Information Technology Plan, the AFITM establishes goals and objectives that provide guidance for the Department of the Air Force's communications and information personnel. Strategies are used to provide more detailed focus on goal and objective attainment. A strong point in the AFITM is that it uses a Strategy-to-Task methodology, which identifies gaps and redundancies in mission planning and offers recommendations for correction or elimination (AFITM: 3).

Summary

This chapter has abstracted relevant portions of current Federal information resources management policy literature. Each source document was analyzed and presented individually. The following chapter presents an aggregate analysis of the documents coupled with recommendations for future research and an enhanced Federal and DoD information resources management environment.

IV. Analysis and Recommendations

Analysis

The individual and aggregate analysis of Federal, Department of Defense, and Air Force information resources management policies and directives under study for this research suggest a fairly coherent IRM policy framework. Some of the consistent patterns and salient themes discovered through this analysis will be addressed further in this chapter. It should be noted however, that analysis of the primary data sources revealed points of possible conflict in the aggregate policy; these also will be identified and discussed in the following paragraphs.

The Air Force Information Technology Plan states that "information technology influences every Air Force activity" (AFITM: 1). Aggregate analysis of the primary data sources for this study suggests this is true. One could argue that information technology affects every activity within the U.S. Government. The pervasive impact that information technology plays in Government is evidenced by one of the main tenets of the Paperwork Reduction Act of 1995 -- to improve the productivity, effectiveness, and efficiency of Government programs through IRM policies and practices (PRA: Sec. 3501.3). Simply stated, this guidance implies that IRM policies should be applied throughout the Federal Government to enhance any activity or program from which productivity, effectiveness, or efficiency could be gained. Executive Order 13011 codifies this by stating, "A Government that works better and costs less requires efficient and effective information systems." OMB Circular No. A-130 and the Information Technology Management

Reform Act add to this policy by prescribing processes which motivate productivity and cost savings through more effective and efficient management of information resources within the Federal Government. The theme of productivity, effectiveness, and efficiency gains through the management of information resources carries down to the Department of Defense and Air Force levels as well. The DoD Information Technology Management Plan mission statement speaks of the need to provide the right information to users so that the mission can be achieved effectively and efficiently (DoD ITM: 3). The Air Force VISTAS identifies cost savings and productivity gains as anticipated outcomes through the effective and efficient use of information resources management (VISTAS: 7). Finally, the Air Force Information Technology Management Plan vision, "An Air Force that works better and costs less - through the smart use of technology," provides the foresight for the management of information resources within the US Air Force.

Another salient theme throughout the documents under study is the concept of using information resources to strengthen decision-making and contribute to mission performance. The DoD ITM mission statement speaks of the necessity to have the right information at the right time. The document's vision statement builds on this by establishing that information superiority is needed for effective decision-making and mission operations and must be available when needed. VISTAS supports this philosophy in the Air Force IRM Vision - "Decision makers with the right information -- anytime, anywhere, on demand." To complete this congruity, the AFITM outlines IRM related goals and objectives that align Air Force IT activities with overall mission goals (AFITM: Obj. 2.2, Goal 3).

The practice of fostering partnerships for sharing information to improve mission performance is another theme that appeared in virtually every document under study (AFITM: 5; DoD ITM: 9; Exec Order 13011: Sec. 1.e; OMB: 57; PRA: Sec 3503.b; VISTAS: 8). Each of the documents speaks directly to the need of creating partnerships to enhance IRM practices. Partnerships can lead to increased productivity through benchmarking and can decrease data and technological redundancies. The PRA sets the tone for Federal agency partnering (PRA: Sec 3503.b, Sec 3504.2.b). Executive Order 13011 reiterates this policy by advocating the cross-agency sharing of information to improve decision-making and business practices (Exec Order 13011: Sec. 1). Further, both the DoD and Air Force ITM Plans designate their first goal as "Become a Mission Partner," signifying the importance placed on partnering in today's information resources management arena.

Concordant through this study are the information technology management plans for the Department of Defense and Air Force. Both plans meet the basic criteria for successful policy formulation set forth by Nakamura and Smallwood (1980):

1. Policy goals are stated clearly;
2. These goals are precise enough to be measurable;
3. Implementation activities are directed toward achieving these goals;
4. Objective measures that relate implementation activities to goals exist or can be created.

As discussed in Chapter I, alignment of IRM related goals to organizational goals and objectives are essential components of effective information policy and information

systems planning (Bates and Eldredge: 1984, Orna: 1990, Wassenaar: 1990). The DoD and Air Force Information Technology Management Plans are harmonious in this manner. Both plans link operational and mission support needs to information technology management goals and objectives (DoD ITM: 3, AFITM: 4). Moreover, both documents take guidance from higher level directives (Exec Order 13011, Global Engagement, Joint Vision 2010, OMB Circular No. A-130, PRA) and establish operational goals and objectives in order to meet the higher order goals. This alignment of organizational goals to meet higher level goals indicates a continuity of policy from level to level of the Federal information management arena.

The consistency in IRM policies set forth by the primary data sources reveals a congruous Federal IRM policy framework. The theme of productivity gains through the effective and efficient management of Federal information resources is clearly the overarching policy established through these documents. The themes of increasing decision-making and fostering partnerships through information resources management were also well founded in the text under study and concordant throughout the documentation. This congruence of the policy set forth in these documents provides strong evidence that these documents do join to offer a coherent policy.

Although there do not seem to be large disparities, there are several incongruent aspects. Specific discrepancies found include the issue of IRM related training and the ambiguity of the term IRM and how it impacts the documents under study. On the surface these disparities do not seem to have much impact, but may pose a hindrance to effective Federal IRM policy formulation and implementation if not clarified or

addressed. On the issue of training, there seems to be a discontinuity between higher and lower level policies. The Paperwork Reduction Act of 1995 directs that Federal Agencies will "conduct formal training programs to educate agency program and management officials about information resources management" (PRA: Sec. 3506.1.b.3). The ITMRA and Executive Order 13011 prescribe similar policies. VISTAS speaks of the need to inform both internal and external information technology users of information resources management principles. However, the DoD ITM and AFITM do not seem to carry through with this philosophy. The DoD and Air Force information technology management plans offer little guidance or direction regarding information resources management training. When the issue of training is addressed, it is oriented toward technical training. The DoD Information Technology Management Plan calls for information technology management training, but not information resources management training (DoD ITM: 17). The Air Force ITM Plan, in objective 4.1, calls for the need to train and educate information technology professionals (AFITM: 10). Although technical training is a necessary component to ensuring a skilled communications and information personnel base, the study of the management of information conjoined with the resources which process it should be considered equally important. The realization of the benefits that can be reaped from the study of information resources management cannot be achieved if information technology managers below the DoD level do not receive such training.

Clouding the issue of training may be the ambiguity of the meaning of the term *IRM*. *IRM* is referred to in the basic sense as information resource management. That is,

management of the information itself, as Hoffer and McFadden (1994) define it. The term is sometimes stated as information resources management; the plural noun is used. This plural usage implies the management of not only the information, but also the hardware and software that process information. This meaning of IRM - managing the information and the associated hardware and software, is sometimes confused with information technology management. A consideration which may shed light on this issue of managing information as a resource versus managing information resources, is that as the documents under study went to subordinate levels of the Executive Branch hierarchy, less discussion focused on information resource or resources management and more so on information technology. OMB Circular No. A-130 points out that the difference between information technology and information resources management is that information resources management includes all aspects of managing resources within the information technology environment – the information itself, the personnel, the equipment, the funds, and the technology. Section 7.1 of the Circular states, "Information technology is not an end in itself. It is one set of resources that can improve the effectiveness and efficiency of Federal program delivery." This guidance suggests that information resources management is a *philosophy*, while information technology management is a *tool* used to carry out the IRM philosophy. Within the Air Force context, this guidance suggests that an IRM mindset should drive IT/IS management goals and objectives, which are established to support Air Force mission goals and objectives that support higher level DoD and Federal goals. A graphical model of this concept follows.

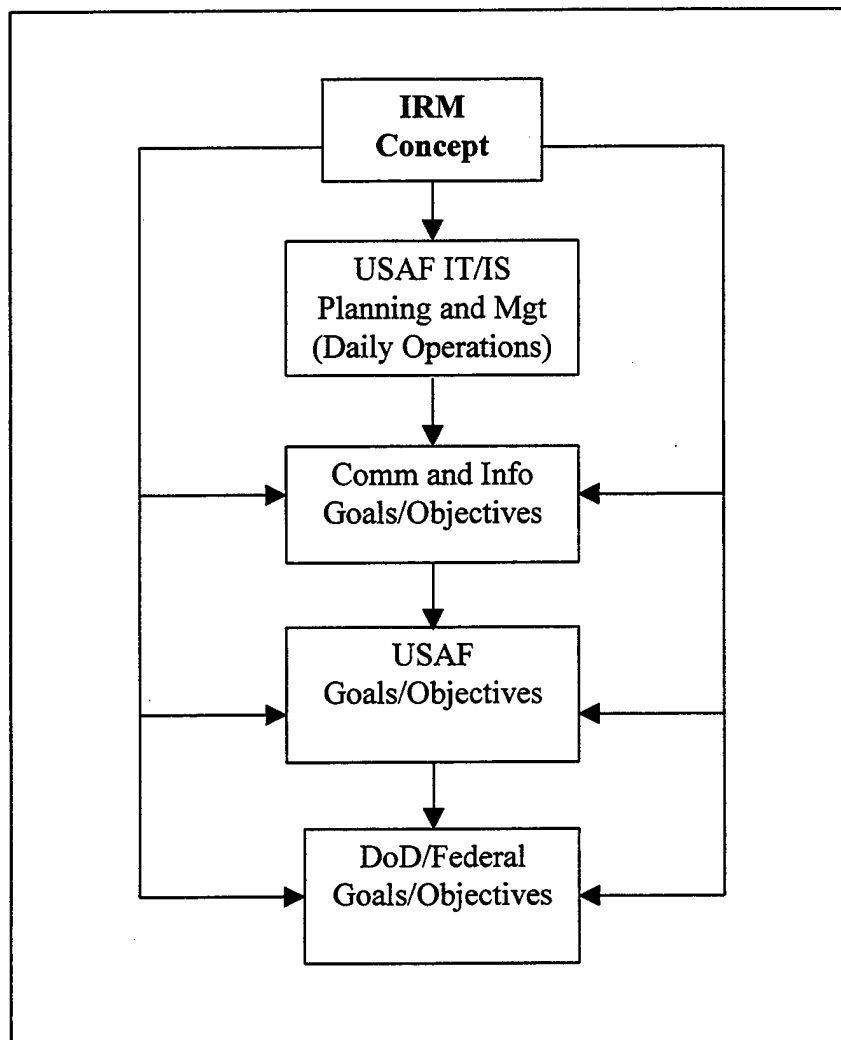


Figure 2. IRM Concept Model

Recommendations

As the IRM Concept Model indicates, for information resources management to be truly effective, it should be approached as a philosophical concept considered in all aspects and levels of information systems and technology management. Assuming that IRM is a mindset providing an overarching philosophy of using information resources in

a more effective and efficient manner to achieve productivity gains, this mindset must become engrained at all levels of Federal information and IT management. If the Air Force goal is more effective, efficient, and productive use of information technology in the quest for information superiority, this mindset should be adopted as a critical success factor. Just as higher level policy calls for IRM training, a detailed IRM education and training program should be incorporated into the information technology education and training goals of the Air Force. Until this is accomplished, one could question whether operational outcomes will truly meet the intent of the higher level goals and objectives.

Limitations

The main limitation with this study is that of the potential unintentional bias on the part of the author. Inherent in any qualitative study is the interpretation bias presented by the researcher. A conscious effort was undertaken to avoid personal bias during both analysis and presentation of this study.

Another limitation is the level of analysis. This research was focused on the Air Staff level and above policy-making environment. Keeping the research at the senior level of policy making was intentional for generalizability purposes; however, it must be noted that policy formulation and implementation continues down to the operational level. This lower (operational) level policy was beyond the scope of this study; however, an analysis of IRM policy at the operational level provides an excellent avenue for future study and is discussed in the next section.

Recommended Future Research

As just discussed, the exploration of information resources management policies within the Air Force, down to the operational level is a logical step for future research in this arena. Such a study would search for continuity between the policies explored in this study and the policies and instructions implemented for Air Force communications and information personnel. To explore this issue would involve assessment of Air Staff and Major Command IRM related directives and policies in conjunction with established Air Force Instructions and how these relate to the higher level policies and directives analyzed in this study. The results of such a study could provide insight to whether the policies established at the top-level of the Federal Executive Branch effectively reach down to the operational level.

Another recommended research area would be to study the measurement parameters set forth by the DoD and Air Force information technology plans. That is, study the success levels associated with the strategies and objectives aligned with each of the respective goals of each plan. Such a study would offer an aggregate measure of DoD and Air Force information resources management effectiveness.

Finally, the last topic for suggested future research would be further analysis of the disparity between the concepts "information resource" versus "information resources" management is necessary to fully understand the possible ethnographic parameters involved with this issue. Such a study may be able to quantify through a survey of DoD and Air Force communications and information personnel if there is a cognitive difference in the concepts, and if so, the level of importance assigned to each.

Conclusion

This thesis research studied Federal information resources management policy. As discussed in Chapter I, IRM within the Federal government has been evolving since 1980. The Paperwork Reduction Act of 1980 provided initial guidance for management of government information resources. Since 1980 more direction to IRM policy within the Federal Government has been provided through the release of documents such as OMB Circular No. A-130 and Executive Order 13011. Federal IRM policy was further defined through legislation passed in 1995 to revise the Paperwork Reduction Act and in 1996 with the Information Technology Management Reform Act. The Air Force issued initial guidance in 1995 with the publication of the US Air Force IRM Strategic Plan - VISTAS. And finally, in 1997 both the DoD and the US Air Force each issued information technology management plans as policy and guidance documents for the operational military information resources arena. Each of these documents adds to the guidance and direction of the IRM policy environment, and it is anticipated that future guidance and direction will continue to define this newly evolving field.

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Vita

1st Lieutenant Brian S. Munoz was born on December 5, 1966 in Sacramento, California. He graduated from Mountain Home High School in Mountain Home, Idaho in May 1985. Enlisting in the U.S. Air Force in June 1986, he graduated basic military training as an Honor Graduate and served over 6 years active duty as a Computer and Switching Systems Specialist. In December 1994, he completed his undergraduate studies at Weber State University in Ogden, Utah where he earned a Bachelor of Integrated Studies Degree with emphasis on Political Science, Business Administration, and Aerospace Studies. Lt Munoz received the Superior Performer award through the Air Force Reserve Officer Training Corps and was commissioned in December 1994.

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