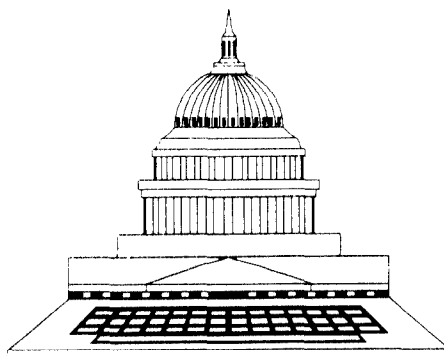

September 1992

Perceived Barriers to Effective Information Resources Management

Results of GAO Panel Discussions



147554



Preface

How information resources—hardware, software, data, and people—are acquired and managed is critical to nearly every government program's mission, from exploring space, to collecting taxes, to providing social security benefits. Managing these resources helps ensure that managers have the accurate, complete, and reliable information they need to make mission-related decisions. Although the dollar investment—at least \$20 billion a year—in federal information resources management (IRM) is significant, the improvements resulting from this investment are uneven. In an effort to discover why so little progress has been made, we sought the expert opinions of representatives of the federal government and private industry. During the summer and fall of 1991, we held a series of panel discussions to determine what panelists believed were the barriers to effective IRM. Panel participants perceived the existence of barriers in many areas, from insufficient IRM training to a lack of management focus on information management.

This publication presents the results of these panel discussions and highlights the barriers discussed. We did not independently validate these barriers, but present them here with the aim of acknowledging that problems exist as a first step toward achieving solutions.



Jack L. Brock, Jr.
Director, Government Information
and Financial Management

Contents

Preface		1
Perceived Barriers to Effective Information Resources Management	Knowledge Barriers Institutional Barriers Political Barriers	4 6 8 11
Appendix I Number of Reports Citing Information Resources Management Problems		13
Appendix II Panelists	Public Sector Private Sector	14 14 15
Appendix III Major Contributors to This Report		17
Table	Table I.1: IRM Problems	13
Figure	Figure 1: IRM Barriers Discussed by Panelists	5

Abbreviations

ADP	automated data processing
GAO	General Accounting Office
IMTEC	Information Management and Technology Division
IRM	information resources management

Perceived Barriers to Effective Information Resources Management

Ineffective information resources management (IRM) often results in massive cost overruns, long schedule delays, and systems that do not perform as intended and do not improve an agency's ability to fulfill its mission. A recently issued GAO report identifies management and operational problems encountered in federal information systems, and groups them into 10 categories (see app. I), with the most common category of problems being inadequate management of the information system development life cycle.¹ Other problem areas include an inability to ensure the security and integrity of information systems; information systems that do not work together; and systems that contain inaccurate, unreliable, or incomplete data. Also included were ineffective oversight and control of information resources; inadequate resources to accomplish IRM goals; cost overruns; schedule delays; systems that do not perform as intended; and systems that make access to data time-consuming or cumbersome.

The impact of poor IRM is sometimes substantial. For example, we identified

- a system development effort with cost overruns of \$800 million;
- a communications system that, because of operational and performance problems, was only able to handle 55 percent of the work it was intended to handle; and
- highly sensitive information at risk of being compromised because it resided in a system that did not have computer security safeguards or controlled access.

Despite the fact that these problems have been identified in hundreds of GAO reports, the problems persist. In an effort to obtain expert opinions on the underlying causes of these problems and the systemic barriers that impede improvement, we sponsored a series of panel discussions in the summer and fall of 1991. The panels were composed of a diverse group of people, including GAO staff, IRM officials, and private sector representatives.

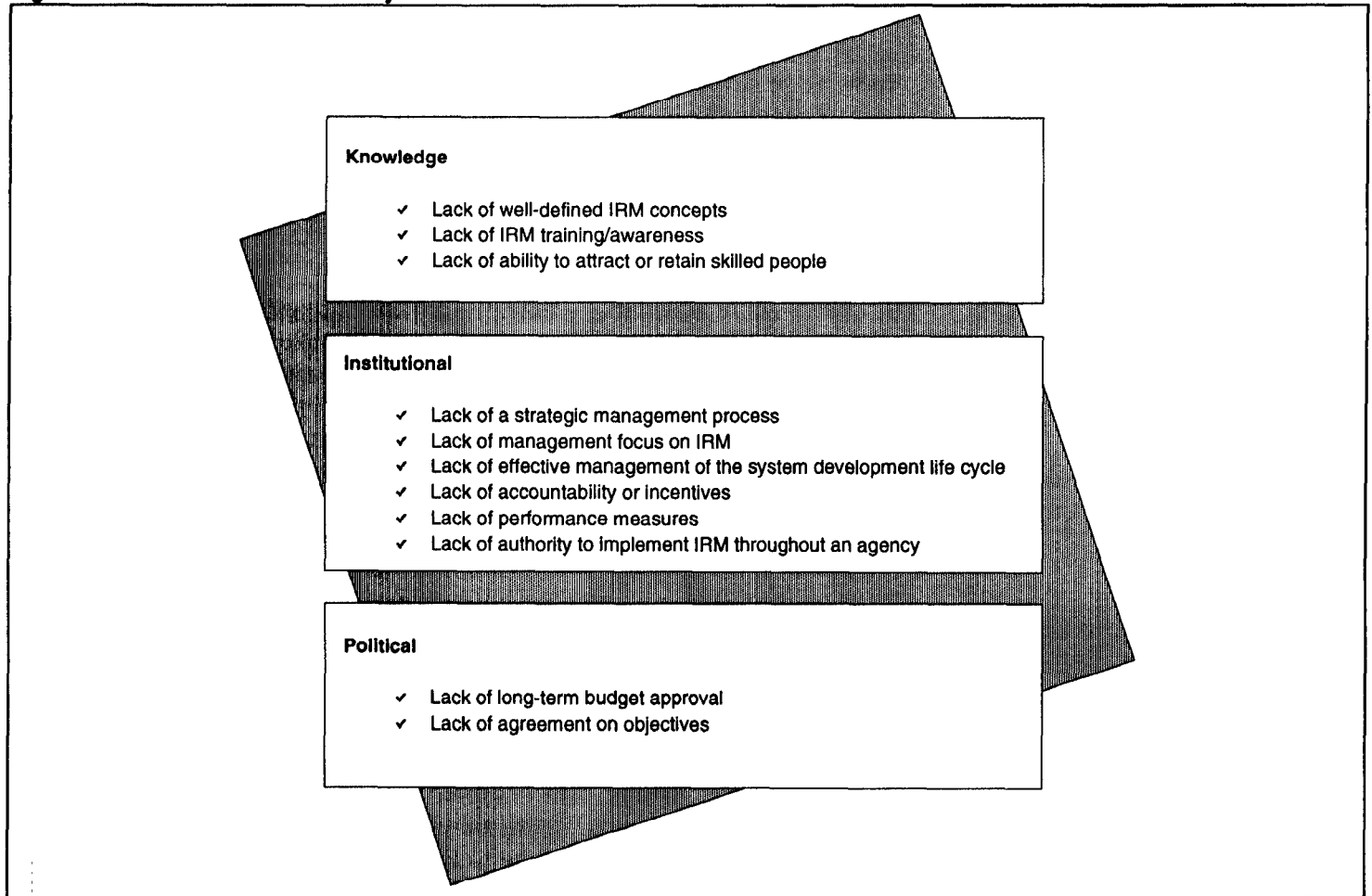
Collectively, our panelists discussed numerous barriers that they felt limited effective information management within the federal government. In particular, three categories of barriers (shown in figure 1) were noted:

¹Information Resources: Summary of Federal Agencies' Information Resources Management Problems, (GAO/IMTEC-92-13FS, Feb. 13, 1992).

- knowledge,
- institutional, and
- political.

Knowledge barriers are the lack of skills or information on how to manage technology. Institutional barriers are internal barriers or poor processes that limit effective IRM. And, finally, political barriers are events and processes that are outside the agencies' control.

Figure 1: IRM Barriers Discussed by Panelists



For the purpose of the panel discussions, we defined barriers as those conditions that could impede the implementation of efficient and effective

information management policies or systems. While every panelist did not agree with every single barrier, a concurring majority existed for each potential barrier discussed in this publication. We did not independently validate these barriers, but present them as the current "state of thought" in the IRM community as represented by our panelists.

In preparing this publication, we relied primarily on information developed during the panel discussions. However, we also used information obtained from internal GAO focus groups, interviews with representatives from government and industry, and published materials.

Knowledge Barriers

Knowledge barriers are caused by a lack of knowledge of IRM—what it is, how to implement it, and how to attract and retain skilled people. The three potential knowledge barriers that were discussed by the panelists are (1) lack of well-defined IRM concepts, (2) lack of training, and (3) an inability on the part of government to hire and retain skilled people.

Lack of Well-Defined IRM Concepts

"The time has come to disengage from the very narrow view that IRM equals ADP."

Our panelists believed that a major impediment to effective IRM is the lack of agreement on what information management means or encompasses. Definitions of IRM ranged from the very narrow view that it is the management of information technology to the very broad concept that it encompasses all aspects of managing information, of which information technology is but one component.² Some of our panelists felt that while IRM theoretically encompasses everything involving information, this definition is too broad to serve as the basis for a mission statement of an IRM organization. These panelists felt that IRM has instead been defined to focus on the tangible elements—hardware, software, and architecture.

Panelists also believed that the meaning of IRM varies depending on individual experience. IRM personnel often view their role as support and do not look at information management in a cross-cutting fashion. Similarly, program managers often believe that IRM offices should support their missions by justifying the computers and automated data processing (ADP) equipment that the program managers feel they need. However, many panelists said it is a mistake to look at IRM as a separate function. They agree with some upper-level managers, especially those who oversee

²The House Committee Report accompanying the Paperwork Reduction Act of 1980 defined IRM as "the planning, budgeting, organizing, directing, training, promoting, controlling, and other managerial activities involved with the collection or creation, use, and dissemination of information by Federal departments and agencies."

large departments, that IRM should be broadly defined as managing information as a valuable resource.

Lack of IRM Training/Awareness

"Until you have a work force that knows what technology can do for them, you cannot expect them to help you find a way to improve what they are doing now."

Most of the panelists believed that staff at all levels of government lacked the training, background, or education necessary to successfully implement—or even understand—IRM. This lack of training affects every level of the government, from top officials who need to know how information management should be embedded in the agency's management plans, all the way down to users who need to understand IRM in order to realistically assess what information they need to do their jobs. Many panelists felt that IRM personnel tend to lack information management skills because information management offices are filled with technicians rather than information management experts. Many managers underestimate the complexity of training, believing they can take good people from disparate backgrounds, send them to 6 weeks of training, and assume they are then IRM experts.

Many panelists believed this lack of training, in turn, leads to a lack of awareness of the potential benefits of strategic IRM. As a result, agency decisions tend to be programmatic (focused on a single program) rather than strategic (focused on the agency mission).

Lack of Ability to Attract or Retain Skilled People

Most panelists said hiring and retaining skilled people has long been a problem throughout government. Because IRM is a relatively new discipline and the pool of candidates is small, competition to attract and retain good people is intensified. Most panelists believed the government finds it very hard to hire and keep people with appropriate technical and information management skills.

However, some of our panelists, especially ones from private industry, had a different view. They believed that many people do good IRM work in the government, but few have specialized technical expertise. Agencies need people for such things as telecommunications, integrated media, and bridges between incompatible systems. Enough people with these skills cannot be hired either in government or industry.

An important ingredient for successful IRM is having people with a vision that can guide system development over the long term. One panelist said that bringing a visionary into the government to integrate IRM is like searching for water in the Sahara. Too often, bureaucratic decisions are

made to maintain the current process. If the government wants to attract people who have a vision and are good at making things happen, agencies must give such people the opportunity to see their vision come to fruition.

Institutional Barriers

Institutional barriers are organizational practices or processes that limit agencies' effective information resources management. Institutional barriers discussed by the panelists include the (1) lack of a strategic management process, (2) lack of management focus on IRM, (3) lack of effective management of the system development life cycle, (4) lack of accountability or incentives to implement IRM, (5) lack of performance measurements for measuring good IRM, and (6) lack of authority to implement IRM policies throughout an agency.

Lack of a Strategic Management Process

"Agencies often focus on the purchase of ADP equipment rather than on an information architecture and IRM plans that can effectively support missions."

Most of the panelists believed that a strategic management process must incorporate a vision of how the agency can benefit from IRM, and a plan that describes both short- and long-term steps to achieving that vision, including how the agency is to change, step-by-step, over time in order to implement that vision. Further, the vision must be shared by the agency, the Congress, and other key stakeholders. Panelists said this shared vision has to start with the users gaining a better understanding of what IRM can do for them and the IRM offices understanding better the organization's mission. Most panelists felt that few top managers think about a shared vision across an agency and the management structure necessary to implement it. Unfortunately, even if this understanding exists, the vision is almost never long-term and often gets diluted due to political turnover and the budget cycle.

One way to institutionalize a vision is to incorporate it into a strategic management plan. Most panelists believe that the lack of a clear mission statement is a primary contributor to agencies not having a strategic management plan. Other panelists added that even when the mission statement is clear, agencies often are unable to translate it into implementable steps and measurable goals.

Lack of Management Focus on IRM

Many of our panelists believed that a key barrier to effective IRM is the lack of management focus on IRM. The panelists agreed that most agencies spend 99 percent of their time solving day-to-day problems and that IRM is rarely discussed as a long-term management issue. Some panelists said one reason for the lack of management focus is that IRM is considered by

agencies to be a staff office rather than a service organization. Further, the focus in agencies has been on establishing and developing the IRM office and not on information management's service to agency needs. Consequently, many agencies still view IRM solely as automating day-to-day activities.

In many agencies, panelists said, there is no oversight to ensure that information resources are a part of the planning process. According to the panelists, someone needs to oversee program managers to ensure that IRM programs support agencywide information needs.

**Lack of Effective
Management of the System
Development Life Cycle**

The system development life cycle describes activities in all phases of the life of a system, from its conception to the point at which it is replaced. It includes all of the activities associated with the analysis, specification, acquisition, design, development, testing, integration, operation, maintenance, and modification of a system. The panelists agreed that agencies have problems managing information systems throughout their life cycle.

"What we wind up doing is buying a 1987 system in 1991 because the current procurement process requires us to define, in advance, how our system is going to look several years from now."

While many of the aspects of system development life cycle were discussed, most of the focus was on defining requirements. Establishing requirements for large information systems is very difficult because, according to the panelists, program managers cannot clearly articulate their needs to system developers. As a result, agencies' procurement requests do not sufficiently address functional requirements, and systems are developed that do not satisfy the real, but undefined, requirements of the agency.

**Lack of Accountability or
Incentives**

Accountability—being held responsible for the success or failure of a program—and incentives—recognition for a job well done—should be a part of managing information resources. Many of our panelists believed that no one is held accountable if an IRM program is found to be ineffective and that no incentives exist to implement an effective IRM program.

The panelists believed that a major reason for the lack of accountability is the absence of oversight at the agency level. This oversight function should be filled by the designated senior official position created in the Paperwork Reduction Act; however, at many agencies, no one above the designated senior official holds the official accountable for the success or failure of IRM at the agency. The panelists said that because the senior

official is not held accountable there is no real accountability within the agencies.

Our panelists believed that publicizing jobs well-done could encourage agencies to do a good job of implementing IRM, and could also give examples of what works. At present, there is no centralized access to such examples. The panelists pointed to the General Services Administration's Trail Boss program as good for highlighting successful IRM programs, but said at present it is reaching only a small audience.

Lack of Performance Measures

*"It is impossible to manage
something you cannot measure."*

Performance measures are used to judge, among other things, progress and productivity. Such measures commonly comprise assessments of effectiveness, efficiency, or both. While the panelists overwhelmingly agreed that the lack of performance measures is a barrier to effective IRM, they had few ideas on what performance measures should include. The panelists said, for example, that in a factory performance measures are simple—a factory manager need only ask, "How many widgets were produced today?" Much of what is done under IRM, however, is intangible, and there are no generally accepted criteria to measure whether or not an agency has an effective IRM program. Most agencies, therefore, use quantitative measures, which causes performance evaluation to degenerate into cost savings estimates. Although panelists agreed that cost is an important factor, it is not the sole consideration in assessing IRM performance. Many panelists believed that no incentives exist for implementing performance measures, and, more importantly, no one knows exactly what the agency would measure.

Some panelists said that performance measures can be applied to very specific areas, but that IRM is a very broad area that is difficult to measure. Further, panelists asked, how do managers measure productivity of white-collar workers—intellectual knowledge workers? Some panelists believed that performance measures show what is wrong but not how to correct it. Also, some panelists said agency cultures are such that those in power do not want to develop these measures.

Lack of Authority to Implement IRM Throughout an Agency

Most of our panelists agreed that a serious impediment to effective information management is that most IRM officials lack agencywide authority to implement IRM, particularly in large departments with several bureaus. Although many IRM officials are in an oversight role and can set policies, guidelines, and standards, they rarely have the political strength

associated with departmental bureaus. The panelists said that top management has to provide the appropriate resources and incentives to make agency managers adhere to departmentwide IRM plans and policies. For example, simply stating an agency vision does not in itself integrate data agencywide. Instead, panelists said, IRM officials have to be part of top management, not ancillary staff, and must fully participate in the decision processes of the agency.

Most panelists said that the autonomous nature of different organizations within agencies contributes to the problem. From an overall agency point of view, such autonomy may be useful, since some of these organizations are quite large and have their own mission. But panelists also believed that allowing all agency components to follow separate paths does not recognize that some information systems and/or information could be shared by more than one component.

Political Barriers

Political barriers are caused by forces outside an agency's control. They can be divided into two areas: (1) the lack of long-term budget approval and (2) the lack of agreement on objectives.

Lack of Long-Term Budget Approval

The federal government operates on a yearly budget cycle, and all agencies must submit a budget each year. Some of our panelists believed that the yearly budget approval process inhibits long-term commitment of funds and, therefore, inhibits the long-term planning needed for IRM.

Many panelists said that when approval of a budget is delayed or occurs near the end of the fiscal year, the funding for projects is uncertain. In such cases, panelists said, the agency's problem is that information resources cannot be obtained when they are needed, which adversely impacts mission effectiveness. The agency finds itself in a use-or-lose situation, and the effect is often to buy whatever is available. However, panelists agreed, agencies cannot make sensible, long-term strategic investments by ad hoc spending of what is left over at the end of the year.

Many panelists believed that the budget literally becomes a substitution for a strategic plan, whereas the strategic plan should drive the budget. Further, it is difficult to implement strategic plans that require large budget increases in any year because it is very difficult to obtain approval for large increases.

Lack of Agreement on Objectives

"There often is conflict between internal and external actors about the short-term and long-term goals of IRM."

Most of our panelists believed that IRM planning is made more difficult because of a lack of agreement on objectives between agencies and the Congress. Additionally, some legislation creates problems for IRM managers because it requires agencies to be in a reactive mode when developing their information plans. Further, because congressional committees often are focused on one program within an agency, an integrated approach to IRM is difficult.

Many panelists stated that part of the problem is that agencies and the Congress have different motivating factors. Efficiency and economy motivate agencies because they help spread limited resources. The Congress' motivation is sometimes constituent-driven. This difference can cause conflict when, for example, agencies try to consolidate areas by closing local offices. Even though consolidation may be an important part of an agency's strategic modernization plan, the Congress may block the effort because of parochial interests.

Number of Reports Citing Information Resources Management Problems

Our review of IMTEC's work performed from October 1988 to May 1991 identified 132 reports (out of a total of 192) that described IRM problems. We summarized these problems in 10 categories; the table depicts the categories and the number of reports that fell within them each year.

Table I.1: IRM Problems

Problem	Number of reports for fiscal year			Total ^b
	1989	1990	1991 ^a	
Inadequate management of information systems development life cycle	24	33	9	66
Ineffective oversight and control of IRM	7	18	4	29
Inability to ensure the security, integrity, or reliability of information systems	3	11	2	16
Inability of systems to work together	2	8	4	14
Inadequate resources to accomplish IRM goals	2	5	2	9
Cost overruns	13	6	3	22
Schedule delays	10	8	2	20
Systems not performing as intended	3	3	1	7
Data that were inaccurate, unreliable, or incomplete	4	7	7	18
Systems that make access to data time-consuming or cumbersome	2	4	2	8

^aFiscal year 1991 reports include only those issued before May 31, 1991.

^bReports that identified more than one problem are listed under more than one category, so the total number of reports is more than 132.

Panelists

Public Sector

Ralph V. Carlone
Assistant Comptroller General
U.S. General Accounting Office

Robert A. Coyer
Director, Office of Information Resources Management
Employment and Training Administration
Department of Labor

Renato A. DiPentima
Deputy Commissioner for Systems
Social Security Administration

Thomas P. Giammo
Assistant Commissioner for Information Systems
Patent and Trademark Office

Harold W. Green
Assistant Director, Office of Voice Programs
Department of the Treasury

Kent H. Hannaman
Director, Information Technology Services Division
Department of Education

Maureen M. Johnson
Chief, Program Management Support Branch
National Data Processing Division
Environmental Protection Agency

Belkis W. Leong-Hong
Director of Functional Information Management
Center for Information Management
Department of Defense

John O. Penhollow
Director of the Office of EDGAR Management
Securities and Exchange Commission

Alvin M. Pesachowitz
Director, Office of Information Resources Management
Environmental Protection Agency

Appendix II
Panelists

Neil J. Stillman
Deputy Assistant Secretary for Information Resources Management
Department of Health and Human Services

Rona B. Stillman
Chief Scientist
U.S. General Accounting Office

Paul A. Strassman
Director of Defense Information
Office of the Assistant Secretary of Defense for Command, Control,
Communication and Intelligence
Department of Defense

Susan Robson Tobin
Chief, Procurement and Management Reviews Branch
General Services Administration

John C. Voglewede
Deputy Director
Division of Information Support Services
Nuclear Regulatory Commission

Private Sector

John R. Cantwell
Manager, Air Traffic Control Plans and Controls
Federal Systems Company
International Business Machines, Inc.

Monroe M. Dickinson
Director, Avionics and Software Systems, Space Station
Grumman Aerospace

Florian N. Hofer
Special Consultant
BDM International, Inc.

Maloy I. Jones
Vice President, Navy Operations
Electronic Data Systems

**Appendix II
Panelists**

**Robert S. Jones
Associate Partner
Andersen Consulting**

**Victor E. Millar
Chairman and Chief Executive Officer
PSF Management International**

**Gail E. Phipps
Operations Director
Special System Development
Computer Sciences Corporation**

**Nicholas L. Soldo
Senior Analyst
MiTech, Inc.**

**Frederic G. Withington
Vice President, Information Systems (ret.)
Arthur D. Little, Inc.**

Major Contributors to This Report

Information
Management and
Technology Division,
Washington, D.C.

Nancy A. Simmons, Assistant Director
Suzanne M. Burns, Evaluator-in-Charge
Kevin G. McCarthy, Staff Evaluator
Alicia D. Wright, Staff Evaluator
Christopher W. Hoenig, Advisor

**United States
General Accounting Office
Washington, D.C. 20548**

**Official Business
Penalty for Private Use \$300**

<p>First-Class Mail Postage & Fees Paid GAO Permit No. G100</p>
--

Ordering Information

The first copy of each GAO report and testimony is free. Additional copies are \$2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

**U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20877**

Orders may also be placed by calling (202)275-6241.