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Information Management and Technology Issues
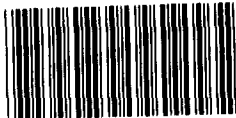
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GAO United States
General Accounting Office
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Comptroller General
of the United States

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The Speaker of the House of Representatives
The Majority Leader of the Senate

In response to your request, this transition series report discusses
widespread weaknesses in federal information resources
management that underlie many of the problems found in individual
programs. Despite heavy investments in computer technology,
executive agencies still lack essential information for managing their
programs effectively and achieving measurable results. Moreover,
many agencies are not using information technology strategically to
simplify and streamline their organization, management, and
business processes—as well as to improve service to the public. Our
efforts have highlighted the need for better leadership and strategic
planning in this area.

The GAO products upon which this report is based are listed at the
end of the report.

We are also sending this report to the President-elect, the Republican
leadership of the Congress, the appropriate congressional
committees, and the designated heads of the appropriate agencies.

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Information Management and Technology Issues

The federal government spends over $20 billion annually on new technology—and tens of billions more running current systems. Yet agency after agency still lacks critical information needed to analyze programmatic issues, manage agency resources, control expenditures, and demonstrate measurable results. Moreover, the government is falling farther behind the private sector in using information technology to streamline its operations and improve service to the public.

As noted in our 1988 transition series report, these problems stem from management weaknesses. Top federal executives continue to overlook the strategic role of information technology in reengineering business practices. Moreover, information resource managers typically lack the authority and resources to help their agencies modernize and simplify work practices, define information needs, and ensure the most effective use of information resources. Aggravating this situation is the federal acquisition management and budget process. Its demand for certainty in the system development process leads project managers to downplay risks and problems—resulting in missed benefits and misspent money. Solving these problems will

depend heavily on the ability of top
executives to both develop a strategic
framework for change and effectively
marshal their agencies' information
resources talent. In addition, both agencies
and the Congress need the willingness to
experiment with different approaches to the
acquisition management and budget process.

Lack of Essential Information

Information problems vex most federal programs. Program managers struggle to wrest the information they need from the mountain of data they collect—much of it still in paper form. Critical pieces of data are missing, unreliable, or not suited to the issues at hand. Even when available and automated, the data may be scattered among many separate information systems—making it harder for managers to analyze complex program problems, develop sound policies, or measure the effectiveness of agency actions. As a result, they may lack essential information needed to manage effectively. Some sobering examples follow:

• Health Care: National health care expenditures reached $666 billion in 1990—absorbing more than 12 percent of the gross national product (GNP). Over 42 percent of this total is publicly funded. By the end of the decade, the expenditures are expected to exceed 16 percent of the GNP. Poor information systems are aggravating the current crisis in health care financing. Medicare, for example, mistakenly paid out over a billion dollars for services already covered by other insurers, in part because of inadequate data. Equally important, patient care is still heavily dependent on paper records that intrinsically limit the capacity to

retrieve critical data needed to guide health care policymaking.

- Education: The Department of Education, with an annual budget of over $29 billion, administers nearly 200 separate programs and provides federal funds to states and localities to educate disadvantaged children, help persons with disabilities, and finance the higher education of young Americans. But the Department lacks key management information with which to measure the effectiveness of its programs and redirect them as needed. For example, missing, incomplete, and unreliable data in the $13 billion Stafford Student Loan Program has led the government to provide millions of dollars in new loans to students who previously defaulted.

- Savings & Loan and Banking Crises: The Resolution Trust Corporation (RTC), responsible for managing and selling over $400 billion in assets from 725 failed thrift institutions, has had trouble effectively executing sales strategies because it cannot adequately track the status of assets. About $100 billion in assets—many of which are hard to sell—remained to be sold at year's end. In addition, RTC could receive another $40 billion in assets from thrifts that may fail

before September 30, 1993. Similar information problems face the Federal Deposit Insurance Corporation in dealing with assets from the rising number of bank failures.

Pulling together data from separate information systems can be particularly troublesome. As programmatic issues become more interrelated, managers increasingly need to integrate data from across an agency in order to analyze cross-cutting problems. The data, however, are commonly scattered among many independent, stand-alone information systems, developed at different times to meet the special needs of individual offices. These systems usually do not employ uniform data standards, processing standards, or communications standards—making the electronic exchange of data difficult or impossible.

At the Environmental Protection Agency (EPA), for example, various program offices manage different kinds of pollution—such as air, water, hazardous waste, toxic substances, and pesticides. Over the years, each office has developed separate information systems to meet its particular needs. EPA is currently struggling to integrate

data from these separate systems to better understand and manage the interplay of various types of pollution. Its difficulties in doing this have weakened the agency's ability to enforce environmental regulations in a comprehensive manner or to pursue complex regional pollution issues.

The effectiveness of federal programs can also be stymied by agencies' inability to readily share information with other units of government and the private sector. This is particularly evident with child support and other welfare programs that are federally funded but locally administered. Each year, for example, about $4 billion in child support payments goes uncollected. A large part of the problem stems from difficulties that states and federal agencies have in exchanging data electronically on the location of absent parents. When absent parents cannot be found, the cost of child support is passed on to the taxpayers.

Chronic Problems in Developing and Modernizing Systems

Developing and modernizing government information systems is a difficult and complex process. Again and again, projects have run into serious trouble, despite hard work by dedicated staff. They are developed late, fail to work as planned, and cost millions—even hundreds of millions—more than expected. The results, in missed benefits and misspent money, can be found throughout government.

During the past 25 years, for instance, the Internal Revenue Service (IRS) has twice tried and failed to modernize its antiquated tax-processing system. Unreliable and unresponsive, this system impedes IRS' ability to collect and account for about a trillion dollars in revenue, deal with a reported $111 billion in accounts receivable, and narrow the annual tax gap (the difference between taxes owed and taxes voluntarily paid), estimated at about $114 billion for 1992. Although IRS now has a vision for how it will operate in the future and has completed basic planning for its latest modernization effort, it has not made satisfactory progress in some areas critical to the project's success. For example, IRS has been slow in finalizing a business strategy for making the transition from its current, paper-intensive business processes to new,

highly automated work processes—a
necessary step before the benefits of
automation can be fully realized.

Like IRS, the Social Security Administration
(SSA) has been involved in a long-term effort
to modernize its systems. For the most part,
however, SSA has focused on automating its
existing paper-driven, labor-intensive work
practices in an incremental, piecemeal
fashion. While resulting in some immediate
benefits in improved service, this approach
will not put SSA in a position to cope with the
surge in beneficiaries looming on the
horizon. To capture the critically needed
benefits of modernization, SSA must direct its
system modernization efforts toward
fundamentally improving the way it does
business. SSA is only now taking steps to
complete a business plan for guiding its use
of information technology in the future.

Poor Management—A Root Cause

Although information problems can be complex and varied, they generally reflect basic weaknesses in leadership and organization. Top agency executives do not pay enough attention to the role of information technology in achieving fundamental improvements in agency operations. In addition, the agency unit responsible for information resources management (IRM) often lacks appropriate organizational stature to be an effective partner with top executives in identifying opportunities to use technology to reduce administrative costs, increase productivity, and enhance service to the public. As a result, agencies often initiate major technology projects without first determining where technology investments can produce the greatest operational benefits. Costly projects end up showing disappointing results. Moreover, many agencies have not even established measurements for determining the actual effects that the projects are having on supporting mission goals.

Failure to Think Strategically

Pressure for quick solutions to complex problems works against strategic planning—the heart of effective IRM. The political process pushes both the Congress

and executive agencies to focus strongly on achieving near-term results at the expense of the long term. So does the fact that the average tenure of top government executives is less than 2 years. Faced with many competing demands and the desire to show progress, agency leaders do not focus enough attention on the long-term task of simplifying and streamlining agency operations through the use of technology.

Successful modernization is based on a strategic analysis of what the agency needs to accomplish, where it is now, and where it must be at future points in order to meet its goals. While most agencies have mission statements that define general goals, many agency leaders do not follow through on the next step: analyzing current business processes to learn where they are breaking down and how they should be restructured to achieve fundamental, long-term improvements in business practices and service to the public. Such analysis is exactly what many successful private sector organizations are doing.

Agencies cannot perform such analysis if they are not disciplined enough to use rigorous performance measures and quantitative data to evaluate current work

processes. Instead of making the effort to do so, agency leaders too often give the green light to technology projects in the belief that more information resources will somehow engender solutions to management problems. Acquiring the latest technology can create the illusion of progress, but agencies may actually lock themselves more tightly into existing, inefficient ways of doing business.

Take, for example, the Veterans Benefits Administration's (VBA) modernization aimed at speeding up claims payments to veterans. VBA did not complete its analysis of claims-processing deficiencies before deciding on a technology approach. As it now turns out, VBA's initial modernization investment of $94 million will trim only 6 to 12 days from the average claims processing time of 151 days—hardly an acceptable return on investment. The problem: Technology was focused on what turned out to be a minor hitch in the claims process as a whole.

Such misjudgment is not uncommon. When an agency does not first analyze its business processes and determine where improvements should be focused, it short-circuits technology's potential to

dramatically increase productivity and reduce costs. This kind of "modernization" often does little more than speed up existing work processes. Not surprisingly, dramatic benefits in cost savings, productivity, and service rarely materialize. Some improvements are gained at the margins—but often at a high cost.

Ineffective IRM Organization

A strong IRM organization is an indispensable partner in helping agency leaders work through a top-down analysis of business processes and determine where strategic information technology investments need to be made. The importance of this partnership is recognized in the Paperwork Reduction Act, which requires federal departments and agencies to designate a senior official for information resources management. This official is to report to the agency head and, in essence, is charged with ensuring that the agency carries out its information activities in an efficient, effective, economical manner.

Many agencies, however, have organized themselves for failure in IRM. Too often, the senior-level IRM official is a titular figure, without experience in information management, who is burdened with major responsibilities in other areas. His or her IRM

responsibilities become delegated to mid-level IRM managers, who are immersed in the agency's day-to-day systems operation and procurement issues. Typically, these managers do not play a major role in the agency's high-level strategic planning. They lack adequate organizational visibility, authority, and competent staff resources to ensure that program offices are using technology to best advantage in meeting both their own needs and the agency's corporate information needs.

This IRM organizational problem has come about largely because top agency leaders have not recognized the increasingly important role of technology in their organizations. Historically, data processing began as a back-room function, supporting activities such as personnel and payroll. Today it is still common to find an agency's IRM function placed under a general administrative services office, even though computers have moved out of the back room and onto the desks of program staff.

Poor IRM organization leads to the failure of top management and IRM staff to work together in developing an effective strategic technology plan. This plan is the linchpin that aligns an organization's business needs

with its information resources. It is the map
for getting the agency from where it is now
to where it wants to be—and for defining the
technology investments that should be made
to support streamlined work processes.
Frequently, what an agency touts as a
strategic technology plan is merely a listing
of ongoing acquisitions.

Failure to align program needs with
technology investments results in lost
opportunities for improvement and wasted
dollars. For example, the National Institutes
of Health (NIH) did not effectively manage
key aspects of a major system contract,
potentially worth over $800 million. The
acquisition was not factored into NIH's
strategic planning, nor were the computing
requirements of the scientific community
identified. The result was a contract that did
not effectively support NIH's basic purpose:
biomedical research. Another example is the
Farmers Home Administration's (FmHA)
effort to modernize the automated systems
used to make and collect loans—its third
attempt since the mid-1970s. FmHA failed to
link its $520 million technology initiative to a
long-range business plan that clearly
articulated how the agency would operate in
the future. Indeed, the technology plan did
not even reflect important changes being

made in FmHA's organizational structure and loan-management operations. These problems cast serious doubt on FmHA's ability to use technology to better support its loan programs.

Without strong corporate IRM leadership and planning, program staff may develop systems that meet their own requirements, but conflict with the broader information needs of the organization. The result is a hodge-podge of incompatible standards and systems. For example, the Navy's $600 million program to upgrade nontactical computers on ships lacks effective central IRM management. Instead, 12 different Navy commands have authority over development, funding, and procurement of the major computer systems that comprise the program. The resulting redundant development efforts require excessive financial resources and increase the amount of training and maintenance needed to support the different systems.

Problems With the Acquisition Management and Budget Process

Even well-planned efforts to modernize the use of information technology can be derailed by the federal acquisition management and budget process. The objectives of the process are reasonable: to deliver individual systems that perform as intended, on time, and cost-effectively. The process aims to achieve economy through standardizing and sharing systems across agencies. Rewards are supposed to go to project managers who can do this. Yet the process repeatedly fails to meet these objectives because it does not take into account the realities of systems development.

A fundamental dichotomy is at work in large-scale systems development projects: the acquisition management process demands certainty and is risk-averse, yet systems development is inherently uncertain and risk-intensive. The process calls for systems developers to formulate precise long-term plans and budgets. It unrealistically assumes that detailed systems requirements can be well understood at the outset, that software development will be predictable, and that long-term budgeting can be done with a high degree of accuracy. Unfortunately, none of these expectations

recognizes the enormous difficulties
involved in developing large systems.

The acquisition management process often
works well for purchasing readily definable
goods and services, but it does not support
effective risk identification and risk
management—the essence of major systems
development. Large-scale systems are
extremely complex and take many years to
design, develop, test, and install. For
example, software development, which is
the heart of most system development
projects, remains a poorly managed
discipline. It is still very difficult to
accurately predict software costs,
development time, and performance at the
beginning of a systems project. Such
uncertainties make it nearly impossible to
satisfy in any meaningful way the process's
expectations for precise milestones and
budget estimates.

To make matters worse, the acquisition
management and budget process creates
behavioral incentives that actually
undermine good systems development
practices and hinder the achievement of
governmentwide objectives. For example,
the process provides powerful incentives for
project managers to set unrealistically

optimistic cost and schedule estimates and
to ignore risks and problems. Project
budgets are generally set by the agency, the
Office of Management and Budget, and the
Congress on a year-by-year basis. This
process often involves scrutiny of the
progress being made by the project. Because
changes in plans and cost estimates are seen
as indicators of poor management, project
managers try to maintain a pretense of
problem-free development and avoid
providing honest assessments of project
risks. By not mentioning problems for as
long as possible, managers can often ensure
continued project funding—at least in the
near term.

Since agencies frequently change project
managers, it becomes easy to defer problems
to others. This is particularly true with
Defense projects, where the rotation of
personnel into and out of project manager
positions is routine. With such managerial
turnover comes a clouding of responsibility
and accountability for the project's success,
all too often resulting in higher costs and
delays in the delivery of systems.

Because there are few incentives and many
risks in developing systems that bridge the
needs of several offices or support other

agencies, it is not surprising that technology projects generally reflect the parochial interests of individual offices. The result is the continued spawning of systems that are narrowly focused and cannot support the larger needs of the agency or the government.

Solving the Problem—Managing Strategically

Managing information resources strategically involves visionary leadership and a framework for managing change that focuses on the strategic uses of technology for achieving the agency's mission. Few other management initiatives offer higher leverage over the cost-effective use of taxpayer dollars. This effort needs to be supported by a sound IRM organization.

Establishing a Strategic Framework for Change

Agency leaders can start by adopting a management philosophy that emphasizes continuous improvement of business practices. This philosophy is essential if agencies are to carry out their missions effectively during a prolonged period of budgetary constraints.

Implementing such a philosophy requires a strategic framework that can guide the agency over many years, even amid turnover in agency leadership. This framework must necessarily be based on mission goals, analysis of business practices, and long-range information technology planning. The operative concept should be simplifying and streamlining business processes. Developing a strategic framework should always precede the development and acquisition of automated systems. Without it,

technology modernization invariably breaks down into a series of half-measures that are redirected or replaced every few years.

The Congress often focuses on the costs of systems procurements. While costs are important, the underlying management issue is becoming more critical: How well do planned information technology projects support fundamental, long-term improvement in agency programs, operations, and service to the public? By highlighting this issue as part of its oversight activities, the Congress can encourage agency leaders to develop and follow a strategic framework for successful modernization that can be sustained over many years. The need to continuously improve federal operations is, after all, a shared concern that transcends shifts in personnel or politics.

Strengthening IRM Leadership and Management

Sound IRM management is essential for realizing potential productivity and effectiveness gains achievable with today's technology. Agency leaders need to make their IRM organization a strong partner in determining how information technology should be applied to best meet the strategic needs of the agency. Doing this involves

three elements: IRM leadership, organization, and resources.

The agency needs a senior-level IRM executive who is familiar with the uses of information technology in simplifying and streamlining business practices and who can devote full attention to this issue. This senior executive needs to be highly placed in the organization so that he or she can work closely with the agency head and senior program managers in analyzing work processes and formulating a strategic plan for information technology needs. Some agencies have formalized this relationship by establishing the position of chief information officer, reporting directly to the head of the organization.

Similarly, the IRM function itself needs organizational placement that appropriately reflects the critical role of information technology in all aspects of agency operations. This means moving the IRM unit out from under general administrative services and making it a unit of its own, reporting to top management. It should be headed by the agency's senior-level IRM executive.

Neither the senior-level IRM executive nor the
IRM organization can be effective without
adequate staff resources imbued with
disciplined approaches for both managing
the current technology base and carrying out
strategic planning for new technology.
Providing these resources is difficult for
agencies in lean budget times. But this is a
good place to make an investment since the
effective use of information technology can
leverage major benefits in operational
efficiency and service to the public.

Experimenting With Change

How can the federal acquisition management
and budget process be better tailored to
accommodate the uncertainty and
complexity inherent in modern, large-scale
systems development? The stakes are high,
considering the billions of dollars involved in
these procurements, the desire to promote
competition, and the need to oversee and
control expenditures.

Resolving this issue will require the
cooperative dedication of the Congress, the
executive branch, and the technology
industry. No one has answers that satisfy
everyone's concerns. It is therefore
important that all parties involved have the
willingness and flexibility to experiment

with different approaches. For example,
multiyear budgeting might be tried on some
projects to encourage managers to identify
and correct problems early in the
acquisition. Such experimentation is
particularly appropriate given the rapid pace
of innovation in information technology. It
may lead to broad-based agreement on
better acquisition management models that
could help agencies build the information
technology base they need to dramatically
improve their operations and better serve
the American people.

Related GAO Products

Veterans Benefits: Acquisition of Information Resources for Modernization Is Premature (GAO/IMTEC-93-6, Nov. 4, 1992).

ADP Procurement: Prompt Navy Action Can Reduce Risks to SNAP III Implementation (GAO/IMTEC-92-69, Sept. 29, 1992).

Defense ADP: Corporate Information Management Must Overcome Major Problems (GAO/IMTEC-92-77, Sept. 14, 1992).

Perceived Barriers to Effective Information Resources Management: Results of GAO Panel Discussions (GAO/IMTEC-92-67, Sept. 1992).

Tax Systems Modernization: Update on Critical Issues Facing IRS (GAO/T-IMTEC-92-18, May 13, 1992).

Department of Education: Management Commitment Needed to Improve Information Resources Management (GAO/IMTEC-92-17, Apr. 20, 1992).

Environmental Enforcement: EPA Needs a Better Strategy to Manage Its Cross-Media Information (GAO/IMTEC-92-14, Apr. 2, 1992).

Resolution Trust Corporation: Corporate Strategy Needed to Improve Information Management (GAO/IMTEC-92-38, Mar. 5, 1992).

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

Major NIH Computer System: Poor Management Resulted in Unmet Scientists' Needs and Wasted Millions (GAO/IMTEC-92-5, Nov. 4, 1991).

ADP Modernization: Half-Billion Dollar FmHA Effort Lacks Adequate Planning and Oversight (GAO/IMTEC-92-9, Oct. 29, 1991).

Interstate Child Support Enforcement: Computer Network Contract Not Ready to Be Awarded (GAO/IMTEC-92-8, Oct. 23, 1991).

SSA Computers: Long-Range Vision Needed to Guide Future Systems Modernization Efforts (GAO/IMTEC-91-44, Sept. 24, 1991).

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Medical ADP Systems: Automated Medical
Records Hold Promise to Improve Patient
Care (GAO/IMTEC-91-5, Jan. 22, 1991).

Meeting the Government's Technology
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