Chapter 9
Government Management of Data Processing

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Government Use of Information Technology

In the early days of computing, the Federal Government as a user was a principal stimulus to the development of the field. Agencies such as the Census Bureau, the Bureau of Standards, the Atomic Energy Commission, and the Department of Defense supported the design, programing, and uses of the most sophisticated computer systems in the world. In many cases, development work funded by the Government was carried out in university and industrial laboratories.

A few instances of Federal expertise at the leading-edge of computer applications remain, for example in the scientific research field. However, it appears that, in general, the Federal Government is rapidly falling behind the private sector in its use and management of up-to-date computing technology. If this observation is correct such a lag would penalize Government operations in two ways.

1. *potentially lost opportunities* to use the newest technology to improve the efficiency and effectiveness of Government programs, and
2. *increased cost and decreased reliability* resulting from operating systems that are becoming obsolete, from archaic management procedures, and from burdensome procurement restrictions.

Cheaper computing hardware, the emergence of data communication-based systems, and new software techniques are changing the way computers are used in industry. The next 10 years will see significant movement in the private sector toward automating the flow of information in offices, toward experimenting with new management structures based on high-volume data communication, and toward automating decision support systems for use by higher management. To the extent that these applications fulfill their promise of improvement in both the quality and productivity of management, the Federal Government would be remiss in not making use of them where appropriate.

Government, to a great extent, resembles the service and information sectors of the economy with respect to the role of information technology in making productivity improvements. Any significant productivity improvements brought about by this technology would have to be examined in the light of their possible effects on:

- employment, particularly at the clerical and lower management levels; and
- requirements for training to upgrade or reorient the skills of employees forced to use information technology or displaced by its adoption.

Problems

A host of new demands for Government recordkeeping requirements may arise, ranging from draft registration to the possible expansion of Federal health-care benefits. Increased demands are being made on existing systems, such as that of the Social Security Administration, due to population growth, the increased complexity of the programs that must be administered, and the demand for higher productivity by the bureaucracy.

New information technology will help to provide the tools to meet these needs.

There are indications suggesting that the Government is now experiencing severe difficulties managing the computer technology it currently has in place. The General Accounting Office (GAO) reports, congressional hearings, the report from the recent Presidential reorganization project, personal testimony from Federal electronic data processing administrators, and OTA'S assessment of the National Crime Information Center (NCIC) run by the Federal Bureau of Investigation (FBI), all indicate that, for a variety of reasons, the Federal Government does not seem to be managing its computing resources effectively.

A sampling of over 200 GAO reports on electronic data processing (EDP) that have been published over the last few years show the following titles:

- *Federal Productivity Suffers Because Word Processing Is Not Well Managed,* April 1979.
- *Problems Found With Government Acquisition and Use of Computers From November 1965 to December 1977* March *1977.*
- *Contracting for Computer Software Development—Serious Problems Require Management Attention To Avoid Wasting Additional Millions,* November 1979.
- *Inadequacies in Data Processing Planning in the Department of Commerce,* May 1978.
- *IRS Can Better Plan For and Control Its ADP Resources,* June 1979.

The Federal data processing project of the President's reorganization project reported in April 1979 that, while there was a clear need for using advanced information technology, the Government was seriously mismanaging its existing data processing. The OTA assessment of the FBI's NCIC system shows that it has been obsolete for several years and is growing more costly and unreliable to operate. (A recently approved upgrade is now being implemented.) Other studies have shown that the ratio of personnel to hardware costs at Federal installations is nearly twice that of private industry.

Among the reasons proposed for these problems are:

- *Bureaucratic red tape:* Computer technology is changing rapidly; however, the rules governing the procurement and management of automated data systems are proliferating. Unless they are written with technological farsightedness, they can restrict the modernization of an installation's operations. The numbers shown in table 7, which have been taken from a 1977 report of the Office of Management and Budget (OMB), ' illustrate the welter of rules under which the Federal computing centers operate.
- *Organizational inflexibility:* Recent research has shown that modern information systems profoundly affect the deci-

'Office of Management and Budget, *Federal Data Processing Policies and Regula tion—Annotated Bibliography,* December 1978.

Table 7.—Policies and Regulations Concerning Federal Data Processing

- 4 **laws**
- *3* Executive orders
- 3 Presidential memoranda
- 10 Office of Management and Budget circulars
- 12 Office of Telecommunication Policy circulars
- 3 Federal management circulars
- 3 Federal procurement regulations
- 3 Federal Property Management Regulations (FPMR's)
- 16 FPMR bulletins
- 2 FPMR temporary regulations
- 6 National Communication System Guidance Publications
- 60 Federal Information Processing Standards Publications (FIPS Pubs)
- 11 Federal Telecommunications Standards (some overlap with FIPS Pubs)
- 11 Policy letters and memoranda
- 2 Department of Justice Office of Legal Counsel Opinions
- 3 Federal Communications Commission decisions
- 5 General Services Administration Management Guidance Documents

SOURCE Off Ice of Management and Budget, 1977

sionmaking patterns in organizations.[2] The research suggests that computerized information systems are particularly effective under special conditions; these depend on the operational level and support for the system. At higher levels of organizations, information systems are more subject to the politics and conflicts of organizational life. While at times these systems prove to be effective, at other times they will be unworkable because existing powerful groups will not cooperate in systems development and use. Experience in the private sector likewise suggests that attempts to force major new information systems into rigidly traditional and unreceptive management structures are often doomed to failure.[3] Yet, reorganizing a bureaucracy is a difficult and highly political process.

- *Procurement delays:* Federal EDP managers complain that the procurement process is so complex, confusing, and fraught with delay that by the time a new systems concept is actually realized in the installation of new hardware, the system is already approaching obsolescence. Estimates of delays in the procurement process for some large systems run as long as 6 years, long enough for the desired technology to become obsolete. Estimates do not include the further delays imposed by discussions within the executive branch or Congress of the appropriateness of the systems or of their possible social impacts.
- *Staffing problems:* There has been some concern expressed that Government computer expertise itself has been growing obsolete. In particular, the Government has trouble competing with private industry for highly talented, and correspondingly expensive, programing and systems analysis talent.

  Furthermore, although job-hopping and staff turnover have been chronic problems for private industry, this rotation also seems to produce *a* cadre of very broadly experienced, expert, and up-to-date programmers in the labor pool. Not only do these people learn faster, but as they change jobs they bring new ideas and techniques into each data processing center. Government programing staff seems to be more static, moving less between agencies and almost never between private industry and the Government.

  In addition, a principal drawing card for talented programmers is the opportunity to work on state-of-the-art systems. The job of maintaining a decade-old operating system on an out-of-date computer, even if very highly paid, is unlikely to attract an experienced and talented programer. Thus, the obsolescence of Federal systems sets up a vicious circle-a disincentive to the kind of people who could best develop new systems.
- *Debates over social impacts:* The installation of several large, new data processing systems has been delayed or, in some cases, completely halted in the face of congressional concerns about impacts these systems might have on constitutional rights and other societal values such as privacy. Plans proposed for integrated Federal data banks have also occasioned public debate. Thus, it is reasonable to assume that there will be a great deal of social sensitivity and distrust or at least wariness about major new data systems. This concern will affect particularly those applications that are designed to handle personal data.

It may be that a more clearly articulated set of social policy concerns with more concrete guidelines will aid Federal agencies to better anticipate the questions of societal

[2] R. Kling and W. Scacchi, "Computing as Social Action, the Social Dynamics of Computing in Complex Organizations," *Advances in Computers,* vol. 19 (New York: Academic Press, 1980).

[3] Henry C. Lucas, *Why Information Systems Fail* (New York: Columbia University Press, 1975).

impacts before they arise. Furthermore, system managers and designers working in these agencies need to be more sensitive to these broader policy concerns, which can run counter to more narrow engineering design goals such as efficiency and reliability y.

Issues

There seems to be no doubt that several major new data processing systems will be needed by Federal agencies within this decade. Congress will, therefore, be faced with a number of problems involving planning, designing, procuring, and managing these systems.

Some legislative attempts to rationalize Federal EDP have been made. The most notable is the 1967 amendment, which is known as the "Brooks Act, " to the Federal Property and Administrative Services Act. This act set up authorities in the executive branch to regulate agency procurement of data processing equipment. The most recent significant bill was H.R. 6410/S. 1411 passed by Congress and signed into law December 11, 1980. This public law, known as the Paperwork Reduction Act of 1980, establishes central oversight in OMB of the information policies and practices of the executive branch. Perhaps most important, this act emphasizes the basic need for restructuring the way information resources and supporting technologies are managed in the Government. This represents a new approach by giving management of information resources similar importance to that traditionally assigned to managing financial and personnel resources. Many issues and questions need attention from this broader perspective. For example:

- There is a need to better understand the effects of large-scale information systems on the internal organization and management of Government agencies and on decisionmaking in Federal agencies.[4]

Congress and the public need to know more about location of responsibility, the quality of the decisions, the nature of due process for clients affected by those decisions, and the accountability of the bureaucracy to Congress and to higher-level policy makers in the executive branch. A better understanding of the broader and longer term social impacts of a massive automated bureaucracy is also needed.

Many questions are still unanswered. Can there be both increased efficiency and fairness in Federal data processing? Are there inherent threats to the civil liberties of the clients of agencies that automate their decisionmaking? Will there be more subtle effects on social values and on the political attitudes of citizens toward Government?

Some research on these topics, particularly on managerial effects, has been done in the context of private sector organizations. A few investigators have also started to look at local government impacts.[5]

Some of these results maybe directly applicable to Federal agencies; other findings can only be suggestive. For example, research suggests that some local agencies may use their information systems for political purposes rather than to improve administrative efficiency.[6] Single, centralized policy-oriented information systems may not

[4] K. Laudon, "Privacy and Federal Data Banks, " *Society,* January/February 1980, pp. 50-56.

[5] William Dutton and Kenneth Kraemer, "Management Utilization of Computers in American Local Governments, " *Communications of the Association of Computing Machinery,* vol. 2, No. 1, March 1978, pp. 305-309.

[6] Rob Kling, "Automated Welfare Client-Tracking and Service Integration: The Political Economy of Computing, " *Communications of the Association of Computing Machinery, vol. 21, No. 6,* June 1978, pp. 484-493.

necessarily be more objective than their manual counterparts (containing less data); much may be gained by having competing systems.[7] While these and other studies of private sector and local government information systems may not shed much light on Federal information systems, this existing body of empirical studies does provide a useful starting place.[8 9 10] Careful similar studies of Federal systems should be undertaken, since these systems are often large in scale, accountable to a wider variety of interests, and managed under somewhat different vendor and civil service arrangements.

Little actual research has been done on these broader policy issues, although there is an indication of some activity among analysts working in this field. One possibility would be for some appropriate agency to be encouraged by Congress to support research in the important areas of social impact. Such a program could fund long-term investigations that look beyond the short-range focus of most current policy analysis.[11]

- The process by which appropriate social values and goals are reflected in system design needs clarification. Major new systems will need to be evaluated by Congress for their effects on privacy, security, constitutional rights, and many other issues that are not normally the concern of the designer or operator of an information system.

Four fundamental approaches are available to deal with social value questions:

1. Congress could assess the potential social impacts of each new system design that is proposed on a case-by-case basis.

   There are several dangers inherent in such an approach. Inconsistent policies may be set for different systems and different agencies (or even for different versions of the same systems at different times); the evaluation process can seriously delay procurements; and because the system designer is not aware of which issues will be deemed important and which requirements are likely to be placed on the system, the design is nearly always subject to the criticism that it is seriously deficient.
2. Congress could codify a social impact policy concerning all Federal information processing systems. An appropriate executive branch agency could be designated as responsible for seeing that all new system designs are evaluated in relation to that policy.

   The drawbacks would be the difficulty of developing such a policy in the first place, and the loss of the ability to evaluate each new system in light of its own peculiar characteristics and the specific mission of the operating agency.
3. Congress could continue to examine agency proposals system-by-system, but would base its evaluation on a social impact framework encompassing a set of principles for the design and operation of Federal information systems. This process has already been started by the Privacy Act of 1974, which expressed congressional concern about one specific aspect of Federal agency recordkeeping practices, the effect on the privacy rights of individual citizens.
4. Proposals for simplifying the procedures for purchasing data processing equipment will probably be introduced in Congress during this decade. It will be necessary for Congress to balance the need to speed up design and pro-

[7] Rob Kling, "Information Systems in Public Policy Making: Computer Technology and organizational Arrangements, *Telecommunications Policy*, vol. 2, No. 1, March 1978, pp. 22-32.

[8] Dutton, and Kraemer, op. cit.

[9] Rob Kling, "Social Analyses of Computing: Theoretical Perspectives in Recent Empirical Research, *Computing Surveys*, vol. 12, No. 1, March 1980, pp. 61-110.

[10] Kling and Scacchi, op. cit. pp. 250-327.

[11] See, for example, H.R. 4326, 96th Cong., to establish a commission on the implications of information technology in education. Also see H. R, 8395 introduced by Rep. George Brown in the 96th Cong., 2d sess. This bill would establish an Institute for Information Policy and Research to address national information policy issues.

curement of Federal systems, against the paramount requirements that tax money be spent as effectively and as equitably as possible and the necessity to consider carefully the societal impacts of these systems.

Some opponents of large information systems welcome delays as useful impediments to the installation of new information systems that could turn out to be unnecessary or even harmful. However, if after careful consideration Congress approves a particular information system, bureaucratic delay could be viewed as disadvantageous, undermining the potential utility and performance of the system and the effectiveness of the relevant agency.