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ABSTRACT

The management of data processing systems in the Federal government is rapidly approaching a state of crisis.[1] The Federal information systems inventory is a collection of outdated hardware as well as software techniques and systems which were abandoned long ago in the private sector. Projects have such long lead times that when systems are finally developed they are outmoded or no longer meet current requirements.

A number of solutions have been proposed which range from new rules and procedures to increased use of private contractors in delivering EDP resources. Many of the proposed solutions have more to do with the political philosophy of the proposers than with the realities of data processing management or the underlying political processes which make EDP management so complex in the government sector. This paper examines the causes of Federal FDP management problems and the political questions that must be resolved for any proposed solutions to succeed.

INTRODUCTION

The Federal Government has the largest inventory of information system assets in the world, and it continues to add to this inventory at a prodigious rate. These assets perform virtually every function ever developed for EDP application, from state-of-the-art scientific calculation to routine payroll and accounting functions. Trans-

action volume varies from the unique calculation of the burn time for a particular satellite thruster by the National Aeronautics and Space Administration to the millions of accounts processed monthly by the Social Security Administration.

In this paper, the authors will examine some examples of the difficulties experienced in Federal EDP management and then, using the general ideas and approach of the web model of computing of Kling and Scacchi (1982) combined with the economic ideas of efficiency and social equity, will argue that the outcomes observed are the result of the way the social and political system is designed. Furthermore, in a political democracy, these outcomes reflect the way in which one would

expect the overall social decision making process to work.

When one looks at the Federal Government's management of its data processing resources, it sometimes seems that there are nothing but failures. Some examples of major problems include:

The World Wide Military Command and Control System (WMCCS). This program was started in 1971 to provide real time information about the status of military equipment and units. It uses a world wide network of computers to exchange information. The system has been plagued by poor software design and reliability problems. There is little doubt that it cannot fulfill the mission for which it was designed.[2]

The Social Security System. In addition to its well-publicized financial problems, the Social Security System's computers are nearing breakdown. The system was a model when it was set up in the early 1960s. Little has been done to upgrade the system, and unless a major overhaul is undertaken soon, the whole system could collapse.[3]

The Navy Automated Small Purchase System. In the early 1970s it became apparent that there were a number of problems in the Navy procurement process. In 1974, the Navy initiated a project to automate the procurement process (Automation of Procurement and Accounting for Data Entry). By 1979, the project was still unfinished. Further development on the original project was abandoned and a new development effort was begun which is still underway.[4]

This list of problems is only suggestive. Over the past ten years, there have been more than one hundred General Accounting Office (GAO) reports concerning information systems failure and problems which have occurred in all Federal Government agencies. It is doubtful, however, that experiencing problems with information systems is a characteristic solely of the Federal Government. A similar kind of review would probably uncover analogous problems in the private sector, but there is no equivalent of GAO to perform such reviews.

The list of proposed solutions for Federal EDP problems is at least as long as the list of problems. As noted by Head (1981) these solutions include contracting out more government data processing, the institution of new rules governing EDP management, the institution of new organizations to manage EDP resources, or even the establishment of special computer "SWAT" teams to go into agencies with EDP problems to correct them. These and

[2]See W. Broad, "Computers and the U.S. Military Don't Max," _Science_, March 14, 1980, p. 1183.

[3]See J. Fialka, "Ailing Computers Give Social Security System Another Big Problem," _Wall Street Journal_, October 5, 1981, p. 1; Warren Weaver, "Social Security System Is Planning 4479 Million Computer Overhaul," _New York Times_, March 3, 1982, p. A14; or "SSA's Computers labeled 'Geriatric'," _Government Computer News_, Volume 2, Number 5, May 1983, p. 24.

[4]See Theodore A. Coyle, "An Examination of the Effort to Automate the Procurement System of the Navy Field Contracting System," M.S. Thesis, Administrative Sciences Department, Naval Postgraduate School, Monterey, California, October 1982.

similar solutions are based upon such premises as the superior efficiency of private sector methods or the ineffectiveness of Federal EDP managers, procedures, and organizations.

The proposed solutions usually have two things in common. First, they tend to be very much influenced by the political philosophy of the person proposing them, and, secondly, they are mechanicl or procedural changes that focus on only systems of the problem. These solutions ignore the fact that the problems that exist in Federal EDP management spring from causes that will not respond to minor administrative tinkering. These proposals may change the picture somewhat, although not necessarily for the better, but they will not cause problems to disappear.

Along with all other governmental functions, the management of Federal data processing is embedded in the overall social and political processes of the nation. Decisions are not made on the narrow grounds of EDP management rationality. These decisions are made to serve higher social goals (e.g., encouragement of competition in the computer industry, encouragement of small business, aid to a particular company or sector of the economy, employment of minorities, openness of the government procurement process. This is not to imply that such external considertions do not exist in EDP management decisions in the private sector. They obviously do, but the social good that is being promoted in the private sector is the narrower good of a single corporation and not that of a diverse country of over 220 million people.

It is this difference in goals that makes EDP management in the government sector different from EDP management in the private sector. Organizations in the private sector operate with a relatively clear objective. Although

this object is probably not that of maximizing profits to the _maximum maximorum_, there is always a profit constraint present, which, if binding, most certainly affects organizational behavior. On the other hand, public sector organizations operate with a plethora of goals and objectives, at least some of which are mutually contradictory, if not infeasible.

This difference in goals makes management a great deal more complex for a Federal government manager than for his counterparts in the private sector. This complexity of the environment has a significant impact on the decisions that result. Decisions made by public sector management are rational, but they are rational within a different framework. Solutions to problems of public sector management which do not address this underlying social and political framework are not likely to produce any real long term changes. For these solutions to have long term positive effect requires a review of the fundamental social and political influences on EDP. These influences have to be changed for more efficient EDP management to occur.

The next section will address the role of information systems in organizational objectives and will include a discussion of some of the characteristics of the Federal Government which create difficulties for information systems managers. The third section addresses some proposed solutions to these difficulties and the final section presents conclusions.

INFORMATION SYSTEMS AND ORGANIZATIONAL OBJECTIVES

Using the framework suggested by Kling and Scacchi (1982), much of the analysis and commentary on the management of Federal Government EDP must be classified as discrete-entity analysis. This type of analysis focuses

upon technology, rational calculation, and computing resources. This paper, however, takes the approach of a web model, the other type of analysis suggested by Kling and Scacchi (1982). Hence, this paper views the Federal management process as composed of multipe interrelated organizations with a control hierarchy overlaid upon them, all interacting within a larger environment of political actors (individuals and interest groups). The ideas expressed in the web model represent a natural analytical approach for this particular situation. To the approach of the general web model, this paper adds the economic concepts of efficiency and social equity in order to gain an understanding of the Federal EDP management process as the outcome of social and political interactions. A necessary consequence of this view is that the outcomes of the Federal EDP management process occur because society desires those outcomes.

The milieu of computing in both the public and private sectors results in a number of characteristics of information systems which reflect the environment in which the computing occurs. These characteristics are enumerated next, and Federal and private EDP manifestations of each are discussed.

Social Equity Considerations

If there is any fundamental difference between public and private sector organizations, it is clearly based upon social equity considerations. Private sector organizations have a clearly defined constituency, and equity considerations are limited solely to the components of that constituency. Public sector organizations, however, do not have such a limited constituency. Consequently and by definition, any equity considerations are determined by society at large.

Data processing reflects these organizational equity constraints. Private sector EDP organizations generally function at cost, if not profit, centers and so serve all elements of the organization's constituency by performing its tasks as efficiently as possible. This is not to imply that efficiency is the sole objective for a private sector EDP organization, but, clearly, it is one of the most important objectives if not _the_ most important. In public sector organizations, considerations of social equity are important in decisions affecting data processing. Examples of social considerations which override efficiency aspects of public sector EDP operations are small business and minority set-asides and lengthy proposal and benchmarking requirements designed to encourage competition.

One of the primary examples of such equity considerations in the Federal Government is the proposed replacement for the Social Security System's computers. When they were first installed in the 1960s, the system was considered a model. But little was done to update them, and for years, the system has been teetering on the edge of disaster. New computers have been authorized in an upgrade that is conservatively estimated at $475 million, but no contractor has yet been selected. Congress did not approve an all-IBM installation and one plan was devised to split the computer system into seven sections so that other companies could bid on the equipment more readily.[5] No efficiency-oriented EDP manager would consider such a solution for any organization. The problems of running a seven-way mixed shop would generate enormous operating and support costs in exchange for the possibly lower procurement costs and improved industry competitiveness of this plan.

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[5] See the references in footnote 3.

In setting these requirements, however, Congress was not looking at the problem from the point of view of EDP management. They focused on the issue of social equity. In this view, standardizing on IBM makes the computer industry less competitive. Also, an equipment decision of this size could spell the difference between survival and bankruptcy for some companies. These considerations would not count in a private sector decision. This is because the measure of effectiveness in the private sector is the profitability of the firm and not the good of society.

Age of Computer Systems

It is generally perceived that information systems are retained longer in governmental organizations than in private sector organizations. Private sector organizations, with their emphasis upon efficiency, recognize and quickly adopt the productivity-enhancing features inherent in innovations in both hardware and software. On the other hand, one survey of 1,366 medium and large scale processors in the Federal Government made by the General Accounting Office (1980) found an average age of seven years. The majority of the installations were using computers that had first been introduced twelve or more years earlier. The Social Security Administration had a model system when installed in the late 1960s. This system is now over fifteen years old. The Navy supply network relies upon a system which was designed in 1964. Although there have been upgrades to this system, it is still fundamentally a twenty year old system.

Project Lead Times

The lead time for a system acquisition can be very long. Eight years is not an uncommon figure in the authors' experience. As an example, active planning for the replacement of a major

Navy logistics support system began in 1976, with the first hardware scheduled to be received in early 1984. In the private sector, eight years would be a complete systems life cycle from initial concept through operation to replacement.

Sorting out these political issues and equity considerations mentioned above takes time. This is one contributor to the long lead times found in government. Political negotiating must take place before the government can arrive at a solution that is accepted as fair. If information systems are simultaneously deteriorating, that simply becomes part of the cost of governing the nation. Government procurement procedures have tended to institutionalize this negotiating process into a complex competitive bidding situation that is costly to both government and vendors. This is especially true in the requirement that systems must undergo extensive benchmarking. Often, the construction and analysis of benchmarks is one of the most expensive features of the system. But as was noted by the General Accounting Office (1982), there is still a strong subjective aspect to the interpretation of benchmarking results. Perhaps one of the major purposes of these benchmarks is to give an air of "fairness" to the selection process rather than to arrive at the best possible system.

These long lead times further add to the problem of outdated, aging computer systems in the Federal Government. By private sector standards, much of the government's computer inventory has outlived its economic usefulness. It would be cheaper to replace the equipment than to continue paying the costs to operate it. However, from the point of view of a government manager, this is not true. This is because the Federal manager perceives different costs than a private sector manager. For a Federal EDP

manager, a major cost of a new system is the administrative cost that must be paid to justify it. This cost is hard to compute explicitly, but it is real and it is high. This has the effect of making the economic life of systems in the Federal government much longer than their counterparts in the private sector. In fact, the true cost of replacement of a comparable government system is much higher since the procurement process involves a great deal of effort and frustration. The manager must divert a large share of the staff's energies into the complex process of justifying and purchasing a new system. While they are doing this, they are also supposed to be running the old system. Understandably, many Federal EDP managers do not enthusiastically repeat this process after one enduring it.

As an example, the tenure of a Navy commanding officer (CO) is about three years. If a CO decided to pursue the purchase of a new computer system on the first day on the job, the installed system would still be several years off at the end of the tour, and the command would probably be in a state of administrative chaos due to the attempts to both procure a new system and run the old. Using the average time of approximately eight years from beginning to end of the procurement cycle, very probably the system would not arrive during the tenure of the next CO either. Only the third CO would reap the benefits. Since an individual's prospects for promotion depend on current performance, it is not surprising that most COs opt for making marginal improvements which will have nearly immediate effects on outdated systems rather than trying to replace them.

In other branches of the Federal Government, such top positions may not change as often. However, there is a reasonably high probability that a President and his assistants may be in

command for only four years. Consequently, this problem of the disregarding of long term goals creating both short and loan term disruptions may be pandemic to the Federal Government.

Fiduciary Responsibilities and EDP Management

Another fundamental difference between public and private sector organizations is the degree to which managers function in a fiduciary capacity. In a private firm, only certain officers of the firm have a clearly defined fiduciary responsibility. This fiduciary responsibility in the private sector usually focuses on efficiency aspects since this is of primary concern to the constituency of the firm.

In the public sector, however, every manager with funds allocation authority has a fiduciary responsibility for those public funds under the manager's control. Necessarily, government managers tend to take a fiduciary view rather than a managerial view. The prevention of fraud, waste, and abuse of government funds is sometimes viewed as more important than effective use of the funds. Federal EDP managers are no exception to this orientation.

This problem is accentuated by the funds-categorization process in the Federal Government. In Federal budgeting, all categories of dollars are not equivalent. It may be possible to obtain operating funds to hire programmers in order to make marginal improvements to an old system. It may not be possible to obtain procurement funds to buy new equipment, or if the dollars are there (as in the case of Social Security), the process may dissolve into an interminable political battle over how to divide them up. Such expenditure constraints may con-

tribute to the tendency of Federal EDP system toward overly complex and tailor-made systems.

Complexity and Specification of Systems

The considerations of social equity and the pursuit of diverse goals within the government contribute to the complexity of the systems that must be implemented. An example is the area of payroll systems. Payrolls are common EDP applications. The first true data processing program was a payroll system constructed at General Electric in 1954. By now, the EDP profession should have wide experience with the implementation of payrolls. Yet, the government has always had problems in the construction of payroll systems. As an example, consider a hypothetical Navy payroll situation. The Navy operates its centralized payroll system out of Cleveland. Suppose that a sailor, who was qualified as a diver, held a desk job in Naples, Italy. While working as a diver, he is eligible for hazardous duty pay. Suppose that he is called away from his desk job for three days special duty as a diver. That must be figured into his pay for this period in question. The fact that he is in Italy adds a further complication. To ease currency exchange problems, a portion of his salary is paid in Italian lira at the current exchange rate. To properly compute his paycheck, the center in Cleveland must receive timely notification of his three days duty as a diver in order to perform the currency exchange calculations, compute his paycheck, and get it to him in Naples. The diver's paychecks are issued semi-monthly.

Compound this problem with many similar local rules and pay rates, and an idea of the complexity involved in government EDP systems begins to emerge. It is not easy to manage the timely processing of data in a monoli-

thic system being run in Cleveland which is supposed to serve persons spread over the entire globe, doing all kinds of jobs, and frequently changing what they do for short and intermittent periods. Note that all of the rules are eminently rational. Incentive pay for special duty is a long-accepted compromise for complex issues in military pay rates. The currency exchange rules make for easier economic relations with other governments. However, the result from an EDP management view is an administrative nightmare. Volumes of complex, constantly changing rules must be accommodated in designing and maintaining such a system. Individual component rationality has led to large scale difficulties. Clearly, this problem exists in the private sector as well, but in the Federal government it is made much worse by the sheer volume of transactions and the complexity of the system interrelationships.

This volume and complexity leads to the problem of tailor-made systems. Government computer shops tend to lag behind similarly sized computer shops in the private sector in the use of off-the-shelf software and software tools. This is frequently cited as an area where government computer managers can improve their productivity. An example of this view can be found in a report by the General Accounting Office (1980a). The report recommends using new software technology tools to speed up computer system development. Examples of such tools include program generators, program libraries, database systems, preprocessor packages, fourth generation retrieval languages, etc. There is little doubt that these tools can substantially improve productivity. In government installations, it is not uncommon to find that one-of-a-kind systems exist that accomplish some of these functions. Unfortunately, these tailor-made systems are purely local systems programs and they must be updated as the manufac-

turer of the computer system provides new software releases.

An example of this practice can be found in the Navy Supply Corps systems using locally-developed database management systems which provide only a few of the features found in commercial database management systems. The cost of updating these database systems is large, and the unique features they incorporate have found their way into many of the programs that the Supply Corps uses to process its data. Maintaining these unique systems and the applications software that uses them is costly since the Supply Corps has over twenty million lines of COBOL code to maintain.

Development of such unique software has occurred despite Federal Government EDP managers being fully informed about these private sector off-the-shelf developments. However, it is only with great difficulty that Federal managers can adopt these new tools and systems. Most of the productivity enhancing software (database management systems, fourth generation languages, etc.) is designed for IBM-compatible hardware because IBM has the major market share of hardware for customers interested in this type of software. The social equity considerations in procurement tend to prevent government managers from purchasing that brand of hardware. Hence, Federal Government EDP managers find themselves between the Scylla of an enormously heavy replacement cost (including effort and frustration) in order to obtain these new tools, and the Charybdis of continuing use of an aging tailor-made system which has few capabilities. The choice becomes easier if operating funds are relatively easier to obtain than procurement funds, which is not an uncommon occurrence. It should be noted that this more attractive choice leads to further overaging of Federal EDP equipment.

Involvement by top management has long been held to be a necessary ingredient to the success of information systems. Although this tenet was not initially accepted in either the private sector or government, there is no general agreement, if not necessarily general practice, of this requirement in the private sector. The Federal government, however, faces problems of continuity in management that are not faced by private industry. The entire top management structure of government can change every four years. It might be argued that this should not be a problem, since corporate management teams change frequently as well, and they are successful in setting up strategic planning procedures. However, the process by which corporate management changes is very different. In government, a new management team comes to power by running against the policies of the team currently in power. By implication, the current team is inept, at best. In a corporate management change, the new management team has usually had a mentor-protege-relationship with the old team. Change is more gradual, and there is a much greater chance of continuity in policies. Planning tends to be based upon clearly defined procedures. the new management team understands the policies and the processes by which these policies were formed. Additionally, the new managers do not have to spend the setup time that a new government administration must spend before they can become fully functional.

The result is that EDP planning in government tends to be a function of individual managerial styles. The current incumbent in a job sees a need for long range planning and pursues it. His successor is unfamiliar with the situation and usually has a different set of priorities. The planning processes may not be and usually are not continued since, in definition,

they are tainted by the previous incumbent. In the private sector, because of both mentor-protege relationships and deliberate planning, changes come about in a more orderly fashion. This means that even if the rate of management turnover were the same in government as in the private sector, long range planning processes would still be more difficult to establish in government.

PROPOSED SOLUTIONS

Outside observers looking at this list of characteristics tend to conclude that government EDP managers must be incompetent. Since many people think that the country would be better off if the government were more "business-like," the solutions in this view are simple: get new computer equipment, throw out the incompetents who are responsible for the long lead times, hire professionally oriented EDP management, concentrate on better measure of efficiency such as those used in the private sector, do away with special purpose systems and buy off-the-shelf hardware and software, and, finally, set up groups responsible for long term strategic EDP planning. Interestingly enough, one hears these proposed solutions coming from government employees about as often as one hears them from the private sector. Government EDP managers even share the idea that they, or at least some of their colleagues, must be imcompetent managers. Clearly, this must be the case; otherwise, they would not have gotten into such a mess. This view is reinforced by the Congress and the GAO.

Explaining away all these problems through the sheer incompetence of Federal EDP managers is simplistic, at best. Personal observation, admittedly perhaps biased, suggests that Federal EDP managers are at least as good as their counterparts in the private

sector. They are competent people responding rationally to a different set of ground rules than exist outside government. These rules are generated by deeply held social and political values in society at large, and they will not be changed by any of the solutions proposed above. The solutions offered tend to deal with the symptoms and not the causes and they depend upon measures of efficiency that society has decided are inappropriate for government.

The problems in EDP management in the Federal government are one symptom of the problems in society at large that Thruow (1981) described as the zero-sum society. The issues at stake in resource allocation in the computer industry are political questions with winners and losers in all segments of society. These political questions are resolved in a process that is not concerned with such narrower issues as efficient EDP management. The Federal government EDP manager must allocate resources in a social system where the resource allocation decisions are effectively a zero-sum game between competing factions of society, and the tradeoffs are not his to make. They are resolved by the political process, and the manager must make decisions within a framework of rules that would be considered irrational by a private sector manager. There is little likelihood that the rules will be changed. The stakes are too large, the rules cover many areas of government outside EDP management, and the political processes that generated the rules were developed over many years of compromise and negotiation.

There are approaches to the governmental management process that may make the political tradeoff process less costly to the individual manager. How well they will succeed remains to be seen. One approach is to lengthen the life cycle of a system. At first glance, this may seem bizarre. One

problem with government EDP management is that the life cycles for systems are already too long when considered from the point of view of EDP efficiency. But along with the longer life cycle comes a broader definition of the idea of system. The information system is defined in terms of the functions it is to perform rather than the specific hardware and software that will perform the functions. Specific performance goals are set for the functions, and if an increased workload means that these goals cannot be met, more equipment can be procured without going through the entire procurement justification. Such contracts usually call for periodic reviews at which time the contract may be respecified or renegotiated. Since the hardware is not specified, it is also possible for the vendor to install more modern equipment if this is the cheapest way to meet the performance goals. If the vendor is unable to fulfill these goals at certain points in the contract life, then another vendor can be brought in. An effort is currently underway to replace one of the Navy's aging supply systems in this fashion.

Initially, this approach might seem to offer some relief from the long lead times. The lead time for negotiating the initial contract is as long as ever, but once the political tradeoffs are made, they are presumed to be made for the twenty-five year life of the contract. In fact, there are likely to be problems. The government has to worry about possible problems of non-performance or the possibility of obtaining a better price elsewhere. Because of the respecification and renegotiation aspects of the contract, it may be subject to periodic recompetition. If the stakes are large enough, it will be worth a vendor's time to attempt to reopen the political trade-off issue and obtain a portion of the contract.

The other possibility is to attempt to contract out EDP services. Then the competitive bidding process takes place between suppliers of services, so that these suppliers decide on the cheapest means of delivering the services. Presumably, this would alleviate the political problems mentioned earlier. At least suppliers of EDP services in the private sector think so. Actually, this may only redefine the problem slightly.

As an example, Hanzlik, et al. (1980), describe the results of Orange County, California letting a seven year contract for facilities management of their central data processing facility. The purpose of the contract was to gain control of expenditures or data processing. The net result was that central data processing costs increased 11 percent more than anticipated and non-central data processing costs tripled. The county ended up forfeiting centralized planning and control of approximately one-half of total expenditures on data processing. Some of these results may have been predictable since the two outside bids for the contract were $26 million and $41 million while the in-house bid was $38 million. The county, predictably, accepted the lowest bid, despite the apparent difference in services offered by the low bidder. As Hanzlik, et al., point out (p. 26), "The County's true data processing needs became subservient to the proposal process and the awarding of the contract."

For decisions of sufficient magnitude, there will still be a complicated and lengthy selection process for the supplier of the services. But most suppliers of contract EDP services to the government are still relatively small. So far, the stakes involved are not large. It is not worth initiating the political battle for such a small return. But, if the government were to begin contracting out large scale EDP services such as Social Security or

the Department of Defense data processing, the return would be worth the fight. One could expect then that several outside contractors would enter the political process. When that happened, their advantage over government run EDP operations would diminish accordingly. Without the motivation caused by continued competition with their peers for this contract, they would become government data processing operations operating under another name. Hence, the approach of contracting out EDP services may provide some relief, but only if the process is structured carefully. As the stakes involved get larger, however, it is reasonable to expect the potential contractors to attempt to co-opt the contracting out process. Consequently, one may see elements of the political process intruding here as well.

The common thread of all of these proposed solutions is that they would cause Federal Government EDP managers to more closely emulate their peers in the private sector. Such an approach may be worthwhile, but only to a certain degree. Eventually, the political and social constraints on a government organization insure that the fundamental differences between the public and private sectors are preserved.

CONCLUSIONS

The basic problem with Federal EDP management is not one of the quality of management in this sector. It is primarily a problem of the systems acquisition and design process being heavily influenced by larger political goals. The acquisition process in the Federal government is an example of what economists call a collective good. No one group has custody of the acquisition process. It was designed piecemeal by Congress, the Executive Branch, and industry, and it benefits all. There are many dysfunctional in-

centives built into the process, and it can be slowed down by one participant or another. On the other hand, because it is a collective good, no group has any incentive to fight to make the process more efficient. It is one more example of Bret Harte's remark, "Nobody shoulders a rifle in defense of a boarding house." Perhaps the only forces keeping the system from reaching total stagnation are the public service norms emphasized in government employment. Somehow, the work must be completed.

One way for the government to speed up the computer acquisition process would be to realize that this process may be an inappropriate means to pursue some social goals. In particular, the government might cease regulation of the computer industry through the government equipment acquisition process. In the authors' opinions, this is not cost effective when the impact on the government's administrative system is considered. If the computer industry must be regulated, it should be done directly. Besides the Antitrust Division of the Justice Department and the Federal Trade Commission, provate lawsuits could serve that putpose. Although there may be little hope for this recommendation being adopted, antitrust policies have wide political appeal both with the public at large and with businesses whose larger competitors may be hampered by a vigorous antitrust enforcement.

Additionally, government computer systems are trouble because they are large and their design is very complex. This too is a reflection of the social system in which they are imbedded. The systems are large because the government deals with very large real world problems. The complexity comes out of the political process. In the United States, there are many different groups competing in the political process. The results of this competition are some very complicated politi-

cal tradeoffs. These tradeoffs have to be reflected in the computer systems that the government designs to administer its business. If the United States were more homogeneous, as is Japan, perhaps it could get by with simpler systems. But, it is not. Congress and the public at large need to appreciate the impact of their demands on the systems that are set up to service those demands. If they want simpler, more cost effective systems, they will have to incorporate this requirement, too, into the political process.

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