Computers and the Social Sciences 1 (1985)

The Political Character of Computerization in Service Organizations: Citizen Interests or Bureaucratic Control

Kenneth L. Kraemer and Rob Kling

Abstract: This article explores the provocative question; Are computerized systems at the local government level bringing about new services and more equitable distribution of service benefits and costs, or are they more likely to be instruments of political elites, reinforcing the traditional distribution of values and services? An empirical examination of computing investments by American local governments supports the second alternative: computing investments appear to be oriented toward governmental efficiency and enhancing the choices of top-level administrators, rather than toward direct service delivery and increasing the choices of citizens.

Since the early 1960s, when federal, state and local governments began computerizing many important functions and services, the relationship between citizens' interests and governmental use of computerized systems has evolved along two political paths, which have been called managerial rationalism and reinforcement politics. In the rationalist perspective, computer technology "serves citizens" (ACM, 1973; Blum, 1972; Chartrand, 1972; Evans and Knisely, , 1970; Feigenbaum and McCorduck, 1983; Masuda, 1981; Nanus, 1972; Sackman and Boehm, 1972; URISA, 1977; USAC, 1976; Weiner, 1969). Viewed from this perspective, computerized systems are a way of enhancing the administrative efficiency of government, but they are, more importantly, a means of providing new services to citizens and achieving a greater equity in the distribution of services. They also provide citizens with additional choices, rather than limiting or forcing their responses. If this view is true, and the computing investments of local governments were truly intended to provide services to citizens, then the choices available to citizens would be expanded by computerized systems rather than contracted.

The alternative view of the computing investments by local governments is reinforcement politics (Danziger, Dutton, Kling and Kraemer, 1982; Dutton and Kraemer, 1977; Dutton and Kraemer, 1985; Kling, 1978; Kraemer and Dutton, 1979; Kling, and Iacono, 1984a). In this perspective, computerized systems are tools of the most powerful social forces, primarily used to support the traditional and dominant government operations such as revenue collection, enforcement of regulations, and prevention of fraud and abuse in government programs. Most computerized systems would be used to support routine administrative activities, basic local government services, bureaucratic control of government departments and agencies, and social control over the recipients of social services.

Kenneth L. Kraemer is Professor, Graduate School of Management, and Director, Public Policy Research Organization, University of California, Irvine CA 92717.

Rob Kling is Professor, Department of Information and Computer Science, and Research Computer Scientist, Public Policy Research Organization, University of California, Irvine CA 92717.

This research was supported by grants from the Office of Computing Activities and the Division of Information Sciences of the National Science Foundation.

The Computing Portfolios of Local Governments

The computing investment patterns of local government can be described empirically in terms of two political extremes: as agents of change, bringing in new services and benefits to the public, or as instruments of political control, reinforcing existing structure (Kling and Kraemer, 1982). Determining which role the new technology has assumed required a shift in concentration away from the individual computer application as the primary unit of analysis and toward the "computing portfolios" of local governments, i.e., their total investments in computer applications. From the total inventory of applications available to them, local governments invest in computerized systems purposively and selectively. These investment patterns reveal whether their choices reinforce the existing values of the government and community or represent an independent force for change.

In the United States, local governments (cities and counties) provide many direct services to citizens (Levy, Meltzner and Wildavsky, 1974; Lineberry and Sharkansky, 1978; Yetes, 1977) and have more opportunities to use computing in direct service provision than state and federal agencies, which are less likely to provide direct services to citizens (other than transfer payments). For this reason, and because local governments provide a larger population for study, their computing investments are a better basis for our examination.

Some activities and functions of local government are much more likely to be computerized than others. By 1975, for example, almost every local government of 50,000 or more had computerized its accounting and revenue collection functions. By then, over 80% of American cities and 50% of the counties had acquired computerized systems, with the most common applications in finance and police. About 50% of the counties had also computerized support for public health and welfare agencies. In contrast, about 20% of local government provided similar support for libraries and parks.

Some of these variations can be explained by the mix of services and administrative functions provided by local governments, among which there is no fixed division of services. These services and functions range from fighting fires and inspecting buildings to operating museums, hospitals, and airports. Factors in the division are the size of population in a jurisdiction and local traditions. The smaller cities emphasize such basic services as fire protection and law enforcement, while larger cities usually provide a wide range of services including hospitals and welfare. Counties often provide such special services as recording vital statistics and property tax collection. Many services, like courts, libraries, and parks, are provided by either or both. In addition, local governments provide their own administrative services, such as accounting and building maintenance. In different ways and varying degrees, computer applications support all those services provided by local governments.

For this study, data were collected from computing managers of cities over 50,000 in population and counties over 100,000. Mail questionnaires were sent to over 700 local governments to obtain a comprehensive inventory of existing and planned computer applications. Where governments had more than one installation, the inventory of applications was collected from each one and aggregated for a complete description of that government's computing portfolio. Approximately 80% of the governments queried completed the questionnaires. Further methodological details of the broader study are given in the "Appendix: URBIS Research Methodology" in Danziger, Dutton, Kling and Kraemer (1982).

Our analysis suggests that computerized systems reinforce the traditional emphases of local governments on administrative efficiency and basic government functions, especially finance and police. To explore these patterns more fully, we classify local government computer applications according to whether they provide direct services to citizens, as opposed to indirect support, and social control of "targeted" citizen groups as opposed to bureaucratic control of government departments, agencies, and employees.

The pattern of computerization in local governments reflects an emphasis upon control rather than the distribution of services within and between jurisdictions. Many computer applications in local governments facilitate bureaucratic control (e.g., expenditure control), social control (e.g., law enforcement), and routine administration (e.g., record keeping). Relatively few computerized systems support the direct delivery of services to

citizens by the provision of social services, parks, libraries, and public works. In 1975, new computing developments scheduled by local governments were consistent with their existing style of computerization (Danziger, Dutton, Kling, and Kraemer, 1982).

Characterizing Local Government Computer Uses

These computerization patterns, suggested by the many uses of computer systems for various government functions, can be revealed more distinctly by explicitly characterizing the distribution of computer applications. These may reveal either support of service delivery to citizens at the expense of administration or social control at the expense of bureaucratic control.

The Service Dimension. The activities of local governments have been described (Ostrum, 1975; Savas, 1978; Sonenblum, Kirlin and Reis, 1975) as direct services to citizens and indirect services (which we call administrative activities). When local government agencies educate children, collect garbage, fight fires and circulate library books, they deliver services to citizens. Direct service occurs when a tangible good or a visible service is provided directly to some person, organization, or group as a local government function. Increased effectiveness, efficiency, or equity of these services directly benefits the recipient.

Government activities which support the internal administration of both operations (e.g., operating the motor pool) and the government as an institution (e.g., controlling government expenditures) are still services, but they are indirect. These administrative activities provide a tangible good or visible service to some person or organization within the government, or to the government as a whole. The public is indirectly benefited by increased effectiveness, efficiency, or equity of internal governmental operations.

The Control Dimension.[1] In addition to the distinction between direct services and administrative service, government activity can be characterized by the kind of control exerted over recipients of direct services of administrative support. "Social" control restricts the discretion of the public in carrying out some line of action; "bureaucratic" control restricts the activities of government employees. Some government activities are more "control-oriented" than others. Most direct services to citizens involve a low level of social control, as for example, the lending of library books for a specific time and in limited number. Also low as a level of social control is fire department, inspection of theaters, restaurants, department stores, and other business establishments. The highest levels of social control are established by law enforcement activities such as apprehending criminals and maintaining civic order (Wilson, 1968).[2]

Government administrative activities—purchasing, building maintenance, payroll—are also control-oriented, but many of them involve a low degree of bureaucratic control, as when a card file lists the addresses of common vendors for routine internal administration. Such activities can be expanded to control both the behavior of administration members and the allocation of resources (Blau, 1955; Friedson, 1970; Lawler and Rhode, 1976; Perrow, 1972). Departmental monthly expense summaries, for example, can be used to control expenditures. Any record used by a manager to control individuals and the resources they require usually extends to control an entire staff.

Characterizing Computer Applications

Much like traditional governmental activities, computer applications can be characterized by the same two dimensions: their service or administrative orientation (S) and level of social bureaucratic control (C). Some, such as payroll processing, are primarily administrative, while others, like police warrants files, are directly related to the public, and are called service-support. For example, the processing of traffic tickets and the dispatching of fire trucks both directly affect citizens. But one of these activities (dispatching) helps deliver a service (firefighting) to citizens whose homes or businesses are on fire. In contrast, the traffic-ticket processing system, which is often designed to catch those who fail to pay, supports control by police and courts over the public. Thus each computer application can also be characterized by a control dimension (C) according to the extent to which it increases a public agency's social or bureaucratic control over its clients or the public.

Computer applications which exemplify high

and low values on these two dimensions appear in Table 1, along with classification criteria and examples. In reality, of course, the service (S) and high-low control (C) dimensions are continuous, rather than the dichotomous classifications used for our purposes here. Moreover, many computer applications, like many government activities, have aspects of both direct service and administrative service support, and both high and low control. Our two-dimensional model classifies an application by its typical use and primary orientation. That is, we classify each computer application as mainly supporting either direct services or administrative services, and high or low control. The four cells in Table 1 can be thought of as representing different "genres" of computerized systems.

We were very careful, when classifying actual computer applications according to these "genres," to err on the conservative side. First, we were conservative in coding computer applications as oriented toward high control over direct services or administrative services. For example, payroll programs are sometimes run for urban managers who wish to examine the control patterns of overtime, sick leave, and accrued vacations. Because such uses are atypical, such applications were not coded as supporting bureaucratic control. Second, we were liberal in coding applications as supporting citizen service. For example, welfare information and referral systems were coded as increasing public service, although the empirical evidence indicates that they sometimes support administrators at least as well as welfare applicants (Kling, 1978a). Thus the data underestimate social control. Third, the average number of computer applications in a genre is a conservative measure of computing applications for administrative support. Computer applications oriented toward administrative support (e.g., accounting, payroll, personnel) tend to be larger than those oriented toward service support (e.g., police wants and warrants, library circulation records), but we treat them equally. Thus, our data and conclusions about the distribution of computer applications by genre, if they erred at all, would do so on the conservative side.

The distribution of computerized systems across the four genres exhibited by a particular portfolio (P) of computer applications, for example, those implemented by the City of Los Angeles between 1960 and 1980, demonstrates a pattern worth close examination. Each of these computer applications can be coded into one of the four genres. We will denote the fraction of applications in each cell by Gsc(P) (s = direct or administrative; c = high or low). In our following analysis, we will denote the four genres by Gdh, Gdl, Gah, and Gal.

Distribution of Computerized Systems Genres. As part of a general assessment of how American local governments invest in the computerized systems of these four (S/C) genres, we compiled an inventory of 264 computer applications which could be used by local governments. This inventory we call the National Portfolio (NP). Each of these 264 computer applications is coded into one of the four S/C genres. The four values of Gsc(NP) indicate the relative proportion of computer applications in each genre. If a local government (LG) randomly selected applications from NP and created a portfolio of computer applications, Gsc(NP) would be nearly equal to Gsc(LG), except for sampling errors. If Gsc(LG) differed substantially from Gsc(NP), the differences could be attributed to noise or a non-random investment policy.

Distribution of Computerized System Genres in the National Portfolio. Each item in our National Portfolio (NP) of 264 known computer applications used by American local governments was classified into one of the four S/C genres. The computer applications in NP are known for one of several reasons: mention in other surveys of computing, being offered as prototypes by federal agencies or private vendors, discussion in the literature or networks of local government professionals. For the applications to be in NP, at least one local government had to have used it.

If computing provides service to citizens and enhances their choices, one would expect that the distribution of computer applications in NP would be oriented toward direct service delivery and low social or bureaucratic control. In accordance with the distribution of applications according to our four S/C categories (Table 2), a city that selected its applications in proportion to those in NP would select approximately:

1. 20% of its applications to support high social control in direct services, Gdh;
2. 19% of its applications to support low social

control in direct services, Gdl;

3. 21% of its applications to support high bureaucratic control in administrative services, Gah; and

4. 40% of its applications to support low bureaucratic control in administrative services, Gal.

Of course, local government cannot be expected to randomly select applications from NP. However, these distributions of computer applications across the four S/C genres provide a baseline with which the portfolios selected by local governments can be compared. Thus if 30% of city A's computer applications support direct services with low social control (Gdl(A) = 30%), an orientation toward direct service delivery in city A could be recognized because Gdl(NP) and Gdl(M) are only 19% and 10%, respectively. Conversely, a Gdl(A) of one percent would indicate a bias against such computer uses.

Portfolio of Computer Use Selected. During the last decade, local governments have been under tremendous pressure to maintain or upgrade the quality of urban services with no increase in costs. These service-cost pressures lead local governments to emphasize services to citizens, on the one hand, and internal bureaucratic control on the other, and to invest in computer systems to support both these objectives. Table 2 presents the distributions of computer applications selected by cities and counties in the United states. Our data indicate that city and county investments in computing generally parallel the National Portfolio's distribution of possible applications across the four S/C genres. However, there are four variations:

1. Local governments invest somewhat more in computerized systems to support administrative services than is typical of the National Portfolio (68% versus 61%).

2. Of those computerized systems which support direct services, a somewhat smaller fraction support high social control than one finds in the National Portfolio (32% versus 39%).

3. More than city governments, county governments develop computerized systems to support direct services (16% versus 10%).

4. More than the National Portfolio, local governments invest in computerized systems to support low bureaucratic control (51% versus 40%).

This parallel between the National Portfolio and the computerized systems genres selected by specific cities and counties occurs partly because potential uses of computerized systems in local governments are nearly always conceived as extensions of current operations. Rarely is a completely new computerized system proposed or imported from private vendors or federal and state agencies, for example, or does a local government research and develop such systems.

The parallel between Gsc(NP) and Gsc(C + M) may also occur because planning for computerized systems is constrained by local government emphasis on traditional functions, values, and interests. Theoretically, computerization could be applied to all local government functions and services, and even provide new services and activities not possible without the computer. But such uses might conflict with emphasis on traditional activities, which are easiest to computerize and pay off promptly in cost-efficiency. New services might increase costs, reduce efficiency and political control, or create unanticipated consequences. Thus, the conservative approach of local governments limits the scope of computer uses selected for adoption and development.

In addition to the variations already mentioned, several other patterns emerge. About 12% of the computer applications serve the public at a low level of social control. The most significant pattern, however, is one of rare direct service to citizens without greater than average social control. This pattern can be seen most clearly in Table 3, which records Gsc(M) - Gsc(NP) and Gsc(C) - Gsc(NP) for all four S/C genres. It shows that local governments exercise more control than NP when computerized systems are citizen-oriented and less control when the computerized systems are internally oriented. For example, municipal investment in high-control computerized systems for direct service support was proportionate to Gdh(NP), and 9% less in low control Gdl(NP) applications. At the same time, cities are investing 11% more in low-control computerized systems for administrative support than might be expected from the National Portfolio, and 2% less in high-control computerized systems.

Factors Underlying the Patterns of Computer Use

The data show that computerized systems are adopted in patterns duplicating the coalitions of established interests in American city and county governments. Although it is impossible to categorize the myriad coalitions in thousands of local governments in the United States, the dominant ones share many common concerns: provision of traditional services, organizational efficiencies, and the regulation of public behavior (Levy, Meltsner and Wildavsky, 1974; Lineberry and Sharkansky, 1978; Yates, 1977). Our analysis shows that these concerns are served by the computing investments of local governments. In some cases, one of these concerns overrides the others, as some dominant coalitions value improved public services while others favor computerized systems which improve governmental efficiencies. Such choices are not exclusive, but lead to different patterns of investment in computerized system portfolios in local governments. These reflect the dominant character of local government activity, increasing the efficiency of what they do already, and emphasizing control over citizens rather than control over internal administration (Table 3). Thus computerized system developments reinforce the current orientation of local governments. Further, computing portfolios can be examined in terms of their relation to the three common orientations of American local government: traditional services, public regulation, and organizational efficiency.

The Traditional Service Orientation in Computerized Systems

Computerized systems in local government reflect the traditional allocation of public expenditures and indirectly reinforce certain community values. Computers are mainly used to support the traditional activities: police, finance and administration, fire, sanitation, utilities, and (in counties) public health and welfare.

The allocation of computing resources to police activities is particularly interesting. Outside of finance and administration in local governments, the police function is the single largest use of computing, probably as a response to traditional citizen concern for order as well as fear of crime. Seventy-two percent of the cities and 97% of the counties have at least one computerized police system. Cities have an average of seven, counties have five.

Two factors which affect the service orientation of local government investments in computerized systems are the extent of the demand by residents for direct services and mandates for local governments to provide direct services. Larger cities usually need to provide these more than do the smaller cities. In fact, there is a correlation between computerized systems which support these services and the size of the population ($r = .3$, p is less than .001, see Table 4).

Counties usually are mandated to provide certain services, such as public hospitals and welfare, which cities are not. Table 2 shows that county governments invest substantially more than cities in computerized systems which support services of this kind. The difference between the direct service/low control uses of counties and cities is about 6%.

Although these services may be traditional, they go directly to citizens, with a low level of control. In accordance with our expectation that the dominant interest of local governments would be in providing traditional services, but that larger governments and counties would provide more direct services than smaller governments, this analysis of investment in Gsc lends support to the interpretation that the new technology is reinforcing established political patterns.

The Efficiency Orientation in Local Computer Investments. Computer use also reflects traditional citizen concern with government economy and efficiency and, more recently, with the urban fiscal crisis. With local government revenues unable to keep up with growing demands, computerized systems have been viewed as a way to hold down costs. Local governments are giving priority to computer applications that generate revenue efficiently, save costs, and control expenditures rather than provide new services.

This efficiency orientation in local government computing investments has been evident since the first introduction of computers in the finance function, and has continued as computer use has been extended to other fiscal and administration activities as well as to operating departments. The drive for efficiency in computerized information systems for local governments can be analyzed by examining the investments which support low social

control/direct services (Gd1), according to their location within the governmental structure. Gd1 (M) = 7.6% for the 142 cities which have a city-wide computing facility within the finance department, while Gd1(M) = 10.3% for the 59 cities in which an independent facility serves all departments. Gd1 (C) = 13.8% for the 26 counties with organizational computing operations within the finance department and Gd1(C) = 15.3% for the 86 counties with independent data processing departments.

In both cities and counties, the control of computing operations by a finance department is associated with a computing portfolio which deemphasizes low social control/direct services. This association is much stronger for cities than counties, most likely because finance managers influence computing investments in the direction of government efficiency rather than direct services and low social control.

The Regulatory Orientation in Local Computing Investments. Many local government functions such as law enforcement and code enforcement are regulatory; they enhance social control. These services are designed to control the behavior of individuals, groups or organizations. Other services, such as welfare, also have elements of control (Handler, 1972; Piven and Cloward, 1976).

As with the efficiency orientation, computing investments tend to reinforce the dominant character of local government activity, in this case the regulatory orientation. It was noted earlier that 60% of the computerized systems that support direct services also support high social control. Many of the citizen-oriented systems in local governments are, in fact, devoted to police, and most police computerized systems (54%, or 1,136 of the 2,096 police computer systems in our data) are oriented primarily toward law enforcement (patrol and detective work) rather than crime prevention or community relations (Table 5). (See also Colton, 1978).

Both the regulatory and efficiency orientations of local government provide explanations as to why computerized systems offer little direct service to citizens. Once local government officials have made commitments to finance, other housekeeping activities, and social control through law enforcement, few computing resources, particularly staff, are left for other kinds of service. The low level of support for public services which do not enhance social control can be viewed as the product of a non-decision. While officials are not opposed to such investments, they do not actively seek them because of the demands of their work, their professional ideologies, and the computer resources available. For example, even though planning-orientation data banks and social service information and referral systems were built during the late sixties and early seventies with federal funding assistance, as were the police applications, such computerized systems were outside the mainstream of local government priorities. When the federal funding ended, local governments did not continue the support, even though they continued to invest in computerized systems that reflect their dominant concerns.

The Reform Bias in Local Computing Investment. The local government pattern of computing investments also reinforces the reform orientation of many local governments, those which have organized key aspects of government along "business-like" lines. Their legislators are elected at-large rather than by ward or district, they are administered by a full-time professional manager, their budgets are prepared by the professional manager rather than the legislature, and they follow professional management practices with regard to budgeting, accounting, personnel and other administrative functions.

Several earlier analyses of local computing developments have argued that the reform philosophy of governments leads to computing strategies which emphasize "efficiency rather than equity" and "administration rather than service delivery" (Dutton and Kraemer, 1978; Laudon, 1974). These latest findings support these studies. Table 4 correlates the orientation of computing in local governments with size and reform orientation. It shows that larger governments, while they invest more heavily in computerized systems which support direct services to the public, provide proportionately fewer administration-orientation applications. Reform governments (which are usually smaller cities) show the opposite pattern: their computerized systems support fewer direct services to citizens and more administrative activities. These administrative applications mostly involve record-keeping, printing, and calculating tasks, which lend themselves more readily to increases in efficiency.

Table 4 also shows that larger governments are less likely to invest in computerized systems oriented toward bureaucratic control while reform governments are oriented toward such investments. The negative relationship between size of constituency and investments Gah is consistent with the research literature that characterizes the pluralism of large cities as a step toward less internal control. In contrast, the strong emphasis on administrative computerized information systems in reform governments reinforces the decision-making capabilities of top-level administrators even though the administrative computerized systems may not have been originally designed for this purpose. Bureaucratic control and effectiveness in decision-making are important to professional administrators. In concert with computing personnel, they will find a way to use administrative computerized systems to fit these purposes (Kraemer and Danziger, 1984).

Summary and Conclusion

Rather than being oriented toward direct service delivery and enhancing the choice of citizens, computing investments of local governments appear to be oriented toward governmental efficiency and increasing the choices of top-level administrators. Thus, the process of reinforcement politics as illustrated by this demonstration that computing portfolios reinforce the prevailing orientation of local government activities.

Specifically, our analysis has shown that computerized systems tend to be used primarily to: (1) support basic government services such as the police, fire, highways, and sanitation, rather than newer and more socially oriented services; (2) achieve efficiency payoffs through automation rather than equity, effectiveness, or other possible benefits; and (3) enhance social control through inherently regulatory services such as law enforcement and various kinds of code enforcement. The wide variety of computerized systems serve citizen interests which scholars have characterized as the historically dominant interests of basic services, efficiency, and law enforcement.

Within the government itself, computerized systems have been used to serve the interests of central administrators in reformed governments. Their values of efficiency, control, and effectiveness of decision-making have been served as a by-product of routine administrative automation in finance, general administration, and operating departments. Thus, even where computerized systems appear to have been broadly applied to a wide variety of government functions and departments, they have in fact been narrowly applied to generate efficiencies in large data-handling operations of the departments, and to produce data which top managers can use for management and decision-making. Computing developments have reinforced the biases of reform administrators.

We have found, in short, that the common patterns of investment in computer information systems by American local governments often miss the opportunity to provide direct socially-oriented services to the public. These missed opportunities do not show up when discussions focus on single computer applications. But systematic preferences for applications which enhance control over citizens and which neglect direct services show up clearly when we examine portfolios of applications. By focusing on individual applications, key actors can also avoid acknowledging the value conflicts which are catalyzed by computerization (Kling, 1983).

It is likely that this analysis applies as well to other levels of government and to other types of organizations, e.g., business, schools, hospitals, universities. Only by recognizing the political dimensions of new computing applications and the organizational ecologies within which they are adopted can we understand how different technical choices alter the quality of life in computer-using communities (Kling, 1983; Kling and Iacono, forthcoming)

FOOTNOTES

The authors are listed randomly to denote equal contribution. This research was supported by grants from the Office of Computing Activities and the Division of Information Sciences of the National Science Foundation.

1. Scholars who are broadly interested in social control (Rule, 1974) emphasize the nature, construction, and enforcement of social rules, but they do not address the nature and quality of services that organizations provide to their clients. Scholars of organization behavior emphasize both organization-client exchanges and social control (Blau, 1955; Friedson, 1970; Lawler and Rhode, 1976). Scholars of management information systems emphasize the potential of computer-based systems for enhancing the control of managers over subordinates (Dutton and Kraemer, 1978; Whisler, 1967; Kling and Iacono, 1984b). In contrast, most advocates of "urban information systems" tend to emphasize the direct services delivered (Evans and Knisely, 1970; Nanus, 1972; Sackman and Boehm, 1972) The role of computing in enhancing the control of citizens by local governments has been largely neglected, despite some promising theoretical work and exploratory case studies (Downs, 1967; Kling, 1978a; Laudon, 1974; Kling, 1982).

2. Of course, the actual level of control that government agencies exert over the public varies considerably across places, times, and social contexts. The police in Costa Mesa may give more traffic citations than the police in Milwaukee. And the police in Wakago may operate a speed trap. In any of these places, despite comparable driving, a member of the local city council driving an Oldsmobile Cutlass may receive fewer citations than a leather-jacketed teenager driving a Pontiac Trans-Am. Clearly, greater control is typically excercised by policemen than by garbagemen.

REFERENCES

ACM (Association for Computing Machinery). 1973. Computers in the Service of Citizens. Proceedings of the ACM National Conference (Atlanta, GA). New York: ACM Press.

Blau, P.M. 1955. The Dynamics of Bureaucracy. Chicago: The University of Chicago Press.

Blum, E.H. 1972. Municipal services. In H. Sackman and B.W. Boehm (eds.) Planning Community Information Utilities, Montvale, NY: AFIPS Press, 45-68.

Chartrand, R. 1972. Computers in the Service of Society. New York: Pergamon Press.

Colton, K.W. 1978. Police computer Technology. Lexington, MA: Lexington Books.

Danziger, J.N., W.H. Dutton, R. Kling, and K.L. Kraemer. 1982. The Politics of Computing. New York: Columbia University Press.

Downs, A. 1967. A realistic look at the final payoffs from urban data systems. Public Administration Review, 27: 204-209.

Dutton, W.H. and K.L. Kraemer. 1977. Technology and urban management: the power payoffs of computing. Administration and Society, 9(3): 304-40.

Dutton, W.H. and K.L. Kraemer. 1978. Management utilization of computers in American local governments. Communications of the ACM, 21(3): 206-281.

Dutton, W.H. and K.L. Kraemer. 1985. Modeling as Negotiating. Norwood, NJ: Ablex.

Evans, J.W. and R. Knisely. 1970. Integrated municipal information systems: Some potential impacts. Washington, D.C.: Urban Information Systems Inter-Agency Committee, Department of Housing and Urban Development.

Feigenbaum, E.A. and P. McCorduck. 1983. The Fifth Generation. Reading, MA: Addison-Wesley.

Friedson, E. 1970. Professional Dominance. New York: Atherton Press.

Graham, Noel. 1980. The Mind Tool. New York: West Publishing Company.

Handler, J. 1972. The Coercive Social Worker. Chicago: Rand McNally Publishing Company.

Kling, R. 1978a. Automated welfare client-tracking and service integration: The political economy of computing. Communications of the ACM, 21 (6): 484-493.

Kling, R. 1978. Automated Information Systems as Social Resources in Policymaking. Proceedings of 1978 National ACM Conference. (December), 666-74.

Kling, R. "Citizen Orientation of Automated Information Systems." Information Age 4(4) (October 1982): 215-223.

Kling, R. "Value Conflicts in the Deployment of Computing Applications: Cases in Developed and Developing Countries." Telecommunications Policy 7(1) (March 1983): 12-34.

Kling, R. and S. Iacono. "The Control of Information Systems Development After Implementation." Communications of the ACM (December 1984a).

Kling, R. and S. Iacono. "Computing as an Occasion for Social Control." Journal of Social Issues 403 (1984a): 77-96.

Kling, R. and S. Iacono. "Computing Developments as the Product of Social Movements" (with S. Iacono) in Microelectronics in Transition. R. Gordon (editor) Ablex Publishing Co. Norwood. N.J. (in press).

Kling, R. and K.L. Kraemer. 1982. Computing and urban services. In J. Danziger, W.H. Dutton, R. Kling and K.L. Kraemer, Computers and Politics. New York: Columbia University Press, 194-220.

Kraemer, K.L. and W.H. Dutton. 1979. The interests served by technological reform. Administration and Society, 11(1): 80-106.

Kraemer, K.L. and J.N. Danziger. 1984. Computers and control in the work environment. Public Administration Review, 44(1): 32-42.

Larson, R.C. 1978. Police Deployment by Computer. Lexington, MA: Lexington Books.

Laudon, K.C. 1974. Computers and Bureaucratic Reform. New York: John Wiley and Sons.

Lawler, E.E. and J.G. Rhode. 1976. Information and Control in Organizations. Pacific Palisades, CA: Goodyear Publishing Company, Inc.

Levy, F.S., A.J. Mettsner and A. Wildavsky. 1974. Urban Outcomes. Berkeley, CA: University of California Press.

Lineberry, R.L. and I. Sharkansky. 1978. Urban Politics and Public Policy (3rd ed.). New York: Harper and Row.

Masuda, Y. 1981. The Information Society. Bethesda, MD: The World Future Society.

Matthews, J.R., W.L. Dutton and K.L. Kraemer. 1976. County computers in ICMA (ed.), The County Yearbook. Washington, D.C.: International City Management Association, 133-149.

Nanus, B. 1972. The municipal framework. In H. Sackman and B.W. Boehm (eds.), Planning Community Information Utilities. Montvale, NJ: AFIPS Press, 375-400.

Ostrom, E. 1975. Interorganizational arrangements in urban police service. Presented at the International Institute of Management Conference on Interorganizational Decision-Making and Public Policy, Berlin, June.

Perrow, C. 1972. Complex Organizations (2nd ed.). Belmont, CA: Wadsworth Publishing Company.

Piven, F.F. and R. Cloward. 1976. Regulating the Poor. New York: Random House.

Rule, J. 1974. Private Lives and Public Surveillance: Social Control in the Computer Age. New York: Schocken Books.

Sackman, H. and B.W. Boehm (eds.). 1972. Planning Community Information Utilities. Montvale, NJ: AFIPS Press.

Savas, E.S. 1978. The institutional structure of local government services: A conceptual model. Public Administration Review, 38(5): 412-419.

Sonenblum, S., J.J. Kirlin and J.C. Ries. 1975. Providing municipal services: The effects of alternative structures. Los Angeles: University of California, Institute of Governmental Studies, September.

URISA (Urban and Regional Information Systems Association). 1977. Information Systems as Services to Citizens. Papers from the Fourteenth Annual Conference of URISA. Chicago: URISA.

USAC (Urban Information Systems Inter-Agency Committee). 1976. Federal funding for municipal information systems. Government Data Systems, 1(5):6.

Weiner, M. 1969. Service: The objective of municipal information systems. Storrs, CT: Institute of Public Science, University of Connecticut.

Whisler, T.L. 1967. The impact of information technology on organizational control. In C.A. Myers (ed.), The Impact of Computers on Management. Cambridge, MA: MIT Press.

Wilson, J.Q. 1968. Varieties of Police Behavior. Cambridge, MA: Harvard University Press.

Yates, D. 1977. The Ungovernable City. Cambridge, MA: MIT Press.

TABLE 1. CLASSIFICATION OF LOCAL GOVERNMENT COMPUTER APPLICATIONS

C \ S	Direct Service Support (S=d)	Administrative Service Support (S=a)
High Social/ Bureaucratic Control (C=h)	G_{dh} Examples: Traffic ticket processing, police wants and warrants, child support records (courts), firearms registration file, library circulation records. Criteria: The application supports a government activity which is designed to limit the choices of citizens or institutions that are the "targets" of the activity. (Other people or institutions may be served when the targets are controlled.) Illustrative Rationale: Police wants and warrants applications are explicitly designed for social control, i.e., to aid in the location, identification, and apprehension of criminals.	G_{ah} Examples: Motor vehicle maintenance records, courtroom scheduling, budget monitoring, cost accounting, personnel, position control. Criteria: The application supports an administrative activity in which government resources such as space, goods, money, or staff are allocated or such allocations are monitored. Illustrative Rationale: Budget monitoring is explicitly aimed at bureaucratic control--limiting and rationing the expenditures of government departments and agencies.
Low Social/ Bureaucratic Control (C=l)	G_{dl} Examples: Check processing in welfare, information and referral systems in welfare, emergency vehicle dispatch, vital statistics records, neighborhood social data analysis. Criteria: The application supports a government activity in which a citizen or institution receives a direct service from a government agency and there is little or no attempt to limit the choices of the targets of the activity. Illustrative Rationale: Check processing in social welfare is mainly concerned with delvering payments to individual welfare recipients. Although the application might check for a valid payee before printing the check, it is not designed to support social control, e.g., determine the eligibility of an individual for welfare payments or to catch welfare cheaters. Other applications might do this, however.	G_{al} Examples: Media mailing list, payroll processing, purchase order file, street inventory, census data file. Criteria: The application supports an administrative activity in which there is little or no effort to allocate or monitor resources. Illustrative Rationale: Payroll processing is mainly concerned with calculation and printing payroll checks for government employees. It involves no bureaucratic control; however, other personnel/payroll applications such as position control are aimed at bureaucratic control over hiring by the departments.

TABLE 2. PROPORTIONAL DISTRIBUTION OF SUPPORT OF COMPUTER USES: NATIONAL PORTFOLIO AND LOCAL PORTFOLIOS IN CITIES/COUNTIES

	Percent of Computer Uses Oriented Toward:[a]					
	Direct Service Support		Administrative Service Support			
	Low Social Support	High Social Support	High Bureaucratic Control	Low Bureaucratic Control	Total	N
National Portfolio G_{sc} (NP)	19%	20%	21%	40%	100%	(264)[b]
Locally Selected Portfolios:						
Municipal Governments* G_{sc}(M)	10	20	19	51	100%	(31)[c]
Count Governments* G_{sc}(C)	16	20	14	50	100	(32)[d]
Municipal and County Governments* G_{sc}(C+M)	12	20	17	51	100	(32)

[a] Based on Mean G_{sc}(M), G_{sc}(C), and G_{sc}(C+M) for each genre averaged across the city and county governments in our sample.

[b] 264 applications in NP.

[c] Mean of 31 applications in our population of 403 cities.

[d] Mean of 32 applications in our population of 704 counties.

TABLE 3. DIFFERENCE IN PROPORTIONAL DISTRIBUTION BETWEEN $G_{sc}(NP)$ AND COMPUTERIZED INFORMATION SYSTEM GENRES SELECTED BY CITIES/COUNTIES

Level of Control	Municipal Government* $[G_{sc}(M) - G_{sc}(NP)]$		County Governments* $[G_{sc}(C) - G_{sc}(NP)]$	
	Direct Service Support	Administrative Support	Direct Service Support	Administrative Support
High Control	0%	-2%	0%	-7%
Low Control	-9	+11	-3	+10

* Based on Mean $G_{sc}(M)$ and $G_{sc}(C)$ in each genre from Table 2.

TABLE 4. CORRELATION OF SELECTED ENVIRONMENTAL FACTORS WITH SERVICE DELIVERY AND CONTROL ORIENTATION OF LOCAL GOVERNMENTS (N=495)

Environmental Factors	Computerized Information System Genres			
	Direct Service Support $G_{dh}+G_{dl}$	Administrative Support $G_{ah}+G_{al}$	High Social Control G_{dh}	High Bureaucratic Control G_{ah}
Reformed government	-.22*	.23	-.02	.08
Government constituency size	.30*	-.10	.10	-.24*

* Significant at .001 level.

TABLE 5. DISTRIBUTION OF POLICE COMPUTER APPLICATIONS FOR LAW ENFORCEMENT VERSUS OTHER POLICE ACTIVITIES

	Percent and number of cities and counties with computer use (N=400)[a]	
Law Enforcement	Percent	Number
Parking ticket file	44	(182)
Traffic violations file	37	(153)
Wants/warrants file	33	(135)
Criminal offense file	31	(126)
Stolen vehicles file	25	(102)
Stolen property file	21	(84)
Alias name file	18	(74)
Juvenile criminal offense file	17	(69)
Dispatching	13	(51)
Arrest files	11	(45)
Field interrogation report file	10	(41)
Modus operandi (criminal patterns file)	8	(31)
Fingerprint file	6	(26)
Intelligence compilations	4	(17)
Subtotal		1,136
Other Police Computer Systems (e.g., crime prevention, administration, reporting, etc.)		
Uniform crime reporting (UCR)	36	(147)
Traffic accident file	36	(143)
Service data (type of call, location, time, response, etc.)	35	(143)
Crime reporting systems (other than UCR)	28	(104)
Vehicle maintenance records	25	(101)
Motor vehicle registration	25	(100)
Manpower allocation systems (other than LEMRAS)	14	(54)
Jail population/custody file	11	(45)
Bicycle registration file	11	(45)
Civil offense file	8	(29)
Firearms registration file	7	(28)
Law Enforcement Manpower Resource Allocation System (LEMRAS)	5	(21)
Subtotal		(960)
Grand Total		(2,096)

[a] N varies from 375 to 410 because of missing data; average N = 400