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MANAGEMENT INFORMATION SYSTEMS FOR LOCAL GOVERNMENT

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For some time private firms have used computer-based comprehensive management information systems. Local governments also have used computers to process data, but local governments lack comprehensive management information systems--for several reasons: (1) they have not had or have not allocated resources to develop such systems, (2) the nature of local governments make such development difficult, (3) interstate differences in local governments make it difficult to design systems that can be used nationally, (4) local governments lack incentives to acquire such a system, and (5) private vendors have not developed and marketed such systems as they have for private businesses.

Here we discuss local governments' need for assistance to develop management information systems, constraints that keep them from adopting such systems, and how adoption might affect local governments' capacity. We describe briefly the management information system we developed for and instituted in county governments in Kansas and conclude by discussing the role of economists in system design.

Local Governments Need Assistance

System development and implementation is complex and time consuming. Such a system consists of: (1) a management organization description that specifies flows and uses of management information, (2) software to handle the data described above, and (3) a computer to process the data. The first of the three is most critical. How well the management system

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is organized and understood will determine the limits of the software performance and the computer's usefulness in handling expected tasks. Except for large metropolitan local governments, a local government lacks the resources--financial and technical--to develop its own management information system. Attempts to modify systems developed for private firms have not been successful because management characteristics of local government differ too much from those of a business in at least five ways.

Local governments have no single objective measure of performance as do private firms. In business, profit is a measure of performance and of capacity because the entrepreneur's objective is to produce profits. Also, that profit motive provides harmony of purpose among all managers within a business. Governments are formed to provide services to its citizens. For them, profit is not a reasonable measure of performance and no other measure is a good substitute. It is hard to measure performance other than by voter satisfaction, which tends to be *ex post*. Lacking an objective performance measure, various participants in local government--elected officials, bureaucrats, and citizens--each may have a different concept of a local government's purpose. That lack of a single performance measure and of a harmony-of-purpose control factor requires a more complex management information system as no single indicator contains all crucial information.

Local government decision-making is a political process where the decision-makers are both internal and external. So the management information system must provide information to the public (external) as well as to elected officials, appointed officials, and other employees (internal). The information needed by the public has not been determined. Lack of such information to the public may stem from current information systems not being capable of providing it in a way it can be used or from government

officials not wanting to make full disclosure, which would reduce their discretionary power.

The political process of decision-making produces a sense of discontinuity because leaders are elected and the election of an opposition candidate may result in certain programs being discontinued. That potential for discontinuity may cause employees to concentrate their effort on short run strategies. An information system can provide incentives to develop longer run management strategies.

Most governmental revenues come through coercion--taxation--or through monopoly power. Except for utilities and other services sold to the consumer, public services provide benefits so widespread that few individuals would be willing to purchase the service individually. The services are financed by taxing the citizens so the acquisition of resources does not depend directly on consumer satisfaction with the service. Accountants describe this condition by saying that expenditures for such services do not generate revenue as does a product produced for sale by a private firm.

Since revenues to finance such public services do not come from the sale of the service, state legislatures grant local governments authority to levy taxes for specified purposes. Fund accounting is used to segregate, and account for such money as it is received and disbursed. Other public services, like utilities, may generate their revenue, but a local government that produces and sells those services usually has a monopoly. So whether the service is financed by taxes or by selling the service, there is no competitive market pressure for efficient production. For a government to have an efficiency objective, it must be an explicit objective because economic efficiency is not implicit in the governmental process.

Because of the way resources are obtained and because of the importance of the political process, the annual budget is the central tool guiding government expenditures. It has more force than a budget in private business where it is just a planning tool. When a local government adopts its' annual budget it establishes the spending authority (appropriations) for the next year. Expenditures must be within the appropriations. Exceeding the original budget is difficult. Legislative action by the local government is required to change appropriations, and state administrative approval may also be required. With a budget serving as such a strong control, comparisons of actual expenditures with the budget allocations guide expenditure decisions.

The strong annual budget influence restricts governmental administrators in making long or intermediate run decisions. Long term planning is further inhibited because governmental officials do so little of the actual budget development. In Kansas we find that county budgets are prepared by an outside auditor consulting with the board of commissioners and other officials. The auditor is hired to prepare the budget because with current information systems budgeting is so difficult and complex. So while the process of budget preparation offers the best opportunity to establish long run plans, much budget preparation is turned over to an outside auditor or financial advisor.

From the viewpoint of an administrator, the annual budget process produces temporary property rights (appropriations). An administrator runs two risks when making expenditures from appropriations: exhausting the full appropriation before the end of the budget year, and not expending the full appropriation by the end of the budget year. Those two

risks can dramatically influence an agency's efficiency.

Statutory and regulatory provisions are prominent in local government affairs. State statutes and administrative rulings govern the conduct of business in local governments. Two such examples are state standards regarding accounting and state laws and regulations governing the property taxation process. A management information system must be designed to meet such requirements.

Statement 1 of the National Council on Governmental Accounting, issued in 1979, says the basic financial statements of a governmental unit should be prepared to conform with generally accepted accounting principles. When financial statements so prepared do not demonstrate statutory and regulatory compliance, the unit shall prepare additional schedules to demonstrate such compliance. That clarified an earlier position taken by the Municipal Finance Officers Association that accounting systems should first satisfy statutory and regulatory requirements. Although the clarification has simplified accounting problems for local governments, most local governments still use a single entry, cash accounting system. A challenge facing many states is to get local governments to adopt generally accepted double-entry and accrual accounting practices.

A management information system designed to meet the needs of local governments can contribute to the more effective and efficient operations of local governments. But local governments differ so much from private firms that it is not feasible for a local government to adapt a management information system for a private firm to its needs. Because most local governments do not have the resources to develop their own management information systems, land grant universities can do that just as

they have helped individual farmers to improve management on their farms.

Constraints to Adoption

We found local governments planning to adopt a new management information system must deal with the high initial cost of a new system, delayed benefits, stresses the new system has on the administrative structure and on affected personnel, and possible quick obsolescence of the new system.

Adoption of a new system means investing in equipment, software, supplies, and personal training. Initially extra effort must be expended to put data into the new system and to make the gradual transition from the old to the new system. That may mean additional labor costs for the first year, when benefits received from the system are smallest. The benefits of the new system will not be realized until personnel can use it proficiently and know how to use the information produced. Another benefit after the first year is that some data, such as voter registration and real estate assessment data, need to be entered only once and updated thereafter.

The management information system must be consistent with the unit's organizational and operational procedures. When not, the inconsistencies must be reconciled. For some inconsistencies, unsatisfactory procedures should be discarded, e.g. abandoning single-entry cash accounting. Because a high degree of standardization of procedures is used in computer processing, some procedures acceptable with manual processing may not be acceptable with computer processing. Adoption of a new system provides the opportunity to improve governmental operations. Stresses on the administrative structure may not be welcomed and may create conflicts between offices if the new system changes the relationship between offices.

Education for the changes and consultation with concerned individuals can help to avoid new conflicts between offices, to speed acceptance of the system, and to avoid rejection of the new system before benefits from it are realized.

Implementation of a rational system places new strains and risks on decision-makers. Chris Argyris has concluded that a rational management information system can create conditions where executives experience (1) reduced freedom of action, (2) a sense of psychological failure because of the management system's constraints, and (3) a decreased feeling of importance, as they see (4) emphasis on leadership based on competence instead of formal power so familiar to managers. Those implementing a management information system must cope with the emotional stress the system produces--for themselves and their employees.

A local government considering a new management information system may already have had unpleasant experiences in adopting new methods of data processing. During the 1970's many local governments purchased computers expecting to solve their data problems only to be disappointed with the results. For some, disappointment turned to exasperation when they learned that the purchased equipment was depreciating 30 percent or more per year. Such an experience has caused some officials to be highly skeptical of new technology.

Role of Management Information Systems in Capacity Building

McDowell identified development of management information systems as one strategy to increase the capacity of a local government. Biere and Sjo discussed how information systems impact capacity by drawing an analogy to the general welfare economics model. Here we discuss the impact of improved management information on capacity by studying the definitions

of capacity and their implications. Honadle reviewed several definitions of capacity and concluded that no consensus definition appears in the offing. Instead, she offers a framework for thinking about capacity-building. Capacity, she says, is the ability of a local government to anticipate and influence change, to make intelligent decisions about policy; to develop programs to implement policy; to attract and absorb resources; to manage resources; and to evaluate current activities to guide future actions.

To expand on Honadle's framework, we suggest considering the differences between the concept of the firm and the Robinson Crusoe example. When considering the capacity of a private firm, one usually refers to its ability to produce a certain volume of a good or a service or of a bundle of goods or services. That is really an intermediate measure of capacity. From the viewpoint of the entrepreneur, a firm's capacity would be defined relative to his objective so it might be measured by profit or a related measure.

Within Honadle's framework there is a similar ultimate objective for local governments. Her definition of capacity refers not to an intermediate measure comparable to the volume of goods and services produced by a private firm, but an ultimate objective that justifies the local government's existence, which is not the same as it is for a firm. In the case of the private firm, production is separated from consumption and price serves as the informational link between consumption and production. Profit can be determined readily as the firm, by using market prices and input-output rates, can compute the value of the output and the value of the resources consumed. That profit provides a measure of capacity and an indication of the firm's ability to survive.

Local government is more similar to the classical Robinson Crusoe example of a man who makes production and consumption decisions in combination. As a producer of public services, the local government must make production decisions. As an institution for public decision-making, the local government determines what public services shall be provided--at what level and to whom--and how the services are to be financed. The latter function distinguishes a local government from a firm. But production and consumption decisions can be difficult to separate. With public services produced by the same institution through which the decision to provide the service is made, the question of producing the service commonly becomes entwined with the question of whether to provide the service. For example, a county with a road department does not separate a decision on road improvements from providing for the improvement through the road department.

We find Honadle's definition and most other definitions of capacity to be based on a concept of a local government analogous to a private firm. Such a concept fails to recognize the more crucial role of making public choices regarding the level and mix of public services and regulations and how they will be financed and enforced. Those issues have impacts that are embodied in tbose five characteristics of government discussed previously and that greatly add to the complexity of a management information system and make it more difficult to determine its adequacy.

Although the Robinson Crusoe example is more appropriate than the private firm example, the Robinson Crusoe example ignores the high human interaction in operating local governments. Involved are citizens, elected officials, political party officials, special-interest group

members, and employees of the local government. Those employed in government recognize that the government does not have a single measure of performance and that the decision-making process is complex. Those conditions give each employee much latitude to interpret his duties and to justify his performance. Furthermore, management controls and information systems for government tend to be less developed than for a private firm. Those conditions have remarkable parallels with the five basic elements of Leibenstein's micro-micro theory of production: (1) Individuals in the organization are selectively rational; (2) Individuals in the organization are the basic decision units; (3) Each individual in the organization has discretion over his effort; (4) Individuals in organizations may be inert to organizational pressure; (5) The organization is subject to organizational enthropy or the natural tendency toward disorganization.

Those five conditions make it desirable to consider the individual as the fundamental decision unit, not the local government. Then, the outcome of local government activities reflect the aggregate of individual actions. A good management information system should help the organizational structure to aggregate individual decisions and to assure coordination.

Local government is a complex organization. It is more than a producing unit, because production and consumption decisions are entwined, and because of the high degree of human interaction present. The role of the management information system is to provide information to assist managerial control of the production activity and to provide relevant information regarding public issues to all who participate in the decision-making process. But the information needs may differ in each case. To inform citizens so they can make intelligent collective decisions requires different information

from management information necessary to guide government's internal operations.

The lack of management information systems for local governments seriously detracts from this governmental capacity. It is our premise that developing and adopting management information systems will contribute to local government's capacity by providing information so citizens can make more informed decisions and by providing a control mechanism that assures that the local government operates to produce selected public services efficiently and effectively.

Kansas Local Government Information System

In 1975 the Board of Commissioners of Ellis County, Kansas, invited the Kansas Agricultural Experiment Station to develop a new management information system for that county government. The board previously had purchased two small computers to handle the county's data processing. County officials were frustrated by the limitations of the computers, by increasing reporting requirements of the state, and by finding that data processing on the new computers was not fully compatible with the county's needs. County officials had thought the computers acquired would solve their data handling and management information problems. Instead, they created more problems!

The first product of our work was a report on the organization and operation of Ellis County Government, including a study of statutes pertaining to the management of a Kansas county. Ellis County's operation and organization were tested against those statutes. When the county's operation or organization conflicted with state statutes, we met with county officers to reconcile the differences.

The second product of our work was a restructured management information system, consisting of procedural manuals and computer software to perform the needed data processing. The manuals are organized by major components of the management information system. Each volume of the manual reviews key statutes affecting that part of the management information systems, lists the objectives, and describes both how to use the component and the steps to using the system, including how to prepare originating instruments, to key data, and to obtain reports.

The county keys data at the courthouse and transmits the data for processing by telephone on a remote job entry terminal to a central computer at Kansas State University. Most print jobs are transmitted by telephone back to the courthouse. Large print jobs such as printing tax rolls, tax statements, and tax receivable files can be done at the central computer. Remote processing was chosen because it offered greater capabilities and because the county was relieved of the cost and responsibility of operating a computer in a courthouse. That choice originally gave the county no local computing capabilities. New remote entry terminals can be used both to transmit and receive data and to process small jobs locally. We are scheduled to add a cash register to the system this fall to capture data on cash received in the treasurer's office.

The system has six subsystems (see Sjo and Biere): a name file, taxation, accounting, payroll, physical assets accounting, and voter registration. The financial portions of the system are fully integrated, designed to leave an audit trail, and to provide data security. The accounting subsystems are designed to conform to generally accepted

accounting principles (GAAP) as given in Governmental Accounting, Auditing, and Financial Reporting, 1980. Also, the accounting subsystem is designed to permit a user to obtain cost accounting by office and by job category within an office.

The name file, a supporting subsystem to the taxation system, is a computer-maintained list of the persons, firms, and organizations with which the county conducts transactions.

The taxation subsystem is used to keep assessment records, to levy taxes, to record tax collections, to abstract taxes levied and taxes collected by taxing districts, to process delinquent tax accounts, to prepare tax warrants and tax sales, and to record collections on tax warrants and tax sales.

The accounting subsystem is a double-entry fund accounting system. Revenue and estimated revenue transactions may be recorded also by office receiving the revenue. All expenditures, encumbrances, and appropriations are recorded both by fund and by office. Each office is treated as a cost center. It is then possible to obtain the full expenditures made by any office, and those expenditures can be identified by fund the expenditures were made from. An office also may designate a job code to identify in that cost center the activity that incurred the expenditure.

The physical assets accounting subsystem provides an inventory of each physical asset item. It can calculate depreciation on depreciable fixed assets. Such depreciation is used for cost analysis only.

The payroll is processed through a payroll agency fund. Labor service expenditures are recorded in the accounting subsystem as transactions between the payroll agency fund and the funds from which labor

services and associated benefits are paid. Various employee reports are available such as leave used, W-2 reports, name directories, individual employee reports, various fringe benefit and deduction reports, and needed quarterly reports. The system can handle salaried or wage earning positions. Records of hours spent on various tasks can be kept for cost accounting.

The voter registration subsystem is used to maintain a county voter registration file. It is used to print primary and general election registration lists, to print city and special district nonpartisan or partisan lists, and to abstract voter rolls by voting precinct and by political party.

The complete system has been in use by Ellis County for nearly two years. It is being implemented in another Kansas county which is changing from a completely manual system. That implementation experience shows the need to provide substantial training and assistance for the county to adopt the system smoothly.

Economists' Role in System Design

During our work, we have observed that the design and development of the management information systems for local governments have received little attention from economists, even though much of what such systems are about is in the purview of economics. Such systems are concerned about resources used and products produced, about providing incentives to participants to do what furthers objectives of the entity as determined by the public-choice process, about information flows required to obtain desired coordination among elements of the entity, and about public information needed for enlightened public choice.

The foundation for the design of a management information system is the description of local governments including: crucial characteristics of the local government, the political process by which decisions are made, the internal and external management information needs, the information necessary to determine--at least to encourage--efficient production, and the gamut of alternative arrangements by which a public service might be provided or a social objective met.

The study of local government, public choice procedures, and management needs involves political science and economics. From them is determined the management information needed--that for internal management and that for citizen action in the decision-making processes. The internal and external information desirable should include information regarding the efficiency of resource use. Here the issues of resource use, labor specification, capital intensity, employee incentives, alternative production techniques, and the objective functions of each participant in the operation are important.

Better cost information permits local governments to choose among a wider range of alternative ways to obtain a public service economically, such as by contracting with a private firm or with another local government for the service.

While information is useful, all is not of equal value. Information should be produced to the point where the marginal value of the last unit produced is equal to the marginal cost to produce it. At least it should remind us that more information may not be good.

Most management information systems are now computerized and the complexity of computer programming deters the study of management

information systems by those not proficient in computer programming. But the role of the computer in a management information system is just to capture, store, manipulate and print or retrieve information. The computer is used because it can handle large volumes of data cheaply. Management information system design and requirements can be specified without a computer. Manual prototypes can be used initially to illustrate the steps: how and when data are to be captured, how and when data are to be stored, and how the data are to be retrieved and used. Once those have been specified, a computer specialist can prepare programs to do those jobs.

Economists have a useful role to play in the design of management information systems for local governments. New management information systems should enhance the capacity of local governments. That potential is more significant now that local governments may receive less federal money. But the development of such systems takes time and an understanding of the role of the management information system in governmental operations. By working with political scientists, management experts, and computer specialists, better designed and more comprehensive systems can be developed to meet challenges facing local governments.

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FOOTNOTES

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