Management Information Systems in Public and Private Organizations: An Empirical Test

Stuart Bretschneider, Syracuse University

Management information systems are increasingly important to both public and private sector organizations. More and more managers recognize that access to accurate information, available in a timely fashion, can influence decisions and, in turn, can affect the efficacy of the overall organization. Computers are now a ubiquitous tool for managing information, a tool which is technologically sophisticated and one which continues to experience rapid technological change. One of the results of these trends has been the production of massive amounts of prescriptive material on how to make computers a more effective tool for information management. Some of this material has been of a technical nature, such as database theory and local area networks, while much of it has tried to integrate the technology to management issues, such as decision support systems (DSS) and management information systems (MIS). An important issue to any manager faced with reviewing and making use of these prescriptive arguments is the ability to identify which prescriptions are relevant to their circumstances and which are not.

Accompanying the developing interest in MIS is growing attention to the distinctive elements of the public organization’s environment. It is a central tenet of public administration that “publicness,” by one or another concept, leaves a strong imprint on an organization and its activities.1 Studies have examined the effect of publicness on a variety of organizational activities including personnel management,2 decision making,3 and, recently, information systems management and computing.4 This study is concerned with developing the burgeoning theory of public management information systems (PMIS) and, more generally, contributing to the rapidly changing conceptualization of the implications of “publicness” for the study of organization behavior.5

The purpose of this article is to test empirically the basic PMIS argument that management of information systems in public organizations differs from that carried out in private sector firms. The first section presents a series of theoretically anticipated distinctions and includes a discussion of their importance to management. That is followed by a discussion of a data collection effort designed to test for differences between public and private sector information management. The third section presents the basic findings including a discussion of results and their implications to public management. The article concludes with a summary of results and a brief discussion of how the results suggest further research in PMIS.

Public Management Information Systems Revisited

Existing research on public and private organizational differences, particularly PMIS research, suggests several important differences in managing information systems between sectors. In this section areas are considered where differences are likely to have a major effect on the capacity of an organization to manage computers and data processing effectively. Organizational environment and management activity provide a convenient means of organizing a series of five propositions. The five propositions

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Differences between public and private organizations lie at the core of public administration’s theoretical base. Empirical tests of hypothesized differences in information system management between public and private organizations strongly demonstrate the basis for such distinctions in this study. Consistent differences are identified in both the organizational environment and managerial activity of data processing organizations between sectors. A public organization’s environment reflects greater interdependence and accountability, which leads in part to more red tape. Differences in the criteria used for purchasing hardware and software, planning processes, and placement of the top data processing manager reflect reasonable adjustments to management strategies and actions for coping with these different organizational environments.
related to organizational interdependence, procedural delay (red tape), criteria for evaluating hardware and software, planning process, and the organizational level of the data processing manager.

Organizational Environment

PMIS managers must contend with greater levels of interdependence across organizational boundaries than do private MIS managers. The authority of public organizations derives in part from legal and constitutional arrangements. Embedded in those institutions are traditional concerns for checks and balances, often manifested as oversight groups or external organizational control of personnel activity and financial resources. Consequently, public organizations exhibit greater interdependence across organizational boundaries than do private organizations.

For example, both public and private data processing organizations have personnel and financial activities reviewed by other groups within the agency or firm. Public organizations, though, face additional review by higher levels within the executive branch of government as well as legislative and advocacy groups. The effect of these additional layers of oversight is to make individuals and groups feel that they exert less control than comparable private sector managers over their various activities. Processes such as organization change, planning, personnel selection, and purchasing are all expected to be subject to greater external influence, an influence beyond the organizational boundaries of public organizations.

PMIS managers must contend with higher levels of red tape than private MIS managers. Greater interdependence, in part motivated by checks and balances or accountability, often leads to more procedural steps for a specific management action. The concept of procedural delay, related to many layers of oversight, can be thought of as a form of red tape.

Several studies have examined red tape and/or accountability in organizations and found that public organizations tend to have more layers of supervision and take longer to accomplish similar procedures. Though levels of supervision have been used to measure the degree of red tape present in an organization, it is also possible to look at the length of time each organization takes to accomplish standard tasks. Tasks such as creating a new position, hiring or dismissing staff, purchasing low-cost items or high priced ones, and changing existing procedures are typical of any modern organization and therefore provide a basis for comparing red tape across public and private organizations.

Management Activity

Criteria for the evaluation of hardware and software, which ultimately lead to purchasing decisions, are different for PMIS and private MIS. Many criteria are associated with purchasing decisions of either hardware or software. Some reflect economic criteria such as cost-benefit ratios, while others reflect feasibility issues such as compatibility, connectivity, and quality of documentation. Differences here should reflect general differences in environment and be manifest as different weightings for a fixed set of criteria.

Differences are most pronounced in the reliance on purely economic criteria such as cost-benefit, net present value, and payback analysis. The existence of a “bottom line” provides an overarching criterion for assessing many decisions within a private organization. The MIS literature, based primarily on private sector organizations, prescribes performance evaluation on the basis of the economic efficiency of hardware and software. This is only possible with respect to production processing and profitability of the organization as a whole, when an overall criterion such as the “bottom line” can be defined. Public organizations also have strong incentives to consider economic costs in decision making, but most face other, equally important competing criteria, such as procedural equity. Consequently, any comparison between public and private organizations should reflect the public agency’s lower status for traditional economic criteria when purchasing computer hardware and software.

PMIS planning is more concerned with extraorganizational linkages, while private MIS is more concerned with internal coordination. Planning is a major component of management. However PMIS faces a different type of planning problem. High levels of interdependency lead to higher levels of uncertainty and less control over the environment by any individual group. This condition forces planning to function more as a vehicle for managing interorganizational linkages than coordination of effort within the organization.

Function and form of the planning process should provide useful information to test this hypothesis. Steering committees are discussed extensively in the MIS literature as a device to insure internal coordination within an organization. Steering committees tend to focus on project selection issues in order to mitigate conflict across departments that use data processing services. One would expect to find less reference to such structures in public organizations. Alternatively public organizations tend to be more interdependent, and thus we would expect more mechanisms for coordination across organizational boundaries.

PMIS tend to place the director lower in the organizational structure than private MIS. Here the standard MIS prescription is to place the chief MIS executive at the highest levels of the organization. Yet, public organizations must contend with somewhat regular political cycles that can cause discontinuities in leadership. At the programmatic and policy levels of public organizations, such changes are supposed to reflect changes in the demands of the electorate. Nevertheless, since data processing is a support service, the structure of public organizations is expected to buffer or protect it from such discontinuities of leadership.
Table 1
Testable Hypotheses on Public-Private Difference for Management Information Systems Organizations

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Expectation for Public Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Environment</td>
<td></td>
</tr>
<tr>
<td>Interdependence</td>
<td>More</td>
</tr>
<tr>
<td>Red Tape/Accountability</td>
<td>More</td>
</tr>
<tr>
<td>Managerial Actions</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td>Less economic criteria</td>
</tr>
<tr>
<td>Planning</td>
<td>More feasibility criteria</td>
</tr>
<tr>
<td>Placement of Top Manager</td>
<td>More extraorganizational linkages</td>
</tr>
<tr>
<td></td>
<td>Lower</td>
</tr>
</tbody>
</table>

Different levels of leadership for information systems exist in both public and private organizations. At the state level, for example, there are agency level and statewide level executives, while within a private firm management functions such as policy making, planning, and operations management might be distributed. Nevertheless, the hypothesis above is aimed at comparing the top information executive within a government agency or a business firm with full-line and operational responsibility for computing.

Table 1 summarizes the hypotheses derived from research and theory on Public Management Information Systems.

Two significant results are derived from these differences. The first is that PMIS operates in a more constrained environment. This is due to the higher levels of interdependency, constraints of accountability mechanisms, or red tape. The second point is that PMIS does not follow the standard prescriptions provided in the management literature. Rather than view this as a failure of public managers, it is more likely that it reflects adaptation to the more constrained management environment. PMIS applies different criteria for assessing hardware and software purchases, different orientations to planning, and different placement patterns for PMIS within the organization.

Data Collection

Previous empirical research on computers in government has focused on either local government or the federal government. Typically this work has not systematically compared public and private organizations, though sometimes conclusions are drawn from empirical work that has focused completely on private organizations. This study differs in two important ways: (1) a stratified sampling design was used to collect data from both public and private organizations, and (2) the public organization sample focused exclusively on state government agencies. The basic unit of analysis is the data processing organization.

The sample of public data processing organizations was obtained as a part of the National Study of Information Resources Management in State Government. This study was completed in association with National Association of State Information Systems, Inc. (NASIS). The NASIS representative in each state was asked to provide a list of data processing managers. A final list representing over 40 states was compiled. To ensure maximum representation and to improve the coverage for states that had provided only fragmentary lists, additional names were gleaned from various published directories. The final result was a sampling frame containing 1,361 data processing managers.

The Directory of Top Computer Executives, Spring 1988, was used to develop the sampling frame for the private organizations. The two-volume directory contains information on data processing units for over 10,000 public and private organizations nationwide. A random sample of 1,395 private organizations was selected from the directory. This sample was not stratified by state but was stratified by type of organization: manufacturing and services, banking, diversified financial, insurance, retail, transportation, and utilities.

Separate but overlapping survey instruments were developed for the two sampling frames. Both instruments were pretested. Once the results of the pretest were incorporated into a final survey instrument, all remaining names in both sample frames were sent alert letters. One week later, the first wave of the survey was sent, including a reminder letter and a copy of the survey. After three weeks, a second and final wave mailing was sent to all nonrespondents, which included a reminder letter and a copy of the survey.

During the six-week period between the mailing of the alert letters and two weeks following the second mailing, numerous phone calls were received with questions about the survey. All calls were routed to the survey director to ensure consistency in responses. A frequent concern was whether there was a response deadline. To maximize response rate, no deadline for responses was indicated to any of those individuals who called. Other phone questions included who was the most appropriate individual to complete the survey and whether it was appropriate for the particular agency to respond when only a few microcomputers were currently being used. In all cases callers were encouraged to respond, regardless of the level of computer activity within their respective agencies.

Overall, 1,005 surveys were received for a total response rate of 36 percent. The breakdown by strata were 622 usable public sector surveys for a response rate of 44.5 percent, and 383 private sector surveys for a response rate of 27 percent. There were no statistical differences in response rates between the pretest and the final survey. The samples generated were sufficiently large to permit statistical analysis, although the low response rate suggests potential problems of selection bias.

Several forms of analysis were used to test for selection bias. The geographic distribution of the public sample by...
Management Information Systems: An Empirical Test

Table 2
Factor Analysis of Computer Inventory Variables Computer Technology Factors (Using Varimax Rotation)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Principal Component</th>
<th>Maximum Likelihood*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor 1</td>
<td>Factor 2</td>
</tr>
<tr>
<td>Mainframes</td>
<td>0.68307*</td>
<td>0.12376</td>
</tr>
<tr>
<td>Minicomputers</td>
<td>0.50721*</td>
<td>0.14363</td>
</tr>
<tr>
<td>Networked Minis</td>
<td>0.68957*</td>
<td>-0.02375</td>
</tr>
<tr>
<td>Microcomputers</td>
<td>0.38369</td>
<td>0.80325*</td>
</tr>
<tr>
<td>Networked Micros</td>
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<tr>
<td>External</td>
<td>0.52013*</td>
<td></td>
</tr>
</tbody>
</table>

N = 952 cases
Tucker Lewis reliability coefficient 0.9757
* Chi-square test and Tucker-Lewis statistic are based on the Maximum Likelihood Estimated Factors.

Analysis and Results

Appendix 1 describes the survey questions and scales used to operationalize dependent variables. For the first hypothesis, respondents were provided with ten criteria used in making hardware and software acquisition decisions. For each criterion they indicated their frequency of use on a five-point Likert scale. A similar five-point Likert scale was used to capture responses related to interdependency. Ranging from mostly internal to mostly external, this scale measured the extent of control on eight policy and managerial dimensions related to data processing. For the hypothesis on planning, respondents were asked to indicate the existence of either a steering committee or a formal planning process tied to budgeting. The hypothesis on red tape required respondents to indicate the number of weeks required to complete a series of standard personnel, purchasing and administrative activities. The final hypothesis required individuals to provide the number of supervisory levels between themselves, the data processing manager, and the agency or firm’s executive director.

In testing the five major hypotheses, several important control variables must be considered. The purpose of the control variables in the analysis is to make the comparison of organizations across many different functional areas as comparable as possible. The organizations being compared are all data processing organizations. These organizations tend to perform the same basic tasks, regardless of the function of the larger organizations they serve. All of these organizations are responsible for developing or obtaining software products, they are all responsible for running computer hardware, and they are all service organizations.

Having identified the similarities in all of these organizations, it is also important to recognize important sources of difference. For example, these organizations vary significantly in terms of size measured by the number of full-time equivalent staff. The size of an organization is known to influence many of the factors being considered in the hypotheses. Thus, the size of the data processing organization must be considered in any comparison between public and private organizations. A second important source of difference is the form of the computer technology being managed. Some organizations maintain large mainframe computers, while others work predominantly with microcomputers or interactive minicomputers. Both size of the organization and the nature of computer technology have a strong influence on the daily operation of the organization, as well as how that organization fits within the larger agency or firm.

All the analysis that follows is therefore based on the following relationship:

MIS Variable = F(DP Unit Size, Comp. Technology, Sector) (1)

The size of the data processing unit is measured in numbers of full-time equivalent staff. In most cases the log of this variable is used to reflect the declining influences of size for extremely large organizations. To distinguish forms of computer technology factor analysis was applied to variables describing the basic computer inventory for each organization. The original six variables included the number of mainframes, minicomputers, networked minicomputers, microcomputers and networked microcomputers run by the data processing organization and the number of computers used by the organization but run by other data processing groups. Table 2 summarizes the results of the factor analysis.

The factor analysis supports the view that two underlying dimensions are sufficient to explain the variation in computer technology managed by the sample organizations. Though some differences in individual factor weights result from different extraction methods, both principal component and maximum likelihood estimation identify two factors: one dominated by mainframes, minicomputers, and external computers and the other dominated by the number of microcomputers. Various rotations...
<table>
<thead>
<tr>
<th>MIS Variable</th>
<th>TOBIT Coefficient Public</th>
<th>OLS Coefficient Public</th>
<th>Adjusted R-Square</th>
<th>Cases</th>
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<tr>
<td><strong>Interdependence</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Change Structure#</td>
<td>1.2252***</td>
<td>0.341***</td>
<td>0.0221</td>
<td>917</td>
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<td>1.437***</td>
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<td>0.0009</td>
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<td></td>
<td></td>
<td></td>
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<td>Create a Position</td>
<td>15.949***</td>
<td>15.720***</td>
<td>0.1517</td>
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<td>Hire</td>
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<td>2.228***</td>
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<tr>
<td>Fire</td>
<td>15.146***</td>
<td>14.302***</td>
<td>0.1014</td>
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<tr>
<td>Purchase (&lt;$1,000)</td>
<td>1.958***</td>
<td>1.170***</td>
<td>0.0753</td>
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<tr>
<td>Purchase (&gt;$1,000)</td>
<td>4.492***</td>
<td>4.279***</td>
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<td>5.523***</td>
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<tr>
<td><strong>Evaluation of Hardware</strong></td>
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<tr>
<td>Benchmarking</td>
<td>-0.1323</td>
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<tr>
<td>Economic (NPV)</td>
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<tr>
<td>Installation Time</td>
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<tr>
<td>Ease of Use</td>
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<td>0.0025</td>
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<tr>
<td>Ease of Add-Ons</td>
<td>-0.1045</td>
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<td>Documentation</td>
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<td>Vendor Services</td>
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<td>Reliability</td>
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<td>Number of Vendors</td>
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<td>875</td>
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<tr>
<td><strong>Evaluation of Software</strong></td>
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<tr>
<td>Benchmarking</td>
<td>0.0562</td>
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<td>Economic (NPV)</td>
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<td>Installation Time</td>
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<tr>
<td>Ease of Use</td>
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<td>0.131**</td>
<td>0.0131</td>
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<td>Ease of Add-Ons</td>
<td>0.0780</td>
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<td>Documentation</td>
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<td>0.170**</td>
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<tr>
<td>Vendor Services</td>
<td>0.2663**</td>
<td>0.168**</td>
<td>0.0661</td>
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<td>Reliability</td>
<td>0.1694</td>
<td>0.070</td>
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<td>State of the Art</td>
<td>-0.3729***</td>
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<td>Number of Vendors</td>
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<tr>
<td><strong>Planning (LOGIT)</strong></td>
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<tr>
<td>Steering Committee</td>
<td>-0.4285***</td>
<td>-0.097**</td>
<td>0.0797</td>
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<tr>
<td>Formal Planning Process</td>
<td>1.2226***</td>
<td>0.262***</td>
<td>0.0866</td>
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<tr>
<td><strong>Top Executive</strong></td>
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<td></td>
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<tr>
<td>Level of MIS Director#</td>
<td>-0.183**</td>
<td>0.0187</td>
<td>924</td>
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</table>

# Model based on using total FTE not logarithm of total FTE.
* Statistically Different from zero at 10% or less.
** Statistically Different from zero at 5% or less.
*** Statistically Different from zero at 1% or less.
mirror this result. In the context of this article, factor scores, based on the two factors obtained by maximum likelihood estimation, were calculated and used as control variables to account for differences in computer technology across organizations.

Table 3 summarizes the results of applying model (1) to the MIS variables. Some of the dependent variables reflect ordinal responses which are constrained to a limited range (e.g., 1 to 5), while others are binary variables indicating the existence of planning and steering committees. Application of a standard linear model and Ordinary Least Squares (OLS) estimation are known to be biased in these circumstances.\(^{27}\) Therefore results are presented applying both the linear model, using OLS estimation, and an appropriate form of limited dependent variable analysis. For constrained ordinal rankings and red tape variables Tobit analysis was applied, while a logistics curve model was applied to the binary dependent variables.\(^{28}\) The results from both forms of estimation are generally consistent though interpretation of coefficients is not.\(^{29}\) The resulting test incorporates the controls for organizational size and computer technology, while operationalizing sector as a binary variable where the value one indicates public organizations.

For each of the hypotheses some statistically significant difference is affirmed. The statistical significance of the coefficient for public organization is the formal test of hypothesis. Whenever that coefficient is found statistically different from zero, the hypothesis of difference between public and private organizations is supported by the data. Interdependence across organizational boundaries was significantly greater for PMIS than for private MIS. Interestingly, the largest differences were associated with personnel and procurement, areas where traditionally government has been viewed as more bureaucratic and rule-bound. Little difference was found with respect to reporting requirements and service delivery. Apparently, PMIS and MIS have the final say on how they deliver their services to the rest of the organization.

For red tape/accountability, PMIS faces significantly longer delays than private MIS in all areas. These results tend to mirror those found for interdependencies. For example, the longest differential delays were associated with personnel functions like creating positions and firing staff.

For the evaluation of hardware and software, the expected lower value for economic criteria was the single most significant difference. Surprisingly though, state of the art was viewed by PMIS as more important than private MIS, both in terms of hardware and software. Another surprise was the general tendency for most of the other software evaluation criteria (installation time, ease of use, documentation, and vendor services) to be less important to PMIS. Also surprising was that general feasibility criteria were not more highly valued by PMIS.

In the area of planning, PMIS differed from private MIS as expected. PMIS made statistically significant less use of steering committees but significantly more use of formal planning processes tied to budgeting.

Finally, PMIS directors tended to be placed farther below the organization’s director than their private counterparts. Though in magnitude the difference is small, it is statistically significant, suggesting confirmation of the hypothesis.

Discussion of Results

Despite data limitations, the sample studied here is the first national comparative sample for public and private MIS organizations. The hypotheses derive primarily from public organization theories seeking to differentiate public from private organizations, but the specifications are on managing information and data processing systems.

Interdependence

Public organization theory suggests that greater interdependence with other organizations exists for public than private organizations. The strongest manifestation of this interdependence is through control mechanisms. Budget decisions are influenced by executive and legislative branch agencies for example. For all but service delivery and reporting requirements, public data processing managers responded that they were confronted by greater external review and control than their private counterparts. Procurement and personnel stand out as two of the most significant areas where such distinctions exist.

Client qualification essentially means the determination of what constitutes a client. For government agencies the definition of a client for programmatic services, not data processing services, is also strongly influenced by external groups. Formal legislation and the concept of legislative intent play an important role in defining clientele for public services. Often interest and advocacy groups influence legislation to specific ends. Businesses, on the other hand, use the market to define clients, usually through a price allocation scheme. Though some government programs attempt to use pricing systems, the major definitions of eligibility standards come from legislation and the political process. The distinction here reflects the application of economic versus political authority in defining the mission and role for the overall organization, which is ultimately served by the data processing organization.\(^{30}\)

Red Tape/Accountability

As with interdependence, red tape strongly echoes distinctions between public and private data processing organizations. Measured in the number of weeks it takes to accomplish the same tasks, public data processing organizations take longer in all cases. These differences are statistically significant and control for the size of the organizations as well as their mix of computer technology. Two competing explanations are often asserted. One is that public organizations are poorly managed, and the other, more strongly supported by the above results, is that public organizations face a different set of constraints and opportunities generated by different environments.
Essentially, the existence of red tape reflects greater levels of interdependence and accountability in public organizations. Procedural delays might be viewed as an inefficiency, but when understood in terms of strong differences found with respect to external influence and interdependence, one might ask, why are the delays not longer?

For example, the coefficient from the OLS model implies, that on average, public organizations take only two weeks longer to hire or fill a position than a business organization. Creating a position and firing staff generated the largest differences, almost twice the delay associated with differences in formulating and changing a policy. This reflects the interdependence described above. Creating a position requires budgetary authority and hence budgetary review, and firing remains subject to strict civil service procedural guidelines. Both of these reflect the influence of external organizations not likely to be as pronounced in most private firms.

In procurement the more expensive or complex the item, the greater the delay. Low-priced equipment decisions are only delayed two weeks over those faced by private MIS managers, while expensive items generate over a four week difference. It is interesting that contract services generates the longest differential for procurement decision between PMIS and private MIS. Recent trends toward using contract services have often been prescribed as a positive managerial action, but applied to a public organization these results suggest the cost (in time delay) will be greater. Consequently the use of contract services may not be as attractive to PMIS as to private MIS.

Evaluating Purchase Decisions

Compared to private firms, public organizations rely less on standard economic criteria, such as net present value, payback, or internal rate of return. This was an anticipated result. Surprisingly, though, there was no comparable increase in weights associated with feasibility criteria by public organizations. The exception is that in the TOBIT model, documentation for hardware showed some evidence that PMIS valued this more highly than private MIS. Also surprising was that PMIS placed heavier reliance on "state of the art" as a criterion for hardware and software.

There are three potential explanations for why "state of the art" is more important as a criterion to PMIS than private MIS. The first argument is that government applications require specialized hardware and software. Geographic Information Systems (GIS) is an example of new integrations of hardware and software that has specific application to state government. One recent study suggests GIS is rapidly diffusing across state governments. Reliance on "state of the art" criterion then reflects the complex nature of the tasks and hence computer applications required for government.

A second and possibly additional explanation reflects the constrained organizational environment faced by PMIS. If public managers have a more difficult time getting things done, excessive delays in procurement and staffing can lead to an obsolete or an outdated computer solution. This is, of course, only made worse by the pace of technological change associated with computer technology. The rational response is to anticipate the lengthy delay by acquiring newer, more "state of the art," forms of technology, hoping that when the entire computer package is in place it remains an appropriate system. In the context of the federal government Head identified procurement cycles of two or more years resulting in an inventory containing many obsolete computer systems. Although the problem is less severe in states, it nonetheless exists.

Finally, it is possible that property-rights theorists' notion that public organization activity revolves around "side payments" might explain the interest in "state of the art." If no easily defined criteria exist for technical efficiency of output, such highly visible accouterments of workplace technology may pose a substitute for tangible productivity gains.

Planning Processes

Government data processing groups are more likely to have formal planning processes but less likely to use steering committees. These results follow from the hypotheses that the environment creates greater interdependencies requiring more coordination across organizational boundaries. Planning processes tend to cross traditional agency boundaries providing more vertical linkages. The results on interdependency are consistent with their results.

Steering committee structure tends to be predicated on within-organization coordination or coordination across functions within the organization. One major focus of steering committees is to prioritize systems development projects when competing interests are at stake. Steering committees are less likely to deal with budgetary issues and to focus attention primarily on mediating conflict within the organization. This leads to greater use of steering committee structures by private firms faced with lower levels of interdependence across organizational boundaries.

MIS Organizational Position

In considering the role of the MIS director, it is important to recognize that the comparison here focuses on operational level managers. Given the nature of the sample frames, the top computer executive in a private firm could be a senior vice president or a departmental manager. Note, however, that even the senior vice president's role included responsibility for a data processing line organization. In the case of public organizations, data processing organizations varied significantly in size and function as well. Some respondents were in charge of data processing for a small agency, others were responsible for data processing for many large agencies. In some cases, the data processing organization also had responsibility for office automation and telecommunications.
Nevertheless, all respondents had line responsibility for operating data processing organizations.

The results suggest that public sector data processing managers are placed slightly lower in the organization than their private sector counterparts. The empirical results suggest that after controlling for organizational size and computer technology, government data processing organizations tend to be placed lower in the hierarchy than similar private data processing organizations. Several possible explanations exist for this result. The first is based on the general environmental distinctions developed above. Managers of highly technical suborganizations are insulated from political cycles and politics, thus constraining their organizational placement in the hierarchy.

Conclusions

This study provides two useful results. The first is that the environment of PMIS differs from that of its private sector counterpart. The difference is primarily in the form of greater interdependencies, leading, at least in part, to increased accountability, procedural delays, and red tape. Secondly, within these more constrained environments, traditional MIS prescriptions are not automatically adopted. This suggests that the environment of public organizations has led to adaptation of standard management practices. In other words the environment of the organization affects or tailors the nature of management action.

Recently, Kraemer, King, Dunkle, and Lane have argued that management action tends to be the single, major determinant of change in data processing organizations. They further note that often management action is the result of environmental change, but that environment is a secondary factor in accounting for changes in computing within organizations. This illustrates the danger of developing conclusions, and more importantly prescriptions, without attention to the relevant contingencies. The Kraemer study accurately reflects the importance of management action and environment when only considering public organizations. Environment is a much more significant factor when comparing across sectors. This last point is of particular importance given that most of the current MIS prescriptions derive from small biased samples, usually from the private sector.

The purpose of this study is not to argue that public or private data processing practices are better or worse. Rather the aim is to provide further empirical support for the view that public and private organizations operate in different environments which influence the management of computers and hence information. It is more than likely that the differences found here are the results of an adaptive process. Different procedures are used by public managers because they work better than standard managerial prescriptions. If this is the case, then clearly many of the differences are due to management actions that are responses to the environment.

Future research questions must revolve around the ability of public organizations to adjust their practices over time and to determine the extent to which alternative policies exist for dealing with the environment of public organizations. Probably the greatest problems facing future research are relating management practice to adequate measures of outcome in order to evaluate alternative policies. We know PMIS is different from private MIS, it is not known whether it is better or worse in terms of its effectiveness.

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Stuart Bretschneider is Associate Director of the Technology and Information Policy Program and Associate Professor of Public Administration at the Maxwell School of Citizenship and Public Affairs, Syracuse University. His current research interests include public management information systems, financial forecasting, and program evaluation. Dr. Bretschneider is currently Associate Editor for the new Journal of Public Administration Research and Theory and the International Journal of Forecasting.

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21. Over a period of three months, initial drafts of both surveys were produced. The following steps were used in developing the initial instruments: (1) literature review of MIS, IRM and Public Administration Research; (2) Review of previous surveys conducted on MIS and IRM practices in government; and (3) Review of survey research literature. The actual integration of the information into survey instruments was accomplished by an iterative process of drafting a version, distributing copies of the draft for written comments, followed by group meetings to discuss changes and additions. The final draft was reviewed by experts in MIS, IRM, and survey research from both the School of Information Studies and the Maxwell School’s Technology and Information Policy Program, Syracuse University.

22. A random sample of 100 managers was drawn from each of the two mailing lists in order to conduct a pretest survey. The pretest consisted of an alert letter sent one week before the initial mailing of the surveys. A single follow-up mailing to all nonrespondents was done three weeks after the first mailing. The second mailing included copies of the survey instruments. The pretest was useful in identifying problems with question wording and survey length. The pretest results also highlighted the need for mostly closed-ended questions in the survey.

23. Formal tests of difference were run using Chi-Square statistics and nonparametric measures of correlation in two-way tables. The table consisted of a frequency column for the sample frame and one for the respondents with the rows as either state or business type.


25. The size of the data processing organization is directly related to the size of the agency or firm. See S. Caudle, D. Marchand, S. Bretschneider, P. Fletcher, and K. Thurmaier, op. cit., pp. 187-188.

26. Chi-square test for the null hypothesis that two factors are sufficient is 6.394 with 4 degrees of freedom. The p-value is 0.1716 resulting in an acceptance of the null hypothesis.


29. For interpretation of coefficients from TOBIT and logistic curve models, see G. Judge, W. E. Griffiths, R. Carter Hill, H. Lutkepohl, and Tsong-Chao Lee, op. cit., pp. 752-789.

30. See B. Bozeman and S. Bretschneider, op. cit., pp. 482-485 for a discussion of how distal environmental factors lead to distinctions in the role of policy mission, particularly in evaluation of organization effectiveness.


33. R.V. Head, op. cit.


37. K. Kraemer, J. King, D. Dunkle, and J. Lane, op. cit., pp. 254-285. The authors argue convincingly that this conclusion is the result of a long research stream begun in the mid-1970s with the URBIS project.
Appendix

Organizational Environment

Interdependence

Question:
Please mark along each scale the extent the following topics are primarily influenced by external government agencies or your own agency’s internal initiatives.

Scale:
(1-Mostly internal, 2-Somewhat internal, 3-Neutral, 4-Somewhat external, 5-Mostly external)

Activities:
Organizational structure
Client qualification
Service delivery
Supplier selection/standards
Personnel System
Data processing
Planning process
Reporting requirements

Red Tape/Accountability

Question:
For your agency’s data processing unit, please indicate how many weeks are typically required for approval of the following activities:

Scale:
Integer valued number

Activities:
Create new civil service position
Hiring for existing civil service position
Terminate a civil service employee
Purchase hardware/software under $1,000
Purchase hardware/software above $1,000
Contract for services
Changing a major policy
Changing a major administrative policy

Management Actions

Evaluation of Hardware and Software

Hardware Question:
Please indicate how often your agency uses the following evaluative criteria in assessing hardware purchases.

Software Question:
Please indicate how often your agency uses the following evaluative criteria in assessing software purchases.

Scale:
(1-Very often, 2-Often, 3-Sometimes, 4-Rarely, 5-Never)

Criteria:
Benchmarking
Economic criteria such as net present value
Installation time
Ease of use
Ease of add-ons
Quality of documentation
Quality of vendor service
Proven reliability of hardware
Proximity to the state-of-the-art
Minimize number of vendors serving the agency

Planning Process

Planning Questions:
Many data processing organizations develop multi-year plans through a formal process separate from the budget cycle.

Does your agency have a formal planning process for data processing?
Does your agency have a policy board or steering committee for your agency’s data processing activities?

Organizational Placement of Data Processing Manager

Question:
How many levels of the organization are between your position and the director of the agency?

Scale:
Integer valued number

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