ARTICLES

Public Management and Organizational Performance: The Case of Law Enforcement Agencies

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ABSTRACT

Investigating the impact of management on performance in public organizations is a key challenge for public administration. To that end, we apply to a national sample of law enforcement agencies a recently developed formal model of public management. The model frames a set of specific expectations about the management-performance relationship. The study estimates the impacts of both internally- and externally-oriented managerial activities on a salient metric of law enforcement outcomes. In results supportive of the model, the findings indicate that active internal management contributes to higher arrest rates and helps police departments to be less bound by previous performance. The analysis also indicates that departments' externally-oriented activities of networking and community policing improve arrest rates and assist managers in mitigating the impact of environmental constraints on results.

The impact of management on performance in public organizations has long been a key question in public administration (see Barnard 1939; Brudney, O'Toole, and Rainey 2000; Rainey 2003). Much of the research in this area has been case based and focused on individual organizations or managers (see Doig and Hargrove 1987; Maynard-Moody and Leland 2000; Moore 1995; Ricucci 1995). While providing rich ideographic detail, these types of studies have produced highly contextual insights that are limited in their generalizability. A recent effort by management scholars to increase the specificity of expectations and test hypotheses in large-N data sets, however, has begun to produce a more general body of public management knowledge. The model of management developed by O'Toole and Meier has formalized a number of propositions about the impact that managers might have on public organizational performance, and a set of empirical tests have confirmed that managerial activities both within and without the organization can be substantive contributors to organizational success.

While representing a significant contribution to the study of public management, this recent body of research has seen its utility limited by two factors. First, the model has been applied exclusively to educational organizations within one state. While Texas school

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districts do encompass a great deal of structural and environmental variability, they represent but one type of organization. As such, the promising results generated by empirical tests of the management model may be a function of the unique characteristics of school districts and, therefore, contextually bound. This article intends to address this issue by testing the utility of the O'Toole-Meier model regarding questions of managerial impact on outcomes in law-enforcement agencies. Police organizations are a fruitful place to undertake such a test because they represent the second most common type of bureaucratic agency in this country (after those managing public education), they differ in important ways from highly professionalized and relatively flat education organizations, and there is substantial anecdotal evidence concerning the influence of management in these agencies (see Moore 1990).

The second shortcoming in previous applications of the O'Toole-Meier model is the near-exclusive focus thus far on the impact of externally-focused management activities, such as networking. In addition to the new bureaucratic setting, therefore, we also extend previous management scholarship by exploring more of the complexities of the public-managerial task than have been analyzed thus far. The focus on networking, while instructive, necessarily ignores the myriad managerial functions within organizations, which years of research and the authors of the model themselves suggest are crucial determinants of success. To capture the many sources of managerial impact, we have developed measures of both internal and external managerial activity. Subsequent analyses test whether those activities—including staffing decisions, the establishment of rules and procedures, coordination among government and nongovernment entities, and public relations efforts—help to improve performance in metropolitan police departments. They also test whether the impact of these activities is contingent upon the characteristics of the organization and the environment in which it functions, as the model would suggest.

The argument proceeds in four parts. First, we present a general outline of the O'Toole-Meier management model, review the findings produced to this point, and revisit the shortcomings of the model's application to date. Next, we explore the substance of public management in law enforcement agencies and make the argument that the model can offer some leverage on questions of managerial impact in such organizations. Third, we develop a more simplified model suitable for empirical testing and review the data and measures to be used in subsequent analyses. Finally, we present tests of the hypotheses drawn from the management model and discuss the substantive importance of those findings for law enforcement management, as well as the implications for the utility of the O'Toole-Meier research agenda.

A MODEL OF PUBLIC MANAGEMENT

Our approach to the questions of whether and how the management of law enforcement shapes performance is to situate the issue within the study of public management more generally and to structure a research design that tests some of the most recent and promising ideas about the relationship between public management and program performance.

Many ideas have been offered regarding how managers shape public program performance. For years, these ideas have seldom been subjected to rigorous specification and testing. Recently, a program of inductive theory building has been undertaken by O'Toole and Meier (1999, 2000, 2003; Meier and O'Toole 2001) to outline a formal model of public management and performance with particular attention to the multiple functions

that managers are often called upon to perform, as well as the diverse, often institutionally complex settings in which these managers do their work. These researchers have scoured the case-study and other public management literature and constructed a formal model designed explicitly to identify the kinds of relationships sketched in other and earlier research.

The model is as follows:

$$O_t = \beta_1(S + M_1)O_{t-1} + \beta_2(X_t/S)(M_3/M_4) + \epsilon_t \quad [1]$$

where
O is some measure of outcome,
S is a measure of stability,
M denotes management, which can be divided into three parts (M_1 is management's contribution to organizational stability through additions to hierarchy/structure as well as regular operations, M_3 is management's efforts to exploit the environment,[1] M_4 is management's effort to buffer environmental shocks),
X is a vector of environmental forces,
ϵ is an error term,
the other subscripts denote time periods, and
β_1 and β_2 are estimable parameters.

This model of management is autoregressive, nonlinear, and contingent. The autoregressive component is captured by the lagged dependent variable, thus requiring time-series data for estimation purposes. The nonlinear elements are represented by various interaction effects. Management in the environment (M_3/M_4 or M_2) is depicted in terms of managers' exploiting opportunities and buffering against constraints. The model is contingent on the extent of stability in an administrative system.

O'Toole and Meier (2003) concede that a data set capable of operationalizing this full model does not exist and perhaps is unlikely to exist in the future. Some theoretical gains can be made, however, by testing parts of the model or more simplified forms of it via a number of empirical investigations (Meier and O'Toole 2001, 2002, 2003; Meier, O'Toole, and Nicholson-Crotty 2003; O'Toole and Meier 2003, forthcoming). These authors have successfully demonstrated the impact that managing in the networked environment has on educational performance (Meier and O'Toole 2001, 2003; O'Toole and Meier forthcoming). In particular, evidence has indicated that operating in the networked environment allows managers to leverage resources—that is, to get more out of external resources available and to be less hindered by constraints imposed on the agency. The impacts in that setting, in other words, do seem to be nonlinear. Also, more active management in the network seems to reduce the tendency of programs to be constrained by past performance; the impact of the autoregressive term is less when external management is greater (see in particular Meier and O'Toole 2003).

This earlier research is encouraging but has been conducted with two significant limitations. First, as noted above, it has focused only on public education. It is unclear, therefore, how broadly the conclusions are likely to be applicable. Education organizations are somewhat unique among public agencies and resemble most closely what Wilson termed "craft" agencies (1989). They are typically very flat, with few bureaucratic levels

1 M_2 is used by O'Toole and Meier to denote management's contribution to dealing with the environment, by buffering or exploiting. Therefore, $M_2 = M_3/M_4$.

between top managers and clients. Thus they are typified by large spans of control. Additionally, these units are staffed with a highly professionalized workforce, which enjoys a great deal of discretion in the implementation of policy and the delivery of services. While police departments share some of these characteristics, they are also markedly different from education organizations in certain key features, a point that makes them a good place to test the external validity of the O'Toole-Meier model.

In addition to its exclusive focus on education, earlier empirical work has also emphasized only the second, or environmental, component of public management depicted in the model. Research suggests that networking activities are an important and often inescapable feature of modern public management (Milward and Provan 2000; O'Toole 1986). No one would argue, however, that public managers do not spend a significant portion of their time attending to the internal processes of their organizations. They make choices concerning staffing, motivating, allocating resources, compensating, developing procedures, interacting with subordinates, and countless other issues that are crucial to the success of an organization.

In this analysis of managerial influence on law enforcement agencies, we remain interested in the impact of managing in the external—and often networked—environment of public agencies. However, we want to begin an exploration of internal management as well. This analysis therefore constitutes the first empirical use of the model outside the field of public education and the first attempt to include measures of both M_1 (management of operations) and M_2 (management in and of the environment) in the same analysis. This study, therefore, tests the impacts of public management in the field of law enforcement and also offers a contribution to the general theory of public management.

LAW ENFORCEMENT AND PUBLIC ADMINISTRATION

The administration of law enforcement is clearly a crucial kind of public administration. Surprisingly, however, there has been a paucity of literature concerned specifically with police organizations in either mainstream public administration or the related research specialty of political science. Notable exceptions to this generalization include work by Wilson (1968, 1975), Saltzstein (1989), and Brehm and Gates (1993).

Traditional literature on managing police organizations focused on the pursuit of internal goals such as efficiency, procedural rigor, and organizational specialization (for classic examples, see Fosdick 1920; Fuld 1909; Vollmer 1936; Wilson 1950). These works stressed the importance of management expertise in building agencies that were, in the progressive tradition, neutral in the application of the law and insulated from local politics. In these respects, they reflect themes quite consistent with the tenor of much classic work not only on public administration in general but also on administration and management in various specialized policy fields. These studies described police departments that were, in effect, classic Weberian bureaucracies, organizations marked by centralization and unified command structures (for a review, see Kelling and Moore 1988).

More modern works have also emphasized the importance of agency professionalism and typically arrayed departments along a continuum based on degree of specialization, internal hierarchy, written procedures, and other such bureaucratically-focused criteria (see Feuille and Juris 1976; Skolnick 1966; Wilson 1968). In this line of thinking, whether classic or more recent, suggestions for improving the performance of police organizations have usually emphasized the adoption of new technologies that could enhance the

efficiency of traditional practices (see McEwan, Connors, and Cohen 1986; Moore, Trojanowicz, and Kelling 1988).

Over the past two decades a new paradigm of police management has come to dominate the professional literature. Collectively, this approach is often described as "community policing" (for a comprehensive review of this large set of publications see Oliver and Bartgis 1998). It is based on the recognition that at the core of successful law enforcement is extensive coproduction between the responsible departments, on one hand, and a community's civilian populace, on the other. In its most general sense, this portrayal of a critical component of the managerial challenge emphasizes dealing with actors and contingencies in the broader environment rather than focusing primarily on internal operations. This new approach emphasizes the importance of partnerships between police agencies and others in the community, including public agencies, business interests, and neighborhood groups, in order to bring additional resources to bear on crime-related problems and increase community support for police activities (see Community Policing Consortium [CPC] 1994; Goldstein 1979; Kennedy 1993; Robin 2000).

Research on community policing recognizes that successful implementation of this new approach requires a significant shift away from the traditional culture of police organizations, in which departments are seen by management and by front-line personnel as appropriately isolated from the whims of the community. In order to implement a community policing approach successfully, therefore, managers must build support actively within the organization itself, via the training and inculcation of new members (Breci 1997). They must also actively solicit alliances with external actors and the media (Sparrow 1988; CPC 1994).

The new paradigm emphasizes decentralization within the organization so that line officers can be afforded greater discretion to anticipate and solve problems on their "beat." By encouraging this discretion, managers are less able to rely upon directives from the central office or rigorous compliance with standard operating procedures for controlling the behavior of subordinates. This kind of approach requires a more facilitative style of management, taking into account not only the actions of line personnel but also the environment in which these actions have occurred (CPC 1994; Kelling and Bratton 1993; Robin 2000).

Research does suggest that the new emphasis on actively managing with and tapping the environment helps police departments make more effective use of limited resources, such as staff. Various community-oriented activities have reduced the number of officers that must be dispatched on unimportant calls, reduced response time on important calls, and helped target resources toward high-need areas (Kennedy 1990, 1993; Trojanowicz 1983). Still, this evidence is focused primarily on process and output measures rather than outcomes. When studies have addressed the impacts of community policing, they have typically measured citizen satisfaction with the programs rather than the effects on clearance rates or crime control.

Finally, although this proposition has not been explicitly tested, the research literature suggests that community-oriented techniques may improve police performance as measured by traditional indicators, such as crime control.[2] Those analysts who have

2 The usual way of exploring this issue has been to tap the public's attitudes toward and perception of law enforcement performance (see Robin 2000). While providing some evidence that community policing is associated with public support, this sort of study obviously does not test for actual performance impacts.

considered the impact of community policing have primarily focused on the improved information that police receive when they actively interface with community members, other agencies, and additional external parties (see Greenwood, Chaiken, and Petersilia 1977; Kelling 1988; Taft 1986). These emphases roughly parallel themes evident in public administration scholarship, including the importance of managers' dealing with the environments of public agencies (Selznick 1949) and, especially recently, the salient topic of managing in a networked and interdependent world (see, for example, Milward and Provan 2000).

In short, specialists in law enforcement have argued that management of internal operations can be important and—more recently—that active management in and collaboration with the environment can also be important. The arguments are plausible and generally track points that have been made qualitatively by students of public administration, broadly construed. They have not been tested, however, by probing the ideas with systematic evidence regarding policing performance. We do so in this article by mapping these ideas onto the theoretical expectations of the O'Toole-Meier model of management. This will provide us with specific, testable hypotheses concerning the role of management not only in developing internal, stable bureaucratic operations but also in developing the community policing function, related environmental-management efforts, and the link between those activities and organizational performance.

SPECIFICATIONS FOR TESTING MANAGERIAL IMPACT IN LAW ENFORCEMENT

We cannot explore the full set of relationships sketched in the model outlined in equation [1]. Our approach is to proceed with simpler specifications appropriate to the tasks at hand. Substituting M_2, or managerial networking, in [1] for the ratio M_3/M_4 yields:

$$O_t = \beta_1(S + M_1)O_{t-1} + \beta_2(X_t/S)(M_2) + \epsilon_t \quad [2]$$

Our interests in this investigation center on exploring the impact of public management—that is, the two Ms in equation [2]. Further, we want to retain the O_{t-1}, or autoregressive, term of the model; we expect it to matter considerably in explaining performance in police organizations. We also intend to include (and explore) the impact of environmental forces on law enforcement performance, so it is key to retain a vector of X_t variables as appropriate. The set of internal stabilizing influences (S), however, is less important in the present context. In particular, police departments tend toward fairly similar (and quasi-military) internal structures, so stabilizing features vary modestly, at most, across the sample. Given the relatively similar nature of police departments and their operations, therefore, we work with the following specification of the general model in the analysis for this article:

$$O_t = \beta_1 M_1 O_{t-1} + \beta_2 X_t M_2 + \epsilon_t \quad [3]$$

In this formulation, public program outcomes at any time (t) are a function of outcomes recently. Still, by the logic of the model, management can matter by supporting, coordinating, and improving current operations (M_1) and also managing in and with the program's environment (M_2). Managerial efforts in the environment interact with at least some of the forces that impinge, or have the potential to impinge, on the program (X_t). This version of the model retains the autoregressive and nonlinear elements of the full model

and is amenable to testing in settings of relatively restricted variation regarding stability-inducing components.

This model, when applied to law enforcement, suggests first that police department performance will be autoregressive, with this year's performance highly constrained by performance in the previous year. The first term of the model also suggests that internal managerial activities by police managers will be directly related to the performance of police organizations when controlling for past performance and other factors. Additionally, the term implies that the impact of the inertial term is contingent upon the extent of internal management. Although the developers of the model depict M_1, or internal management, primarily in terms of supporting the operational status quo, it would seem to be more appropriate—at least for law enforcement agencies—to consider this internal function as both supporting current functions and helping to improve performance by innovating within the organization. Thus we can expect that improved internal management—through improved personnel policies, the application of new technologies, and so forth—will reduce the impact of the past on current performance.

The second term of the model moves the examination to managerial activities outside the organization. Here the term implies, first, that networking and other externally oriented management by police managers contributes directly to department performance. The second term also offers another set of hypothesized interactions: between external management and environmental forces. Given the great emphasis on community policing in the field of law enforcement, as well as the recent attention to network management in the field of public administration more generally, the impact of this component of management is of particular interest. Previous empirical tests of this component of the model suggest that more outward-focused activities by managers should help the organization to leverage resources while simultaneously reducing the impact of constraints on performance.

DATA AND MEASURES

The units of analysis for this study are municipal police departments in the United States. Data are drawn from 570 such police departments from throughout the country. The jurisdictions included in this study range greatly in size, from approximately 15,000 to more than 3.5 million. This analysis combines information from two different surveys involving departments in these communities. In addition, demographic information for each of the jurisdictions was added from data gathered at the county level by the U.S. Bureau of Census.

The first survey was administered by the Federal Bureau of Investigation to chiefs of police in the relevant jurisdictions for production of the *Uniform Crime Report* (UCR).[3] It has been administered annually, using roughly the same instrument, since 1975. The survey is administered to over sixteen thousand law enforcement agencies, representing 95 percent of the total population of the United States. The second survey was administered by

3 In twenty-five cases, the crime data reported for jurisdictions by the Federal Bureau of Investigation were suspiciously unstable. Reported rates in some cases varied by 60 to 80 percent across the two time points. Accordingly, we omitted these jurisdictions from the analyses reported here. These cases did not differ in any significant way from other jurisdictions on measures of population, 1998 crime rates, staff per capita, measures of management, or any other relevant variables. Substantive findings reported in this article are appreciably the same, whether or not these cases are included in the analysis. One additional jurisdiction was dropped from the analysis because of questionable data regarding staffing levels. The results reported here cover the 544 cases excluding the problematic ones.

the Office of Justice Programs to the head law enforcement official in all jurisdictions employing one hundred or more officers. The *Law Enforcement Management and Administrative Statistics* (LEMAS) survey included over seven hundred jurisdictions, with an astounding response rate of 93 percent. Data from both studies are available electronically from the Inter-University Consortium for Political and Social Research at the University of Michigan.

Data used in the present analysis are from the chiefs of municipal police departments who provided valid information on the former survey in both 1998 and 1999, as well as on the latter survey in 1997 and 1999. Obviously, the smallest jurisdictions surveyed in the UCR are not covered by LEMAS, due to the department-size threshold for the second survey, and are not included in this sample. For jurisdictions above fifteen thousand persons, however, the sample has tremendous variation on key indicators and provides a representative sample of U.S. police departments.[4] The actual N in the various analyses reported here is 544.

We seek to explain performance in 1999 as a function of: performance during 1998, managerial efforts, and resources and constraints available from the law enforcement unit's environment.

Measures

The variables incorporated into the analyses reported here fall into three categories: outcomes, management, and environmental forces.

Outcomes

There are numerous potentially appropriate outcome measures in the field of law enforcement. While crime reduction is obviously a possible measure of performance, myriad forces influence criminal activity and are beyond the control of even the most effective police organization. Accordingly, most studies of law enforcement management have focused on clearance rates, or the percentage of crimes cleared by arrest, as the best measure of organizational performance.[5] Although all measures of performance have some weaknesses, the clearance rate provides a more realistic indicator of what police organizations are able to accomplish than do alternative measures. Police chiefs, or someone whom they assign, report crime and arrest data used in the calculation of clearance rates via a well-tested instrument that the Federal Bureau of Investigation has been using since it began surveying subnational jurisdictions in 1975. Thus, the data used here represent the most reliable information available on crime and arrests in U.S. police departments.

The dependent variable in the studies reported here is the percentage of "index crimes" cleared by arrest.[6] It is calculated as the number of arrests in a given year divided by the number of reported crimes in that year, all multiplied by one hundred. In the sample examined in this study, the variable has a mean of 28.4 and a standard deviation of 9.9.

4 Departments in the sample have staff sizes between 100 and 12,547. Their crime rates range from a very low 14 crimes per 1000 citizens to an extremely high 266 per 1000 in Atlantic City, New Jersey. The jurisdictions are also extremely diverse racially, ranging from 0.15 to 92 percent African American.

5 This measure is likely to be influenced by the crime rate itself, which is therefore used as a control in the analyses to follow.

6 Index crimes include murder, non-negligible manslaughter, forcible rape, robbery, aggravated assault, burglary, larceny, motor vehicle theft, and arson.

Management

Measuring the quantity and quality of internal management, or M_1, presents a formidable task. The number of internal-managerial influences in police departments is great. The field of public management has been significantly engaged in considering the multiple and subtle influences that managers are able to exert within their public agencies (see, for instance, Rainey 2003), and it would be impossible to develop a set of measures to tap all such forms of managerial effort. In this investigation, we employ a measure based upon a set of concrete managerial outputs that are aimed at bolstering the internal-operational management of a police department. The LEMAS survey gathers data on several such important internal procedures or initiatives that are necessarily products of managerial effort devoted to the operations of the department, particularly the management of departments' human resources. The particular items are as follows: the presence of educational requirements for officers; the extent of classroom training for new recruits; the degree of field training for those recruits; the presence of a collective bargaining policy for officers; investment in technology that allows officers to access criminal histories, arrest records, and crime analysis tools in the field; and the comprehensiveness of written directives.[7] This last item includes such subjects of directives as the use of deadly force, appropriate considerations for discretionary arrest, procedures for juvenile arrest, treatment of mentally ill suspects, and stipulated use of less-than-lethal force. Arguably, some of these items reflect stability-inducing aspects of the organization, particularly procedural stability, rather than the immediate impact of management per se. Given the specification of the full model in equation [1], however, such items can be considered as substitutes for short-term internal management—note the "$S + M_1$" portion of the model, which represents this idea—and are therefore appropriate for inclusion in this term. In fact, as O'Toole and Meier have argued (1999), over time managers can be expected to work on the structure and procedures of the organization so as to shape S for the long term.

The full set of items representing managerial development of internal operations was factor analyzed using a principal components analysis. All fourteen of the items listed above loaded positively on the first factor (eigenvalue 4.82). Each item produced a loading coefficient of .32 or better.[8] Factor scores were used as a measure of internal management. Because factor scores are standardized, one unit is equivalent to one standard deviation.

Management in the environment of the police department, or M_2, can also be measured from the data reported in LEMAS.[9] The survey asked police chiefs to provide information on a set of externally-oriented, networking activities. The police chiefs

7 Measures of a manager's investment in policing technology are included because the literature suggests that when traditional law enforcement managers have looked for ways to improve organizational performance, they have focused largely on technological improvements (Moore, Trojanowicz, and Kelling 1988).

8 Although this was a multifactor solution, the first factor was the only one that produced all positive loadings. Other factors were significant, with eigenvalues greater than one, but their proportion of explained variance was very small relative to the first one. For these reasons we score only the first factor and include it as our measure of internal management.

9 A second, less comprehensive dichotomous measure of M_2 is also available from the LEMAS survey. Respondents were asked whether their department "networks" with other public agencies. Answers were coded as a dummy variable: 1 for networked departments and 0 for the others. Analyses conducted with this measure also showed positive and statistically significant impacts from the variable but are not reported in this article. The measure is limited in some important ways. The dichotomous measure is a blunt instrument used to tap a much more complex set of managerial efforts. It focuses on departmental links per se rather than any direct aspect of managerial effort. Further, it focuses only on public agencies rather than the array of possible partners emphasized in some of the arguments for community policing. We believe the measure constructed as described in the text offers a superior alternative.

responded regarding the "comprehensiveness of their community policing activities" (for instance, training of citizens, neighborhood-specific patrols and detectives, and problem-solving activities with communities), the "comprehensiveness of their networking activities" (for example, meeting regularly with advocacy groups, business groups, public agencies, neighborhood associations, tenant associations, religious groups, youth groups, and schools), and "comprehensiveness of the public feedback system for the department" (such as surveying the public about satisfaction with police operations, perceptions of the crime problem, and personal crime experiences).

Obviously, all of these components get at aspects of managing in the environment of the law enforcement agency, and some of them are quite directly aimed at tapping community policing efforts. Readers who are familiar with the large body of literature on community policing may note that the proposed relationship between clearance rates and externally or community-oriented policing activities is quite unique. Typically, that literature uses measures of community satisfaction with the police as a measure of the effectiveness of such activities.

We argue here, however, that all the types of external activity listed should also affect the ability of officers to clear crimes with arrests. The management of the environment, including community policing activities, could plausibly assist the law enforcement function by reducing information asymmetries between the police and the broader population, encouraging some coproduction of public safety and generally leveraging the agency's efforts into the broader social setting. Additionally, we would argue that police departments strategically adopt community-oriented activities for these very reasons. Though a good public image is undoubtedly a positive externality of having problem-solving officers on local beats, such an image might quickly fade if crimes were to go uncleared and the police appeared unable to accomplish their core function successfully.

Once again, we factor-analyzed the set of responses concerning managing in the environment with a principal components analysis. One factor emerged from this procedure with all positive loadings for the sixteen items (eigenvalue 4.30). Again, all loadings were above the acceptable threshold at .34 or better. We measured M_2 for each department based on the unrotated factor loadings of these items. Again, one unit equals one standard deviation. Note that both measures of management are calibrated in comparable units, thus permitting a direct comparison of the relative importance of these variables. Interestingly, these two measures of management are only modestly correlated (at .21).[10]

Other Variables

Aside from past performance, additional variables can be expected to influence clearance rates among municipal police departments. The data sets available allow for inclusion of six of these. Three explicitly tap resources and constraints in the environment of the police department.[11] To guard against testing with an excessively underspecified model, three others were also added from census data; in these cases, there is precedent from other law

10 Neither measure of management taps the *quality* of managerial work, a most difficult aspect to explore. Meier and O'Toole have developed a salary-based measure of the quality dimension (2002), but this sort of measure is not appropriate for law enforcement agencies and their managers. Managerial quality in law enforcement is undoubtedly important, but it is not included in this analysis.

11 These can be considered components of the vector of X impacts from the environment, as depicted in the model.

enforcement analyses for including them.[12] With regard to the first cluster of three X variables, two of these are effectively constraints on the production of performance, and one is a resource that could contribute to better outcomes.

First, and obviously, clearance rates should be a function of crime rates—the more crime, the tougher the law enforcement task. Another way of putting the point is to characterize the crime rate within a jurisdiction as a constraint imposed upon the department's effective performance by the complexity and difficulty of the core crime-fighting task. Accordingly, the number of Index Crimes per one thousand population in a jurisdiction as recorded by the FBI during the year in question is used as a control.

Second, police departments sometimes have "extra" tasks imposed upon them, depending upon the structure of governance arrangements within the local jurisdiction. Core law enforcement tasks are one thing, but more peripheral tasks may be assigned to these departments and could intrude on those responsibilities deemed more central to the police department's mission. These extra tasks may be valuable in themselves but can burden the agency with competing challenges. In some locales, law enforcement units are charged only with basic law enforcement tasks. In other places, police departments are assigned such duties as civil defense, animal control, fire services, emergency medical services, the execution of arrest warrants, administration of court security, the serving of civil process, and call dispatch. Information on departmental responsibilities regarding these tasks was collected from the 1999 LEMAS survey. Responses were factor analyzed via a principal components analysis to create a general measure of the extent of a department's non-mission oriented activities. All eight items loaded positively on a single factor (eigenvalue 1.74). The measure of extra tasks is standardized in the same fashion as previously reported factor scores and included in the analysis of clearance rates as a second constraint imposed by the environment.

The data subject to analysis include one measure of resources made available from the law enforcement environment: new staff. More departmental staff obviously gives police units greater opportunity to do their jobs well. Since staff-size changes may mean little if the population of the jurisdiction has also changed, it is important to measure this variable in relative terms. Our measure of staff change, therefore, is the difference in staffing levels (in full-time equivalents) between 1999 and 1997, divided by the population change between the same two years.

The other three variables added as controls are as follows: the jurisdiction's percent minority in the population, total population, and population density (as measured by residents per square mile). There is no obvious theoretical reason to expect such controls to contribute to the relative performance of municipal police departments, particularly when crime rates are already included in the analysis, but we add them because of precedent in other law enforcement analyses.

FINDINGS AND DISCUSSION

As a first step, we specify an additive model of managerial influences on police department performance. Remember that the formal model implies that the activities of police management both within and outside the organization can improve performance directly. Table 1 displays the results for this first model of the impacts of management and

12 For instance, Sorensen and Stemen (2002) use the same controls when trying to predict commitment rates and sentence lengths at the state level.

Table 1
Determinants of Clearance Rates among Municipal Police Departments, 1999

The Additive Model	
Variables	Coefficients
Clearance rate 1998	.725*** (31.52)
Internal management	.468* (1.87)
External management	.695** (2.73)
Crime rate 1999	−.033*** (−4.78)
Staff change	1.914 (0.93)
Extra tasks	−.351 (−1.43)
Population	.0000 (0.20)
Population density	−.0002* (−1.75)
Percent minority	−.0129 (−0.95)

Note: Numbers in parentheses are t-scores. Adj. $R^2 = .67$; $N = 544$; $F(9, 534) = 125.34$, $p > .0000$.
*$p < .05$ **$p < .01$ ***$p < .001$ (one-tailed test).

environmental variables on the clearance rates in metropolitan police departments. Initially we can note the highly autoregressive nature of police department performance. While this finding should not be surprising to students of bureaucracy, the magnitude emphasizes the importance of accounting for past performance when modeling current performance in highly inertial public organizations.

The second set of interesting findings relates to the measures of management. Even after one controls for the sizable impact of past performance in police organizations, management activities both inside and outside the organization are positively and significantly related to clearance rates. We can turn our attention first to the measure of internal management activities, comprised of human resources decisions, technological innovations, and the comprehensiveness of written directives. The coefficient suggests that, across the range of the variable, the impact on clearance rates could be as high as 2.8 percent. Though the substantive impact might appear small at first, such a conclusion would be misleading. Given the inclusion of the lagged dependent variable in the estimation, the coefficient refers only to the short-term impact over a one-year period; it would become quite substantial if internal management were to continue to generate impacts of similar size over additional years. The one-year impact, in other words, is added to the performance in the preceding period, and the result becomes the base for future performance improvements that can be shaped still further by management.

The finding regarding the importance of internal managerial activities comports well with the large qualitative literature on law enforcement administration. It also fits the expectations of the formal model of management under investigation. This is the first time in the testing of this model, however, that the concept of internal management has been operationalized so that the expectations concerning its impact could be tested systematically. Again, the results suggest that activities designed to improve organizational processes and procedures are substantive contributors the core function of police departments: clearing crimes by arrest.

The second measure of management is also of substantive interest. As noted previously, this is the term that has received the most empirical attention in previous applications of the model. As in those analyses, the findings here suggest that networking and other externally focused managerial activities help to improve organizational

performance. First, note that the impact of external management on clearance rates would appear to be even larger than that of internal management, or at least the portion of internal management measured in this study. Remember that the two types of management are measured on the same metric and can, therefore, be directly compared. Across the range of the variable, external management can have an impact of almost 4.2 percent on clearance rates. An f-test suggests, however, that the coefficients are not statistically distinguishable from one another when we account for the variance in each. Thus, the results from this analysis suggest that internally- and externally-oriented management activities have a similar impact of performance in law enforcement organizations.

It is important not to miss the practical and theoretical importance of the results for external management. First, the finding that community-oriented management by police improves clearance rates suggests an additional benefit of such activities beyond that normally offered in the literature. Most studies expect and look only for an impact of community policing on citizen satisfaction. The results here suggest, however, that such activities may also help police actually clear more crimes. The finding also provides further evidence for the utility of the O'Toole-Meier model in addressing questions of public management. This study demonstrates that external management can have a significant impact on organizational performance in a sample of organizations that are very different from those studied in previous work and that this finding is maintained even when a measure of internal management is also included in the analysis.

Finally, for this model, we can look to the impact of the environmental or X variables and those included in the model as controls. All of the proposed resources and constraints on law-enforcement organizational performance are in the expected direction. Only crime rate, however, reaches traditionally accepted levels of statistical significance. The negative coefficient indicates, as hypothesized, that higher crime rates mean greater task difficulty which, in turn, reduces the ability of police organizations to clear crimes by arrests. Of the control variables suggested by criminological studies, only one reaches statistical significance. The negative coefficient for the measure of population density suggests that police have lower clearance rates in highly populated urban areas.

These results are interesting but cannot speak to the nonlinear relationship between management and organizational performance suggested by the O'Toole-Meier model. We explore nonlinear aspects here by estimating two additional models incorporating the same set of determinants of the clearance rates in municipal police departments. However, these additional models are not additive; each includes an interaction term to represent a feature of the model depicted in equation [3]. Table 2 presents the findings. The first column displays an estimation for a model incorporating the interaction of internal management with past performance—the first term in equation [3]—while the second shows results for a model including the interaction between external management and environmental variables—the second term of the same equation.

As the findings in the first column show, there is indeed an interactive relationship between managerial activities designed to improve organizational processes and the importance of organizational performance in the previous year. The negative coefficient on the interaction term indicates that, as internal management increases, the impact of the lagged police department performance decreases. As one moves from the minimum to the maximum value for M_1, calculation shows that the coefficient for last year's performance shrinks to .32. In other words, as managers do more to improve human relations procedures, implement new technologies, and ensure the sufficiency of written directives,

Table 2
Determinants of Clearance Rates Among Municipal Police Departments, 1999

Variables	Internal Interaction	External Interaction
Clearance rate 1998	.722*** (31.45)	.724*** (31.49)
Internal management	1.452** (2.71)	.471* (1.87)
Interaction: $M_1 \times$ 1998 outcomes	−.045* (−2.07)	—
External management	.695** (2.78)	.631 (1.13)
Crime rate 1999	−.033*** (−4.84)	−.033*** (−4.77)
Interaction: $M_2 \times$ 1999 crime rate	—	.001 (1.13)
Staff change	1.244 (0.60)	1.952 (0.93)
Extra tasks	−.381 (−1.56)	−.351 (−1.43)
Population	.0000 (0.17)	.0000 (0.20)
Population density	−.0002* (−1.66)	−.0002* (−1.75)
Percent minority	−.0136 (−1.00)	−.0129 (−0.95)

Note: Numbers in parentheses are t-scores. Internal action, Adj. $R^2 = .68$; $N = 544$; $F\,(10, 533) = 113.93$. External action, Adj $R^2 = .68$; $N = 544$; $F\,(10, 533) = 112.60$.
*$p < .05$ **$p < .01$ ***$p < .001$ (one-tailed test).

their organizations become substantially less constrained by the status quo, thus increasing their potential for further improvement.[13]

Substantively, the findings regarding the influence of internal management are obviously important for law enforcement managers attempting to calculate the costs and benefits of organizational reforms. The decreasing importance of past performance implies that the actual benefits from internal management may be greater than those that are immediately apparent. On a more general theoretical level, the finding provides significant support for the model of management described earlier. In this explicit test of the first term in that model, the empirical findings match the hypothesized expectations developed from the formal presentation. Clearly, more research into other types of public organizations is in order, but the congruence between theory and results in this instance should be an encouragement to those interested in a general understanding of the relationship between management and performance.

The findings from the second column of table 2 offer related support. The estimation presented there investigates the interaction between externally oriented managerial activities and the organizational environment, while controlling for the impact of past performance, internal management, and other potential predictors of clearance rates. Because crime rate was the only environmental constraint to emerge as a significant predictor in the additive model, it is the only term with which external management is interacted.

High levels of collinearity between the measure of management and the interaction term render neither significant in this estimation.[14] In such a situation, however, it is appropriate to test for the joint significance of the terms rather than to rely on individual standard errors, which may be artificially large (Baltagi 1995). The joint test determines whether the addition of the interaction term contributes significantly to the explanatory power of the model. In this case, it does.[15]

13 Interactive models often introduce a great deal of collinearity into the estimation. In this instance, however, the variance inflation factor for the terms including the M_1 measure was within acceptable limits (Vif < 5.05).

14 Vif = 10.45.

15 $F(1, 533) = 3.92$, $p > .05$.

The substantive impact of the interaction between external management and crime rate is easily interpreted. Based on the coefficient for the independent impact of crime rate, each one-unit increase in the crime rate decreases the clearance rate by .033. Across the range of the variable, that could be as large as an 8 percent reduction in the number of crimes cleared by arrest. The positive interaction term suggests, however, that a one standard deviation positive shift in external management decreases the negative impact of crime rate by .001. Substantively, that means that in the most actively managed departments the maximum impact of crime on clearance rates could be only 6 percent. Thus the findings suggest that managers who are most aggressive in networking and other community-oriented activities are able to reduce the impact of an environmental constraint on their organization's performance by as much as 20 percent.

Again, the findings have both substantive and theoretical implications. Law enforcement managers who increase their external management may be able to expect not only increased citizen satisfaction and a direct improvement of clearance rates but also the indirect benefit of being less hindered by the constraints within which their organization operates. Further, the findings offer yet more evidence for the explanatory power of the O'Toole-Meier model. Previous research has indicated the impacts of managing the environment. This study, however, replicates the finding in a completely different sample and policy setting. The replication bolsters the external validity of the theoretical expectations concerning the impacts of external management presented in the formal model and supported in the earlier empirical findings.

CONCLUSIONS

The first set of conclusions invited by the findings presented here concern the administration of law enforcement agencies. For decades law enforcement specialists have argued for the importance of management in shaping the performance of police departments. Some proponents have emphasized fairly traditional internal management—POSDCORB, law enforcement style, as it were. Others, particularly analysts more recently, have pointed to community policing and associated ideas, like network management, as keys to successful performance. But anecdotal portrayals of what "must" be important and which managers "should" be considered exemplars have been shown to be of dubious validity. One need only remember the glowing praise heaped on Daryl Gates and his management of the Los Angeles Police Department shortly before the Rodney King incident (Moore 1990). Rather than relying on anecdote, therefore, this study tests the idea that law enforcement management matters with a large sample and via a systematic theoretically driven approach. The results offer considerable support for themes emphasized by the experts.

Managing internal operations contributes to results. Managing externally, including involvement with community actors, other agencies, and outside stakeholders, can also boost performance. The positive, encouraging evidence about public management holds even with past performance included in the analysis as part of the explanation. The influence of public management ramifies forward through time, with effective management helping to build a base upon which higher performance in the future is more likely. While examination of several kinds of performance measures would be useful in additional research, it is worth noting that the impact being emphasized here is arguably the

result that matters most: crimes being solved.[16] The analyses offer rather conclusive evidence that public management does indeed matter in law enforcement.

Some of the nuances are also of interest. More active internal management reduces the reliance of police departments on what and how they were already doing. Additionally, managers heavily involved in developing ties and understanding between their units and the surrounding community also improve performance indirectly. They are less constrained by the impediments imposed upon them by their circumstances. Public management matters, therefore, not only directly but also in interaction with resources (including collaborative partners) and constraints in fashions that add further leverage to the management function.

These findings do not conflict with arguments that many in the field of law enforcement administration have made; indeed, they support several of the claims proffered by theorists and practitioners alike. Nevertheless, the evidence-based findings that public management contributes to law enforcement, quite possibly via more than one function and clearly through nonlinear fashions, are important conclusions.

The findings also provide additional support for several elements of the formal model of public management recently offered in the research literature. This analysis operationalizes concepts that had gone unmeasured in previous research and produces results that fit theoretical expectations. The measurement of the internal management term also allows for the most complete test to date of the formal model. The results do hold, as external management continues to have a direct and a nonlinear impact on organizational performance, even when controlling for managerial activities inside the organization.

This study also bolsters the utility of the theory by testing previously investigated components of the model in a completely new set of venues and policy contexts. Police departments differ dramatically in their organizational form from education organizations. Nevertheless, the estimations presented here confirm the conclusions reached in earlier work regarding the nonlinear impacts of management and the important effect that networking and other externally-oriented managerial activities can have on performance. The new findings begin to provide support for the notion that the core features of the model may hold in multiple contexts. Plenty of additional research is needed, but the possibility of valid general public-management theory is worth pursuing systematically.

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16 The ideal performance measure would tap crimes being *prevented*, not just those being solved. For obvious reasons, this component is inherently impossible to explore.

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