

E-government and perceived outcomes for local government managers

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Abstract: Local government managers in the U.S. are under increasing pressure to adopt technology upgrades and implement e-government initiatives. Many of these efforts are packaged within the rhetoric of engaging the public, improving managers' jobs, and making work more effective and efficient. This research investigates the determinants of local government managers' perceptions of the outcomes of e-government initiatives. Do managers perceive e-government initiatives as improving the governing process and governmental decision-making or do managers believe that e-government initiatives reduce control? We use data from a national survey of 850 local government managers in 500 U.S. cities ranging in size from 25,000 to 250,000 and data from an analysis of those city websites (including departments) to investigate these questions. We hypothesize that local managers' perceptions of e-government outcomes will be related to department level technology use (e.g. computer, internet, and intranet usage) and department electronic interaction with citizens (e.g. breadth of e-government tools, frequency of interaction with citizens). The findings are important for understanding the ways in which local government managers perceive the outcomes of e-government initiatives.

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Introduction

Local governments in the United States have long been under pressure to adopt and use technology upgrades and implement e-government initiatives. Most of these efforts are packaged within the rhetoric of engaging the public and making managers' jobs easier - making work and communication more effective and efficient. The advent of Web 2.0 and the development of new electronic participation technologies have served to further increase the technology push. On the one hand, adoption and use of participation technologies give government a potentially powerful means through which it can access, acknowledge, and address citizen and other stakeholder needs. On the other, these technologies may excessively complicate tasks, creating perceptions that the new participation technologies make management more difficult. This research aims to understand how local government adoption of communication technologies and the use of the technology in the public workplace affect managers' perceptions of e-government outcomes.

We ask: Do managers believe that the integration of technology into the day-to-day operations in local government result in three outcomes – improvement of governing processes, improvement of decision-making, and reduced control? The paper serves an important role because it recognizes that manager perceptions about the value of technology are associated with the level of use in the organization and the extent to which the technology facilitates work processes and autonomy. The findings are important for understanding the ways in which e-government initiatives are perceived by local government managers and how those initiatives improve or hinder work outcomes for public managers.

Using data from a national survey of local government administrators, we test hypotheses relating technology adoption and use with managerial perceptions of e-government. We also include determinants at the individual manager and department level. In particular we look at how computer, internet, and intranet usage are related to perceived e-government outcomes. We also look at how job satisfaction, routineness, and centralization are related to perceived outcomes. We conclude with a discussion of how these findings might help us better understand the ways in which local government managers perceive the outcomes of e-government initiatives.

Literature and Hypotheses

Information and communication technologies in government focus heavily on the technology and information dimensions and lightly on the communication dimension. For example, Yildiz' review of the e-government literature presents an adapted framework of e-government in which typology characteristics dominate, not the particular uses (2007). Similarly, openness and user orientation is typically focused on service delivery, and less on the ways in which technologies enable communication between managers and external groups (Ho 2002). The lack of discussion about communication technologies is understandable because the technological capabilities for communication and participation are much more recent. For example, Kaylor's earlier research found very little evidence of the use of technologies for citizen participation (2001). However, more recent work shows that online communication technologies have grown dramatically (Phang & Kankanhalli 2008) making it increasingly important to understand how e-communications affect outcomes.

The importance of understanding the role that communication technologies have on public organizations is also high because public organizations are strongly affected by their external environments. Early work in information technologies recognizes that technology is constrained and controlled by its environment and that "computing will reinforce the power and influence of those actors and groups who already have the most resources and power in the organization" (Danziger et al. 1982, p. 18). And while we know that public information systems managers are strongly affected by their external environment (Bretschneider 1990; Bozeman & Bretschneider 1986), little research has examined how the use of information communication technologies (ICTs) for communication and participation in government affects public managers' ability to effectively conduct the work of government, or how public managers perceive the outcomes of using those tools.

To the extent that ICTs enable two-way communication between individuals inside and outside the organization they also enable participation of external groups in government decision-making. If we define participation as the involvement of one or more stakeholders in decision-making or policy in such a way that the stakeholder input is considered during the decision making process and influences the decision outcome (Bickerstaff, 2001; Rowe & Frewer, 2000), it is possible that e-government tools and initiatives greatly increase the

opportunity for participation. On the other hand, it is possible that the use of new, electronic modes for increasing participation overburden public managers, either asking them to utilize technologies with which they are unfamiliar or uncomfortable or doubling their work loads by asking them to engage the public in traditional and electronic modes. This research seeks to understand how

Department E-Government Tools and Participation

The use of participation technologies by governments may have both positive and negative outcomes. While public participation is a crucial component of democratic processes, it is also true that increased participation by a diverse group of stakeholders can complicate and delay decision-making processes. That said, increased participation of diverse stakeholders is believed to result in *better* decision-making (Janis 1972). Research notes that public organizations often face quite complex decision-making environments since they are often subject to a higher number of external constraints (Rainey, Backoff, & Levine 1976; Levine et al. 1975; Nutt & Backoff, 1993). Public administration research indicates that differences between public and private organizations can be described by the extent of participation and smoothness of decision-making, with public organizations requiring much more participation from stakeholders (Bryson, Bromiley, & Jung 1990; Coursey & Bozeman 1990; Hickson et al. 1986). Thus, while increased participation in decision-making can complicate decision-making processes, participation is a key component and value of public organizations and public managers.

The increased participation of stakeholders can have a number of positive and negative outcomes for organizations and managers. For example, participatory planning activities may be more complex and require more time, yet they may also result in greater consensus and speed of implementation. Effective stakeholder involvement that instills a sense of ownership or contribution can provide managers a final product – plans, decisions, or policies – that are more likely to be implemented, or less likely to be derailed (Burby, 2003; O’Connor et al, 2000). Additionally, participation may increase the likelihood that opposition to proposed policies or decisions will be exposed early, thereby limiting downstream complications. Failure to include citizen concerns, particularly at the early stages of a decision-making process, can lead to costly mistakes to the agency in terms of time, money, and credibility (Bryson, 2004). Moreover, as

noted earlier, participation is a key value in public organizations; therefore we expect that, overall, public managers will respond positively to efforts to increase citizen participation through the use of technology and e-government tools.

While there is research investigating the ways in which participation can advance or hinder decision-making and policy implementation, we know less about the ways in which electronic technologies and tools might increase, decrease, facilitate, or constrain outcomes. Interaction with external groups and citizens using participation technologies could increase the efficiency of citizen participation and thus increase government outcomes. On the other hand, the use of technologies to engage the public might be perceived as impersonal and result in citizens and managers feeling disconnected. Additionally, the use of participation technologies might overburden government managers or make them feel a loss of control as they are expected to engage citizens in multiple venues using a variety of modes.

Research indicates that technologies that enable a greater level of openness of the agency are likely to attract input and requests from different types of participants depending upon the salience of the problem under discussion, level of control or power held by different actors, responsiveness of actors to input, purpose of the communication, and other factors (Downes & McMillan, 2000; McMillan & Huang, 2002; Heeter, 1989). The complexity of this process requires substantial effort to manage. For example, with more input from citizens and external actors, managers face the challenge of incorporating external stakeholder needs in organization decision-making while balancing the competing desires of a diversity of actors. Further, some work has been done showing the importance of demonstrating how stakeholder input is integrated into decision outcomes (Masters 2002). Participative activity often requires evidence that external input is actually being incorporated into the final decisions, plans, policies or programs. Failure to do so may result in loss of trust or support from external stakeholders (Macintosh 2004; Rowe & Frewer, 2000). Research indicates that greater integration of external needs and demands is likely to result in a loss of managerial decision making autonomy and control. Although there is no research investigating how increased e-participation tools are related to managerial autonomy and control, we expect that greater use participation technologies will result in lower levels of perceived control.

We summarize the above arguments in the following hypotheses:

H1: Increased agency adoption of participation technologies will be related to perceptions about e-government outcomes.

*H1a: Increased agency adoption of participation technologies will be related to increased perceptions that e-government initiatives **improve governing processes**.*

*H1b: Increased agency adoption of participation technologies will be related to increased perceptions that e-government initiatives **improve government decision-making**.*

*H1c: Increased agency adoption of participation technologies will be related to increased perceptions that e-government initiatives **reduce control**.*

Department Technology Use

Research indicates that use of technology in a department is related to positive perceptions of technology and the outcomes of technology. In general, adoption and use of technology implies some level of recognition that the technology fits the organizational or managerial need. Prior research presents evidence that shows that managers adopt and deploy technology in ways that help them negotiate organizational challenges (Welch 2010; Moon & Bretschneider, 2002; Pandey & Bretschneider, 1997). For example, Welch (2010) finds that an organization's preferences and need for transparency drive the dissemination of information via websites. Moon and Bretschneider (2002) find that organizations use information technology to solve problems and that organizational capacity is positively associated with information technology innovativeness.

Additionally, major theoretical models in the adoption literature – such as the technology acceptance model – predict that factors such as usefulness, familiarity, relative advantage and compatibility will be related to technology adoption and subsequent use of that technology (Venkatesh et. al. 2003; Venkatesh & Davis 2000; Karahanna et. al. 1999). Therefore we also expect that managers in organizations that use technologies more will perceive those technologies and improving management outcomes. Because participation technologies are used for the purpose of assessing and integrating external demands into agency plans, decisions and policies, we expect that greater use of these technologies will be associated with higher perceptions that e-government initiatives improve governing processes and decision making and lower levels of perceived control by managers.

H2: Increased technology use (computer, internet, intranet) among employees in the department will be related to perceptions about e-government outcomes (improves government processes, improves government decision making, reduces control).

*H2a: Increased technology use (computer, internet, intranet) among employees in the department will be related to increased perceptions that e-government initiatives **improve governing processes.***

*H2b: Increased technology use (computer, internet, intranet) among employees in the department will be related to increased perceptions that e-government initiatives **improve government decision-making.***

*H2c: Increased technology use (computer, internet, intranet) among employees in the department will be related to increased perceptions that e-government initiatives **reduce control.***

Data and Methods

This research tests the proposed hypotheses using data from a 2010 national web survey of on e-government technology and civic engagement sponsored by the Institute for Policy and Civic Engagement (IPCE) at the University of Illinois at Chicago. The survey was administered to government managers in 500 local governments with citizen populations ranging from 25,000 to 250,000. Because larger cities often have greater financial and technical capacity for e-government, all 184 cities with a population over 100,000 were selected while a proportionate random sample of 316 out of 1,002 communities was drawn from cities with populations under 100,000. The data are weighted to reflect this sampling procedure. For each city, lead managers were identified in each of the following five departments: general city management, community development, finance, police, and parks and recreation. A total of 2,500 city managers were invited to take part in the survey. The survey began on August 2, 2010 and closed on October 11, 2010. The final response rate was 37.9%, with 902 responses.¹

Dependent Variables: This study uses three dependent variables that capture managers' beliefs of the extent to which e-government initiative produce positive and negative outcomes for citizens, the city, and local government. We draw the dependent variables from a series of items

¹ The population size was reduced to 2380 after removing bad addresses and individuals who were not longer working in the position.

in the questionnaire. Respondents were asked “*In your opinion, to what extent do electronic information and communication technologies lead to the following outcomes?*”

1. Improve governmental decision-making.
2. Lead to better policies.
3. Revitalize public debate.
4. Distort political information and facts.
5. Undermine democratic practices.
6. Improve information dissemination to external stakeholders and citizens.
7. Increase opportunity to interact and collaborate with other government officials.
8. Increase access to government services.
9. Enable feedback on service quality.
10. Enhance citizen trust of government.
11. Increase conflict with citizens.
12. Improve efficiency and lower costs of the department.

Response categories were: to a very small extent (1), to a small extent (2), somewhat (3), to a great extent (4), and to a very great extent (5). While we are interested in these 12 possible outcomes from e-government initiatives, we used factor analysis to reduce the data. A rotated Varimax Principal Component Analysis with Normalization indicated that the 12 items load onto three factors. The three factors are presented in Table 1. The first factor, with an Eigenvalue of 4.728 is named “Improve Governing Processes” since each of these items reflects the belief that electronic information and communication technologies lead to increased provision of and access to information, and increased interaction, collaboration, efficiency, feedback, and trust. The second factor, with an Eigenvalue of 2.038 is named “Improve Decision Making” and is comprised of three items that indicate that electronic information and communication technologies lead to better policies, decision-making, and debate. The third factor is named “Reduce Control” because these items indicate that electronic information and communication technologies lead to reduced control as they distort information and facts, undermine democratic practices, and increase conflict.

The factor analysis indicates that reducing the 12 items to three is warranted, since the three factors explain more than the items alone. However, because using factor scores as a dependent variable can lead to difficult and vague interpretation in the results, we instead build scales of the items from the factor analysis. Thus we summed the six questionnaire items that comprise the factor “Improve Governing Processes”, the three items that comprise the “Improve

Decision Making”, and the three items for “Reduce Control”. Scale reliability tests indicate that each of the scales is appropriate. The three scales range from “a very small extent” to “a very great extent”, with higher values indicating that respondents believe that e-government initiatives improve governing processes, improve decision making, and reduce control to a very great extent. The Cronbach’s alpha for each scale is reported in Table 2 along with the descriptive statistics for the three dependent variables.

Table 1: Factor Analysis for 12 Questionnaire Items on E-Government Outcomes

	Improve Governing Processes	Improve Decision Making	Reduce Control
Improve governmental decision-making.	0.269	0.885	-0.056
Lead to better policies.	0.243	0.892	-0.024
Revitalize public debate.	0.337	0.650	0.135
Distort political information and facts.	0.070	-0.050	0.850
Undermine democratic practices.	-0.151	-0.029	0.841
Improve information dissemination to external stakeholders and citizens.	0.730	0.322	-0.109
Increase opportunity to interact and collaborate with other government officials.	0.766	0.290	-0.029
Increase access to government services.	0.853	0.130	-0.039
Enable feedback on service quality.	0.834	0.145	0.031
Enhance citizen trust of government.	0.591	0.230	-0.180
Increase conflict with citizens.	-0.111	0.080	0.749
Improve efficiency and lower costs of the department.	0.500	0.376	-0.066
Initial Eigenvalues	4.728	2.038	1.153
% of Variance	39.404	16.981	9.608

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Table 2: Scale Reliability and Descriptive Statistics for Dependent Variables

	Cronbach’s Alpha	Mean	Std Dev.	Min	Max
Improve Governing Processes	.852	21.71	4.45	6	30
Improve Decision-Making	.836	9.42	2.468	3	15
Reduce Control	.751	6.78	2.595	3	15

Independent Variables. We include seven independent variables. Four variables capture the number of e-government tools used by departments and the frequency with which departments use the tools to engage with the public. First, we asked respondents to indicate if their department uses the following fourteen technologies to facilitate participation with citizens: blogs, online chats, discussion forums, e-mail, online newsletters, audio webcasts, text messaging, really simple syndication (RSS), social networking sites, video sharing sites, video webcasts, web surveys or polls, wikis, and electronic polling. The variable, **E-GovTools**, is the sum of the number of e-government tools used by department (See Table 3). E-GovTools ranges from zero to 14 with a mean of 3.70. Second, we asked respondents about the frequency of electronic interaction with different stakeholders including citizens, neighborhood associations, and interest groups. **Individual Citizens**, **Neighborhood Associations**, and **Interest Groups** indicate how often the department uses technology to each group. These variables are coded 0=never; 1=rarely, 2=sometimes, 3=often, and 4=very often.

Table 3: E-Government Tools for Facilitating Participation

E-Government Tools for Facilitating Participation	Mean	Std. Dev.	Min	Max
Blogs to facilitate participation	0.16	0.37	0	1
Online chats to facilitate participation	0.07	0.26	0	1
Discussion forums to facilitate participation	0.21	0.40	0	1
E-mail to facilitate participation	0.93	0.26	0	1
Online newsletters to facilitate participation	0.68	0.47	0	1
Audio webcasts to facilitate participation	0.21	0.41	0	1
Text messaging to facilitate participation	0.23	0.42	0	1
RSS to facilitate participation	0.15	0.36	0	1
Social networking sites to facilitate participation	0.52	0.50	0	1
Video sharing sites to facilitate participation	0.18	0.39	0	1
Video webcasts to facilitate participation	0.41	0.49	0	1
Web surveys or polls to facilitate participation	0.48	0.50	0	1
Wikis to facilitate participation	0.04	0.20	0	1
E-polls to facilitate participation	0.11	0.31	0	1
E-GovTools to Facilitate Participation	3.70	2.35	0	14

We include three variables to measure technology use in the department. First, **%Computer** is the percent of department employees who use a computer for work. **%Internet** is the percent of department employees who use the Internet for work. The dummy variable, **Intranet**, is coded one if the department or local government has an intranet.

Controls: We include control variables at the individual, department, and city level. We use three variables to capture individual level managerial perceptions. First, we include a variable, **Job Satisfaction**, which is a likert scale of agreement to the questionnaire item “All in all, I am satisfied with my job”, where 1=strongly disagree and 5=strongly agree. Second, we measure respondents’ perceptions of the department centralization. **Centralization** of the department is a scale comprised of the following four questionnaire items: (1) There can be little action taken here until a supervisor approves a decision. (2) In general, a person who wants to make his own decisions would be quickly discouraged in this agency. (3) Even small matters have to be referred to someone higher up for a final answer. Centralization ranges from 4=least centralized to 20=most centralized. The Cronbach’s alpha for the scale is .750. **Routineness** is the sum of the following two questionnaire items: (1) One thing people like around here is the variety of work. (2). Most jobs have something new happening every day. The Cronbach’s alpha for this scale is .636.

We also control for the respondent’s age, education, gender, and work tenure. **Age** is a continuous variable with a mean of 51. **College Graduate** is coded one if the respondent has a college degree. **Female** is coded one for women, zero for men. **YearsPosition** is the number of years that the respondent has served in the current position. **YearsCity** is the number of years that the respondent has worked for the city. We control for the respondent’s department with the following five dummy variables: Mayor’s Office or City Manager, Community Development Department, Finance Department, Parks and Recreation Department, and Police Department. We control for city population with the following five dummy variables: Population less than 49,999; Population 50,000 to 99,999; Population 100,000 to 149,999; Population 150,000 to 199,999; and Population 200,000 to 250,000. Table 4 lists the descriptive statistics for the variables in the models.

Table 4: Descriptive Statistics for Study Variables

	Mean	Std. Dev.	Min	Max
E-Government Participation & Engagement				
E-GovTools to Facilitate Participation	3.70	2.35	0	14
Individual Citizens	2.73	1.27	0	4
Neighborhood Associations	2.26	1.35	0	4
Interest Groups	2.12	1.32	0	4
Department Technology Use				
Percent dept. employees use Internet for work	73.28	30.53	0	100
Percent dept. employees use a computer for work	90.05	19.52	0	100
Intranet in local government or department	0.78	0.41	0	2
Controls				
Routineness	7.58	1.36	2	10
Job Satisfaction	4.26	0.77	1	5
Centralization	6.97	2.23	3	15
Population less than 49,999	0.50	0.50	0	1
Population 50,000 to 99,999	0.36	0.48	0	1
Population 100,000 to 149,999	0.08	0.28	0	1
Population 150,000 to 199,999	0.03	0.18	0	1
Population 200,000 to 250,000	0.02	0.14	0	1
Mayor's Office or City Manager	0.15	0.36	0	1
Community Development Department	0.23	0.42	0	1
Finance Department	0.17	0.38	0	1
Parks and Recreation Department	0.23	0.42	0	1
Police Department	0.21	0.41	0	1
Age	50.96	8.52	25	75
College Graduate	0.94	0.23	0	1
Female	0.23	0.42	0	1
Years worked in position	6.69	6.27	0	34
Years worked for City	13.95	10.59	0	44