E-GOVERNMENT: TRENDS AT THE GRASS ROOTS

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Electronic-government, or e-government, offers all levels of government the ability to communicate information, deliver services, and provide additional avenues designed to interact with and participate in government. Based on a detailed content analysis of government websites in conjunction with descriptive and multiple regression approaches, this study assesses and explains the level of e-government sophistication at the local level of government in the state of Oklahoma. The study hypothesizes that the council-manager form of government and increasing levels of organizational resources and socioeconomic wealth enhance e-government sophistication at the local level of government. While the findings mostly support the hypothesis, local governments in Oklahoma, like many municipalities across the country, have not fully embraced the potentials of e-government.

INTRODUCTION

Over the past two decades innovations in information communication technologies have contributed to new forms of interaction between governments and citizens in this and other industrialized countries. The adoption of these technologies at different levels of government has contributed to the emergence of electronic-government, or e-government, designed to communicate information, deliver services, and offer additional avenues designed to interact with and participate in government. An increasing body of research assesses and explains the breadth of e-government at the international and national levels, but a systematic analysis of e-government at the local level and across different population sizes remains scant. In an attempt to fill this gap this study focuses on e-government at the local level of government.

Based on a detailed content analysis of government websites in conjunction with descriptive and multiple regression approaches, this study assesses and explains the level of e-government sophistication at the local level of government in the state of Oklahoma. The study argues that the council-manager form of government as well as increasing levels of organizational resources and socioeconomic wealth enhance e-government sophistication at the local level of government. Following a brief review of the literature about current trends in e-government, this study operationalizes the relevant concepts and introduces the methodological framework. Using a series of benchmarks, the third part of the study analyzes the level of e-government sophistication across a sample of towns and cities in the state of Oklahoma.

TRENDS IN E-GOVERNMENT

With the aim to encourage the use of the Internet as an interactive tool of information retrieval, communication, transaction, and public outreach, many industrialized countries have embraced e-government (Hernon 2006; Nilsen 2006; Chadwick 2006; Petroni and Tangliente 2005; Brown 2005; Sancho 2005; Maniatis 2005). The idea of e-government in the United States was born by the late 1960s with the imagination of "interactive multi-access computer communities." Decades later, the idea of e-government crystallized with the release of

the 1997 *Access America: Reengineering through Technology* (Seifert 2006). For some, e-government can increase government efficiency, effectiveness, and transparency while improving the interactions between citizens and their government. However, technical, organizational, and cultural barriers continue to undermine the development of e-government in this and other industrialized countries (Petroni and Tagliente 2005; von Haldenwang 2004; Wong and Welch 2004; Snellen 2005; Seifert 2006).

As illustrated by the Center for Digital Government (2004), Darrell West (2005, 2004a, 2004b), Ramona McNeal et al. (2003), and Anna Brannen (2001), all states have embraced the idea of e-government. Noting the e-government differences among the states, McNeal et al. (2003) argue that the extent of e-government innovation at the state level are functions of legislative professionalism and, to a lesser extent, state professional networks. Others, like West (2005), explain e-government performance in relation to the number and breadth of online services, website reliability, quality of privacy policy, and overall performance using a range of organizational, fiscal, and political factors. While these factors, measured by levels of interest group lobbying, education, legislative professionalism, fiscal health, party competition, and citizen demand, are important, West (2005) concludes: "money is most crucial in terms of overall performance. States with the financial means to fund digital government are the ones that have earned the highest scores and received the highest ranks" (81).

Optimistic forecasts in the 1980s predicted the emergence of an automated city hall to become a reality in the near future. Others took a more realistic point of view arguing that "new information technologies show about a 10-year lag period between introduction in local government and acceptance and routinization in a significant population of local government" (King 1982, 25). Nevertheless, the use of the new information technologies at the local level has jumped from an estimated nine percent in 1995 to about ninety percent by the early 21st century (Holden, Norris, and Fletcher 2002). Some of the major factors determining the adoption of local e-government include the size of the local government unit, the type of municipal government and location. Large government units, especially those with city or metro status based on the professionally-driven council-manager form of government, adopted e-government earlier and to a

greater extent than their counterparts (Holden, Norris, and Fletcher 2002; Moon 2002).

The online presence of local government is apparent, but the degree of e-government sophistication continues to evolve. From a traditional bureaucratic paradigm, local government websites are mostly informative and are limited to providing a range of basic one-way services rather than transactional services (Phillips and Chase 1998; ICMA/PTI 2000, 2001, 2002; Ho 2002; Holden, Norris, and Fletcher 2002; Norris and Moon 2005). Responding to the information needs of specific groups within the community, city e-government has evolved beyond this information-oriented stage. From both an e-government paradigm and a user-oriented portal design, local governments are in the process of centralizing their citizen-oriented e-communication channels and categorizing their web-based services "according to the needs of different user groups" (Ho 2002, 437). Residents can communicate with a centrally managed service request system, learn about community events and employment opportunities, and acquire the agendas and minutes of various city governing bodies. At the same time, separate business websites offer relevant information concerning the local economic and fiscal environment (Ho 2002; Center for Digital Government 2005).

In recent years a dramatic increase in the electronic networking of the relevant local agencies and departments has allowed residents to conduct online services and transactions. An increasing percentage of cities now offer web portals and online services, including the payment of utility bills, parking tickets, building permits, and taxes, as well as the submission of city job applications, the application for permits, license renewal, and property registration. Mostly governed by the council-manager form of government, a series of relatively large and small cities such as Corpus Christi, Texas, Madison, Wisconsin, Roanoke, Virginia, and Delray Beach, Florida, have attained the highest level of service and transaction digitalization (Moon 2002; Center for Digital Government 2005). Despite these accomplishments, much more growth is possible, but the lack of technology, web staff, financial resources, and expertise have hampered further growth (Moulder 2001; Holden, Norris, and Fletcher 2002).

Over the past few years it has become increasingly possible to retrieve information about the local government and to complete various governmental transactions online. On the surface these ongoing ef-

forts sound simple but, as claimed and illustrated by research, they can profoundly shape government-citizen relationships. The provision of government online services "will likely have a positive effect on levels of citizen trust and confidence in their governments" (Nugent 2001, 230). Research by Caroline Tolbert and Karen Mosenberger (2006) confirms this claim illustrating that the use of local government websites creates greater trust in local government. Given this positive influence, greater accomplishments through information and communication technologies are possible. E-government can nourish an interactive and participatory democracy or e-democracy. At this stage, government websites are much more than highways flanked by billboards and a series of service stops along the way. Such sites can "extend public space [promoting] consultation and dialogue between citizens and their governments" (Lenihan 2005, 274).

Opinions about the merits of e-democracy are mixed. Advocates generally stress e-democracy as an extension of governance, while others perceive the implementation of it as running counter to a liberal democracy (Clift 2004; Knowles 2005; Johnson 2006). The optimists argue that the Internet can be used to "enhance our democratic processes and provide increased opportunities for individuals and communities to interact with government and for the government to seek input from the community" (Clift cited in Riley and Riley 2003, 11). Similar to the argument made by Robert Putnam (2000) about the relationship between technology and the loss of social connectedness, critics claim that the impersonal dialogue encouraged by e-government and the cultural values associated with the Internet-based technologies undermine the participatory nature of a democratic political system (Johnson 2006). Nevertheless, research points to promising advances made by local governments in e-democracy. The City of St. Paul, Minnesota, offers an email notification and personalization option while the Village of Hastings, New York, provides an online input system (Clift 2004).

Other studies take a broader scope and concur with the overall assessment of e-democracy at the local level. Studying websites in the hundred largest U.S. metropolitan statistical areas, James Scott (2006) finds that most cities allow citizens to interact with elected officials and use a variety of online services. This research also shows that while some cities try, only a few successfully facilitate participatory democracy through online public dialogue and consultation (Scott 2006; Holzer, Hu,

and Song 2004). As with the delivery of sophisticated online services, several obstacles remain regarding e-democracy. They include the lack of information technology expertise to reduce errors and tampering with the system, the limited access of the poor to e-government, and the uneven telecommunication infrastructure across the country (Moynihan 2004; Toregas 2001; Cavanaugh 2000).

RESEARCH DESIGN

A single definition of e-government does not exist in the research literature since its conceptual scope ranges from the narrow to the broad. As discussed by Ignace Snellen (2005), e-government at the informative level provides basic information about government operations and services. Beyond this basic level government can seek higher levels of e-government by allowing citizens to interact and communicate with government, conduct online transactions with government, and gain access to other aligned websites of public and even a private nature (Snellen 2005). E-government is defined as the "transformation process of the Public Administration as a whole and of its interaction with people; this process, through information and communication technologies (ICTs), aims at optimizing the provision of services, at increasing participation by citizens and enterprises . . . ." (Petroni and Tagliente 2005, 24).

Typically, the implementation and assessment of e-government has relied on a sequential approach (Giuliani 2005; Petroni and Tagliente 2005; Scott 2006; West 2005, 2004; Chadwick and May 2003; Moon 2002). Accordingly, this study relies on a three-level approach to assess local e-government sophistication. It concerns the ability of local government websites to communicate information, offer a range of online services, and facilitate interaction with the government and the community. The billboard level emphasizes the display of information used by city residents to evaluate the performance of government and the elected officials. The service-delivery level allows multiple constituents, including city residents, businesses, and visitors to gain tangible benefits from the use of online services. The interactive democracy level offers a range of interactive features that facilitate both interactive communication and involvement in both the government and community. **Table 1** operationalizes the dependent variables associated with three-level assessment of e-government.

To measure the influence of organizational factors at the local level in terms of government type and the resources available on the dependent variables, this study distinguishes among the major forms of local government (i.e. town, council-manager, and mayor-council) and considers the current number of full-time employees. As for the socio-economic wealth of the community, the measure includes the median household income. The study hypothesizes that the council-manager form of government and increasing levels of organizational resources and socioeconomic wealth enhance e-government sophistication at the local level of government. The three regression models that will be estimated can thus be summarized in the following equations:

$$Y_{bibo} = â_0 + â_1 town + â_2 coma + â_3 fuem + â_4 hoin + c$$
$$Y_{sede} = â_0 + â_1 town + â_2 coma + â_3 fuem + â_4 hoin + c$$
$$Y_{inde} = â_0 + â_1 town + â_2 coma + â_3 fuem + â_4 hoin + c$$

Where:coma = council-manager; fuem = full-time employees; hoin = household income

To test the hypothesis, this study conducted a detailed content analysis of municipal websites between November 1 and November 30, 2006. Descriptive and multiple regression approaches were used to analyze the data. Based on population categories, this study, by oversampling municipalities with a population between 100 and 20,000, drew a disproportionate stratified sample of 60 incorporated towns and cities in the state of Oklahoma. Under Oklahoma law, localities with more than a population of 1,000 can choose their form of government (i.e. council-manager and mayor-council). Cities with more than 2,000 may become charter cities using any of the aforementioned forms, while places with fewer than 1,000 are generally considered towns (Oklahoma Almanac 2005). The United States 2000 Census, the *Oklahoma Almanac* (2005) and the Oklahoma Municipal League and the Oklahoma Conference of Mayors (2006) served as the principal data sources to determine the municipalities' size, governing structure, organizational resources, and socioeconomic characteristics.

TABLE 1

The Three-Level Assessment of Local E-Government Sophistication

Level	Definition	Indicators
Billboards	To evaluate the performance of government and the elected officials, government websites providea wide range of government-related information to the local resident.	News and Notices Council Meeting Agendas Council Meeting Minutes Board/Committee Agendas Board/Committee Minutes Regulations and Ordinances Finances and Budget Background of Elected Officials Email Address for Elected Officials
Interactive Democracy	To facilitate and encourage communication with and involvement in government and community organizations, government websites offer forums and opportunities for informed policy discussion and participation in government and the community	Email Notification E-Comment Forms Discussion Forums E-Polling Voter Registration Facilitate Voluntary Services
Service Delivery	To serve multiple constituents, government websites offer city residents, businesses, visitors and others tangible benefits through online services.	Employment Opportunities Payment of Taxes Payment of Utility Payment of License Fees Payment of Fines Request for Services Request for Records Permit Application/Renewal Property Registration

Source: Author's calculations.

ANALYSIS

Interesting patterns emerge regarding website presence at the local level relative to both population size and form of government. As expected the prevalence of municipal websites generally increases for those localities included within the larger population categories. Based on the sample, towns between 100 and 1,000 citizens have no website presence, while only 22 percent of those municipalities between 1,001-2,000 people offer and maintain a website. This trend of low website presence reverses for cities with a population larger than 2,001. From that point on, the Internet presence of local government tends to increase steadily and all cities with a population of more than 30,001 offer websites to residents and visitors alike (see **Table 2**).

In addition to the size of municipalities, the form of government matters and yields expected patterns. Only 9.1 percent of the towns but 50.0 percent of the mayor-council municipalities in Oklahoma have websites respectiv ely. As illustrated in **Table 3**, the website presence

TABLE 2

Website Presence by City Population Category

City Population Category	Website Presence		
	No	Yes	Total
100-1,000	15 (100.0%)	0 (0.0%)	15 (100%)
1,001-2,000	7 (78.0%)	2 (22.0%)	9 (100%)
2,001-6,000	2 (25.0%)	6 (75.0%)	8 (100%)
6,001-10,000	2 (33.0%)	4 (67.0%)	6 (100%)
10,001-20,000	1 (12.5%)	7 (87.5%)	8 (100%)
20,001-30,000	1 (20.0%)	4 (80.0%)	5 (100%)
30,001-50,000	0 (0.0%)	4 (100.0%)	4 (100%)
50,001-70,000	0 (0.0%)	2 (100.0%)	2 (100%)
More than 70,000	0 (0.0%)	3 (100.0%)	3 (100%)
Total	28 (47.0%)	32 (53.0%)	60 (100%)

Source: Author's calculations.

TABLE 3

Website Presence by Form of Government

		Form of Government		
	Town	Mayor Council	Council Manager	Total
No Website	20 (90.9%)	5 (50.0%)	3 (10.7%)	28 (47.0%)
Website	2 (9.1%)	5 (50.0%)	25 (89.3%)	32 (53.0%)
Total	22 (100%)	10 (100%)	28 (100%)	60 (100%)

Source: Author's calculations.

increases to 89.3 percent for municipalities governed by the council-manager system. Moreover, the use of the Internet by local governments as a means to provide a variety of information, services, and opportunities to interact with government or get involved in the community reflects the leadership position of the council-manager form of government.

Table 4 reveals that the billboards level is the most developed area at the local level compared to the more sophisticated service delivery and the interactive democracy levels. Accordingly, municipalities offer a variety of services, ranging from information about the history of the municipality and government structure to information about the missions and services provided by the municipal departments. The most prevalent information provided via the Internet include council agendas and minutes, news and notices, other board and committee agendas, regulations and ordinances, and elected officials' email contacts. Common among the council-manager cities with a mean billboard score of 11.0, these information services are rarely provided by the towns and mayor-council communities with mean scores of 0.4 and 3.4, respectively.

The service delivery and interactive democracy levels are the least developed relative to all forms of government. Table 4 illustrates that none of the towns and only a small fraction of mayor-council municipalities offer specific online services and interactive democracy tools. In contrast, council-manager communities generally score higher

TABLE 4

Billboards, Services, and Interactive Democracy by Form of Government

		Form of Government	
	Town	Mayor Council	Council Manager
Billboards			
Council Agendas	1 (4.5%)	3 (30.0%)	22 (78.6%)
Council Minutes	1 (4.5%)	0 (0.0%)	11 (39.3%)
Board/Committee Agendas	1 (4.5%)	3 (30.0%)	20 (71.4%)
Board/Committee Minutes	1 (4.5%)	0 (0.0%)	10 (35.7%)
Finance and Budget	0 (0.0%)	1 (10.0%)	13 (46.4%)
News and Notices	0 (0.0%)	3 (30.0%)	21 (75.0%)
Regulations and Ordinances	0 (0.0%)	2 (20.0%)	18 (64.3%)
Background of Elected Officials	0 (0.0%)	1 (10.0%)	9 (32.1%)
Email Address for Mayor	0 (0.0%)	2 (20.0%)	16 (57.1%)
Email Address for Council Members	0 (0.0%)	2 (20.0%)	14 (50.0%)
Billboard Mean Score	0.4	3.4	11.0
Service Delivery			
Payment of Taxes	0 (0.0%)	0 (0.0%)	0 (0.0%)
Payment of Utilities	0 (0.0%)	0 (0.0%)	7 (25.0%)
Payment of License Fees	0 (0.0%)	0 (0.0%)	0 (0.0%)
Payment of Fines	0 (0.0%)	0 (0.0%)	3 (10.7%)
Employment Opportunities	0 (0.0%)	2 (20.0%)	22 (78.6%)
Request Services	0 (0.0%)	0 (0.0%)	1 (3.6%)
Request Records	0 (0.0%)	0 (0.0%)	0 (0.0%)
Permit Application	0 (0.0%)	0 (0.0%)	0 (0.0%)
Property Registration	0 (0.0%)	0 (0.0%)	0 (0.0%)
Voter Registration Search	0 (0.0%)	0 (0.0%)	0 (0.0%)
Service Delivery Mean Score	0.0	0.4	2.4
Interactive Democracy			
Enabled Links	0 (0.0%)	4 (40.0%)	20 (71.4%)
E-Comment Forms	0 (0.0%)	2 (20.0%)	7 (25.0%)
E-Notification	0 (0.0%)	0 (0.0%)	1 (3.6%)
Voter Registration	0 (0.0%)	0 (0.0%)	1 (3.6%)
Discussion Forums	0 (0.0%)	0 (0.0%)	0 (0.0%)
E-Polling	0 (0.0%)	0 (0.0%)	1 (3.6%)
Facilitate Voluntary Service	0 (0.0%)	1 (10.0%)	13 (46.4%)
Interactive Democracy Mean Score	0.0	1.4	3.0

Source: Author's calculations.

regarding service delivery and interactive democracy with mean scores of 2.4 or 3.0, respectively. Accordingly, a number of council-manager cities post employment opportunities and allow residents to pay both utility bills and fines. Council-manager communities are also in the early stages of nourishing interactive democracy by allowing residents to learn about and get involved in civic organizations like churches, youth organizations, historical societies, and other volunteer-based organizations in the community.

The multiple regression analysis presented in **Table 5** further supports some of the previous trends. Overall, the model estimating the influence of forms of government, organizational resources, and socio-economic characteristics on the level of e-government sophistication in terms of billboards, service delivery, and interactive democracy yielded influential and statistically significant coefficients. The results shown in **Table 5** suggested that organizational resources measured by number of full-time employees and socioeconomic characteristics measured by the median household income accounted for some significant variation in the overall model estimations. The town government, while insignificant, had a consistent negative impact on e-government sophistication. Accordingly, the most important variable contributing to increasing e-government sophistication, especially with respect to the billboards and service delivery levels was the council-manager form of government. Except for the interactive democracy level, the council-manager variable explained most of the variations in the billboards and service delivery models and remained significant at the $p<0.01$ level across the three levels of e-government sophistication.

CONCLUSION

This study represents one of the first extensive and systematic analyses of municipal government websites in the state of Oklahoma. Guided by the literature on e-government sophistication and based on a disproportionate stratified sample of 60 municipalities, this paper assesses the ability of local governments to provide information, services, and democracy-enhancing tools via the Internet. The study hypothesizes a positive relationship between the council-manager form of government, organizational resources, and socioeconomic characteristics on the one

Table 5

The Determinants of Local E-Government Sophistication

	Billboards	Service Delivery	Interactive Democracy
Town	-.096	-.072	-.171
	(1.701)	(.488)	(.573)
Council Manager	.460	.451	.330
	(1.841)**	(.528)**	(.620)**
Full-time Employees	.266	.094	.360
	(.004)*	(.001)	(.001)**
Median Household Income	.134	.281	-.046
	(.000)	(.000)*	(.000)
Constant	-1.548	-1.439	1.008
	(2.509)	(.720)*	(.845)
R Square	.640	.535	.536
Adjusted R Square	.613	.500	.501
F	23.553***	15.245***	15.293***
N	60	60	60

$*p<0.05$ $**p<0.01$ $***p<0.001$

Source: Author's calculations.

Note: The numbers are the standardized least squares regression coefficients, with the standard error in parentheses. The number of asterisks indicates the level of statistical significance. Tolerance statistics show that there is no multicollinearity in the model.

hand and local e-government sophistication on the other. The descrip-
tive and multiple regression analyses mostly support the hypothesis
but also find mixed results depending on the level of e-government
sophistication.

As suggested by the literature, many government sites associated
with larger municipalities, endowed with more organizational resources,
and governed by the council-manager system attained relatively high
levels of e-government sophistication. These municipalities, in con-
trast to their smaller counterparts and those governed by the town and
mayor-council systems, did particularly well in terms of providing
a wide array of information concerning the structure, function, and
operation of government. Beyond this information-driven billboards
level, local e-government performance regarding online service deliv-
ery and interactive democracy declined substantially. A relatively small
proportion of municipalities provided online services or facilitated a
meaningful involvement of residents in government and in the com-
munity, as defined by the service delivery and the interactive democracy
levels. Nevertheless, across the levels of e-government sophistication
the council-manager municipalities clearly outperformed the town and
mayor-council communities.

As demonstrated by other scholars, the findings clearly suggest that
local governments have adopted the Internet to inform their residents.
With respect to providing online services and enhancing democratic
engagement through the new information communication technologies,
local governments in Oklahoma are in the early stages of implementa-
tion. As such, despite the advances made in information communication
technologies in recent decades, local governments in Oklahoma, similar
to many municipalities across the country, have not fully embraced and
implemented the range of possibilities associated with e-government.
This research encourages other scholars to discuss the delivery of online
services and the meaning of e-democracy at the local level while at the
same time comparing the level of local e-government sophistication
across municipalities in the United States as well as other countries.

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