

E-Government: Trends and Sophistication at the Local Level of Government

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ABSTRACT

Innovations in information communication technologies have contributed to new forms of interaction between governments and citizens in the United States and other industrialized democracies. 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. 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 across different States in the United States. The study argues that local e-government sophistication increases for municipalities governed by professional managers, endowed with more organizational resources, characterized by higher socioeconomic levels, increasing population size, and located in the west. While the findings support the hypothesis, the descriptive analysis also illustrates that local governments have not fully embraced the potentials of e-government.

Keywords: e-government, assessing e-government sophistication, e-democracy, municipalities.

INTRODUCTION

Over the past two decades, innovations in information communication technologies have contributed to new forms of interaction between governments and citizens in the United States and other industrialized democracies. 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 participation in government. An increasing body of research examines the breadth of e-government at the international and national levels, while 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. The focus rests on small to relatively large municipalities located in the western, southern, and eastern regions of the United States. The study argues that e-government sophistication increases for

municipalities governed by professional managers, endowed with more organizational resources, characterized by higher socioeconomic levels, increasing population, and located in the west. Following a brief review of the literature about current trends in e-government, this study defines the relevant concepts and introduces the methodological framework. The third part of the study analyzes the contents of local websites and the level of local e-government sophistication across a random sample of municipalities.

LITERATURE REVIEW

With the aim to encourage the use of the internet as a interactive tool of information retrieval, communication, transaction, and public outreach, many industrialized countries have embraced e-government [1; 6; 9; 19; 24; 29; 32]. The idea of e-government in the United States was born with the imagination of "interactive multi-access computer communities" by the late 1960s. Decades later, the idea of e-government crystallized with the release of the 1997 *Access America: Reengineering through Technology* [34]. For some, e-government can increase government efficiency and transparency and improve citizen-government interactions. However, technical, organizational, and cultural barriers continue to undermine the development e-government (29; 34; 35; 39; 43).

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" [16, p. 25]. Within the last ten years, 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 [11]. Large governments units, especially those with city or metro status, governed by the professionally-driven council-manager form of government, and located in the west, adopted e-government earlier and to a greater extent than their counterparts [11; 21].

From a traditional bureaucratic paradigm, local government websites are mostly informative and limited to providing a range of basic one-way services rather than transactional services [30; 10; 11; 13; 14; 15; 30]. Responding to the information need 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. Residents can communicate with a *centrally managed service request system*, learn about

community events and employment opportunities, acquire city governing body agendas and minutes [3; 10].

An increasing percentage of the cities offer online services, including the payment of utility bills, parking tickets, building permits, and taxes, submission for city job applications, and application for permits, license renewal, and property registration. Particularly, the professional influence of city managers on local governance “[strengthens] communication with the community” and seems to be conducive to the development and expansion of e-government at the local level [36, p. 161]. Accordingly, a series of cities, mostly guided by professional managers, have attained high levels of e-government sophistication [3; 21]. Despite these accomplishments, much more growth is possible, but especially the lack of a technology infrastructure, staff, financial resources, and expertise hamper further growth [11; 22].

Over the past few years, it has become increasingly possible to retrieve information about the local government and complete various governmental transactions online. On the surface, these ongoing efforts 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” [26, p. 230]. Research by Caroline Tolbert and Karen Mosenberger [37] confirm 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 a interactive and participatory democracy or e-democracy. At this stage, government websites are much more than high-speed highways flanked by billboards and a series of service stops along the way. E-democracy provides an opportunity to “extend public space [promoting] consultation and dialogue between citizens and their governments [18, p. 274].

Advocates of e-democracy generally stress e-democracy as an extension of governance [7; 17]. For them, the internet can be used to “enhance our democratic processes and provide increased opportunities for individuals and communities to interact with government for the government to seek input from the community [31, p 11]. Despite recent efforts by governments to encourage participation in online governance, only a few have attained a meaningful level of e-democracy (Riley and Riley 2003). Nevertheless, research points to promising advances made by local governments in the area of e-democracy. The City of St. Paul, Minnesota offers an email notification and personalization option, the Village of Hastings, New York provides an online input system, and Vienna, Austria hosts online public issue forums [7].

Studying websites in the hundred largest U.S. metropolitan statistical areas, James Scott [33] finds that most cities allow citizens to interact with elected officials and to utilize a variety of online services. This research also shows that while some cities try, only a few facilitate participatory democracy through online public dialogue and consultation [11; 33]. 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 [2; 23; 38].

METHODOLOGY

As discussed by Ignace Snellen [35], 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 private nature [35]. 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...” [29, p. 24].

Typically, the implementation and assessment of e-government has relied on a sequential approach [5; 8; 21; 29; 33; 40; 42]. 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 billboards 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, visitors, to gain tangible benefits from the use of online services. The interactive democracy level offers a range of interactive features that facilitate encourage the interactive communication with and involvement in both the government and community.

Professional management, available organizational resources, and demographic characteristics influence the level of local e-government sophistication. In addition, this study argues that socioeconomic attainment is another influential variable. The respective indicators for the independent variables are: 1) the presence of professional managers; 2) the number of administrative full-time employees; 3) the population and regional location of municipalities; and 4) the percentage of both, residents with a college or professional degree and families living below the poverty line. The study argues that e-government sophistication increases for municipalities guided by professional managers, endowed with more organizational resources, characterized by higher socioeconomic levels, increasing population, and located in the western region of the United States.

To test the hypothesis, this study conducted a detailed content analysis of municipal websites between November 1, 2006 and January 15, 2007 to construct an additive index for the respective e-government sophistication levels. Descriptive and multiple regression approaches were used to analyze the data. Based on different population categories to include small, medium-sized and large municipalities, this study drew a disproportionate stratified sample of about 200 incorporated

towns and cities in the States of Washington (WA), Wyoming (WY), Oklahoma (OK), Arkansas (AR), and Maine (MA). The United States 2005 census data, the Oklahoma Almanac (2005) and data collected by the respective municipal state associations served as the principal data sources to determine the municipalities' size, governing structure, organizational resources, and socioeconomic characteristics. To verify information and to close gaps in the data, numerous municipalities were contacted by email and telephone.

FINDINGS

Interesting patterns emerge regarding the presence and sophistication of e-government across the different population categories in terms of billboards, service delivery, and interactive democracy. As expected, the online presence of local governments increases as a function of a growing population. For the selected population categories, the presence of e-government for municipalities between 100 to 1,000 residents is about 13.0 percent. This relatively low, but visible, internet presence almost triples to about 36.0 percent for municipalities with a population between 1,001 and 2,000. From this point on, online presence increases further to about 80.0 percent for municipalities between 2,001 and 10,000 residents and eventually stabilizes at a fully comprehensive online presence for municipalities larger than 30,000 (see Figure 1).

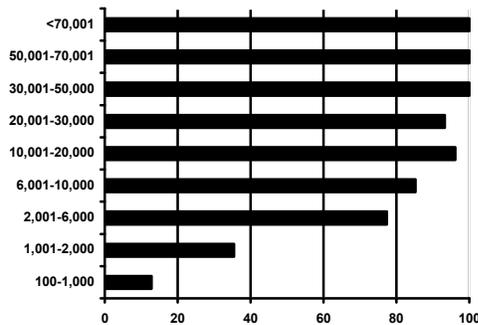


Figure 1: Online Presence by Population Category (in percent)

The descriptive analysis regarding e-government sophistication across the selected population categories illustrates similar patterns. As indicated by the respective billboards, service delivery, and interactive democracy mean scores in Figure 2, small municipalities with a population between 100 and 2,000 residents are generally characterized by low e-government sophistication. They only provide a few essential information nuggets about government via the internet and rarely expand into the more sophisticated service delivery and interactive democracy areas. A visible expansion into the service delivery and interactive democracy levels occurs for municipalities with a population of more than 2,000.

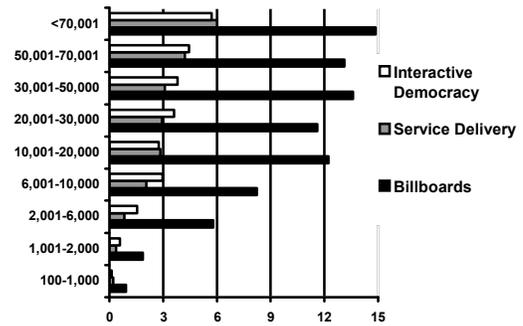


Figure 2: Local E-Government Sophistication by Population Category (mean scores)

Interesting patterns also emerge regarding the presence and sophistication of e-government across the municipalities in the selected States. Moving from the eastern to the western regions of the United States, localities in Maine and especially those in Wyoming and Washington have a much stronger website presence at the local level in comparison to their southern cousins. With an overall website presence at 71.7 percent, localities in Maine closely trail their counterparts in Washington (80.0 percent) and Wyoming (76.9 percent). In contrast, the online presence of municipalities in the States of Arkansas and Oklahoma drops to 54.2 percent and 53.2 percent, respectively (see Figure 3).

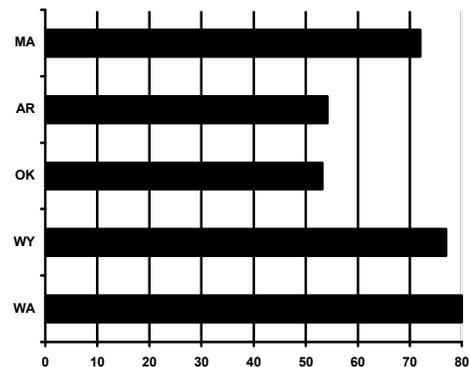


Figure 3: Online Presence by State (in percent)

Similar patterns emerge regarding e-government sophistication. Municipalities located in the east and west exhibit considerably higher levels of e-government sophistication than their counterparts in the south. Accordingly, the respective mean scores regarding billboards, service delivery, and interactive democracy for municipalities are 8.3, 2.2, and 2.7 for Maine, 10.0, 2.7, and 3.0 for Washington, and 9.0, 2.0, and 2.2 for Wyoming. The respective e-government sophistication mean scores in the south are much lower at 4.1, 0.9, and 1.0 for Arkansas municipalities and 5.4, 1.2, and 1.6 for the sampled municipalities in Oklahoma. In addition, the data reveals that the billboards level is by far the most developed area at the local

level compared to the more sophisticated service delivery and the interactive democracy levels (see Figure 4).

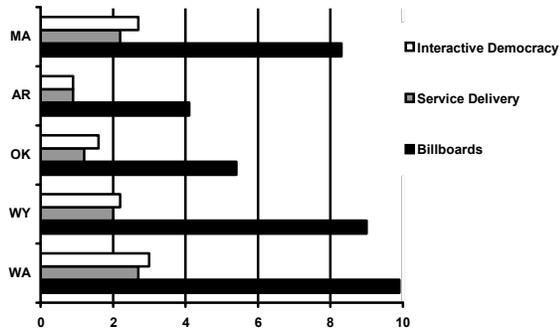


Figure 4: Local E-Government Sophistication by State (mean scores)

The prevalence of the specific content items associated with the billboards, delivery, and the interactive democracy levels are a reflection of the previous trends. In contrast to municipalities in the south, those in the east and west offer a broader array of information, ranging from the current government structures to information about the missions of and services provided by city hall. Particularly, the most prevalent information provided via the internet include news and notices, regulations and ordinances, council minutes, council agendas, and email contacts of the elected officials. Background information about the elected officials and commission agendas are the least common municipal online information features (see Figure 5).

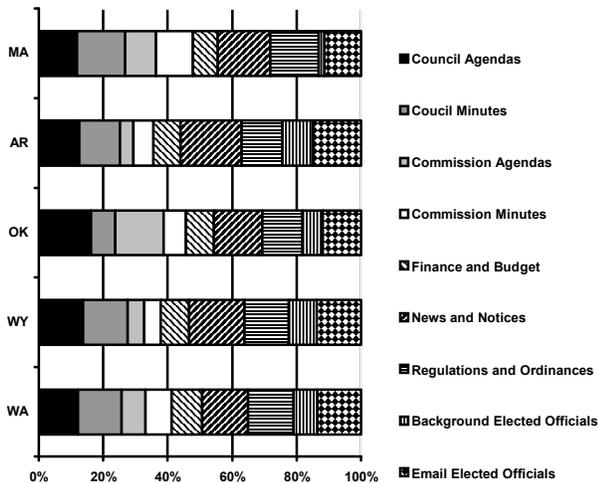


Figure 5: Billboards Contents by State (in percent)

The service delivery and interactive democracy levels are the least developed e-government areas. Accordingly, only a few specific services and interactive democracy tools are offered online on a consistent basis. Nevertheless, trends are visible. The most consistent service delivery items across municipalities

include the payment of utility bills and fines, while the possibility of registering property through the internet is a common online feature for municipalities located in the east and west. In contrast, only a fraction of municipalities allows residents to apply for permits and search voter registration databases (see Figure 6).

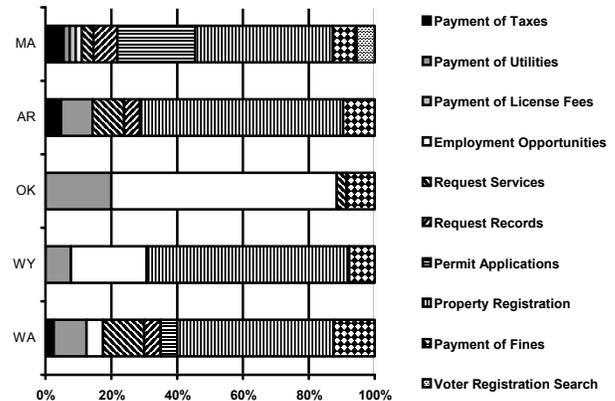


Figure 6: Service Delivery Contents by State (in percent)

Communities are also in the early stages of nourishing interactive democracy. Through enabled links, numerous municipalities, particularly in the east and west, allow residents to learn about and get involved in civic organizations, such as churches, youth organizations, and other volunteer organizations. Other common interactive democracy online features are the availability of online comment forms to ascertain input from residents and the explicit encouragement by city halls to volunteer for services on government and civic organization committees or boards (see Figure 7).

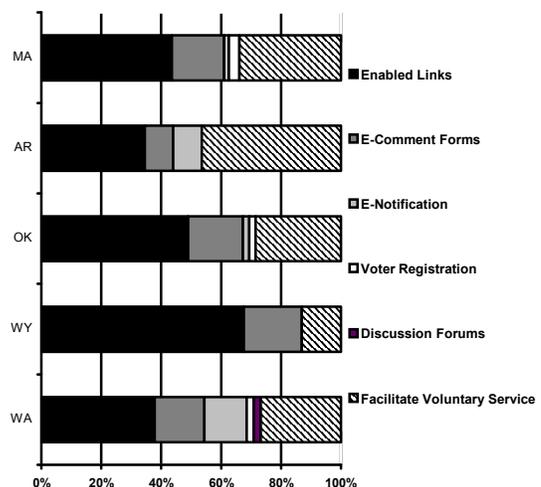


Figure 7: Interactive Democracy Contents by State (in percent)

In addition to the population and location of municipalities, the specific administrative perspective provided by professional managers makes a difference in each State. Municipalities guided by professional managers tend to have a stronger online presence than those without. In fact, municipalities with professional managers in Oklahoma and Arkansas are able to more than double their online presence. With the exception of a few municipalities in Oklahoma and Maine, municipalities with a professional manager in the States of Washington, Wyoming, and Arkansas have a fully comprehensive website presence (see Figure 8).

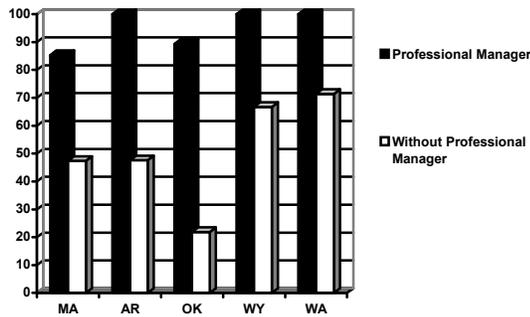


Figure 8: Online Presence by Professional Management (in percent)

As expected, the degree of local e-government sophistication in each state varies considerably with the presence or lack of professional managers. Accordingly, Table 1 indicates that the use of the internet by local governments as a means to provide information, services, and opportunities to interact with the government strengthens for those communities with professional managers. Depending on the specific level of e-government sophistication, this is again most obvious for communities in Oklahoma and Arkansas. The presence of professional managers in these states coincides with a four to twenty-three fold increase in the respective mean scores for billboards, service delivery, and interactive democracy.

Local E-Government Sophistication				
State	Professional Management	Billboards	Service Delivery	Interactive Democracy
MA	With	10.6	3.0	3.6
	Without	4.0	0.7	1.0
AR	With	12.6	3.6	2.6
	Without	2.9	0.4	0.6
OK	With	10.0	2.3	2.9
	Without	1.2	0.1	0.4
WY	With	12.5	3.0	3.5
	Without	7.3	1.5	1.5
WA	With	14.8	3.5	4.6
	Without	7.7	2.2	2.1

Table 1: Local E-Government Sophistication by Professional Management (mean scores)

The multiple regression analysis presented in Table 2 confirms most of the previous trends. The models estimating the

influence of professional management, organizational resources, socioeconomic characteristics, population, and location on the level of local e-government sophistication in terms of billboards, service delivery, and interactive democracy yield influential and statistically significant coefficients. As suggested by the research literature, professional management and educational attainment are consistently influential and significant across the models. The remaining determinants of local e-government sophistication mostly behave as expected but are not consistently significant. Overall, the respective R squares adjusted suggest that the combined influence of the independent variables explain 45-51 percent of the variation in the dependent variables.

Particularly, municipalities located in the west tend to perform better in terms of e-government sophistication compared to those located in the south. In contrast to southern municipalities, there is a consistent positive relationship between municipalities in the west and their level of e-government sophistication. Furthermore, there is a consistent but negative relationship between families below poverty line and local e-government sophistication. However, as with municipalities located in the west, this variable is only significant in relation to the billboards model. To some extent, these patterns are also visible regarding the influence of population, which, interestingly, has an exclusive significant positive and negative influence on the billboards and service delivery levels, respectively. The most important variables contributing consistently and positively to local e-government sophistication at $p = <0.006$ are the educational attainment of residents and especially the presence of professional managers.

	Billboards	Service Delivery	Interactive Democracy
Professional Management	.420 (.754)***	.307 (.308)***	.346 (.312)***
Fulltime Employees	-.454 (.002)**	.811 (.001)***	.011 (.000)
College/Professional Degree	.199 (.075)***	.172 (.031)***	.220 (.031)***
Families below Poverty Line	-.129 (.060)**	-.069 (.025)	-.070 (.025)
Population	.686 (.000)***	-.347 (.000)*	.331 (.001)
Region (West)	.167 (1.027)**	.090 (.419)	.057 (.425)
Region (South)	-.054 (.913)	-.053 (.373)	-.095 (.377)
Constant	3.689 (1.149)**	.608 (.469)	.805 (.475)*
R Square	.526	.499	.467
Adjusted R Square	.508	.480	.447
F	28.715***	25.771***	22.669***
N	204	204	204

* $p < 0.1$ ** $p < 0.06$ *** $p < 0.006$

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 models.

Table 2: Determinants of E-Government Sophistication

CONCLUSION

The findings show that many local websites associated with professional management, higher socioeconomic status, and located in the west embrace e-government and attain relatively high levels of e-government sophistication. These municipalities, in contrast to those that lack professional managers, are characterized by lower socioeconomic levels, and are located in the south, do particularly well in terms of providing a wide array of government related information. Beyond this information-driven billboards stage, local e-

government performance regarding online service delivery and interactive democracy declines substantially and across the board. A relative small proportion of municipalities provide online services or facilitate a meaningful involvement of residents in government and in the community, as defined by the service delivery and the interactive democracy levels. Nevertheless, across these higher levels of e-government sophistication, municipalities characterized by stronger socioeconomic attainment and especially those with professional managers continue to outperform their counterparts.

As demonstrated by other scholars, the findings clearly suggest that local governments have widely embraced the internet as a tool to inform their residents. With respect to providing online services and enhancing democratic engagement through the new information communication technologies, local governments across the United States are still in the early stages of implementation. As such, despite the advances made in information communication technologies in recent decades, local governments in the United States have not fully acknowledged and realized the more advanced and probably more challenging stages of e-government. Given the rapid advancements in information communication technologies, this research encourages other scholars to discuss the policy implications of online service delivery and e-democracy and to expand the comparison of e-government sophistication to municipalities in this and other industrialized democracies.

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