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The Evolution of E-Government among Municipalities: Rhetoric or Reality?

Information technology has become one of the core elements of managerial reform, and electronic government (e-government) may figure prominently in future governance. This study is designed to examine the rhetoric and reality of e-government at the municipal level. Using data obtained from the 2000 E-government Survey conducted by International City/County Management Association and Public Technologies Inc., the article examines the current state of municipal e-government implementation and assesses its perceptual effectiveness. This study also explores two institutional factors (size and type of government) that contribute to the adoption of e-government among municipalities. Overall, this study concludes that e-government has been adopted by many municipal governments, but it is still at an early stage and has not obtained many of expected outcomes (cost savings, downsizing, etc.) that the rhetoric of e-government has promised. The study suggests there are some widely shared barriers (lack of financial, technical, and personnel capacities) and legal issues (such as privacy) to the progress of municipal e-government. This study also indicates that city size and manager-council government are positively associated with the adoption of a municipal Web site as well as the longevity of the Web site.

Introduction

Information technology (IT) has become one of the core elements of managerial reform, and electronic government (e-government) may figure prominently in future governance. IT has opened up many possibilities for improving internal managerial efficiency and the quality of public service delivery to citizens. IT has contributed to dramatic changes in politics (Nye 1999; Norris 1999), government institutions (Fountain 2001), performance management (Brown 1999), red tape reduction (Moon and Bretschneider 2002), and re-engineering (Anderson 1999) during the last decade. The Clinton administration attempted to advance e-government, through which government overcomes the barriers of time and distance in providing public services (Gore 1993). Recently, some studies have found widespread diffusion of various IT innovations (mainframe and PC computers, geographical systems, networks, Web pages, etc.) in the public sector (Cats-Baril and Thompson 1995; Ventura 1995; Nedović-Budić and Godschalk 1996; Norris and Kraemer 1996; Weare, Musso, and Hale 1999; Musso, Weare, and Hale 2000; Landsbergen and Wolken 2001; Layne and Lee 2001; Nunn 2001; Peled 2001).

On June 24, 2000, President Clinton delivered his first Webcasted address to the public and announced a series of new e-government initiatives. One highlight of these new initiatives was to establish an integrated online service system that put all online resources offered by the federal government on a single Web site, *www.firstgov.gov*. The initiative also attempted to build one-stop access to roughly $500 billion in grants ($300 billion) and procurement ($200 billion) opportunities (White House Press Office 2000). Following the federal initiative, many local governments also adopted IT for local governance. For instance, they have created or improved their Web sites and provide Web-based services to promote better internal procedural management and external service provision.

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Despite this continuing move toward e-government, the development, implementation, and effectiveness of e-government at the local level are not well understood.[1] This article is designed to conduct an empirical study of how the e-government initiative has been introduced and implemented effectively at the municipal level. The study will explore a basic conceptual framework for the evolution of e-government and will examine the effectiveness of e-government in municipal governments based on comprehensive survey data obtained from the 2000 Electronic Government Survey that was conducted by International City/County Management Association and Public Technology Inc. It will also discuss two primary institutional factors (size and type of government) that contribute to the development of e-government at the local level.

E-Government: Theory and Practice

E-government is one of most interesting concepts introduced in the field of public administration in the late 1990s, though it has not been clearly defined and understood among scholars and practitioners of public administration. Like many managerial concepts and practices in public administration (TQM, strategic management, participative management, etc.), the idea of e-government followed private-sector adoption of so-called e-business and e-commerce. The Global Study of E-government, a recent joint research initiative for global e-government by the United Nations and the American Society for Public Administration, provides a broad definition of e-government:

> Broadly defined, e-government includes the use of all information and communication technologies, from fax machines to wireless palm pilots, to facilitate the daily administration of government. However, like e-commerce, the popular interpretation of e-government is one that defines it exclusively as an Internet driven activity ... to which it may be added "that improves citizen access to government information, services and expertise to ensure citizen participation in, and satisfaction with the government process ... it is a permanent commitment by government to improving the relationship between the private citizen and the public sector through enhanced, cost-effective and efficient delivery of services, information and knowledge. It is the practical realization of the best that government has to offer. (UN and ASPA 2001, 1)

Similarly, e-government is narrowly defined as the production and delivery of government services through IT applications; however, it can be defined more broadly as any way IT is used to simplify and improve transactions between governments and other actors, such as constituents, businesses, and other governmental agencies (Sprecher 2000, 21). In her recent book, Jane Fountain (2001) suggests the concept of the "virtual state," that is, a governmental entity organized with "virtual agencies, cross-agency and public-private networks whose structure and capacity depend on the Internet and web" (4).

Largely speaking, e-government includes four major internal and external aspects: (1) the establishment of a secure government intranet and central database for more efficient and cooperative interaction among governmental agencies; (2) Web-based service delivery; (3) the application of e-commerce for more efficient government transaction activities, such as procurement and contract; and (4) digital democracy for more transparent accountability of government (Government and the Internet Survey 2000). Various technologies have been applied to support these unique characteristics of e-government, including electronic data interchange, interactive voice response, voice mail, email, Web service delivery, virtual reality, and public key infrastructure. For instance, by introducing electronic filing systems with custom-designed software that incorporates encryption technology, the U.S. Patent and Trademark Office has made a bold move toward substantially reducing the amount of paper it handles by allowing inventors or their agents to send documents over the Internet (Daukantas 2000). As a result of various Web technologies, 40 million U.S. taxpayers were able to file their 2000 returns over the Web, while 670,000 online applications were made for student loans using the Web-based system of the Department of Education (Preston 2000). Some governments also have promoted virtual democracy by pursuing Web-based political participation like online voting and online public forums.

The functionality and utility of Web technologies in public management can be broadly divided into two categories: internal and external. Internally, the Web and other technologies hold promise potential as effective and efficient managerial tools that collect, store, organize, and manage an enormous volume of data and information. By using the function of upload and download, the most up-to-date information and data can be displayed on the Internet on a real-time basis. Government also can transfer funds electronically to other governmental agencies or provide information to public employees through an intranet or Internet system. Government also can do many mundane and routine tasks more easily and quickly, such as responding to employees' requests for benefits statements.

Externally, Web technologies also facilitate government's linkages with citizens (for both services and political activities), other governmental units, and businesses. Government Web sites can serve as both a communication and a public relations tool for the general public. Information and data can easily be shared with and transferred to external stakeholders (businesses, nonprofit or-

Table 1 Electronic Government Framework with Examples

		Stages of E-government				
		Administrative functions				Political functions
		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
	Types of government	Information: dissemination/ catalogue	Two-way communication	Service and financial transaction	Vertical and horizontal integration	Political participation
Internal	Government to government	Agency filing requirements	Requests from local governments	Electronic funds transfers		N/A
	Government to public employees	Pay dates, holiday information	Requests for employment benefit statements	Electronic paychecks	One-stop job, grade, vacation time, retirement information, etc.	N/A
External	Government to individual–services	Description of medical benefits	Request and receive individual benefit information	Pay taxes online	All services and entitlements	N/A
	Government to individual–political	Dates of elections	Receive election forms	Receive election funds and disbursements	Register and vote: federal, state, and local (file)	Voting online
	Government to business–citizen	Regulations online	SEC filings	Pay taxes online, receive program funds (SB, etc.), agricultural allotments	All regulatory information on one site	Filing comments online
	Government to business–market-place	Posting request for proposals	Request clarification or specs	Online vouchers and payments	Marketplace for vendors	N/A
Technologies used		Basic Web technology, bulletin boards	Electronic data interchange, email	Electronic data interchange, electronic filing system, digital signature, interoperable technology, public key infrastructure	Integration of the technologies required for phase 1, 2, and 3.	Public key infrastructure, more sophisticated interface and interoperable technologies, chatrooms

Adopted from Hiller and Bélanger (2001).

ganizations, interest groups, or the public). In addition, some Web technologies (such as interactive bulletin boards) enable the government to promote public participation in policy-making processes by posting public notices and exchanging messages and ideas with the public.

As table 1 summarizes, there are various stages of e-government, which reflect the degree of technical sophistication and interaction with users: (1) simple information dissemination (one-way communication); (2) two-way communication (request and response); (3) service and financial transactions; (4) integration (horizontal and vertical integration); and (5) political participation.[2] Stage 1 is the most basic form of e-government and uses IT for disseminating information, simply by posting information or data on the Web sites for constituents to view. Stage 2 is two-way communication characterized as an interactive mode between government and constituents. In this stage, the government incorporates email systems as well as information and data-transfer technologies into its Web sites. A good example is the Social Security Administration's Web site, where the agency receives new Medicare card applications and benefit statement requests, then processes and responds to service requests (Hiller and Bélanger 2001). In stage 3, the government allows online service and financial transactions by completely replacing public servants with "web-based self-services" (Hiller and Bélanger 2001). This "transaction-based e-government" can be partially achieved by "putting live database links to on-line interfaces" (Layne and Lee 2001, 125). Through this online service and financial transaction, for example, constituents can renew licenses, pay fines, and apply for financial aid (Hiller and Bélanger 2001; Layne and Lee 2001).

In Stage 4, the government attempts to integrate various government services vertically (intergovernmental integration) and horizontally (intragovernmental integration) for the enhancement of efficiency, user friendliness, and effectiveness. This stage is a highly challenging task for governments because it requires a tremendous amount of time and resources to integrate online and back-office systems (Hiller and Bélanger 2001). Hiller and Bélanger (2001) suggest three good examples: Australia's state of Victoria (*http://www.maxi.com.au*),[3] Singapore's e-Citizen Center (*http://www.ecitizen.gov.sg*),[4] and the U.S. government's portal site (*http://www.firstgov.gov*). Both vertical and horizontal integrations push information and data sharing among different functional units and levels of governments for better online public services (Layne and Lee 2001). Stage 5 involves the promotion of Web-based

political participation, in which government Web sites include online voting, online public forums, and online opinion surveys for more direct and wider interaction with the public. While the previous four stages are related to Web-based public services in the administrative arena, the fifth stage highlights Web-based political activities by citizens.

It should be noted that the five stages are just a conceptual tool to examine the evolution of e-government. The adoption of e-government practices may not follow a true linear progression. Many studies of technological innovation also indicate the diffusion and adoption of technology may even follow a curvilinear path (that is, Cancian Dip).[5] For example, a government may initiate stage 5 of e-government (political participation) without full practice of stage 4 (integration). It is also possible that government can pursue various components of e-government simultaneously. Like other stage models of growth (Nolan 1979; Quinn and Cameron 1983),[6] the framework simply provides an exploratory conceptual tool that helps one understand the evolutionary nature of e-government.

Implementation of Municipal E-Government: Adoption and Evolution of E-Government at the Municipal Level

The following sections will examine the current state of the evolution of e-government at the municipal level by examining the data obtained from the 2000 E-government Survey conducted by the International City/County Management Association and Public Technology Inc. The survey was designed to examine and assess local government activities in the area of e-government (Web site adoption, electronic delivery of community services, interactive service delivery, digital divide, e-procurement, etc.). The survey was sent to 2,899 municipal governments with populations over 10,000 identified by the ICMA municipal government database.[7] A total of 1,471 surveys were received, a response rate of 51 percent. Table 2 indicates the response rates by city population. Geographically, the responding municipalities represent the Northeast, North-Central, South, and West regions. As table 3 shows, the sample somewhat over-represents the West and under-represents the Northeast.

Table 2 Response Rate by City Population

Population	Number of cities surveyed	Number of cities responded	Response rate (percent)
Over 1,000,000	10	6	60.0
500,000–1,000,000	17	4	23.5
250,000–499,999	38	15	39.5
100,000–249,999	140	96	68.6
50,000–99,999	353	201	56.9
25,000–49,999	688	368	53.5
10,000–24,999	1,653	781	47.2
Total	2,899	1,471	50.7

Table 3 Response Rate by Geographic Region

Population	Number of cities surveyed	Number of cities responded	Response rate (percent)
Northeast	805	286	35.5
North-central	815	419	51.4
South	737	405	55.0
West	542	361	66.6

Adoption of Web Sites and Intranet

The e-government survey shows that 85.3 percent (1,260) of responding municipal governments (1,471) have their own Web sites, and 57.4 percent (766) of them have an intranet. The adoption of municipal governments' Web sites is a recent phenomenon. As table 4 indicates, only 46 cities had constructed a Web site more than five years ago. More than half (633) of the responding cities with their own Web sites (938) constructed their Web sites within the past three years. It should be noted that the evolution of e-government started in the mid-1990s, when the World Wide Web became more widely available after its standards were finalized in 1996 by the World Wide Web Consortium.[8]

Table 4 Adoption of Web Site, Longevity, Intranet, and Comprehensive Strategic Plan[1]

Web sites		Longevity of Web sites		Intranet		E-government strategic plan	
No	(209)	No Web site	(209)	No	(568)	No	(1,280)
Yes	(1,260)	Less than 1 year	(131)	Yes	(766)	Plan	(704)[2]
		1–2 years	(247)				
		2–3 years	(255)			Yes	(114)
		3–4 years	(153)				
		4–5 years	(106)				
		5–6 years	(46)				
Nonresponse	(2)	Nonresponse	(324)	Nonresponse	(137)	Nonresponse	(77)
Total	(1,471)	Total	(1,471)	Total	(1,471)	Total	(1,471)

[1]Figures in parentheses are the number of municipal governments.
[2]Out of 1,280, 704 governments considered developing a formal e-government strategy or master plan within the next year.

The survey also suggests that only a small portion of municipal governments makes a proactive and strategic move toward e-government. For example, only 114 municipal governments out of 1,394 (8.2 percent) responding municipal governments have a comprehensive e-government strategy or master plan to guide their future e-government initiatives. This fact indicates that e-government initiatives are often pursued and implemented without a long-term strategic plan by many municipalities. Interestingly, early adopters of a Web site are more likely to have begun e-government initiatives and to have adopted specific e-government strategy plans. For example, about 23

Table 5 Practices, Effectiveness, and Barriers of Municipal E-Government

E-government in practice

Stage 1: One-way communication/information dissemination (Yes/No)[1]

- Web site: Information Posting: (1,260/209)

Stage 2: Two-way communication (Yes/Plan)[2]

- Registration for program/services: parks and recreation facilities (97/541)
- Requests for government records (175/390)
- Requests for services: streetlight, potholes, etc. (267/445)

Stage 3: Service and financial transaction (Yes/Plan)[2]

- Property registration (10/264)
- Business license application/renewal (46/524)
- Permit application or renewal (63/604)
- Online payment of fines (21/475)
- Online payment of taxes (14/277)
- Online payment of utility bills (29/513)
- Online payment of license/permit fees (22/612)
- E-procurement: purchase (723/197)
- E-procurement: online request for proposal (359/956)[3]

Stage 4: Integration[5]

- N/A

Stage 5: Political participation[5]

- N/A

Barriers to e-government

Personnel capacity

- Lack of technology staff (837)

Technical capacity

- Lack of technical expertise (585)
- Lack of technical upgrade (431)
- Security issues (512)

Financial capacity

- Lack of financial resources (671)

Legal issues

- Privacy issues (320)

E-Government effectiveness

Cost saving

- Reducing administrative costs (60)

Downsizing

- Reducing of the number of staff (7)

Entrepreneurial activities

- Increasing non-tax-based revenue (6)
- Paid advertising on the web (16)

Changing work environment

- Changing role of staff (257)
- Reducing time demands on staff (103)
- Increasing demands on staff (289)
- Reengineering business processes (220)

General efficiency

- Making business processes more efficient (171)

Effective procurement (359)[4]

- Increasing the number of bids (107)
- Improving the quality of bids (47)
- Cost saving (28)

[1]It is assumed that the municipal governments that have their Web sites at least post some information on the Web for dissemination purpose.

[2]The two figures in the parenthesis indicate the number of governments that currently offer the listed services and the number of governments that have a plan to offer in the future.

[3]The two figures in the parenthesis indicate 359 municipal governments currently post requests for bids or request for proposals on their Web sites and 957 municipalities do not.

[4]359 municipal governments currently post requests for bids or requests for proposals on their Web sites.

[5]The 2000 E-government Survey does not include relevant information regarding stages 4 and 5.

percent (10) of the municipal governments that have had Web sites for over five years (81) have a specific e-government strategic plan, whereas only about 6.5 percent (16) of those who have had their Web sites for one to two years currently have a strategic plan for e-government.

Evolution of Municipal E-government

As discussed in the previous section, there are five stages of e-government. Each stage is defined by the degree of technological sophistication, transparency, and interaction with internal and external constituents (public employees, other governments, citizens, businesses, and other social actors). The government can post information on the Web and simply facilitate one-way communication to the public as an information provider (stage 1), while stage 5 requires highly sophisticated security, encryption, and interactive technologies to support online political participation such as election and public forum. As summarized in table 5, many of the responding municipal governments appear to be at either stage 1 or stage 2. In fact, a relatively small portion of the municipal governments has moved to stage 2 (two-way communication), and fewer have entered stage 3 (service and financial transactions), though many municipalities answered they plan to offer related services in the future. For example, 97, 175, and 267 municipal governments answered that they offer online registration for programs (parks and recreation facilities), requests for government records, and requests for services (streetlight repairs, potholes, etc.), respectively.

Only 10 governments currently have online property registration and 46 and 63 municipalities offer online business license application/renewal services and online permit application/renewal services, respectively. Fewer municipalities have entered into the financial transaction part of stage 3 of e-government. Fewer than 30 municipalities have Web-based payment systems for fines, taxes, utility bills, and permit fees. In contrast, e-procurement (both purchases and requests for proposals) appears to have been extensively adopted by municipal governments. Interestingly, more than half (723) of the responding municipal governments answered that they currently purchase products using the Internet. This may be because e-procurement has been pushed continuously by private businesses, and governments have taken advantage of available technologies and existing e-commerce practices developed in the private sector. It is also noteworthy that about 27 per-

cent (359) answered they currently post requests for bids or requests for proposals on their Web sites to make the contract and proposal processes easier for businesses. Overall, it suggests that few governments have taken proactive approaches to Web-based services for incoming transactions, but many have utilized available online e-commerce channels and outgoing transactions mainly initiated and developed by private businesses. It should be noted that stage 4 (integration) and 5 (political participation) were not examined in this article because the survey did not cover those two areas. Considering the fact that not many municipal governments have reached stage 3, it is assumed that few municipalities have entered stage 4 or 5.

It seems that municipal e-government has not been in full bloom. Many municipalities have not made a full commitment to developing a comprehensive strategic e-government plan to achieve a higher level of e-government. Considering that Web technologies became widespread in the mid-1990s, however, many municipal governments initiated e-government relatively quickly. For the last three years, in particular, the evolutionary process seems to have been very dramatic in terms of the number of municipalities that have adopted municipal Web sites, but less progressive in the advancement to higher stages of e-government such as service and financial transactions. Table 5 suggests an optimistic view of the future of municipal e-government practices, as many of the municipal governments that do not provide Web-based public services answered they have plans to implement those services in the near future. As summarized in the second column of table 5, some institutional and resource barriers to e-government are also identified. In particular, municipal governments are perceived to face a lack of technology staff (837), lack of financial resources (671), lack of technology expertise (585), security issues (512), technological upgrades (431), and privacy issues (320).

Effectiveness of Municipal E-Government

As the last column of table 5 indicates, top city administers were asked to respond to the changes and benefits (perceptual measure for effectiveness) that e-government has brought. The survey shows that only a few municipal governments claim that e-government programs have been effective in specific areas (cost savings, downsizing, etc.), while many of the responding municipal governments agreed that e-government initiatives have brought overall efficiency and changes in the workplace. For example, few cities have experienced administrative cost savings (60), procurement cost savings (28), or reductions in the number of staff (7), while many cities have observed changing roles of staff (257) and changes in business processes (220). Entrepreneurial outcomes seem to be very minimal: Only six municipal governments answered that they generated more non-tax-based revenues through e-government, and 16 cities responded that they allow paid advertisements on their Web sites. Among city governments, 171 believe that e-government initiatives have enhanced the overall efficiency of city management. It is noteworthy that many respondents think that e-government practices reduce *time* demands on staff but increase *task* demands on staff. These survey results may indicate that many public administrators perceive that e-government initiatives save time but often demand more technical expertise and skill to staff. It appears that municipal e-procurement practices have not been very effective. Only a few have experienced increased numbers in bids/proposals (107), improvement of the quality of bids/proposals (47), and average cost savings (28).

There has been extensive diffusion of Web technologies and Web-based services at the local level. The adoption of e-government in the last several years is particularly noteworthy. But the survey results indicate that many municipalities are still at an early stage of e-government. The speed at which municipalities are adopting high levels of e-government does not seem proportionate to the emerging rhetoric of e-government.

Municipal E-Government and Institutional Characteristics

As discussed earlier, e-government is not well defined and is still under much debate regarding its rhetoric and reality. Based on the current state of municipal e-government, this section will examine some institutional factors that contribute to the adoption of e-government practices at the local level. In this article, two primary factors will be examined: city size and types of municipal government (city mayor-council, city manager-council, etc.).

Size and E-Government Practices

The relationship between organizational size and the probability of adopting an innovation has been widely studied (Musso, et. al., 2000; Weare, et. al. 1999; Moon and Bretschneider 1997; Rogers 1995; Tornatzky and Fleischer 1990; Kimberly 1976). Some of the previous literature on technology diffusion and adoption has found that larger organizations tend to adopt new technologies and innovations more frequently than their smaller counterparts. Studying the diffusion of municipal Web pages in California, Weare and his colleagues (1999) and Musso and her colleagues (2000) find that adopters are more likely to have larger, more affluent, and more politically active population than nonadopters. Moon and deLeon (2001) also point out that larger municipal governments may have more stakeholders and be more sensitive than smaller municipal governments to the external pressures to make the govern-

ment more efficient. More importantly, larger municipal governments may be more receptive to and more easily afford new technological innovations than smaller governments; larger governments often have the advantage of greater administrative, technical, and financial resources than smaller governments in seeking alternative managerial innovations.

As shown in table 6, the positive relationship between size and the adoption of e-government is supported by the 2000 E-government Survey data. For example, 98 percent of cities with populations over 50,000 have their own Web sites, while about 79 percent of the municipalities with populations of 10,000–24,999 have their own Web sites. The longevity of municipal Web sites and adoption of intranets appear to be positively associated with municipal size. Overall, table 6 suggests a casual observation that a positive association may exist between size and the level of e-government adoption, which indicates that larger municipal governments are more likely to be earlier adopters of e-government practices than smaller municipalities.

Types of Municipal Government and E-Government Practices

The influence of a municipality's type of government and its policy attitude has also been well examined (Svara 1990, 1999). City managers, who are often professional chief administrators, may be more proactive in introducing technological innovations to the public sphere because their professionalism tends to value innovativeness and efficiency more than mayors, who are elected officials and thus tend to hold political values. As Svara (1990) points out, this is partially because the cooperative nature of the internal process in council-manager governments makes them more receptive to managerial reforms and innovations than mayor-council governments.[9] Moon and deLeon's study (2001) of municipal reinvention concurs that council-manager governments are more proactive in introducing and implementing reinvention programs. As summarized in table 7, the results of the 2000 E-government Survey support this argument: The figures indicate that about 90 percent (945) of the responding council-manager governments currently have Web sites (1,057), whereas only 77 percent (267) of the mayor-council governments (346) have Web sites.

Table 7 E-government Implementation by Type of Municipal Government

	Council-manager governments	Mayor-council governments
Number of responded municipalities	1,057	346
Web sites	945 (90%)	267 (77%)
Longevity of Web site (more than three years)	238 (30%)	61 (20%)
Intranet	581 (60%)	150 (49%)
Comprehensive strategic plan	90 (8%)	22 (7%)

The council-manager municipal governments also tend to be early adopters of Web technologies. About 30 percent (238) of responding council-manager governments had developed their city Web sites at least three years ago, where just 20 percent (61) of responding mayor-council governments have city Web sites that are more than three years old. Regarding the adoption of intranets, 60 percent (581) of the responding council-city manager governments (968) currently have an intranet, while about 49 percent (150) of mayor-council governments (307) are equipped with one. Ninety municipalities (8 percent) with council-manager governments currently have a comprehensive e-government strategic plan, while 22 mayor-council governments (7 percent) have developed an overall e-government initiative. *T*-tests were also conducted to see whether the mean differences between mayor-council government and council-manager governments are statistically significant. The statistical results indicate that mean differences in adoption of a Web site, its longevity, and adoption of an intranet between the two types of municipalities are all statistically significant at the 1 percent level ($p < 0.0001$).[10]

Table 6 Municipal Size and E-Government[1]

Population	Adoption of Web site (percent)	Longevity of Web Site: longer than three years (percent)	Adoption of Intranet (percent)	Development of E-Government plan (percent)
Over 1,000,000	6/6 (100)	4/5 (80)	5/6 (83)	4/6 (67)
500,000–1,000,000	4/4 (100)	2/3 (67)	4/4 (100)	1/4 (25)
250,000–499,999	15/15 (100)	6/8 (75)	12/15 (80)	5/13 (39)
100,000–249,999	94/96 (98)	40/74 (54)	73/92 (80)	14/95 (15)
50,000–99,999	195/201 (97)	55/139 (40)	131/190 (69)	29/196 (15)
25,000–49,999	334/368 (91)	79/275 (29)	200/335 (60)	28/352 (8)
10,000–24,999	612/779 (79)	119/643 (19)	341/692 (49)	33/728 (5)
Average	1,263/1,469 (86)	305/1,147(27)	766/1,334 (57)	114/1,394 (8)
Total number of responding cities[2]	1,469	1,147	1,334	1,394

[1]Figures indicate the number of adopters, total number of responded municipal governments, and percentage, respectively. Basically, the percentage refers to the proportion of municipal governments that have adopted each aspect of e-government (Web site, three-year longevity, Internet, and e-government plan) by municipal size. The percentage is rounded.

[2]Numbers of responding municipal governments are different due to the difference in the number of missing observations for each question.

Conclusions and Future Studies

This study examined an emerging issue of e-government in municipal governments. The study surveyed the rhetoric and reality of municipal government by investigating the 2000 E-government Survey data collected by International City/County Management Association and Public Technology Inc. The assessment was based on the framework of e-government developmental stages. This study also evaluated the respondents' perception of the effectiveness of e-government initiatives in various functional areas.

The survey results show that municipality size and type of government are significant institutional factors in the implementation and development of e-government. As expected, larger governments are likely to be more proactive and strategic in advancing e-government, and council-manager governments seem to pursue e-government more actively than mayor-council governments. The study also finds that the lack of technical, personnel, and financial capacities are perceived to be major barriers to the development of e-government in many municipalities.

This study also suggests that many municipal governments are still in either stage 1 or stage 2 of e-government, where they simply post and disseminate government information over the Web or provide online channels for two-way communication, particularly for public service requests. Overall, the current state of the e-government initiative is still very primitive in many municipal governments, though the adoption rate for Web sites among municipalities is very high. Only half of the responding governments currently utilize an intranet, and only 8 percent of the responding governments have a comprehensive strategic plan for an e-government initiative. The study also finds that e-government has not been as effective as its rhetoric would suggest. Although many top city managers share the view that e-government has brought broadly defined changes in procedural practices and task environments, it seems that municipal e-government is still far from maturity and from contributing to cost savings, revenue generating, and downsizing. It echoes the conclusion of Musso, Weare, and Hale (2000) that the study only leads to "mild encouragement at best regarding the potential of Internet technologies to reinvigorate local governance" (16). In her recent book, Jane Fountain (2001) also gives a similar assessment of the current practice of virtual state: "The dot-coming of government is just beginning.... Agencies are still in the process of putting basic information on the web and institutionalizing secure methods and authentication so that web-based payments become possible and personal documents, such as social security benefit information and tax files, can be transmitted safely over the Internet" (201).

Despite seemingly limited practices and effectiveness of municipal e-government, the survey results also posit a positive and optimistic future by suggesting that many nonadopters of Web-based public services plan to offer those services in the near future. In order to enhance the effectiveness of their e-government practices, many municipal governments will need to move toward a higher level of e-government development, which will require more technical, personnel, and financial commitments. In particular, more continuing efforts should be made to advance Web-based participatory and democratic local governance. Municipal governments also need to establish systematic and comprehensive e-government plans, in which they assess available resources and address related legal issues like privacy and security as well (Fountain 2001). In the future, city governments should further promote horizontal (interagency relations at the municipal level) as well as vertical (intergovernmental relations with state and federal government) collaborations to advance e-government initiatives to stage 4 (integration) and stage 5 (political participation). These stages require a higher level of "interoperability" (Landsbergen and Wolken 2001) and demand further information sharing and interactive operations among various stakeholders and governmental agencies to deliver more efficient and effective online public services. They also demand more sophisticated technological solutions for encryption, information sharing, and interactive communication. Equipped with sustainable managerial support and resources, municipal governments should be prepared for legal and political challenges in order to accelerate the evolutionary process by which e-government can become reality, not just rhetoric in the near future.

As municipal governments continue their e-government march, future studies need to examine the progress and effectiveness of municipal governments in delivering Web-based public services and facilitating citizens' Web-based political participation. As addressed in Fountain's (2001) recent work, it should be further examined how IT and government institutions interplay through human actions and how actual e-government practices change the content and functions of governmental institutions and their interactions with other governments, business, and citizens. A comprehensive assessment of municipal e-government, along with federal and state e-government, should be followed in the future to address vertical/ horizontal integration, public participation, citizen access/digital divide,[11] as well as other emerging regulatory and legal issues regarding e-government.

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Notes

1. Some studies were conducted with the sample collected in a specific geographic boundary (California). Musso, Weare, and Hale (2000) examine the applications of Web technologies for local governance based on data collected from a structured content analysis of 270 Californian municipal governments' Web sites. The study concluded that many municipal Web sites are not well designed and do not make substantial contributions to better local governance.
2. The five-stage framework is adapted from Hiller and Bélanger (2001). The United Nations and the American Society for Public Administration (2001) also suggest a similar framework for the Global Study of E-government: (1) emerging Web presence; (2) enhanced Web presence; (3) interactive Web presence; (4) transactional Web presence; and (5) fully integrated Web presence. These proposed stages of e-government seem to focus on Web-based public services (information provision and public service delivery) and do not include Web-based political participation and virtual democracy (online voting and public forums). Layne and Lee's study (2001) also proposes a similar stage-growth model of e-government that presents a general progress of e-government based on technical, organizational, and managerial feasibilities. The stage model includes the cataloguing stage, transaction stage, vertical integration stage, and horizontal integration stage. While this model does not include the political participation stage, it distinguishes vertical integration (integration of similar functionalities among different levels of government) from the horizontal integration (systems integration across different functions).
3. The "maxi" system enables citizens to obtain government information, request permits, and make various transactions, such as bill payment.
4. Singapore's "e-citizen" includes various public services such as birth registration, education, employment search, business-related government services, and retirement.
5. Cancian, an anthropologist, rebuked the positive and linear relationship between socioeconomic status and innovativeness and suggested a nonlinear relationship between the two variables. For more information, see Rogers (1995, 270–72).
6. Nolan's (1979) model of advanced data processing systems posits six stages of growth in companies, including initiation, contagion, control, integration, data administration, and maturity. The model has been widely applied for the adoption and growth of various IT innovations. In their study of organizational life cycle and effectiveness, Quinn and Cameron (1983) posit four stages of organizational growth, including the entrepreneurial stage, collectivity stage, formalization/control stage, and structural elaboration stage.
7. In addition, the survey also includes a sample of 850 county governments, which is excluded in this study.
8. Berners-Lee developed the first program for the original idea of the World Wide Web in 1990 and released it in 1991 to the High Energy Physics community. In 1994, he formed W3C as a neutral open forum to discuss and develop new computer protocols. W3C reached its standards in 1996. For more information see the W3C Web site, *www.w3.org/* (Accessed September 7, 2001).
9. Svara (1999) also finds that the roles of elected officials (council members) and chief administrators, particularly in large council-manager cities, are getting increasingly blurred, though they continue to complement each other (middle-range policy making versus goal setting).
10. The mean difference in the adoption of a strategic plan for e-government between the two types of governments is not statistically significant.
11. Some municipal governments indicated that they have implemented various programs such as establishing pubic access terminals in city facilities (729 municipalities), working with local schools (392 municipalities), and providing training and technical support for citizens (201).

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