

Critical Factors in the Delivery of e-Government Services: Perceptions of Technology Executives

Douglas A. Goings, Dale Young, Sarah H. Hendry

Georgia College and State University, Department of Information Systems and Communications, Milledgeville,
Georgia 31061-0490
478.445.5721, Fax: 478.445.5249, DGoings@gcsu.edu

ABSTRACT

E-government is growing in importance for providing government services, while reducing the delivered costs of those services. To understand key aspects of Web-based government services the researchers created a model of e-government based on prior studies, and surveyed technology executives about the potential for e-government services within their county. The executives believe e-government can improve constituency satisfaction, but it will be limited by funding and technology staffing needs. They are interested in transactional services, but don't want to pay transaction fees to cover the costs of e-government. They believe it is important to provide access to e-government through public facilities and favor the use of one-stop portals to make government accessible to all citizens.

INTRODUCTION

Shortly after electronic commerce became widely accepted, consumers and businesses developed an interest in electronic interactions with agencies and departments from state, local, and national government. Although e-government receives significantly less press than business-to-consumer e-commerce, it is slowly becoming a reality in municipalities, counties, and states across the U.S. Additionally, federal agencies in the U.S., and national governments outside the U.S., are active adopters of Web technology. Progress in moving government forms, brochures, and transactions to the Web has been limited due to financial constraints, privacy concerns, and the need for technology staff (Robinson, 2002). Nevertheless, government agencies are progressing with plans to Web-enable services for improving interactions with users.

This paper examines the e-government planning activities of a county government in the southeastern U.S. The research is distinctive in that it focuses on the e-government views of key technology executives within the county. This report reviews the status of e-government adoption, summarizes recent surveys regarding e-government initiatives, identifies common services and benefits of e-government, develops a model for the delivery of e-government, describes the study and its findings, and makes suggestions about future directions for e-government.

ADOPTION OF E-GOVERNMENT

E-government is the on-line delivery of information and services related to a government entity, through the Internet or another digital outlet, such as a public kiosk (West, 2000). E-government is an administrative rather than a policy reform (McNeal, et al., 2003). Government agencies are building capabilities for Web-based services. Governments at all levels – national, state, and local – have rapidly delivered Web capabilities to extend services provided by office visits. The U.S. Congress went on the Web in 1994, one year after the www.whitehouse.gov site became operational (Leigh and Atkinson, 2001). A motivation for the adoption of e-government is improved efficiency in providing services to citizens (McNeal, et al., 2003).

The public in a number of developed countries is quickly adopting Web-based, e-government services. For example, use of on-line government services is between one-third and one half of the population in the U.S. (34% of the population), Norway (53%), Denmark (47%), Finland (46%), and Canada (46%). Conversely, usage of e-government sites is lower in other developed countries, such as France (18%) and Germany (17%) (Greenspan, 2002).

Government agencies are pressured to Web-enable their operations for several reasons. In the U.S., there are mandates to reduce paperwork (Salkever and Kharif, 2002). State and local governments, facing revenue shortfalls due to a stagnant economy, are looking for ways to deliver services with a relatively fixed set of physical and human resources. Citizens are interested in, and are demanding access to, e-government services. Americans use government Web sites to research public policy, e-mail public officials, investigate voting records, and participate in electronic lobbying (Greenspan, 2002).

Government agencies have reached the same conclusion as commercial enterprises: the Web is a logical extension of, but not a substitute for, the brick-and-mortar services they currently offer customers or constituents (AMS, 2002). Government agencies are moving beyond providing forms on a public Web site to developing more sophisticated transactional services. Unfortunately, many government Web sites reflect agency or departmental services only, and are not well integrated with other agencies offering similar services (Leigh and Atkinson, 2001).

The evolution of government Web sites follows the pattern of commercial sites. Early dot-com sites were informational -- the firm put up a copy of its annual report and a list of the products it sold. Business-to-consumer (B2C) Web sites evolved to providing sales transactions, package tracking, and product delivery. Later features enabled personalization and one-to-one interactions with consumers. Business-to-business (B2B) sites followed a similar pattern, evolving to trading hubs controlled by the dominant buying partner. Government Web sites have progressed from providing information only (e.g., on-line forms and tourist/recreational information) with long lists of hyperlinks, through wizard-assisted search, to transactions involving interactive forms and digital signatures. A final stage of e-government is to build a citizen base that is capable and willing to access e-government services (Salkever and Kharif, 2002). The informational phase of government sites in the U.S. occurred between 1993 and 1998; the transactional phase is still in progress (Leigh and Atkinson, 2001).

State and local government Web sites in the U.S. provide information to state residents, prospective residents and tourists, and businesses. For example, at the state of New Hampshire Web site (<http://www.state.nh.us/egov.html>), businesses can make tax payments, and residents can apply for fish and game licenses, track legislative bills, and locate state legislators. Wisconsin residents are encouraged to file their taxes electronically on the state's Web site. Some county governments have moved a number of services to the Web. Arlington County, Virginia, (www.co.arlington.va.us) provides interactive services, including bicycle registration, e-mail to officials, utility billing, and tour group assistance. In Dakota County, Minnesota, (www.co.dakota.mn.us) residents pay taxes electronically and register for parks programs. City governments are active on the Web; the City of Houston, Texas, site (www.cityofhouston.gov) includes paying traffic tickets and reporting potholes. Thus, in the U.S. governments at all levels are Web-enabling a number of services.

There are resources available to assist agencies with e-government. Sites such as egovlinks.com are a clearinghouse of information on various state/local e-government subjects, including privacy, geographic information systems (GIS), e-voting, and open source solutions. Journals such as *Government Technology* offer Web-based content for e-government, GIS, local government, and mobile government. IBM provides a Web-based Institute for Electronic Government (<http://www.ieg.ibm.com>), which is a portal for IBM services and offers a large assortment of reports and articles on e-government issues. Hardware and software vendors, and consulting firms, provide a number of services aimed at government agencies. For example, ezgov.com offers software products to government agencies, and e-government.com offers automated municipal Websites services. City and county governments develop e-government services in-house with local staff or use consultants in combination with local staff (ICMA, 2002).

SURVEYS OF E-GOVERNMENT

Numerous e-government surveys have been conducted, to review constituency needs and examine the content of dot-gov sites. However, "it is not clear exactly how far the e-government revolution has progressed and what kinds of information and services are online" (West, 2000). Survey methods include face-to-face, focus group, or telephone interviews with citizens or government employees (CTG, 2003; Gardner, 2001), visits to agency Web sites (BBC, 2003; West, 2000; Worldmarkets, 2001), governmental task forces (OMB, 2002), mailed surveys to city and county governments (ICMA, 2002; NACO, 2000), and questionnaires to CIOs of states (CTG, 2003; West, 2000). Surveys are conducted by the government bodies themselves, by various associations that represent state and county governments, by academic researchers, and by consulting firms such as KPMG and Accenture. A common procedure is to offer survey participants a list of potential e-government services and ask them to pick the ones they want most.

States that have conducted e-government studies include Texas, Indiana, Arizona, California, Florida, New York, New Jersey, and Wyoming. These surveys focus on the types of services of interest to state residents.

An Accenture study of 22 national government sites identified both informational (e.g., converting leaflets into html documents) and transactional capabilities (e.g., calculating and paying taxes) on the sites of various countries (BBC, 2003). The study found sites offered various services, and adapted tools to measure usage, from national governments in the U.S., Canada, U.K., Singapore, and Australia. However, national government Web sites receive limited usage. The highest ranked sites coordinate Web activities across various departments or agencies and are transforming work processes across agencies.

A study of 2,288 national government Web sites in 196 countries inventoried site features (Worldmarkets, 2001). The survey found that few sites (6%) state a privacy policy, and fewer (2%) provide disability access. Few (6%) national sites provide a single entry point, or portal, for citizens. Less than one in twelve national government Web sites are transactional (the rate for U.S. national sites was 34%). In contrast, 65% of Taiwan's governmental Web sites have executable services; other countries with high levels of executable services are Germany (59%), Australia (50%), New Zealand (48%), and Singapore (47%). Only a third offer search capabilities. Digital signatures are accepted at just two countries' Web sites – Taiwan and Ireland – and only 1% of the sites accept credit cards. Commercial advertising appears on national government sites in the Caribbean where the economy is reliant on tourism. Nearly three quarters (72%) of these sites have an English language version, and almost half (45%) are multi-lingual. The most highly ranked national government Web sites are the U.S., Taiwan, Australia, Canada, the U.K., Ireland, Israel, Singapore, Germany, and Finland.

The U.S. federal government is involved in an e-government initiative involving 46 agencies, with the goal of improving service to clients and making it easier for citizens to interact with the federal government (OMB, 2002). Benefits are improved operational efficiencies and elimination of redundant spending and paperwork. Savings include over \$1 billion dollars from reducing redundant information technology (IT) investments across agencies. The task force recommended cross-agency, high payoff initiatives that can be developed rapidly over two years. Benefits include improved relationships between the federal government and citizens, businesses, and state and local agencies, and increased intra-governmental exchanges.

Researchers at Brown University examined 1,813 state, federal government, and federal court Web sites in the U.S., and conducted an e-mail survey of chief information officers in state and federal agencies (West, 2000). The CIOs believe e-government improves delivery of services, reduces costs, and makes government more efficient. A few (15%) of these sites offer disability access; fewer still (7%) posted a privacy policy. Less than a quarter (22%) provide transactional services. The study concluded that federal government Web sites were superior to state Web sites regarding services to citizens. A study of state-level government Web sites concluded that citizen demand, measures of state resources, and high rates of citizen access to the Internet were not significant factors in the implementation of e-government (McNeal, et al., 2003).

The International City/County Management Association (www.icma.org) surveyed 4,123 cities and counties (Sarkar, 2002). Nearly three-quarters (74.2%) of these governments have a Web site, and 70% of citizens in cities and counties communicate online with elected officials. Most (60%) local governments use a geographic information system (GIS), but the majority (82.8%)

do not provide GIS data online. Almost a third (31%) provide on-line service requests and over half (51%) plan to offer online utility payments. An overwhelming majority (90.5%) of the cities and counties had not conducted a survey of citizens and businesses to see what online services they wanted. Online financial transactions, such as payment of taxes, were requested by nearly half (48.7%) of surveyed citizens, but 70% of the cities and counties don't plan to offer that service (ICMA, 2002). Less than 5% of these local government sites offer payment of taxes, utility bills, and fines/fees, and less than 3% provide voter registration or property registration (e.g., animal, bicycle). Among the 70 largest cities in the U.S., only 13% offer executable services on their Web site (Robinson, 2002). Lack of technology staff (65.7%) and lack of Web expertise (46.7%) were the most significant barriers to city/county e-government initiatives (ICMA, 2002).

The National Association of Counties (www.naco.org) surveyed county governments in the U.S. regarding Internet usage for constituencies and employees (NACO, 2000). (Note that the ICMA survey just discussed was conducted two years later than the NACO survey.) Smaller counties are generally less advanced in providing Web-based e-government services. Sixty-one percent had a Web site, but nearly half (48%) used the site for information dissemination only. Just 8% of the county Web sites provided transactional services. Voter registration (3%) and paying taxes (2%) appeared infrequently. Funding (70%) and technology staffing (46%) were the most common obstacles to providing e-government services.

e-Government Services

Several studies have examined the services provided by, and constituency expectations of, state and local government Web sites in the U.S. Drivers license renewal, voter registration, and state park information are top choices on state systems (CTG, 2003). For city/county governments, the most-requested services are online registration for community events (e.g., adult education), online service requests (e.g., pothole repair), online tax payments, and council meeting minutes (ICMA, 2002). Among county governments, access to county records is the most frequently appearing service, available on 11% of the sites (NACO, 2000).

Surveys indicate that governments must be accessible to individuals with and without computers (Leigh and Atkinson, 2001). Technology should complement rather than replace existing service offerings (Gardner, 2001). Constituents are interested in one-stop portals, which provide links to multiple agencies, rather than being forced to access each agency's Web site individually. Portals provide access to information and enable citizens to contact government agencies (Lenk, 2002). Services offered on national, state, and local Web sites include:

- Ordering publications,
- Downloading publications or forms,
- Filing complaints,
- On-line databases (e.g., access to voting records of elected officials),

- User payments (e.g., pay parking tickets),
- Filing and paying state taxes,
- Fully-executable services (e.g., driver's license renewals and voter registration),
- Voting on-line, and
- State park information.

Executable services are limited on the Web sites of cities in the U.S. Some city officials express fear that expansion of Web-based municipal services may reduce the number of people who visit government offices, and therefore reduce the added commerce through shopping or restaurants generated during those visits (Robinson, 2002).

Benefits of e-Government

Several benefits are mentioned repeatedly in e-government studies. E-government enables agencies to lower their operating costs, provide faster service to clients, and eliminate redundant IT development across agencies. A principle in e-government efforts is that government services should be citizen centered, not bureaucracy centered. Agencies, for example, tend to evaluate IT based on how well it serves the agency, rather than how well it serves citizens (OMB, 2002). The citizen-centered view requires services across agencies to eliminate duplicate reporting by citizens and businesses. For example, if a local community in the U.S. wants to receive an economic development grant from the federal government it could file over 1000 forms at 250 federal bureaus (OMB, 2002). Many of the 1000 forms contain duplicate data.

E-government increases accountability of agencies to citizens and improves access to data (CTG, 2003). E-government increases citizen contact with elected officials, but also increases demands on the staff of government agencies (ICMA, 2002). To become most effective, e-government Web sites need to be organized around specific topics of consumer interest, they must include personalization features for repeat visitors, and they must provide cross-agency connections (Leigh and Atkinson, 2001).

Funding e-Government

Taxes are unpopular for funding e-government; citizens and businesses are willing to pay a transaction fee for Web-based services (CTG, 2003). Over half (57.1%) of city and county governments view a lack of financial resources as a barrier to providing e-government (ICMA, 2002). In a similar study of only county governments, funding was listed as the greatest obstacle to moving county government services to the Internet by 70% of the respondents (NACO, 2000). Most (75.6%) city and county governments have no separate budget line item for e-government; e-government is normally (96.5%) funded from general revenues (ICMA, 2002).

A MODEL FOR E-GOVERNMENT SERVICES

Studies note that creating citizen-centered services are an objective of e-government. Outcomes from e-government initiatives include “brochure-ware” (i.e., moving forms and other publications to the Web to reduce printing costs) and limited use of transactional capabilities. However, significant obstacles hinder the effective delivery of e-government, especially for municipal and county governments. These three variables – objectives, outcomes, and obstacles – are the basis for the delivery of e-government services; they are summarized in Figure 1.

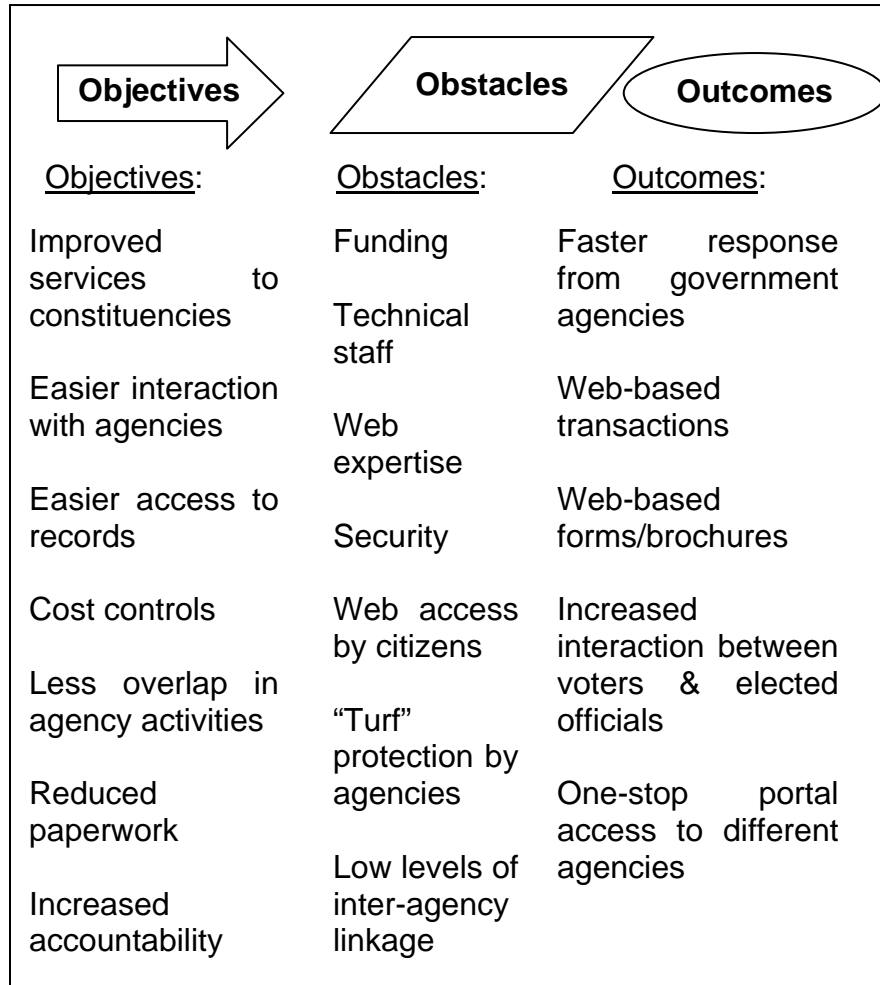


Figure 1: A Model for the Delivery of e-Government

THE STUDY

The goals of this study were to:

- Understand attitudes toward, and opinions about, e-government (Objectives),

- Identify key issues for implementing e-government (Obstacles), and
- Identify factors that business persons perceive as being important to the success of e-government (Outcomes).

The survey was conducted in a middle-Georgia county. The population of the county, as of July 2001, was 44,700. The county seat is the only town in the county, which has 18,757 residents. The town is home to a medium-sized liberal arts university with 5,500 students. The town is home to a medical center, state prison, and various industries, including agricultural, industrial/manufacturing, mining, recreation, and tourism.

Methodology

One aspect of understanding attitudes toward e-government was determining the readiness of citizens to accept and use those services. E-government outcomes include determining which e-services were most desired. Therefore, a questionnaire was developed; the basis for the survey content was a review of the e-government literature. The questionnaire was printed and piloted on a small group of executives who made written comments on the instrument itself and also discussed the questionnaire with the researchers in a face-to-face meeting.

The survey was completed by leading information technology executives, who are active members of a technology council in the county. They were asked to indicate their opinions of, and preferences for, e-government services. The questionnaire gathered demographic information. The data were gathered in a non-random opportunity-sampling. These leaders reflect, in part, the population of interest as those most likely to have an informed opinion on e-government. Descriptive statistics were used to summarize the data from the ten respondents (24% response rate). The data were collected in April 2003.

FINDINGS

Demographic information appears in Table 1. The study sample is too small to be representative of the larger population in the county; however it was designed to focus on the views of technology executives. The job titles of the respondents show that they are high-level executives, many holding technology positions. Reported annual revenue ranged from a low of \$180,000 to a high of \$77 million. The largest organization is a state-wide corrections department, while the smallest is a local economic development authority. "Education" was the most frequent industry classification. Although the respondents are primarily technology executives, the organizations in the study represent small to mid-sized for-profit firms and government departments, as measured by revenue and number of employees.

Job Title	#	Number of Employees	#
Chief information officer	1	14,500	1
Data manager	1	2,500	1
Executive director	1	1,169	1
IS manager	1	1,000	1

IT program chair	1	500	1
Investment manager	1	490	1
Professor	1	450	1
Site director	1	60	1
Systems analyst	1	55	1
Vice president	1	1.5	1
Annual Revenue (\$)		Industry Classification	
77,000,000	1	Aerospace/defense	1
30,000,000	1	Education	4
17,000,000	1	Financial services	1
10,000,000	1	State & local government	2
4,500,000	1	Healthcare/pharmaceuticals	1
180,000	1	Nursing home	1
Not reported/Not applicable	4		

Table 1: Demographics (N = 10)

Perceptions of e-Government

Respondents indicated agreement, using a five-point Likert scale, with items regarding the expectations of, and satisfaction with, e-government services. Scale anchors are “Strongly agree” (5), “Somewhat agree” (4), “No opinion” (3), “Somewhat disagree” (2), and “Strongly disagree” (1). There is a high level of agreement that governmental offices and departments that offer on-line services, in addition to existing “brick-and-mortar” services, are more likely to meet public expectations than those that do not (mean 4.3). Respondents believe e-government can improve the satisfaction levels of constituents with the government services they receive.

Public satisfaction with government offices and departments within (county) engaged in e-business will improve in the short term.	3.9
Governmental offices and departments that compete successfully in offering traditional services and develop on-line services are more likely to meet public expectations than offices and departments offering traditional or on-line services only.	4.3
The continued trend towards serving citizens on-line will result in improved constituent satisfaction.	4.3

Scale Anchors: “Strongly agree” (5), “Somewhat agree” (4), “No opinion” (3), “Somewhat disagree” (2), and “Strongly disagree” (1)

Table 2: E-Government Expectations and Satisfaction Levels

e-Government Obstacles

Table 3 shows obstacles to Web-enabling county government services. Respondents were asked to select “the three greatest obstacles to moving county government services to the Internet” from a list. An “Other” category was provided to write in additional items.

Funding and staffing were identified as the greatest obstacles (70% and 60% agreement respectively), while constituent use, and implementation and maintenance were considered obstacles by 40% of the respondents. They believe funding is a threat to providing e-government, but as shown in Table 5, they do not want to pay a per-transaction charge to fund e-government. Respondents fear that citizens are not yet ready to adopt e-government.

Obstacles	%
Funding	70
Staffing	60
Implementation/maintenance	40
Willingness/ability to use	40
Lack of infrastructure	30
Security/fear	20
Training	20
Privacy	10
Other--Advertising	10

Table 3: Obstacles to e-Government

e-Government Services/Outcomes

Respondents indicated the e-government services most desired by checking all items that were applicable from a list of potential services. They were given the option of writing in additional e-government service requests in an “Other” category.

Table 4 displays the list of most-requested services. Transactions, such as paying taxes and other fees, are highly desired services. Other high-demand services, including service requests and licenses/permits, are also transactional. A number of these on-line transactions would replace face-to-face visits at various governmental offices. Note that on-line tax payments and collection of other fees require the local government to accept payments through a Web site.

e-Government Service	%
Pay taxes	100
Request service (e.g., pothole repair)	100
Apply for employment	90
Pay license and permit fees	90

Pay tickets and fines	80
Pay utilities	80
Register for programs or services (e.g., parks, recreation)	80
Request local government records	70
Obtain business licenses & renewals	60
Obtain permits & permit renewals	60
Register property (e.g., animal)	60
Register to vote	60
Visit board of education Web site	60
Visit specific school Web sites	50
Other—voting	20

Table 4: Most Desired e-Government Services

Accessibility to e-Government

Table 5 shows these executives’ views, using “Yes” and “No” responses, about making e-government available to the general public. They favor free access to e-government offerings. They do not favor a per-transaction charge, to cover the costs of providing the electronic service, in addition to the normal charges for licenses or permits. They favor using public facilities in order to make e-government widely available. They support the concept of one-stop government through a Web-based portal by creating links from the local government Web site to other local and state agencies.

Linking to e-Government Services	% In Favor
If e-government websites are made available in (county) for conducting interactive transactions to provide public information or government services to citizens, should a fee be charged for conducting such transactions?	10
Should Internet access be made available in public places without charge to citizens within the geographic area served by e-government websites?	80
In developing e-government, should (county) provide a “seamless” presence that links its e-government functions to the State so citizens can go through one Internet portal to accomplish multiple transactions with more than one state and local government agency and avoid having to go to multiple websites?	100

Table 5: Access To and Funding For e-Government

Note that these executives were not asked their preferences for funding e-government initiatives, other than a direct fee for each electronic transaction.

DISCUSSION

One way to examine e-government services is by tracking the evolution of those services. Government Web sites have evolved from a publishing model of providing static information to a transactional model. Governments have rapidly adopted Web sites; for example, nearly 75% of local governments have a Web presence. However, only 5-20% of these sites, depending on the survey and level of government being investigated, offer transactional capabilities. Respondents in this study strongly desire transactional e-government services. Closer relationships with constituencies, through one-to-one links, are limited by regulations regarding the use of cookies on e-government sites (Leigh and Atkinson, 2001).

E-government can be examined by constituency demand. Prior surveys and this study indicate that both the general public and businesses are willing to use e-government Web sites. Between 20 and 50% of the population in developed countries has used e-government services. A number of dot-gov surveys have looked at what is being done on e-government sites, but fewer have examined what is desired by the users of those sites. For example, one survey of local governments noted that 90% of cities or counties did not survey citizens before building a Web site (ICMA, 2002).

E-government has been examined from a social responsibility perspective. Citizens who do not own a computer, or have a bank account, or have a credit card must have access to e-government (Leigh and Atkinson, 2001). Respondents to this study voiced a similar concern through their desire to offer free, public access to e-government services. Data privacy is an important social issue. Privacy policies do not widely appear on e-government Web sites (Worldmarkets, 2001), even though privacy is considered a “pillar” of digital government (Leigh and Atkinson, 2001).

This study creates a model to facilitate the examination of e-government. Broad e-government objectives, such as improved services, must be converted to specific outcomes, such as Web-based transactional services, while overcoming obstacles, like funding limitations. The model begins with the objectives for providing e-government, rather than focusing on Web site content. A fundamental objective is easy access, but few national government Web sites feature a one-stop portal – an outcome that meets the “easy access” objective. Study respondents favored the portal concept, especially as it related to accessing other in-state and local government Web sites. Web-based transactions are an outcome desired by constituencies, but only 1% of e-government Web sites accept credit cards and respondents in this study were unwilling to pay additional fees to support electronic transactions.

Another objective is easier interactions with government agencies, but turf protection by agencies is an obstacle to a seamless e-government experience. Prior surveys and the results of this study confirm that funding and access to technology professionals are obstacles to e-government objectives. Respondents in this study note that lack of citizen readiness will limit usage of e-government as much as limited Internet access.

Where is e-government headed? The Web has magnified what we have known for some time: access to government must be easier and less confusing. Citizens want access to government

services without having to know the specific agency or department that provides the service. Adoption of e-government will:

- Evolve to a citizen-centered, service model. Publishing, the most widely used model, and transactions, which are just now being adopted on some dot-gov Web sites, are interim steps to reaching the service model of e-government. The service model integrates the Web portal concept for one-stop service by citizens and businesses.
- Continue a slow path to personalization, transactions, and the service model. Governments need to find creative ways to reallocated revenues to cover e-government service costs. A greater challenge is reengineering the tangle of agencies and departments that provide services.

We have learned that citizens want easier access to a large number of local, state, and national government services, but want those services without paying additional charges. The Web extends government services, but creates obstacles to service access.

LIMITATIONS

There are some limitations to the generalizability of these findings. Although the model itself is well supported by the e-government literature, the number of survey respondents is small, and this group of influential executives is not representative of local government populations as a whole. The respondents represent small-to-medium sized organizations; there are no billion dollar or greater firms in the sample. The survey is limited to a single geographic location. However, the findings do match extremely well in a number of key areas (e.g., concerning the types of e-government services being requested and the perceived barriers to implementation) with broader surveys of other state and local e-government initiatives.

CONCLUSION

This study develops a model of e-government, and surveys executives to understand their views of e-government services. The study finds that some citizens are ready for e-government, transactions are important, funding is limited, and equitable access will complicate e-government.

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