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Technology, Communication, Collaboration

The Effects of E-Government on Trust and Confidence in Government

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Trust in government has been declining for more than three decades now. E-government has been proposed as a way to increase citizen trust in government and improve citizen evaluations of government generally. Using two-stage models to analyze recent Pew survey data, this research explores the relationship between e-government use, attitudes about e-government, and trust in government. There is a statistically significant relationship between trust and use of a local government Web site, as well as other positive assessments of federal and local governments. The evidence suggests that e-government can increase process-based trust by improving interactions with citizens and perceptions of responsiveness. The findings are theoretically important for reconciling the conflicting research on the effects of e-government and for understanding variations by level of government. Citizen attitudes toward government, including trust, are core concerns for democratic governance and public administration.

Does e-government improve citizen attitudes toward government? Can it remedy the problem of declining public trust and confidence in government that has been apparent for more than three decades? According to Norris, "There is widespread concern that the public has lost faith in the performance of the core institutions of representative government, and it is hoped that more open and transparent government and more efficient service delivery could help restore that trust" (2001, 113). E-government, which has been proposed as one solution, "refers to the delivery of [government] information and services online via the Internet or other digital means" (West 2000, 2) and may include opportunities for online political participation (Mossberger, Tolbert, and Stansbury 2003). E-government holds promise for improved delivery of many types of public services, including online transactions, and for disseminating information about the operation of government. It can improve communication between citizens and government through e-mail, enabling more direct participation in government decision making (Thomas and Streib 2003). The purpose of this research is to provide an empirical evaluation of the impact of e-government on citizen attitudes about government.

Reversing the decline in public trust in government is one of the dilemmas of modern governance, and it has been the focus of a great deal of theory and research (Levi and Stoker 2000; Nye, Zelikow, and King 1997). The problem has also inspired myriad proposals for government reform, including market-based or entrepreneurial reforms that seek to make the administration of government more efficient and effective (NPR 1993; Osborne and Gaebler 1992; Peters 2001). Other proposals for government reform prescribe increased citizen participation in the political process to counteract declining trust in government (Barber 1984; Bowler, Donovan, and Tolbert 1998; Donovan and Bowler 2004; Dryzek 1990; Fishkin 1993). Drawing on both of these prescriptions for reform, governments and institutions such as the European Union and United Nations have embraced e-government as a renewal of the relationship between governments and citizens (Chadwick and May 2003; United Nations 2001, 5).

An early study of e-governance conducted by the Organisation for Economic Co-operation and Development (OECD), based on interviews with information specialists, public officials, and the policy-making community in eight postindustrial countries found that the "overall impact of the Internet had failed to increase access to policymakers, to improve the transparency of government decision making, or to facilitate public participation in policy making" (quoted in Norris 2001, 114). In the seven years since this study was conducted, the use of e-government has increased dramatically. The use of government Web sites is one of the fastest-growing activities on the Internet (Larsen and Rainie 2002), and survey data show that 50 percent of Americans (and 75 percent of Internet users) report experience using e-government (Council for Excellence in Government 2003). The federal government has a central portal for all federal services

(www.firstgov.gov), and all 50 states have adopted some form of e-government (West 2003a, 2005). A recent survey indicates that almost 80 percent of local governments maintain a Web site (Norris, Fletcher, and Holden 2000).

Some survey data suggest that citizen attitudes are influenced by e-government (Council for Excellence in Government 2003; Larsen and Rainie 2002; West 2004). West (2004) analyzes national survey data gathered by Hart-Teeter in 2000 (Council for Excellence in Government 2001) and finds that exposure to information about e-government is significantly related to the opinion that government is effective at solving problems, but it is not related to trust in government. The telephone survey offered a description of e-government, and respondents were questioned both before and after priming. Survey data collected in 2001 by the Pew Internet and American Life Project (Larsen and Rainie 2002) show a greater range of positive attitudes toward government among e-government users, but the authors do not use multivariate regression analysis to control for factors other than e-government use that may influence general attitudes toward government. A two-stage multivariate analysis of the 2001 Hart-Teeter data (Council for Excellence in Government 2002) concluded that e-government users are in fact more likely to trust government as a result of their experiences online (Welch, Hinnant, and Moon 2005).

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Has confidence in government improved as e-government use has increased? Or was the original OECD study correct—has e-government had little positive effect? This research is an attempt to reconcile and update previous, conflicting findings about the effects of e-governance on public trust and citizen attitudes about government. Drawing on the 2001 Pew survey data discussed by Larsen and Rainie (2002), we use two-stage multivariate models to test whether e-government users have more positive attitudes toward government and whether positive attitudes toward transparency and effectiveness, accessibility, and responsiveness are, in turn, related to more generalized trust. In contrast to Welch, Hinnant, and Moon (2005), a unique contribution of this research is to analyze variations among local, state, and federal e-government users. We find that users of local government Web sites are more likely to trust local governments, controlling for other demographic factors, and that the use of government Web sites is associated with other positive attitudes, especially for federal and local governments.

Trust in Government

Trust in government slid into a steep decline during the mid-1960s and has been persistently low ever since despite short-lived fluctuations, including a temporary respite after the terrorist attacks of September 11, 2001. In 1958, almost three-quarters of people surveyed said they trusted the federal government "to do what is right" most of the time or just about always. Only 40 percent professed this level of confidence in 2002. In 1994, the proportion of the population who trusted the federal government reached a century low of 21 percent, and it has been hovering around 40 percent since the 1970s (Donovan and Bowler 2004, 17–18). What is exactly meant by "trust in government," and why does it matter?

According to Miller and Listhaug, trust in government is an evaluation of "whether or not political authorities and institutions are performing in accordance with normative expectations held by the public" (1990, 358; see also Levi and Stoker 2000). Declining trust has been linked to declining political participation by some of the leading scholars in the field (Craig 1996; Hetherington 1998, 1999; Norris 1999), and many consider it no accident that the dramatic decline in turnout rates in America since the 1960s mirrors the decline in political trust (Putnam 2000). Yet trust is only one factor in complex decisions about political participation, and so its effect has been hard to measure and much debated (Levi and Stoker 2000). Beyond the question of voting and participation, trust is important for the legitimacy and stability of the political system. Trust in government encourages compliance with laws and regulations (Ayres and Braithwaite 1992; Levi 1988, 1997; Tyler 1990, 1998). At the extreme, a lack of trust in governmental institutions undermines the rule of law. Most importantly, distrust diminishes the legitimacy of government. High levels of cynicism and distrust are reasons to be concerned about American democracy (Craig 1993; Donovan and Bowler 2004, 29; Putnam 2000).

If trust in government is merely related to citizen evaluations of particular politicians, parties, events, or policies, then citizen disaffection is more episodic and of lesser concern. Evidence shows that these specific outcome variables do matter for trust (Abramson and Finifter 1981; Citrin 1974; Citrin and Green 1986; Craig 1993; Hetherington 1998, 1999; Hibbing and Theiss-Morse 1998; Miller and Borrelli 1991; Orren 1997). Research has found that voting for losing candidates can generate discontent among voters. If "your" candidate loses, then you aren't as satisfied with politics as people who vote for the winner (Donovan and Bowler 2004, 31).

Citizens may be making what Easton (1975) calls "diffuse judgments" about government rather than

specific evaluations of particular administrations or political actors. In a survey of the extensive literature on trust, Levi and Stoker conclude that "variations in political trust reflect more than incumbent-specific satisfactions or dissatisfactions" (2000, 483) or specific historical events such as the Vietnam War and Watergate. Hypothesized causes of decreased confidence in government are multiple and interrelated, involving many actors and many institutions in society. Possible causes include economic change (Bok 1997), perceptions of performance of government programs (Orren 1997), decreasing social capital (Mansbridge 1997), party polarization (King 1997), and postmaterialist values (Inglehart 1997). Comparing these possible causes of dissatisfaction, Nye (1997) concludes that each of these offers only a partial explanation, at best, and that the causes are complex.

Traditionally, scholars have conceptualized trust as a product of citizen preferences regarding outcomes (either policy or electoral outcomes). But preferences and outcomes explain only one part of the dissatisfaction with government: Surveys show that only about 37 percent of Americans with low trust in government say that policies do not reflect their beliefs and values (Nye 1997, 9). Recent research provides evidence that citizens base their evaluations on *process* considerations as well—how fair, open, and responsive political and governmental processes are (Donovan and Bowler 2004; Hibbing and Theiss-Morse 1998, 2001, 2002; Jiobu and Curry 2001; Miller and Borrelli 1991; Anderson et al. 2005).

"Beneath the general distrust of government are specific perceptions that American government [is] … no longer responsive to citizens," according to Donovan and Bowler (2004, 17). In 2002, only 33 percent of Americans thought that public officials care about what "people like them" think, down from 73 percent in 1960. In the 1990s, a majority of Americans agreed with the statement "people like me don't have any say in what government does" (Donovan and Bowler 2004, 19). Research by Hibbing and Theiss-Morse (1998, 2001, 2002) shows that although citizen preferences fall short of direct democracy, citizens want a more participatory policy-making process than what they perceive is the current operation of American representative government. As these studies show, trust is simply one factor that is measured to understand citizen confidence in government.

Causal Mechanisms: E-Government and Trust

How can e-government possibly influence trust in government against this broad backdrop of social forces? How is it that trust relates to what public agencies and administrators do? Government agencies and programs are perceived to be part of the problem. Surveys show that the most common reasons given for low trust in government are perceptions that government is inefficient, wastes money, and spends money on the wrong things (Baldassare 2000, 12; Nye 1997, 18). Norris (1999) argues that politics are increasingly characterized by "critical citizens" who have heightened expectations of government and low evaluations of the performance of both government agencies and representative institutions (see also Rosenthal 1997).

Thomas (1998) indicates that little research has considered the exact mechanisms through which public institutions maintain or create trust in government. Like Hibbing and Theiss-Morse (2002), he concludes that citizen beliefs about the fairness and responsiveness of government processes are important. Thomas identifies two modes for the creation of trust that are significant for e-government: process-based trust and institutional-based trust (see also Welch, Hinnant, and Moon 2005). *Process-based trust* is rooted in repeated exchanges or interactions with government. As a result of these interactions, individuals participate in instrumental exchanges and get what they need, but there are also symbolic exchanges. Thomas asserts that one dimension of trust is based on perceptions that government cares about citizens, their needs, and their expectations—that is, perceptions that government is responsive. *Institutional-based trust* is a judgment of institutions rather interactions, and it conveys an expectation that institutions will "do what's right." Citizens trust institutional expertise or past institutional practice. In many ways, institutional-based trust represents an image held by respondents. Institutional actions that conform to public expectations may enhance an institution's image or reputation.

E-government has been proposed as a solution for increasing citizen communication with government agencies and, ultimately, political trust (Chadwick and May 2003; Clift 2000; Ho 2002; Norris 2001; Seifert and Peterson 2002; Tapscott 1997; Thomas and Streib 2003; West 2004, 2005). The literature on e-government identifies two different but coexisting reform paradigms related to digital government-to-citizen relationships. These can be characterized as the *entrepreneurial approach* and the *participatory approach* (Chadwick and May 2003; McNeal et al. 2003; Moon 2002; Mossberger, Tolbert, and Stansbury 2003, 95–96; Musso, Weare, and Hale 2000). Both reform paradigms predate the widespread use of e-government but embrace the use of the Internet to either modernize government or to promote e-democracy. A summary review of the two approaches to e-government demonstrates that both depict potential benefits that may influence process-based and institutional-based trust.

The Entrepreneurial Approach

The entrepreneurial approach to e-government is closely associated with the idea of reinventing

government in the United States and with New Public Management reforms abroad (Chadwick and May 2003; Fountain 2001, 19; Osborne and Gaebler 1992). The critical task is to create government that is customer driven and service oriented (NPR 1993; Osborne and Gaebler 1992). Emulation of the private sector is significant for the entrepreneurial model, and the rise of e-commerce clearly influenced later reinvention initiatives (Chadwick and May 2003; Fountain 2001, 18–20). Responsiveness in the entrepreneurial model is represented by quality customer service. The Internet provides a flexible and convenient interface with government customers, who can access government around the clock and experience "one-stop shopping" for information and services. Efficiency is another important value in this model. The single portal creates an atmosphere that is conducive to the interagency and even interorganizational collaboration that is also part of the reinvention paradigm for enhancing efficiency and effectiveness (Ho 2002; see Fountain 2001, 201, for a discussion of the limitations of integration). E-government has the potential to reduce the cost of service delivery, although the front-end costs of development may mean that cost savings are not immediately realized. This is consistent with the philosophy that government that "works better, costs less" will increase citizen confidence in government. Indeed, the original federal government report on reinvention, the National Performance Review, identified government waste and inefficiency as reasons underlying current lack of trust in government (NPR 1993). Although customers are concerned with results, their views of the effectiveness of government processes count, too.

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The Participatory Approach

Another major model of government reform that has been associated with e-government is the participatory model. To revitalize trust in government, prescriptions range from direct democracy through ballot initiatives and referenda to more transparent representative systems (Barber 1984; Bowler, Donovan, and Tolbert 1998; Donovan and Bowler 2004; Dryzek 1990; Fishkin 1993; Tolbert 2003). Citizen participation and public dialogue are deemed critical for fostering greater government accountability, transparency, and responsiveness. Some scholars see information technology as the most important ingredient for creating a more participatory democracy and increasing confidence in government (Alvarez and Hall 2004; Bimber 2003; Budge 1996; Grossman 1995; Rheingold 1993; Norris 2001; Toffler 1995). The information capacity that is available on the Internet allows citizens to become more knowledgeable about government and political issues, and the interactivity of the medium allows for new forms of communication with elected officials and between citizens—through chat rooms, Listservs, e-mail, and bulletin board systems. The posting of contact information, legislation, agendas, and policies are all preliminary steps that make government more transparent, enabling informed participation online and offline, and the Internet offers direct channels of communication as well. Clearly, the participatory model addresses the concerns about a fair and open process that Hibbing and Theiss-Morse identify as a source of discontent with government.

Although these two paradigms have different emphases, together they suggest that there are six possible benefits of e-government that could lead to increased trust and confidence in government.

Process-Based Trust

Citizens may perceive government as

- *Responsive*, through improved communication and interactions with citizens. Both Web sites and e-mail systems create new opportunities for interaction with officials that are convenient and quick, potentially enhancing responsiveness. By making available information and services that citizens want and improving the speed and ease of interactions, e-government may be an antidote to the decrease in external efficacy that has paralleled the declines in trust. This external efficacy—the judgment that government cares about citizens like oneself—is clearly related to process-based trust.
- *Accessible*, around the clock, seven days a week. Single, integrated portals and links to other sites have the potential to make information and services from a number of agencies available to citizens through a single Web site. Searchable databases and layout can improve the accessibility of information as well. Government online may also feature foreign language translation capabilities and Web sites that are accessible to people with disabilities. Accessibility may cause greater familiarity with government through more frequent interactions, thereby increasing process-based trust.

Institutional-Based Trust

Citizens may perceive government as

- *Transparent*, through the posting of information such as data, policies, laws, meeting schedules and minutes, and contact information. Searchable databases on Web sites may also make information

searches easier for citizens. This transparency makes increased accountability to the public possible, increasing institutional-based trust.

- *Responsible*, as demonstrated by privacy and security statements and policies for handling personal information submitted online and government data that are posted online. Such responsibility might encourage citizens to see government as fair and ethical, affecting institutional-based trust.

Process-Based and Institutional-Based Trust

Other aspects of e-government may include both types of trust, as citizens may perceive e-government as

- *Efficient and effective*, through the use of the latest technology to automate processes, improve service delivery, produce budget savings, and save time. Online transactions and downloadable forms are examples of more efficient and effective processes through e-government. Generally, however, automation emulates the convenience and efficiency of e-commerce and suggests that government is adopting state-of-the-art private-sector practices. Individuals may believe that e-government is effective because of their experience finding the information they want, increasing process-based trust, or they may have a more favorable impression of government in general because of its use of information technology, increasing institutional-based trust.
- *Participatory*, providing for citizen input. Online town meetings, bulletin board systems, chat rooms, and deliberative processes for e-rulemaking, are examples of how this might be realized through e-government. Citizens who are more engaged could increase process-based trust, while others may observe opportunities for participation and experience an increase in their institutional-based trust.

The argument is that the use of government Web sites may lead to positive attitudes toward e-government, which, in turn, may encourage improved trust or confidence in government generally. The next section gives a brief overview of the current state of e-government, and the rest of the article tests some of these assumptions and concepts using Pew survey data.

The Current State of E-Government

In practice, the implementation of e-government varies widely, and not all of these ideal benefits have been realized. The posting of information is most common, and online transactions are spreading but not universally available at the state and local levels. For all governments, information and service delivery are more prevalent than participatory opportunities through e-government (see Chadwick and May 2003 on federal policy; West 2003a, 2003b, 2005 on state and local government; Norris and Moon 2005 and Musso, Weare, and Hale 2000 on local government). Some of the constraints on e-government implementation reflect a lack of experience and capacity, and this is most evident at the local level (Ho 2002; Moon 2002; Norris, Fletcher, and Holden 2000). Governments have also consciously favored the entrepreneurial paradigm over the participatory one. Research on state implementation of e-government has shown that professional networks, legislative professionalization, and Republican legislatures are associated with more advanced implementation, but participatory variables, such as voter turnout, are not (McNeal et al. 2003). Similarly, surveys of local officials found cost savings are the most frequently cited reason for adopting e-government (West 2000).

Survey research shows that citizens turn to government Web sites for a number of activities, but looking up information (63 percent) is more common than online transactions (23 percent) or use of the sites for political participation (Council for Excellence in Government 2003; Larsen and Rainie 2002). Some of this, of course, reflects the configuration of current e-government Web sites as well as citizen preferences. About 23 percent said they had used government Web sites to research voting records or to get information on voting, even if those Web sites did not provide a direct means of participation online. Thirty percent of e-government users reported submitting personal information to a government Web site to obtain a product or service, indicating some level of trust that the government will act responsibly with this information (Council for Excellence in Government 2003).

Use of government Web sites also varies across levels of government. Most Americans with experience using e-government have used federal government Web sites (59 percent), but significant proportions have used local (43 percent) and state government Web sites (54 percent) (Council for Excellence in Government 2003). However, African Americans and women are most likely to use local Web sites (Larsen and Rainie 2002).

What is the evidence that e-government, in its current state, influences citizen attitudes toward government? Two major national surveys asked respondents whether e-government affects their attitudes toward government, including trust in government. West (2004) found that receiving information about e-government was associated with positive attitudes about government effectiveness but not trust, whereas Welch, Hinnant, and Moon (2005) found both positive attitudes and trust using the same data. Using two-stage models for 2001 survey data collected by the Pew Internet and American Life project, we can examine attitudes toward government Web sites and government at the federal, state, and local levels. The Pew survey did not include questions measuring all of the potential benefits of e-government, but it did

include questions related to the most common uses of e-government, such as information seeking and online interactions. The questions posed can be conceptualized as measures of transparency and effectiveness, accessibility, and responsiveness. Several hypotheses can be tested using this data.

H1: The use of government Web sites leads to increased perceptions of (1) transparency and effectiveness of government; (2) accessibility of government; and (3) responsiveness of government.

H2: Improved evaluations of government institutions and processes lead to greater trust in government.

The causal mechanisms for linking the attitudes in hypothesis 1 with trust include institutional-based trust and process-based trust. Transparency and effectiveness may be associated with institutional-based trust in particular because it enhances the image of government. Perceptions of improved interaction or responsiveness are clearly related to process-based trust.

Another possibility is that e-government changes citizen attitudes because it makes government more *accessible.* Nye assert that "the information technology revolution may also help government get closer to people, and when people feel a closer connection to government, confidence tends to be higher" (1997, 18). Trust in government is higher for state and local governments than for the federal government, perhaps partly because of their greater accessibility and familiarity (Thomas 1998). Surveys also show that citizens think more highly of their own representatives than of Congress and that they are more satisfied with their local schools than with public education (Nye 1997, 9). Perhaps greater accessibility to government online also increases trust in government.

H3: Because e-government is more extensive and more sophisticated at the federal level, the translation of positive attitudes toward government Web sites into increased trust in government is more likely for the federal government, followed by state government, then local government.

If the effects of e-government are primarily the result of the potential of the technology rather than particular uses or government attributes, then we could expect the federal government to be rated most highly by citizens.

Data and Methods: Pew Survey Data

To examine the effect of the use of e-government on citizen attitudes about government, we turned to a national random digit-dialed telephone survey conducted by the Pew Internet and American Life Project with 815 people who had previously reported that they used government Web sites. This is the first research we are aware of to explore the impact of the *use* of e-government on citizen attitudes rather than information about e-government itself. The survey was conducted between September 5 and 27, 2001. The Pew survey questions can be used to operationalize perceptions about some of the important benefits of e-government identified earlier: (1) transparency and effectiveness, (2) accessibility, (3) responsiveness, and (4) trust. We analyzed each dependent variable using these data, with separate models for the effects of visiting a government Web site (federal, state, or local) on citizen attitudes about government.

The primary explanatory (independent) variable measures whether the respondent visited the Web site of a government or government agency. Separate questions measure exposure to federal, state and local e-government Web sites. Each of the three explanatory variables was coded 1 if the respondent had used that type of government Web site and 0 otherwise. Based on Thomas's hypothesis that process-based trust is built over time through repeated interactions, we included a control variable for frequency of e-government use ranging from 5 (use e-government every day) to 1 (less often), but this variable does not distinguish use of e-government at varying levels (federal, state and local), as our primary explanatory variables do. Frequency of e-government use, however, should be important for improving citizen attitudes about government. Analysis (not shown) suggests that endogeneity (or selection bias) is not a significant factor in e-government use.[1]

To test the three primary hypotheses, we propose a two-stage causal model in which exposure to and use of e-government makes government processes, services, policies, and information more available to citizens. In turn, improved perceptions of government transparency and effectiveness, accessibility, and responsiveness should translate into increased general trust in government. We expect variations by level of government, with improved trust more likely at the federal level. Therefore, we employed two-stage estimation procedures to test the hypothesis that e-government increases perceptions of government processes and eventually trust. In the first stage, we estimated perceptions of (1) government transparency and effectiveness, (2) accessibility, and (3) responsiveness as a function of a critical set of independent variables employed in the second stage, as well as the frequency of e-government use. To do so, we used a two-stage procedure estimating two-stage models with ordinal dependent variables, in that our models assume an ordered logistic distribution instead of a normal distribution (Alvarez and Bedolla 2004; Alvarez and Glasgow 2000).

We began this two-stage procedure by estimating the reduced-form equations for perceptions of (1) government transparency and effectiveness, (2) accessibility,

and (3) responsiveness, which are reported in tables 1–3. These equations were estimated using ordered logistic regression.[2] From the reduced-form estimates, we produced predicted values for each respondent for the three government process evaluations at the federal, state, and local government levels. We substituted these predicted values for the endogenous variables on the right-hand side of the equation that models trust in government. We estimated the second-stage models (tables 4–6) using ordered logistic regression. The same set of explanatory variables was used in the stage 1 and stage 2 models, with the exception of frequency of e-government use, which was used only in stage 1 (instrumental variable). Specifically, the probability of improved perceptions of government transparency and effectiveness ($X_{1.1}$ federal, $X_{1.2}$ state, $X_{1.3}$ local), accessibility ($X_{2.1}$ federal, $X_{2.2}$ state, $X_{2.3}$ local), and responsiveness ($X_{3.1}$ federal, $X_{3.2}$ state, $X_{3.3}$ local) was used to predict trust in the federal government (Y_1), trust in state government (Y_2) and trust in local government (Y_3).

Three primary dependent variables were used in the first stage to test the hypothesis that e-government makes government processes, services, policies, and information more available to citizens. The concepts of transparency and effectiveness were operationalized with the question, "When you go online to government Web sites, how often are you able to get information or services you are seeking?" This variable captures some elements of both transparency and effectiveness because of the way the question was asked. The dependent variable was coded from 5 (always) to 1 (never), with higher values indicating increased perceptions of transparency. To explore whether e-government makes government information more accessible, accessibility was operationalized with the survey question, "When you want to get information about … Your federal government or agency, do you find that it is generally very hard, fairly hard, fairly easy, or very easy to find the government Web site that you need?" The dependent variables range from 4 (very easy) to 1 (very hard), with higher values measuring more positive experiences with the usability of e-government. Finally, e-government may improve transactions and communication between citizens and their government. Government responsiveness was operationalized with the survey question, "How much, if at all, has the Internet improved the way you interact with … the federal government?" The dependent variables range from 4 (a lot) to 1 (none at all), with higher values indicating increased responsiveness of government. Identical question wording was used for state and local government questions, substituting the word "federal" with either "state" or "local."

Table 1 E-Government Use and Government Transparency or Effectiveness First-Stage Estimates

	Are you able to get information or services you are seeking online?		Are you able to get information or services you are seeking online?		Are you able to get information or services you are seeking online?	
Variables	β (se)	p>|z|	β (se)	p>|z|	β (se)	p>|z|
Visited federal government Web site	**.57 (.22)**	**.012**				
Visited state government Web site			.02 (.22)	.942		
Visited local government Web site					–.18 (.18)	.309
Employed by the government	.01 (.20)	.962	–.01 (.20)	.951	–.03 (.20)	.881
Frequency of use	.11 (.08)	.152	**.13 (.08)**	**.103**	**.13 (.08)**	**.090**
African American	.02 (.39)	.957	.03 (.40)	.935	.08 (.39)	.847
Latino	–.28 (.38)	.464	–.26 (.38)	.489	–.27 (.38)	.483
Democrat	–.25 (.21)	.243	–.24 (.21)	.252	–.23 (.21)	.282
Republican	–.01 (.21)	.969	–.00 (.21)	.991	–.02 (.21)	.921
Age	**.02 (.01)**	**.062**	**.02 (.01)**	**.062**	**.01 (.01)**	**.083**
Education	.07 (.07)	.298	.10 (.07)	.155	.09 (.07)	.189
Income	–.05 (.06)	.358	–.05 (.06)	.383	–.04 (.06)	.471
Male	.02 (.18)	.924	.04 (.18)	.831	.05 (.18)	.781
Cut1	–3.85 (.78)		–4.04 (.79)		–4.16 (.78)	
Cut2	–1.91 (.57)		–2.11 (.58)		–2.22 (.58)	
Cut3	.03 (.54)		–.19 (.55)		–.31 (.54)	
Cut4	2.90 (.56)		2.65 (.57)		2.54 (.56)	
N	552		548		550	
LR Chi^2	16.59	.1206	10.44	.4916	10.74	.4651

Note: Unstandardized ordered logistic regression coefficients, standard errors in parentheses; probabilities are based on a two-tailed test. Statistically significant coefficients at more than a 90 percent confidence interval appear in bold. Pseudo R^2 is .01.

Source: Survey conducted by the Pew Internet and American Life Project ("The Rise of the E-Citizen: How People Use Government Agencies' Web Sites," April 3, 2002) of 815 people who had reported in previous Pew surveys that they used government Web sites. The random digit-dialed national survey was conducted between September 5 and 27, 2001.

The primary dependent variable in the second-stage models is trust in government. The hypothesis is that exposure to and use of e-government leads to improved experience with and perceptions of government processes and eventually increases citizen trust in government. The classic survey question, "How much trust and confidence do you have in … our federal government when it comes to handling domestic problems?" was used to measure attitudes about the federal government. The dependent variables range from 4 (a great deal) to 1 (none at all), with higher values indicating more political trust. The same question wording was used to measure trust in state and local government, substituting the words "state" and "local" for "federal."

Previous research has shown that although trust in government has decreased for all demographic groups, some individuals are more likely to trust government than others. African Americans are more likely to trust government, and trust rises with education. Factors that decrease trust in government include age (King 1997). Partisanship also affects trust, as those who identify with the party controlling the presidency or Congress are more likely to trust the federal government (Donovan and Bowler 2004). Regardless of the party in power, strong partisans are also more likely to trust government, perhaps because of feelings of efficacy and greater identification with the political process (King 1997). Government workers are more likely to trust government, perhaps because their attitudes toward government encouraged them to enter public employment in the first place (Brewer and Sigelman 2002).

To ascertain whether e-government increases trust in government, it is necessary to control for factors that are related to trust or can be hypothesized to influence interest in e-government. The educated, young, affluent, and non-Latinos are statistically most interested in looking up government information online, controlling for other factors. African Americans and whites do not differ significantly in *interest* in looking up government information online, although technology disparities influence who actually goes online and who does not (Mossberger, Tolbert, and Stansbury 2003, 100). Because this sample includes those with experience using e-government, variation in the interests of those who are online is most germane to this analysis. Descriptive data from the Pew study shows that African Americans and women are more likely to use local government Web sites, although this is based on simple percentages rather than multivariate statistical analysis (Larsen and Rainie 2002).

Individual-level explanatory variables included in this analysis measure race, ethnicity, gender, partisanship, income, age, and education and whether the respondent is a government employee. Dummy variables for African American, Latino, Democrat, Republican, government worker, and male were coded 1 and 0 otherwise. For race and ethnicity, whites were the reference group. For partisanship, those without strong partisan identification—independents—were the

Table 2 E-Government Use and Government Accessibility First-Stage Estimates

	Generally very easy to find the federal government Web site that you need?		Generally very easy to find the state government Web site that you need?		Generally very easy to find the local government Web site that you need?	
Variables	β (se)	p>|z|	β (se)	p>|z|	β (se)	p>|z|
Visited federal government Web site	**.77 (.25)**	**.002**				
Visited state government Web site			.26 (.26)	.320		
Visited local government Web site					**.70 (.22)**	**.001**
Employed by the government	.17 (.21)	.413	**.36 (.22)**	**.095**	.21 (.24)	.370
Frequency of use	.01 (.08)	.903	**.16 (.08)**	**.053**	–.07 (.09)	.458
African American	.04 (.41)	.931	–.21 (.46)	.644	–.01 (.45)	.988
Latino	–.47 (.39)	.235	.26 (.43)	.537	.28 (.43)	.513
Democrat	.22 (.23)	.327	.04 (.23)	.873	.13 (.25)	.614
Republican	.03 (.23)	.900	–.11 (23)	.637	–.20 (.25)	.433
Age	–.01 (.01)	.240	–.00 (.01)	.633	**–.03 (.01)**	**.014**
Education	.04 (.07)	.592	.02 (.08)	.834	–.13 (.08)	.136
Income	.00 (.06)	.956	–.02 (.06)	.723	.09 (.06)	.189
Male	.02 (.19)	.901	–.22 (.19)	.264	–.22 (.21)	.296
Cut1	–2.89 (.65)		–3.31 (.67)		–3.68 (.67)	
Cut2	–.75 (.60)		–1.02 (.62)		–1.92 (.64)	
Cut3	2.49 (.61)		2.16 (.62)		.96 (.64)	
N	514		497		374	
LR Chi^2	14.59	.2021	13.04	.2907	22.75	.0192

Note: Unstandardized ordered logistic regression coefficients, standard errors in parentheses; probabilities are based on a two-tailed test. Statistically significant coefficients at more than a 90 percent confidence interval appear in bold. Pseudo R^2 values range from .01 to .03.

Source: See table 1.

Table 3 E-Government Use and Government Responsiveness/Communication First-Stage Estimates

	Improved interaction with the federal government		Improved interaction with the state government		Improved interaction with the local government	
Variables	β (se)	p>|z|	β (se)	p>|z|	β (se)	p>|z|
Visited federal government Web site	**1.16 (.21)**	**.000**				
Visited state government Web site			**1.55 (.22)**	**.000**		
Visited local government Web site					**1.90 (.19)**	**.000**
Employed by the government	.05 (.18)	.799	.13 (.18)	.484	–.05 (.20)	.819
Frequency of use	**.24 (.07)**	**.001**	**.36 (.07)**	**.000**	.11 (.08)	.185
African American	–.26 (.35)	.458	.09 (.37)	.811	.20 (.37)	.582
Latino	–.06 (.36)	.867	.14 (.36)	.709	–.41 (.39)	.295
Democrat	.29 (.20)	.146	.20 (.20)	.307	.34 (.22)	.129
Republican	.16 (.19)	.400	.11 (.20)	.583	.09 (.22)	.693
Age	**–.02 (.01)**	**.040**	–.01 (.01)	.326	**–.01 (.01)**	**.047**
Education	–.00 (.07)	.969	.10 (.07)	.131	.01 (.07)	.906
Income	.10 (.05)	.049	–.02 (.05)	.694	.04 (.06)	.423
Male	–.02 (.17)	.901	–.09 (.17)	.588	–.02 (.18)	.933
Cut1	.32 (.50)		1.11 (.53)		.82 (.55)	
Cut2	1.50 (.51)		2.58 (.54)		1.83 (.56)	
Cut3	3.05 (.52)		3.98 (.55)		3.21 (.57)	
N	543		537		529	
LR Chi^2	61.44	.0000	94.65	.0000	140.84	.0000

Note: Unstandardized ordered logistic regression coefficients, standard errors in parentheses; probabilities are based on a two-tailed test. Statistically significant coefficients at more than a 90 percent confidence interval appear in bold. Pseudo R^2 values range from .04 to .11.

Source: See table 1.

reference group. Otherwise, the data available for this survey do not allow measurement of the intensity of partisanship. Females were the reference group for gender (males = 1, females = 0). Education was measured on an eight-point scale, with responses ranging from 1 (none or grades 1–8) to 8 (postgraduate training). Income may be related to feelings of trust, as those with higher incomes may be more satisfied with government performance. Economic factors may be related to the decline in trust in government (Lawrence 1997). Income was also measured on an eight-point scale ranging from 1 (less than $10,000) to 8 (more than $100,000). Age was measured in years.

Results

Stage 1: Predicting Attitudes about Government Processes

Because the dependent variables measuring the concepts of transparency, accessibility, and responsiveness are ordinal, ordered logistic regression was used to predict the impact of the use of e-government on citizen attitudes. Table 1 explores whether e-government affects citizen attitudes about the transparency or effectiveness of government, with separate statistical models for the federal, state, and local government levels. Column 1 shows that visiting a federal government Web site is statistically related to increased perceptions of the transparency of government, even after controlling for other demographic, economic, and attitudinal factors. Individuals who reported using federal e-government Web sites were more likely to report finding the government information or services they were seeking. However, visiting a state or local government Web site was not related to an increased probability of finding relevant government information or services. This suggests that federal e-government sites may increase perceptions of transparency, if not overall levels of political trust.

The substantive magnitude of the effect of visiting a federal government Web site on attitudes about the transparency of government is nontrivial. To simulate the predicted probability of improved evaluations of government transparency, the ordered logit coefficients for e-government use from table 1 (column 1) were converted to predicted probabilities. We varied whether the respondent had used a federal government Web site, setting values for age, income, education, and frequency of e-government use at their

Table 4 Summary of Stage 1 Findings

	Improved Government Transparency and Effectiveness	Improved Government Accessibility	Improved Government Responsiveness
Visited federal government Web site	√	√	√
Visited state government Web site			√
Visited local government Web site		√	√

Table 5 Does Improved Government Transparency Lead to Trust in Government? Second-Stage Estimates

	Do you trust the federal government?		Do you trust the state government?		Do you trust the local government?	
Variables	β (se)	p>|z|	β (se)	p>|z|	β (se)	p>|z|
Improved government transparency through federal Web site (predicted probability)[a]	–.05 (.76)	.944				
Improved government transparency through state Web site (predicted probability)[a]			–.29 (.1.18)	.802		
Improved government transparency through local Web site (predicted probability)[a]					.32 (1.20)	.788
Employed by the government	.23 (.19)	.240	–.10 (.20)	.598	.20 (.20)	.314
African American	.16 (.39)	.652	.46 (.41)	.255	.07 (.38)	.845
Latino	–.41 (.38)	.281	–.36 (.40)	.367	**–.88 (.39)**	**.024**
Democrat	.11 (.21)	.598	.31 (.23)	.174	.14 (.23)	.530
Republican	**.64 (.21)**	**.003**	**.65 (.21)**	**.002**	.01 (.21)	.978
Age	–.01 (.01)	.106	–.01 (.01)	.357	–.00 (.01)	.584
Education	–.03 (.06)	.660	.03 (.08)	.694	.04 (.08)	.659
Income	.01 (.06)	.797	–.04 (.06)	.493	–.04 (.06)	.529
Male	**.32 (.18)**	**.076**	.00 (.18)	.988	.18 (.18)	.323
Cut1	–3.44 (2.82)		–4.51 (4.29)		–1.67 (4.38)	
Cut2	–1.47 (2.81)		–2.27 (4.29)		–.06 (4.37)	
Cut3	1.30 (2.81)		.63 (4.28)		2.69 (4.38)	
N	541		543		540	
LR Chi²	18.10	.0533	14.29	.1601	10.20	.4232

Note: Unstandardized ordered logistic regression coefficients, standard errors in parentheses; probabilities based on a two-tailed test. Statistically significant coefficients at more than a 90 percent confidence interval in bold. Pseudo R^2 values range from .01 to .02.

[a] Predicted probabilities were estimated from models in table 1, columns 1–3.

means. Binary variables were held constant at their modal category, so for the simulation, the respondent was assumed to be female, white non-Hispanic, without strong partisanship (independent), and a nongovernment employee.[3] Holding the other explanatory variables constant (described earlier), a respondent who had not visited a federal government Web site had a 14 percent probability of answering that he or she would "always" "get the information or services you are seeking," "when you go online to government

Table 6 Does Improved Government Accessibility Lead to Trust in Government? Second-Stage Estimates

	Do you trust the federal government?		Do you trust the state government?		Do you trust the local government?	
Variables	β (se)	p>|z|	β (se)	p>|z|	β (se)	p>|z|
Improved government accessibility through federal Web site (predicted probability)[a]	.25 (.81)	.756				
Improved government accessibility through state Web site (predicted probability)[a]			.06 (1.18)	.963		
Improved government accessibility through local Web site (predicted probability)[a]					**–1.66 (.63)**	**.008**
Employed by the government	.24 (.20)	.225	–.10 (.25)	.680	.07 (.20)	.729
African American	.18 (.39)	.645	.46 (.41)	.259	–.05 (.39)	.904
Latino	–.44 (.37)	.254	–.32 (.39)	.410	**–1.07 (.36)**	**.003**
Democrat	.14 (.22)	.526	.33 (.21)	.119	–.04 (.22)	.864
Republican	**.65 (.22)**	**.003**	**.65 (.21)**	**.002**	.11 (.21)	.606
Age	–.02 (.01)	.084	–.01 (.01)	.224	.01 (.01)	.314
Education	–.03 (.07)	.694	.02 (.07)	.758	.12 (.07)	.106
Income	.02 (.06)	.759	–.04 (.06)	.523	–.08 (.06)	.167
Male	**.32 (.18)**	**.069**	–.01 (.20)	.949	**.38 (.19)**	**.045**
Cut1	–2.70 (1.85)		–3.33 (2.45)		–5.76 (1.23)	
Cut2	–.73 (1.85)		–1.09 (2.45)		–4.14 (1.22)	
Cut3	2.05 (1.85)		1.81 (2.45)		–1.36 (1.20)	
N	541		543		540	
LR Chi²	18.19	.0518	14.23	.1627	17.26	.0689

Note: Unstandardized ordered logistic regression coefficients, standard errors in parentheses; probabilities based on a two-tailed test. Statistically significant coefficients at more than a 90 percent confidence interval in bold. Pseudo R^2 values range from .01 to .02.

[a] Predicted probabilities were estimated from models in table 2, columns 1–3.

Table 7 Does Improved Government Responsiveness Lead to Trust in Government? Second-Stage Estimates

	Do you trust the federal government?		Do you trust the state government?		Do you trust the local government?	
Variables	β (se)	p>|z|	β (se)	p>|z|	β (se)	p>|z|
Improved government responsiveness through federal Web site (predicted probability)[a]	–.04 (.27)	.890				
Improved government responsiveness through state Web site (predicted probability)[a]			–.04 (.21)	.834		
Improved government responsiveness through local Web site (predicted probability)[a]					**.49 (.18)**	**.006**
Employed by the government	.22 (.19)	.238	–.10 (.20)	.599	.20 (.19)	.315
African American	.17 (.39)	.661	.47 (.40)	.248	–.10 (.39)	.798
Latino	–.40 (.36)	.269	–.32 (.37)	.381	**–.86 (.35)**	**.015**
Democrat	.13 (.22)	.565	.34 (.21)	.111	.03 (.22)	.897
Republican	**.64 (.21)**	**.003**	**.64 (.21)**	**.002**	–.06 (.21)	.776
Age	–.01 (.01)	.090	–.01 (.01)	.212	–.00 (.01)	.979
Education	–.03 (.07)	.625	.02 (.07)	.735	.05 (.07)	.434
Income	.02 (.06)	.763	–.04 (.06)	.524	–.05 (.06)	.317
Male	**.31 (.18)**	**.073**	–.00 (.18)	.954	.19 (.18)	.283
Cut1	–3.32 (.81)		–3.54 (.71)		–1.78 (.66)	
Cut2	–1.36 (.78)		–1.30 (.68)		–.16 (.64)	
Cut3	1.41 (.18)		1.61 (.68)		2.63 (.66)	
N	541		543		540	
LR Chi²	18.12	.0530	14.27	.01609	17.91	.0565

Note: Unstandardized ordered logistic regression coefficients, standard errors in parentheses; probabilities based on a two-tailed test. Statistically significant coefficients at more than a 90 percent confidence interval in bold. Pseudo R^2 values range from .01 to .02.

[a] Predicted probabilities were estimated from models in table 3, columns 1–3.

Web sites." This probability increased to 22 percent for the same respondent who had used federal e-government Web sites, a difference of 8 percent based on experience with e-government alone.

Improved accessibility is another way that e-government might affect citizens. Table 2 explores whether visiting a federal, state, or local government Web site affects one's ability to find information from the government or agency. The analysis shows that visiting a federal or local government Web site statistically increases the perceived ease of finding information. Individuals who had used federal and/or local government Web sites were more likely to report that it is easy (or very easy) to find the government Web sites they need. This positive statistical relationship holds after controlling for other demographic factors, such as age, gender, race, ethnicity, income, education and employment, and frequency of use. Interestingly, visiting a state government Web site does not produce perceptions of accessibility.

Table 3 reports on whether e-government increases perceptions of government responsiveness. The data indicate that visiting a federal, state, or local government Web site statistically increases the perceived responsiveness of government, all else being equal. Citizens who had used Web sites for *any* level of government were more likely to say that the Internet had improved their interaction with government at that level. Probability simulations indicate that local e-government use has a dramatic effect on perceptions of local government responsiveness (column 3). Setting the explanatory variables at their means or modes (for binary variables), as discussed earlier, a respondent who had not visited a local government Web site had only a 3 percent probability of indicating that the Internet had significantly improved ("a lot") interaction with local government. This probability increased to 19 percent for the same individual who had used local e-government Web sites, all else being equal. Among non-e-government users at the local level, there was only a 9 percent probability of indicating that the Internet had "somewhat" improved

Table 8 Summary of Stage 2 Findings

	Trust Federal Government	Trust State Government	Trust Local Government
Improved government transparency/ effectiveness		***	***
Improved government accessibility		***	
Improved government responsiveness			√

*** Hypothesis cannot be tested because there is no instrumental variable; coefficient for e-government use was not statistically significant in the first-stage model.

interaction with local government. This probability increased to 29 percent among local e-government users, a 20 percentage-point difference based on use of local e-government Web sites alone.

In summary, visiting a federal Web site was statistically related to citizen perceptions of transparency of government, accessibility of government information, and increased responsiveness of the federal government. Visiting a local government Web site was associated with citizen perceptions of accessibility and responsiveness of local government. Visiting a state government Web site was statistically associated with only increased perceptions of responsiveness of state government.

> . . . visiting a federal Web site was statistically related to citizen perceptions of transparency of government, accessibility of government information, and increased responsiveness of the federal government.

Stage 2: Predicting Trust in Government

Do improved attitudes about government processes translate into increased general trust in government? If so, e-government could be a powerful mechanism for the development of process-based trust. Because the dependent variables in the stage 2 models measuring the concept of trust in government at the federal, state, and local levels are ordinal, ordered logistic regression coefficients are again reported. In table 5, we see that although Republicans tended to have more trust in the federal and state government (likely reflecting partisan control of government at the time of the survey), individuals with improved perceptions of government transparency through the use of federal, state, or local government Web sites were *not* statistically more likely to trust their federal, state, or local governments. Thus, although visiting a federal government Web site did appear to increase perceptions of federal government transparency, this does not appear to lead to more trust in federal government institutions. This is important and shows the limitations of e-government on citizen attitudes.

Table 6 repeats the null findings just reported. Republicans and the young were more likely to express trust in government at all levels than Democrats, independents, and older respondents, a finding that is consistent with the published literature. Among e-government users, Latinos were less likely than others to trust local government. But respondents with improved perceptions of government accessibility through the use of federal, state, or local e-government Web sites were not more likely to trust the government at any level. In fact, we found that improved perceptions of local government accessibility resulted in *reduced* trust in local government. This null finding is noteworthy, given that use of federal and local government Web sites was linked to perceptions of government accessibility at the federal and local levels in the models reported in table 2. The fact that ease of finding a government Web site was negatively related to trust in government indicates that perhaps this variable is measuring something that is conceptually different from the other questions. Accessibility is more directly an evaluation of the e-government Web sites than of government in general. Finding a government Web site demonstrates technical proficiency in organizing the sites rather than governmental intent to be open or responsive. Again, e-government appears to improve perceptions of government processes but not trust.

Finally, table 7 explores whether perceptions of government responsiveness translate into government trust. Controlling for other factors, improved perceptions of government responsiveness at the federal or state levels did not appear to increase trust in those governments. But interestingly, improved perceptions of *local* government responsiveness (through local government Web site use) *was* statistically related to increased trust in local government, even after controlling for other demographic, economic and attitudinal factors. Probability simulations based on the coefficient in table 7 (column 3) reveal a significant impact of evaluations of government responsiveness on general trust in government. Holding the explanatory variables at their means or modal category (for binary variables) reveals that a respondent with low (minimum) perceptions of local government responsiveness had a 12 percent probability of trusting local government "a great deal." This increased to 15 percent if the respondent had average (mean) evaluations of government responsiveness and 24 percent if he or she had high (maximum) evaluations of local government responsiveness. Varying evaluations of local government responsiveness from low to high increased trust in local government by 12 percent, all else being equal.

Table 8 shows that in the six relationships tested in this second-stage analysis (three could not be tested because there was not a valid instrument, as the coefficient for e-government use was not statistically significant in the first stage model), only one—perceptions of government responsiveness at the local level—led to greater trust in local government. This suggests that the local level is important in terms of studying the effects of e-government on citizens.

The statistical analysis provides some support for our primary hypotheses. Use of government Web sites did appear to lead to increased perceptions of government transparency and effectiveness, accessibility, and responsiveness, though to varying degrees depending on

the level of government. As we hypothesized, the use of federal government Web sites appeared to have the greatest positive effect on citizen attitudes about government processes. We found only limited support for our second hypothesis, but important support nevertheless. Experience with local e-government did appear to have beneficial effects on citizen attitudes toward government responsiveness, which, in turn, resulted in improved general trust in local government. Based on this analysis, federal and local e-government sites appear to be the most fruitful venues for future study, given the positive attitudes that citizens demonstrated in response to these sites.

Conclusion

Digital government has attracted attention as one way of improving citizen interactions with government and a possible remedy to the dilemma that citizen apathy and distrust pose for democracy. There is currently a shortage of empirical information about whether e-government in fact influences citizen attitudes about government, and, if it does have some effect, how or why it matters.

Analysis of Pew survey data revealed that visiting a local government Web site led to enhanced trust in local government, controlling for other attitudinal and demographic factors. E-government at the local level was also perceived by citizens as making government accessible and responsive, but only responsiveness was directly linked to increased trust of local government in the two-stage model. This suggests that increased government trust is produced by improved interactions through e-government at the local level. The federal government rated highest on positive attitudes about government processes. This likely reflects the wider use and greater technical capacity of digital government at the federal level. Yet these advantages did not lead to greater trust. For federal and state government, trust among e-government users was a function of other factors, such as age, partisanship, gender, and ethnicity. More frequent use of e-government was also associated with more positive attitudes toward government processes in many of the models. Despite the limited findings in terms of trust, it is good news that citizens see digital government in a positive light.

What are the likely reasons for the use of e-government and responsiveness producing greater trust at the local level? Local government Web sites are often the least technically proficient. Perhaps it is the nature of local government and its proximity to citizens that leads them to place greater value on improved interactions with local government. The information and services available on local government Web sites may be especially valuable for citizen's daily routines, such as mass transit, local services, or neighborhood information. Alternatively, the results may reflect a negative judgment of federal government. Distrust of federal government may be so high that even more positive attitudes toward e-government at that level do not influence these more generalized feelings.

Theoretically, the research supports the hypotheses about process-based trust that were advanced by Thomas (1998) but that have not been extensively tested. The fact that improved evaluations of government responsiveness appeared to lead to increased trust in local government seems to be driven by process rather than institutional factors. Citizen attitudes related to institutional trust, such as government transparency, did not lead to increased trust in government at any level. This analysis extended previous research on process and trust (Hibbing and Theiss-Morse 1998, 2001, 2002) by measuring responses to actual changes in process. It suggests future research on e-government should continue to explore process-based trust, and this may be more significant than the scholarship on trust has recognized.

What guidance does this offer for government agencies and their managers? The generally positive perceptions indicate that e-government is worth pursuing as a means of enhancing the effectiveness of government agencies and their relationships with citizens. Improved interactions with citizens are the most widely perceived benefit across all three levels of government, and this is also the only variable associated with higher levels of trust. Interaction through online transactions, e-mail, or question services may be especially important for increasing process-based trust. Improving interactions could also include an expansion of participatory opportunities online, such as online chats or bulletin boards for commentary. E-government has not provided many venues for citizen participation.

There are also some limitations of current survey research for understanding what the potential of e-government might be in building better relationships with citizens. We can say with confidence that e-government leads to positive attitudes among current users, but would that be true if the e-government users were a more diverse group? Currently, half of the American population has used a government Web site. What would be the impact if access to and knowledge about e-government were more widespread? Because of disparities in information technology access and use, which are patterned by race, ethnicity, income, education, and age, there are some limitations for generalizing these findings to all Americans. Still, even citizens who are not currently Internet users say they would be interested in looking up information on a government Web site, as 78 percent of Americans express interest in doing so (Mossberger, Tolbert, and Stansbury 2003, 98).

If e-government leads to better relationships between citizens and government, this lends even more credibility to policies designed to encourage widespread use of the Internet through public access and use of technology in schools.

Notes

1. Very few demographic or attitudinal factors are statistically related to use of federal, state, or local e-government Web sites. The more educated are statistically more likely to have visited a federal government Web site; government workers are more likely to have visited a state government Web site; and African Americans are more likely to have visited a local government Web site. Beyond these limited factors, gender, age, income, race, ethnicity, partisanship, and frequency of use provide no explanatory power in predicting e-government use. Logistic regression models predicting e-government use based on demographic, economic, and attitudinal factors offer little explanatory power, with very low explained variance (pseudo-R^2 range from .02 to .04).
2. As with any two-stage model, we made some identification assumptions in the structural models. We hypothesized that demographic factors such as race, ethnicity, age, education, and income would affect citizen satisfaction with e-government. Frequent users of e-government should be more likely to perceive improved government transparency, accessibility, and responsiveness; the same should be true for government workers, who presumably use e-government more frequently. Partisanship may also shape perceptions of government processes. Because Republicans controlled the presidency and Congress at the time of the survey, we expect Republican partisans to have more favorable views of government. To simplify the calculation of predicted probabilities, reported in tables 5–7, they were based on first-stage Poisson regression models rather than ordered logistic regression models, as reported in tables 1–3. This resulted in one overall prediction (or value) per respondent rather than predicted values for low, moderate, and high evaluations of government transparency and efficiency, accessibility, and responsiveness.
3. Estimations were produced using *Clarify: Software for Interpreting and Presenting Statistical Results* by Michael Tomz, Jason Wittenberg, and Gary King.

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