Innovating in Digital Government in the American States*

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Objective. The purpose of this research is to examine why some states have embraced digital government more extensively than others. *Methods.* Multivariate regression analysis is used to empirically test explanations for state innovation in e-government. The primary dependent variable is the percent of state-level government websites offering online services to citizens. *Results.* Republican-controlled legislatures are more likely to embrace e-government, implying that efficiency concerns may drive reliance on digital government. Innovators in e-government were states with fewer households with Internet access and less use of the initiative process, indicating that citizen demand was not a factor. More extensive use of e-government is also associated with legislative professionalization and professional networks—factors that may be useful for explaining the diffusion of other administrative reforms, and technical issues lacking political salience. *Conclusions.* These data suggest e-government implementation is driven by legislative professionalism and, to a lesser extent, state professional networks, rather than citizen demand. These indicators fit Lowi's (1972) conception of "constituent policy" as a top-down process, confined to administrative or legislative circles, compared to distributive, regulatory, and redistributive policy. We hypothesize that other administrative reforms, particularly those lacking political salience, may exhibit similar relationships with legislative professionalization and professional networks.

Arguably, one of the most recent significant innovations in information technology has been the creation and ongoing development of the Internet. The medium combines the audiovisual components of traditional forms of media such as the newspaper and television with the interactivity and speed of the telephone and mail. The Internet also increases communication flexibility (through e-mail and chat rooms) while reducing communication

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cost, by permitting the exchange of large amounts of information instantaneously regardless of geographic distance. Because of these advantages, federal, state, local, and municipal governments are increasingly relying on the Internet to communicate and complete transactions with citizens, commonly referred to as electronic government. Electronic government (e-government) "refers to the delivery of information and services online via the Internet or other digital means" (West, 2000:2), and may also include opportunities for online political participation (Clift, 2000; Melitski, n.d.; Norris, 2001). The diffusion of e-government has been rapid and widespread. All 50 states have adopted some form of e-government (Stowers, 1999); a recent survey indicates that 80 percent of local governments maintain a website (Norris, Fletcher, and Holden, 2001).

This research seeks to understand why some states have embraced digital government more extensively than others. It evaluates trends in the adoption of e-government across the 50 states as well as explores patterns of state innovations in this policy area. To date, little published research has been conducted on the determinants of state policy innovation in e-government. Descriptive studies, however, provide useful measures for distinguishing between different types or levels of implementation of e-government.

The diffusion of e-government presents several interesting questions. Has more extensive use of this new technology occurred in states that are generally more innovative? Are they states with more resources to invest? Has e-government spread in response to citizen demand, been facilitated by participatory politics, spread through professional networks, or spread because of efficiency concerns? In discussing e-government as a state policy innovation, we add to the existing literature on policy diffusion by contrasting the variables that influence the adoption of an administrative reform such as e-government to previous studies that examined developmental and redistributive policies (Hwang and Gray, 1991) or morality policies (Mooney, 2001; Mooney and Lee, 1995; MacFarlane and Meier, 2001).

This article first provides an overview of existing research in trends in e-government in American cities and the states. In the next section, we provide a summary of the previous research on state policy innovation, defining e-government as an administrative policy innovation, and specifying factors that may promote more extensive use of digital government. The third section uses multivariate regression analysis to empirically test explanations for state innovation in this policy area. We conclude with a discussion of the broader implications of this study for diffusion theory.

Trends in Digital Government in the American States

Digital government potentially transforms government activities in two ways: by improving service delivery, including costs; and by improving

communication between citizens and government. The traditional orientation of state and municipal websites has been business and economic development (Stowers, 1999), but, clearly, information and service provision are becoming more significant.

Governments are employing Internet technology in the expectation that it will be cheaper, faster, and more convenient than traditional means of delivering products and services. Most state websites have information posted regarding agriculture, transportation, revenues, elections, banking and insurance, environmental issues, and health and human services (Stowers, 1999). Some of the services that states are offering their residents online include the renewal of vehicle registration, hunting licenses, and the filing of tax forms (Accenture, 2001). However, only 22 percent of state websites offer citizens the ability to complete an entire transaction online, versus simply downloading a form (West, 2000). According to a survey of state and federal chief information officers, 86 percent believed that e-government improved service delivery, and 63 percent felt it reduced costs. Surveys of city managers show a lower perception that e-government reduces costs, but cities tend to conduct fewer transactions online (Stowers, 1999) and so have taken less advantage of the technology's potential for cost savings.

Many observers and advocates view e-government as a means for enhancing democratic participation through improved communication with agencies, online public hearings and forums, and, possibly, the advent of online voting at home (Clift, 2000; Melitski, n.d.; Norris, 2001). Communication through e-mail is prevalent, with 68 percent of state websites including e-mail addresses (West, 2000) and government receipt of e-mail increasing (Clift, 2000). Other forms of technology-enabled communication are fairly rare, with only 15 percent of state websites providing message boards for public comment, and only 1 percent (16 sites) offering real-time chat rooms (West, 2000). As of 1997, only 34 percent of states and 20 percent of large cities used their websites to post final policies (Stowers, 1999). Because of the expense related to constructing secure voting systems, Clift (2000) argues that such an innovation is most likely to occur in states that have ballot initiatives, giving voters a direct mechanism to demand change.

According to a survey conducted by the Center for Digital Government and the Progress and Freedom Foundation (2001), state leaders in e-government services are Washington state, Kansas, Alaska, and Illinois. The center ranked the 50 states across eight areas of technology applications, including electronic commerce, taxation/revenue, social services, law enforcement and the courts, digital democracy, management/administration, higher education, and K–12 education. A distinguishing feature of all four of the highest-ranked states were governors and legislators committed to advances in information technology. The report attributes the success of the technology program in number-1-ranked Washington state to its

cabinet-level authority and support from the governor. The report ascribed Kansas's success to the partnership that has been forged between the three branches of government, and the "flattening" of its bureaucracy. Alaska's Information and Technology Council (ITC) played a pivotal role in the state's technology success, and is comprised of commissioners of all major state agencies and the state legislature. The report cited Illinois's commitment from the governor, which allowed the state's Chief Technology Officer to push an agenda that calls for IT innovation among the state agencies. This study suggests that gubernatorial leadership and collaboration across branches and agencies are important factors.

A useful measure of state innovation in e-government is a recently developed index published by the World Bank of the percentage of a state's government websites that offer at least one service to citizens, ranging from online fishing licenses to small business applications (West, 2000). The ability to offer service transactions online marks a relatively higher level of e-government development, compared to the more common practice of merely posting information on the web. Layne and Lee (2001) have delineated a four-stage model of e-government development (cataloguing, transaction, vertical integration, and horizontal integration). The availability of transactions on the web represents advancement to at least the second stage of implementation, and fits more closely with criteria outlined by Ho (2002) for evaluating the use of e-government as part of the "reinventing" government paradigm, which aims to give citizens more flexibility and convenience in their interactions with government.

West (2000) analyzed 1,813 state government websites in 2000[1] and found that the 50 states vary widely in the percentage of government sites that offer completely online service transactions to citizens. This ranges from a high of 48 percent in Kansas to a low of 3 percent in New Hampshire. The mean percentage of state government websites offering services is 19 percent, meaning that approximately one of every five state websites offered one or more services. West found that federal websites were more likely than state websites to offer one or more services. Table 1 ranks the 50 states on this measure of e-government services.

[1] The West/World Bank index of the percent of state government websites that provide services has a statistically significant correlation of 0.520 with the West overall ranking of state government websites. The indices are also statistically correlated with other measures of e-government implementation in the states constructed through a team effort by the Center for Digital Government, the Progressive & Freedom Foundation, and Government Technology magazine 2000. See Center for Digital Government "2000 Digital State Survey." Available at ⟨http://www.centerdigitalgov.com/center/00digitalstates.phtml/⟩. The West overall ranking has a 0.333 correlation with the overall ranking of state government websites produced by the Center for Digital Government, and a 0.360 correlation with the Center for Digital Government digital democracy measure (all correlations significant at a p value < 0.01).

TABLE 1

Ranking of States on E-Government Innovation Index

State	Percent of Websites Offering Service	Rank	State	Percent of Websites Offering Service	Rank	State	Percent of Websites Offering Service	Rank
KS	48	1	AR	19	18	AZ	11	35
KY	46	2	IN	19	18	CA	11	35
IA	43	3	MS	19	18	RI	11	35
PA	37	4	NJ	19	18	VA	11	35
FL	36	5	NY	19	18	MD	10	39
NC	34	6	AK	18	23	DE	9	40
MO	32	7	MT	18	23	SD	9	40
OK	31	8	WA	18	23	TN	9	40
SC	31	8	WI	18	23	WY	9	40
IL	28	10	NE	16	27	HI	8	44
ND	28	10	GA	15	28	OR	8	44
NM	28	10	ID	15	28	TX	8	44
MN	26	13	AL	14	30	NV	7	47
ME	24	14	LA	14	30	CO	6	48
MI	23	15	UT	14	30	CT	6	48
OH	23	15	WV	14	30	NH	3	50
MA	22	17	VT	12	34			

SOURCE: West (2000). Variable has a mean of 19.10 percent with a standard deviation of 10.87.

State Policy Innovation and Diffusion Research

One of the most prevalent themes in the political science literature on the diffusion of innovations is the "policy determinants" approach, or the search for variables that explain the adoption of policy innovations (Savage, 1985). Much of the previous research in this area has focused on empirically modeling the temporal adoption of a policy across the states (Berry and Berry, 1999), such as abortion laws, state lotteries, or right-to-die legislation. A common critique of diffusion studies is that they often provide only a dichotomous measure of adoption, ignoring policy scope or, in this case, the extent of implementation (Clark, 1985; Downs and Mohr, 1976). Ranking the states on measures of implementation or policy scope gives a valid and perhaps more accurate picture of innovation than the timing of adoption (Clark, 1985; Hays, 1996), as it accounts for states that have invested more effort and resources.

What variables might explain the extent of implementation of e-government initiatives in the states? How does the ranking of online government services compare to state innovation in other policy areas? Comparison of the rankings produced by both the Center for Digital Government (2001) and West (2000) shows that neither of the commonly used indices of state policy innovation (Walker, 1969; Savage, 1978)

describes the findings on e-government, where most leading states score relatively poorly on general measures of policy innovation.[2] Some states that rank highly on both the Walker and Savage indexes, such as California, Oregon, and Colorado, are among the laggards on the West e-government index. In California, the home of Silicon Valley, only 11 percent of state government websites provide services to citizens.

In his pioneering article on policy diffusion in the American states, Walker (1969) argued that certain states demonstrated a pattern of innovation across a wide variety of policies. Walker concluded that more innovative states tended to be larger, wealthier, and more urbanized. In contrast, the 17 states ranked high (above the mean) on the West (2000) e-government index range from extremely poor and rural (New Mexico) and small (North Dakota), to large, industrialized Midwestern states (Pennsylvania, Illinois, Michigan, Ohio). Walker also hypothesized that policies spread from more innovative states in both regional patterns and through national professional networks. The e-government ranking does suggest a regional pattern, as states in the Midwest and Northeast tend to be ranked relatively highly.

Later research conducted by Gray (1973) challenged Walker's findings, showing that policy innovations differed by policy type. Gray's argument regarding variability in state innovation is supported by the broader, interdisciplinary research on the determinants of innovation in organizations. A major difficulty in developing innovation theory is the variation of determinants across policy areas (Downs and Mohr, 1976).

One way to understand the many different variables that have been used to explain state policy innovation is as measures of politics, resources, and demands (Mooney and Lee, 1995). The comparative state politics literature focused first on political variables, such as party competition, voter participation, party control, and malapportionment (e.g., Key, 1956), but later studies argued that resource variables—economic factors such as income, urbanization, and industrialization—explained more state policy variation than did political factors (Dye, 1966; Dye and Robey, 1980). Erikson, Wright, and McIver (1993) found that variations in many policy areas can be explained by political variables other than party politics—the public opinion of the electorate, measured by an index of state ideology. Measures of demand, of course, include problem severity or need in the specific policy area (see, for example, ways demands have been operationalized in Berry and Berry 1990, 1992; Goggin et al., 1990; Mintrom 2000:189–90).

[2] Of the states that rank among the top 10 in West's e-government index, only Illinois (tied for 10th place) is among the top 20 states in either Walker's (1969) or Savage's (1978) innovation indices in the latter half of the 20th century. Illinois ranked 13th in innovation on both indexes.

The particular variables that influence policy adoptions are likely to vary by policy issue, as Gray argued in her 1973 article. Hwang and Gray (1991) categorize state policies as either redistributive or developmental and conclude that political factors are more important in the adoption of redistributive policy, whereas economic development is more important for developmental policy. Scholars examining "morality" policies, which involve the legitimization of values or first principles (McFarlane and Meier, 2001:3; Mooney, 2001:3) have argued that these policies represent a third distinct type that shares little with either redistributive or developmental policies, and little with other regulatory policies. Factors important in the diffusion of morality policies are demographic factors such as the religious composition of the state population, and political factors such as interest-group activity, partisanship, and public opinion (McFarlane and Meier, 2001:101–04; Mooney and Lee, 1995).

Previous efforts to categorize the diffusion of innovations in public policy leave out some important activities of state governments, including administrative reforms. The diffusion of these policies could be expected to differ from the highly politicized patterns of redistributive and morality policy because, for the most part, administrative reforms such as e-government are technical rather than value-laden, and not likely to be politically salient. The major participants are also likely to include administrative officials, although state legislators also play a role through budget processes or legislative oversight.

How could politics, resources, and demand affect the adoption and implementation of e-government, an administrative reform? The following section discusses a number of relevant measures for these categories. For the diffusion of an administrative reform, we feel that professionalization and networks may matter as well. Legislative professionalization has been found to influence program adoption and spending levels in a number of policy areas, as varied as air pollution (Downs and Rocke, 1980), juvenile corrections (Downs, 1976), and public assistance (Derthick, 1970). Legislative professionalization might be used as a proxy measure of the relative professionalization of state government more generally. Professionalization may represent expertise and values within state government that are conducive to the adoption of new technologies and administrative reforms. Diffusion may also be a product of professional networks, as Jack Walker (1969) argued. The significance of national professional networks of administrative and elected officials is substantiated in later research (Grupp and Richards, 1975; Mossberger, 2000; Nelson, 1984; Walker, 1971).[3]

[3] This type of network could be expected to be more closely linked to the diffusion of administrative reforms than the issue-oriented networks involving interest groups that have promoted the diffusion of school choice, for example (see Mintrom, 2000).

Empirical Model: Data and Measurement

As discussed in the introduction, the primary dependent variable in our analysis of state innovation in e-government is the percent of state-level government websites offering online services to citizens (West, 2000). Online services are measured by the percentage of a state's government websites that offer at least one service. For a comparison and validity test, a second dependent variable is a measure of the overall state ranking of government websites. The overall ranking is an index based on 12 criteria that are focused on citizen contact material, services and information, and access quality. The 12 features include offering phone contact information, addresses, publications, databases, foreign language access, privacy policies, security policies, an index, disability access, services, e-mail contact information, and search capabilities (West, 2000). Both dependent variables have the advantage of measuring the extent or scope of innovation.

Based on the previous literature on state policy innovation and diffusion, and our characterization of e-government as an administrative reform, a primary explanatory variable is professionalism of the state legislature. Legislative professionalism also serves as a proxy for overall professionalism of state government.[4] We would expect support for digital government to be the strongest in states with more professional legislatures, measured by an index created by Squire (1992) that uses the U.S. Congress as a baseline against which to measure the salary, staff, and time-in-session of the 50 state legislatures.

We also measure a state's participation in professional networks directly with a dummy variable measuring leadership by state officials in the two most important state government organizations: the National Council of State Legislatures (NCSL) and National Governor's Association (NGA) (see Powell, 2002). These two organizations provide information and opportunities to discuss many state-level policy innovations. We would expect states with more professional networks and leadership to be more likely to be innovative in e-government. If a state had representation in the leadership of the NCSL or NGA in 2000 they were coded 1, and 0 for otherwise. We define "leadership" as state membership on the NCSL's Executive Committee of 11, which includes four ex-officio members. Leadership within the NGA consists of the nine-member Executive Committee, the chairs of five standing committees, the chair of the Best Practices Board, and for this particular issue, the two members of the e-government committee (Missouri and Wyoming).

Mooney and Lee (1995) identify resources as an important factor in state policy innovation. State wealth includes both governmental resources and societal resources. Slack resources (Downs and Mohr, 1976; Walker, 1969)

[4] An extensive search of the literature failed to reveal a meaningful quantitative measure of administrative or "bureaucratic" professionalism.

such as the size of the state budget may account for the scope of adoption of e-government reforms. While uses of computers and the Internet have the potential to save money in the long run, there are start-up and maintenance costs associated with websites. Governmental resources are measured by state general revenue per capita in 1998. It is possible that administrative reforms are tied to economic factors, much like developmental policies. Societal resources are measured by state income per capita (1999) (U.S. Bureau of the Census, 2000). An extended model also includes education and urbanization as measures of economic development. We operationalize these as the percent of the population residing in metropolitan areas (1998) and the percent of the population with a bachelor's degree (1999). The discussion focuses on the reduced model in which revenues and income alone represent state development and slack resources.

Demand is another important factor in state policy innovation, according to Mooney and Lee (1995). Use of the Internet in state government could be conceived of as a response to demand from an increasingly computer-savvy populace (Norris, Fletcher, and Holden, 2001), as measured by Internet use by state residents. We measure public demand for e-government services by the percent of households with Internet access at the state level (U.S. Commerce Department, 2000). Given disparities in access to computers and the Internet based on race/ethnicity (U.S. Department of Commerce, 2002), commonly referred to as the "digital divide," we would expect states with a high percent of minority residents to be less likely to innovate in digital government than predominantly white, homogeneous states. State minority diversity is measured by an index of racial and ethnic percentages created for the 50 states using 1996 demographic data on the size of the Latino, African-American, Asian-American, and non-Hispanic white populations from Current Population Surveys (Hero, 1998).[5] State racial and ethnic context has also been shown to be associated with a broad range of policy outcomes in the states (Hero, 1998), and thus also serves as a control variable.

Political factors influencing government reform may not follow traditional partisan cleavages, as these issues may be framed as more administrative than political. To test this hypothesis, we introduce partisanship as an independent variable, but expect that it will have little effect. The Clinton/Gore presidential administration spent much of the 1990s promoting the idea of "reinventing government," using technology as well as other administrative reforms to improve government efficiency and citizen participation (see Osborne and Gaebler, 1992). The idea of reinvention, however, has been less clearly identified with any particular

[5] Following Hero and Tolbert (1996) and Hero (1998), an index (Sullivan, 1973) of state racial diversity was created from 1996 census data on the percent Latino, African American, white, and Asian American in each state. The index was computed with the following formula: Minority diversity $= 1 - [(\text{proportion Latino})^2 + (\text{proportion African American})^2 + (\text{proportion white})^2 + (\text{proportion Asian})^2]$.

party at the state and local level, and some of the states cited as most innovative have had Republican governments (Center for Digital Government, 2001).

We measure party control of the government by the percentage of Democrats in the state legislature in 1999 (U.S. Bureau of the Census, 2000). Party control of the state legislature measures the magnitude of partisan control of the state government and provides a better measure than a dummy/dichotomous variable for the political party of the governor or state legislative leadership.

We also control for party competition, as we expect states with greater levels of party competitiveness to be more fragmented politically. This may create a more difficult environment for the adoption of reforms even if the issue is not highly charged politically. Party competitiveness is measured by an index of district-level electoral competition developed by Holbrook and Van Dunk (1993). Legislative variables are relevant to e-government implementation, as legislators control budget authorization, and their support has been characterized by state administrative officials as helpful (West, 2000).

Another argument in favor of digital government, articulated by participatory models of governing (Peters, 2001; Osborne and Gaebler, 1992), is to lower barriers for constituents and businesses in terms of accessing government information. If a participatory political culture and constituent demand drive support for digital government, we would expect more extensive reliance on e-government in states with a history of frequent use of direct democracy. Clift (2000) also suggests that there will be more commitment to use of e-government for enhanced political participation (including online voting) in such states. The average annual number of citizen initiatives appearing on state election ballots from 1970–1992 has been included in the models to test this proposition and to control for variation in state usage of the process over time (Tolbert, Lowestein, and Donovan, 1998). We also test this hypothesis directly by including voter turnout in the state in the 2000 presidential elections, as a measure of participatory politics.

Findings and Discussion

Since the two dependent variables measuring implementation of e-government initiatives are continuous, OLS regression coefficients are reported. Three models are reported, the first two in which the dependent variable is the percent of state government websites offering services. The first model includes a complete set of predictor variables and the second a reduced number of coefficients addressing concerns about collinearity between the socioeconomic measures and providing a more convincing empirical test of the slack resources hypothesis. In the third model,

the dependent variable is an overall ranking of the state government websites.

Consistent with the categorization of digital government as an administrative reform, Table 2 suggests that after controlling for other factors, legislative professionalism is an important factor in determining whether states will innovate in e-government. In all three models, legislative professionalism is a strong and statistically significant predictor of implementation of digital government. States with more professional governments are more likely to be leaders in offering state residents government services online, regardless of the measure of e-government used. The data also indicates that states with more developed networks, measured by leadership in the National Conference of State Legislatures and National Governor's Association, have more advanced websites, as measured by the overall index of state websites (90 percent confidence interval). The admittedly rough measure of professional state networks may account for the lack of a statistically significant relationship in the models measuring the percent of state websites providing services.

While legislative professionalism was found to be an important indicator of innovation, measures of state resources such general state revenue per capita and income per capita were not found to be significant factors in any of the three models. An extended version of our primary model in which the dependent variable is the percent of services provided (Column 1) suggests educational attainment and urbanization are also not related to innovations in e-government. State professionalism and networks may be more important than financial or economic resources in determining whether a state will take the lead in offering online services to citizens.

The data suggests that participatory politics and constituent demand do not drive adoption of digital government. Contrary to our expectations, states with frequent usage of ballot initiatives were less likely to innovate in offering government services online (90 percent confidence interval). Participation in elections, measured by average state voter turnout in 2000, and minority diversity were also not related to innovation in digital government. Consistently, across the three models, states with higher rates of Internet access actually offered fewer online services to residents.

States with Republican-controlled legislatures are more likely to embrace e-government, as the coefficient for percent Democratic lawmakers is statistically significant and inversely related to policy innovations in two of the three models. This contradicts our hypothesis that partisanship would not be significant. One possible explanation is that efficiency concerns may drive implementation of digital government, rather than citizen demand or concerns about expanding citizen participation. Since e-government promises long-term cost savings, it could be most attractive to parties focusing on reducing the cost and size of government. This finding is also consistent with qualitative reports noting that state innovation in digital government in Republican-controlled Alaska, Kansas, and Illinois is linked

TABLE 2

State Innovation in Digital Government

Independent Variables	Percent of State-Level Government Websites that Provide Services		Percent of State Government Websites that Provide Services (Reduced Model)		Overall Rating of State Government Websites	
	β (SE)	p > |t|	β (SE)	p > |t|	β (SE)	p > |t|
Legislative professionalism (1992)	29.753 (14.198)	0.043	32.770 (13.285)	0.018	12.882 (6.555)	0.057
State professional networks (Leadership NCSL or NGA 2000)	0.785 (3.154)	0.805	0.369 (3.078)	0.905	2.740 (1.519)	0.079
Avg. freq. of initiative use (1970–1992)	–3.698 (2.094)	0.086	–3.449 (2.025)	0.097	–0.609 (0.999)	0.547
State racial diversity (1996)	–14.702 (15.176)	0.339	–11.317 (14.156)	0.357	6.513 (6.985)	0.357
District-level competitiveness	–0.108 (0.178)	0.546	–0.079 (0.174)	0.651	0.091 (0.086)	0.293
Voter turnout (2000)	0.407 (0.373)	0.282	0.261 (0.322)	0.423	0.143 (0.159)	0.375
Percent of households w/Internet access (2000)	–0.799 (0.356)	0.031	–0.758 (0.339)	0.032	–0.323 (0.167)	0.061
State general revenue per capita (1998)	– 0.0013 (0.001)	0.261	–0.0011 (0.001)	0.260	–0.0005 (0.000)	0.261
Personal income per capita (1999)	– 0.0007 (0.001)	0.304	–0.0002 (0.001)	0.622	–0.0002 (0.000)	0.922
Percent Democrats in legislature (1999)	– 0.298 (0.122)	0.020	–0.285 (0.119)	0.022	–0.096 (0.059)	0.107
Percent bachelor degrees (1999)	0.072 (0.509)	0.888				
Percent metropolitan (1998)	0.148 (0.136)	0.283				
Constant	62.534 (23.251)	0.011	64.701 (21.644)	0.005	44.389 (10.680)	0.000
Adjusted R^2	0.198		0.214		0.165	
F	1.966	0.059	2.280	0.034	1.925	0.073
N	48		48		48	

NOTE: Unstandardized regression coefficients, standard errors in parentheses. Probabilities based on two-tailed test. The largest correlation coefficients were between percent metropolitan and personal income (0.6979) and personal income and percent bachelor degrees (0.6657). Tolerance statistics indicate no problems of multicollinearity in the reduced or extended model.

to the commitment of political leaders. For all three models, the coefficient for district-level competitiveness was not found to be statistically significant, suggesting an absence of party competition is not necessary for innovation in e-government. Given rival accounts of which political party will take the lead in updating American political institutions for the 21st century (Dionne, 1996), it is a nontrivial finding that states with Republican leadership have been most innovative in this area of administrative reform.

To facilitate interpretation of the statistical findings, the regression coefficients in Table 2 were calculated as expected values using a Monte Carlo simulation technique, Clarify Software (King, Tomz, and Wittenberg, 2000). We calculate the change in the expected level of digital government implementation by varying the variable for state legislative professionalism from low (one and two standard deviations below the mean), medium (mean) to high values (one and two standard deviations above the mean) while simultaneously keeping all other variables set to their mean value. We also calculate the change in the expected level of e-government implementation by varying the variable for percent Democratic state lawmakers from very low, low, average, high, to very high while holding all other variables at their mean value. These changes in the expected level of digital government implementation, caused by moving from the low to high values of the independent variables for legislative professionalism and party control of the legislature, allow for effective comparisons across independent variables, while simplifying interpretation of the unstandardized regression coefficients.

The data suggests that holding other factors constant, states with highly professional legislatures (two standard deviations above the mean) offer residents roughly 17 percent more online government services than states with the least professional legislatures (two standard deviations below the mean), regardless of party control. States with moderately professional legislatures (one standard deviation above the mean) offer residents 10 percent more online government services than less professional legislatures (one standard deviation below the mean), all else equal. At the same time, states with Republican-controlled legislatures (one standard deviation below the mean) offered roughly 8 percent more online services than states with Democratic-controlled legislatures (one standard deviation above the mean), all else equal. States with virtually unified Republican control (two standard deviations below mean) offered 16 percent more online government services than states with overwhelmingly Democratic legislatures (two standard deviations above the mean).

To see how legislative party control and professionalism work together to shape the extent of reliance on digital government in the American states the following simulations were estimated. In states with the least professional legislatures (two standard deviations below the mean) and split party control of the legislature (measured by the mean number of Democrats in the legislature) we estimate only 12 percent of state government websites offered

residents online services. This figure jumps to 19 percent in states with moderately professional legislatures (mean) and then to 29 percent of government websites in states with highly professional legislatures (two standard deviations above the mean). Republican leadership, even in less professional state governments, is associated with innovation in digital government (ranging from 16–20% of websites providing services, respectively, depending on whether legislative professionalism was set as one or two standard deviations below the mean), jumping to between 33–37% of websites providing online services in states with highly professional (one and two standard deviations above the mean) Republican-controlled legislatures.

Parallel simulations were calculated for the overall ranking of e-government innovation, but the results are less dramatic. The scope of implementation of e-government increases with more professional state legislatures (an increase of up to 7 percent) and in states with Republican Party control (an increase of up to 4 percent), holding other factors constant.

Conclusion

This study has examined factors associated with innovation in digital government—an increasingly widespread administrative reform that holds the potential to transform methods of providing information and services to citizens, as well as democratic governance in the American states. By seeking to understand innovation in digital government we have focused attention on the diffusion of an administration reform—a type of policy that has been less studied than developmental, redistributive, or morality policies.

The data suggests innovation in e-government is driven by legislative professionalism and, to a lesser extent, state professional networks, as expected. Surprisingly, use of the Internet by the state population is inversely related to innovation on both measures of e-government implementation. This contrast fits Lowi's (1972) conception of "constituent policy" as a top-down process, confined to administrative or legislative circles, compared to distributive, regulatory, and redistributive policy. We hypothesize that other administrative reforms, particularly those lacking political salience, may exhibit similar relationships with legislative professionalization and professional networks. Moreover, we would expect them to be unrelated to political factors such as citizen demand, political participation, and interparty competition.

Exactly how legislative professionalization matters in e-government is open to some speculation. Legislative professionalization is not necessarily congruent with state wealth or budgetary resources, and these were found to be unrelated to e-government innovation. It is likely that in many states administrative officials are more directly involved in e-government than legislators; however, funding for information technology innovations

ultimately resides with the legislature. Legislative professionalization may also represent trends in state government more generally, including within administrative agencies. More professional state governments may possess expertise and values conducive to the implementation of e-government.

Professionalism may also provide information networks regarding e-government. Using a more direct measure of state participation in networks, we found that leadership in professional networks was associated with higher levels of implementation for e-government. This supports Walker's (1969) argument about the role of professional organizations and Mossberger's (2000) findings about "polydiffusion" in intergovernmental networks, where state and professional organizations play a key role.

The literature on e-government characterizes it as both a source of potential administrative efficiencies and a mechanism for democratic participation. Our finding that innovation is not associated with direct democracy or political participation indicates that participatory goals are not presently a dominant factor in state programs. This is plausible, given one of our primary measures of innovation (services), but is also consistent with other research on e-government (for example, West, 2000).

Efficiency motivations underscore the framing of e-government as an administrative issue. They may also provide part of the explanation for the clear association between Republican state governments and more extensive implementation. Contrary to our expectations, partisanship of state legislatures emerged as a critical causal factor. This apparently influences support for digital government, although it may not be exhibited in traditional partisan fashion, through interparty competition.

Republicans may be more predisposed toward e-government because of their orientation toward small government, toward business-like practices, and a wealthier constituency that is more likely to be "plugged in." Online transactions, in particular, may eventually reduce the need for government employment. The Republican Party is more generally identified with budget-cutting measures and limited government. While Democrats such as former Vice President Al Gore are well known as advocates of e-government at the federal level, government that works better and costs less embraces a traditionally Republican approach, consistent with the ideology of the "third way." The use of e-government for online transactions also emulates the spread of e-commerce, and introduces practices used in the private sector. Republicans are more likely than independents or Democrats to have a home computer and an e-mail address (Mossberger, Tolbert, and Stansbury, 2003; Tolbert and McNeal, 2002),[6] and Republican politicians may be less concerned about the consequences of the "digital divide" for e-government.

[6] Partisan differences in home computer ownership and e-mail access are statistically significant at a 95 percent confidence interval. Simulations of a hypothetical voter with average education, income and age, white race, and female gender reveal that Republicans have the highest probability of home computer ownership (64.16 percent), independents following (57.64 percent), and Democrats the lowest probability (54.25 percent). Holding

The findings presented here imply at least two possibilities for future research on state policy innovations. First, understanding the role of professionalization and networks may be especially relevant for explaining the diffusion of administrative reforms such as e-government. Does legislative professionalization represent a more general professionalization of state government? Do professionalized state governments have a more innovative attitude toward administrative reforms more generally? Do they have more developed professional networks and sources of information? Second, how much does e-government have in common with other policies that could be defined as administrative reforms, and other types of policies, including redistributive, developmental, and regulatory/morality policy? There has been a profusion of studies over several decades on the determinants of innovation for individual policies. As Downs and Mohr (1976) observed, we need to move beyond the accumulation of discrete studies in order to develop theory by clustering policies into categories.

The presence or absence of political salience may be a critical, yet relatively overlooked, factor in understanding variations in policy innovation and implementation. Instead of looking for discrete policy areas, it may be more important to ask what factors contribute to the diffusion of policies that are politically salient, compared to highly technical/professional policies that are not politically charged. Where policies are more salient, we would expect legislative professionalism and networks not to matter as much, with increased significance for interest-group politics (see Mintrom, 2000 on school choice), political entrepreneurs (see Smith, 1998 on tax limitations; Mintrom 2000), and institutionalism mechanisms for direct democracy. Future research should explore the interaction of political salience and professional networks in the adoption and diffusion of state policy innovations.

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other factors constant, Republicans are 10 percent more likely to have a home computer than Democrats (Tolbert and McNeal, 2002; Mossberger, Tolbert, and Stansbury, 2003). This translates into a modest increase in terms of "demand" among Republican constituents, but is emblematic of the greater relevance of the "digital divide" for Democrats.

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