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LESSONS AND TRENDS IN E-VOTING: INITIATIVES IN THE US AND ABROAD

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Since the 2000 election, there has been a debate over the role of voting technology in the election process. In 2000 and 2001, this debate focused on the deficiencies associated with paper ballots—especially the punch card—and the ballot errors associated with these ballots. However, this debate has shifted since 2002 to a conflict between concerns about the accessibility of voting technologies versus their security, especially electronic voting technologies. This shift in the debate over voting technologies can be seen in the quantity and tone of media coverage of this issue, with coverage swinging markedly against electronic voting in 2003 and 2004. The accessibility versus security debate is familiar ground for interest groups, scholars, and players in the election policy domain. Similar debates previously occurred over modification of voter registration and related voter access issues.

America is not the only nation developing and using new voting technologies. Around the world, many nations are moving toward more advanced electronic voting systems. The goal of these reforms or voting techniques varies from nation to nation. Some nations are attempting to increase turnout in elections, others seek to reduce election fraud, and still others want to enfranchise difficult-to-serve voting populations. In general, all election reform efforts are intended to improve the democratic process by making voting easier, more accurate, more accessible, and more secure. What reforms or voting techniques lead to an outcome that achieves these goals? The chair of the Election Assistance Commission (EAC), Gracia Hillman, asked this question in a more pointed fashion at a hearing held at the California Institute of Technology on July 28, 2005. Her concern was that there is a wide array of viewpoints on election reform that have been embraced by academics, interest groups, and policy makers. This diversity puts the EAC and lawmakers in a difficult position; how do they know that the

decisions they make are moving policy in the direction of making voting easier, accurate, assessable, and secure?

In this paper, we examine the lessons that can be learned by studying election reforms in other nations. We are most keenly interested in examining the processes that have been adopted in an effort to move election reforms forward toward successful outcomes. We focus most directly on the United Kingdom, which created a national Electoral Commission (EC) in 2001. Our goal is to compare and contrast the model used to test election reforms and new voting techniques in both nations. The EC has used a research-based model for improving elections that emphasizes research and experimentation in the testing of new voting methods, something that could be replicated in the U.S. Additionally, some of the same concerns that exist in the United States—such as security and accessibility—also exist in the U.K. Before we examine the EC model, we review the major debates that have occurred internationally regarding election reforms and how some nations have attempted to address these concerns. We also review how the media has covered these debates in both the United States and internationally.

The Debate over Election Reform

What constitutes election reform varies based on the political conditions in the nation being examined. For example, in many African nations, election reform constitutes actually having multi-party elections, or having multi-party elections that also include a transfer of power (Bienen and Herbst 1996). Similar issues have arisen in countries like China, where major reforms included offering more than one candidate on the ballot in county-level elections (Womack 1982). Other nations, such as South Korea and Columbia, have engaged at election

reforms that focused on how representatives were selected. An issue in South Korea was whether proportional representation should be used (Choi 1973), while in Columbia the issue was the size of the districts, and the nature of representation, in their Senate (Crisp and Ingall 2002). Similar reforms of electoral districting, moving from multi-member to single-member districts, occurred in Japan in the 1990s, in part to combat one-party dominance that had existed since World War II (Cox, Rosenbluth, and Thies 1999; Hrebendar 1977; Wolfe 1992). There have also been issues regarding how to transition nations from one electoral system to another, such as occurred in Poland in the early 1990s and in Indonesia after World War II (Bone 1955; Olson 1993).

This type of election reform makes fundamental change to the elections process in a nation. As such, these changes have to be implemented at one time, across the nation. The United States has a similar history of election reforms. The nation has changed the nature of presidential selection, senatorial selection, and representation in the House of Representatives during its history. It has also changed the nature of the franchise, through the passage of various constitutional amendments, federal enforcement legislation, and state legislation. Within the context of constitutional franchise requirements, states determine, through legal statute, who is enfranchised. It is for this reason that constitutional enactments have been required to enfranchise women, the poor, minorities, and persons 18 to 20 years of age. States are otherwise free to establish the rules that will govern the franchise of voters.

The nature of election reform in the United States has largely been one of debating who has the right to vote (Keyssar 2000). For example, the establishment of absentee voting was designed initially to enfranchise military voters in the Civil War, and subsequent changes to the franchise

for these voters has typically occurred concomitant to major military conflicts (Keyssar 2000; Alvarez and Hall 2004). Likewise, the rise of voter registration systems and literacy tests—which were used in the South and in places in the North such as New York State—were also designed to constrain participation by certain populations of voters. Many of these reforms were seen as being good government reforms, keeping the wrong people, such as the poorly educated, from voting. This was the rationale, for example, given by the *New York Times*, in its advocacy for literacy tests in New York in the early 20th century (Keyssar 2000).

Since the development of a full franchise in the United States in the early 1970s, election reforms have primarily focused on reducing barriers to voting and improving the voting process.

Movement has been made in this area, with improvements in the voter registration process, and passage of laws such as the National Voter Registration Act (Knack 1995). Moreover, the Help America Vote Act (HAVA) enfranchises voters through provisions such as provisional balloting, which is linked tightly to issues with voter registration, and the creation of statewide voter registration databases.

Since the 2000 election, there has been a sharp focus on the role of voting technologies, especially electronic voting technologies, as a means of improving elections. The adoption strategy, as laid out in HAVA, has been for the federal government to provide large sums of money to states for them to use to purchase new voting equipment. Additionally, many states have been engaging in other sweeping reforms, such as expanding by-mail voting and early voting, instituting new identification requirements, and otherwise changing election procedures with the goal of improving the elections process. In the United States, these changes to election

administration—from the implementation of new voting systems to the implementation of expanded early voting—are typically conducted in what might be considered as large-scale and non-scientific tests. A change is made to the law, to procedures, or to technology, and then is implemented in the next election. Often these implementations are undertaken without much attention paid to whether or not they achieve any necessary and stated purpose. Sometimes, sweeping changes are implemented, and policymakers are interested in determining the extent to which their implementation has influenced some outcome variable, but the policymaker is very constrained in their ability to learn much from their “test” as it has not been undertaken in a controlled manner.

The United States model of implementation can be contrasted with the more careful model of implementation that has been followed in Europe, where reforms are more often pilot tested under controlled conditions before being implemented in a large scale. This has been especially true in the area of electronic voting technologies and convenience voting in the United Kingdom, France, and Switzerland. In the next section, we use the United Kingdom as a model of how such pilot testing can be done successfully, and then compare this success to the way in which such tests occur in the United States.

An Effective Approach to Pilot Testing Election Reforms: The UK Example

In the UK from 2002 to 2004, the Electoral Commission and the Office of the e-Envoy conducted a series of experiments, or pilots, examining various election reforms and new voting techniques. The pilots had several goals. As the EC wrote in its report *Modernising Elections* (2002, 15)

The pilots took place against a backdrop of seemingly irreversible declining participation in local government elections and the substantial drop in turnout in June 2001 general elections... However, turnout was not the only, or even primary, goal of the pilot schemes. Some were looking for administrative efficiency gains; others wanted to be involved in the state or the process of developing electronic voting mechanisms robust enough to win public credibility.

Given the varied goals of the pilots for the stakeholders involved in the process, the pilot tests had a multi-part evaluation component, as shown in Table 1. The evaluation methodology, in practice, had two components. First, there was an analysis of the pilot scheme, as implemented in a specific locality, to determine its affect on factors such as turnout, election administration, and fraud. Second, there was an analysis of public attitudes toward the experiment in question through the use of survey research. This evaluation methodology was used to test five sets of election reforms: (1) all-postal voting, (2) multi-channel and electronic voting, (3) electronic counting, (4) early voting and extended voting hours, and (5) greater voter education.

[Table 1 here]

The evaluation criteria used in the pilot schemes are a part of a larger model of evaluating program effectiveness. As we illustrate in Figure 1, the evaluation criteria, taken from the EC reports from 2002 and 2003, provide a framework for implementing and evaluating a successful

pilot program. This process begins with the identification of evaluation criteria—some of which are contained in the statute creating the Electoral Commission and its mandate to conduct pilots—and are supplemented by criteria from other sources. The various components of the pilot are then identified and implemented, and the pilot is evaluated. Finally, the pilot program has a very strong publication and evaluation component, which ensures that the findings of these pilots are widely disseminated and are used as the basis for decision making regarding what types of future pilots to conduct.

[Figure 1 here]

The EC's piloting process is aligned with the piloting principles recommended by the U.S. General Accounting Office (GAO-03-861).¹ In a critique of the Department of Defense's pilot program for innovative partnerships and human resource strategies, the GAO lays out a multi-part process for effective pilots. As shown in Table 2, the GAO piloting principles begin with the need for clear statutory guidance to support the pilots. There should be a clear linkage between the pilot program proposal requirements and a set of overall goals and measurable objectives for the pilots. Then, the pilots can be selected on the basis of their quality, implemented, and evaluated. The GAO also stressed the need for the agency to communicate with the Congress about what objectives should be achieved with the pilots. Finally, the GAO noted that an effective pilot will provide participants with a positive experience, so that others are willing to participate in future pilots.

¹ At the time this report was written, the Government Accountability Office was known as the General Accounting Office.

[Table 2 here]

The process used by the EC also closely resembles the approach to evaluation in most textbooks (e.g., Rossi 1993). In linking evaluations to programs, the key steps to evaluating a program's success involves conceptualizing the evaluation by defining the problem, operationalizing the objectives, identifying the target population, formulating a research design, implementing the research design, and planning for how the evaluation data will be used (Rossi 1993, chapter 3). This textbook approach is designed to ensure that program evaluations are methodologically effective as well as useful to policy makers.

The UK pilot schemes for election reforms benefit from following a strong piloting and evaluation strategy. Not only were the pilot schemes implemented in jurisdictions across the UK in local elections, but detailed evaluation reports were produced on each pilot, and then an overall report was issued after each set of pilots was completed to provide policymakers with a plan for how to move forward with election reforms, based on the social-science research evidence at hand. Finally, these reports and much of the evaluative data used in the pilot tests are made available to other researchers, policymakers, and the public so that additional analysis can be undertaken.²

² For example, Pippa Norris (2003, 2004, 2005) has presented several papers examining theories of voter turnout using these data.

There were three sets of pilot schemes implemented between 2002 and 2004. There were 30 individual pilots in 2002, 59 pilots in 2003, and 47 pilots in 2004. Table 3 lists the types of pilots that were conducted each year and it illustrates the benefits of conducting pilots. The pilot process allowed for a wide range of technologies to be tested, but in carefully chosen settings. By piloting small, and by providing multiple channels for voting in cases where new technologies were being implemented, the risks associated with a problem in any one voting system being piloted were greatly minimized. Once the small-scale pilots in 2002 proved successful, these pilots were expanded in 2003 so that more information could be collected on the critical factors of success identified at the outset of the pilot process.

[Table 3 here]

The pilots also allowed the UK to build on successes and refocus research so that successful implementations were made more so. The 2003 report, *The Shape of Elections to Come*, reflects the confidence of the EC that postal voting was a successful means for promoting more convenient voting, higher turnout, and effective election administration. However, the report goes on to state that “It is important that the roll-out of all-postal voting incorporates the best practice that has been developed by the pilot authorities....successful all-postal pilots require consideration be given to a wide range of operational and management issues that are not stipulated in law but nevertheless play a major part in ensuring the success or otherwise of moving to an all-postal ballot” (2003, 35). In short, piloting allows for critical factors, such as management, to be recognized as important. For example, in the case of the all-postal pilots, public education was a key factor in the success of the pilots.

Electronic voting pilots were held in 2002 and 2003. These pilots tested a wide range of electronic voting technologies, including voting over the Internet, voting on precinct-based touch-screen machines, voting over text messaging systems, voting via the telephone, and voting using interactive digital television services. These trials were all successful. In fact, respondents in focus groups states that “voting using the internet is tacitly accepted by most as ‘the way forward’ (at least in conjunction with other methods). Some see it as a logical, and perhaps even inevitable development, especially in the context of the younger generation’s perceived preference for communicating electronically” (Electoral Commission 2003, 66). Also, when given a choice between paper ballots and new electronic technologies, voters chose the electronic technologies. However, compared with the postal option, the electronic channels, while beneficial for many voters, did not result in the large boost in turnout that the Electoral Commission had hoped.

The benefit of conducting these pilots, however, is that the Electoral Commission was able to learn quite a bit about the issues associated the deployment of these systems. For example, issues associated with interacting with vendors, such as contract negotiating, quality assurance efforts, and project management all came to the fore in the pilots. A related issue—scalability and cost of scaling—also came into play with the electronic voting systems. These systems require professional support and relatively high usage to justify the costs, and developing a business model for elections is needed to make such systems effective. Survey data from the pilots allowed the EC to see the concerns that some voters had with the potential for fraud in the system, a finding that occurred with the postal voting as well. By piloting, and using the pilots to

develop a plan for future action, the EC has been able to develop a new time table for further testing electronic voting systems and develop a plan for further investments in these technologies.

In 2004, the EC again engaged in a series of trials, but this time focused on postal voting. This trial was a sharp ramping up of postal voting trials in combination European parliamentary elections and local elections. As expected, turnout increased in the locations using the all-postal voting and increased as well in locations that had used all-postal voting in all three years. Additionally, the specter of fraud also increased, as more allegations were made about the security of these systems, especially in regards to voter intimidation. However, what is of greatest interest in this pilot is not the overall result but the process that followed. Specifically, the EC issued a report that what needed to be done in regards to the legal framework, best practice, and election management in order to have the most effective and efficient postal voting system possible.

The EC also focuses on two issues that is far too often overlooked in the U.S.: project management capacities and public relations. The report notes that postal voting requires the development of new administrative capacities by election officials, the political parties, and third-party contractors in order for it to be successful. There is a different model of work with large-scale postal voting that involves outsourcing more work such as printing and processing ballots for delivery to voters, which also raises all of the issues associated with contracting and procurement. On the issue of public relations, the EC explicitly has focused throughout the pilot process on the importance of educating voters about pilots and about changes in election

processes and procedures. In the U.S., too often these changes are not well communicated either to voters or to the candidates in elections.

It is also important to note that the pilots are but one feature of the EC's research efforts related to election reform. The EC engages in a regular pattern of surveys, focus groups, and policy analyses in order to inform its decision making. For example, in just the last two years, the EC has commissioned studies on ballot security, electronic tabulation, and vote registers. They have also conducted survey research on issues such as political engagement, reasons for voting and non-voting, the success of the pilot schemes, gender and political participation, and perceptions on fraud. In short, the work of the EC is well informed regarding the public's perceptions as well as the realities on the ground.

Other European nations are following in a similar vein in piloting voting technologies. In addition to the United Kingdom, Germany and Australia are considering Internet voting pilots and such systems have been pilot tested in Switzerland and France. These nations all are engaged in deliberative evaluations of the issues associated with Internet voting. In Germany, a phased approach is planned, much like the one that we are advocating, with Internet voting to be tested first in local elections with the goal of having an online national election later. In Switzerland, Internet voting was pilot tested in Geneva in January 2003 without incident. The Swiss also hired a team of "white-hat" hackers to try to break into their security system over a three-week period—the system was online to voters only for two days—but the hackers failed. France has used Internet voting to enfranchise its overseas citizenry in small-scale trials.

The U.S. Model

We do not argue that piloting does not occur in the U.S. Instead, tests in the US are rarely conducted in a comprehensive and scientific manner. One example of such a pilot in the U.S. is the case of Georgia's move to electronic voting. There, the state engaged in a set of trials, where each approved voting system was used in a municipal election. Voters were surveyed after using the system, and statewide surveys were conducted to gauge the public's views toward the move to electronic voting. These data, along with data from the pilots, were used to select a voting machine that was then deployed statewide. Similarly, the City of Alexandria, Virginia conducted a trial to test two voting systems before selecting one for purchase.³ This trial consisted of testing the new voting technology in a single precinct, surveying voters at that precinct regarding their attitudes toward the new technology, and collecting other data on system performance. These data were compared to a "sister precinct" that had similar demographic characteristics.

First, while some election jurisdictions have undertaken small-scale pilot projects before making broader, jurisdiction-wide voting system implementations, trials are rare. It is much more common for a very ambitious project to be undertaken, often without any piloting at all. Even where previous trials have been conducted, the temptation in the U.S. is often to move from very small to very large quite quickly. This was the case with the Secure Electronic Registration and Voting Experiment (SERVE), which built off of the successful Internet voting proof-of-concept trial conducted by the Federal Voting Assistance Program in 2000. SERVE was a quite ambitious project. This project involved developing, testing, and certifying a novel Internet-based registration and voting system in a relatively short period of time and then deploying such

³ The evaluation report for this trial can be found at <http://www.vote.caltech.edu/Links/AlexandriaReport.pdf>.

a system in seven states and over fifty counties. The goal was to have the active participation of perhaps as many as 100,000 UOCAVA citizens—military personnel, their dependents, and overseas citizens—from around the world. This implementation would have been done in 2004, in the midst of in a closely contested presidential election season and in an environment where election procedures and voting technologies were under extremely close scrutiny.

Given the success of the 2000 proof-of-concept, it would have likely made more sense to follow the EC's model. In that case, the scope of the project would have been much more limited. The roll-out of an Internet voting system would have been done over a series of election cycles. This would have allowed for better training of election workers in the use of the new voting system, more effective assistance and involvement from key players such as the system vendor and the independent testing authority, and for meaningful post-election analysis of problems that arose so that re-training or system re-development could occur between trials. The first principle, therefore, would be to start small, both in terms of the number of participating jurisdictions and in the types of elections the system is initially used in. For example, initially implementing the system in two or four states in a non-presidential election would be ideal. Then the voting system could be scaled up to be used in more states based on the lessons learned in the first trial. Again, building on lessons learned, the voting system could then be prepared to be used in an eventual presidential election, in a much broader set of states. This model would require a project that spans a number of election cycles, and is part of an ongoing research and implementation process, where the lessons learned from each use and evaluation of the voting technology allows the system to improve with each implementation. This incremental development, implementation, and evaluation path allows for key milestone goals to be specified

for each stage of the project, especially focused on quantitative documentation of how the project is resolving known UOCAVA registration and voting problems.

The second problem with these trials, when they are undertaken, is that in the US few trials are conducted in a controlled, evaluative manner. The Arlington, Virginia example, while far from perfect, is an excellent example. There the local election board was deeply interested in making a decision that was informed with real evaluative data; however, they were unable to implement a carefully controlled scientific trial of how different voting systems worked for their voters in their local context. Instead of utilizing a controlled study, for example randomly assigning voters entering a single precinct to use different voting devices, they used a second-best approach, where all voters in certain precincts used a voting system and the analysis was based on a weaker methodology of comparing the effect of the “experimental” voting system relative to the current voting system as used by voters in a “most-similar” precinct. The latter methodology is much weaker in its ability to differentiate the precise impact of the voting systems themselves on the voting experiences of participating citizens in this pilot trial, as policymakers are then forced to rely on a statistical analysis of quasi-experimental data rather than on a much stronger analysis of truly experimental data.

Third, rarely are election officials in the United States asked or willing to provide a careful analysis of their implementation of new voting systems, even when that implementation is based on carefully designed pilot studies. And when such studies are produced, there is no entity, private or public, that collects the results of new voting system implementations (especially pilot studies) and which seeks to aggregate the results of these trials. The result is that much potential

knowledge is lost, that trials are needlessly repeated, and that voting systems may be implemented without the procurement process necessarily being informed by the experiences of other jurisdictions with identical voting systems.

Changing the Implementation Paradigm in the U.S.

The comparison between the United States and the United Kingdom in the area of pilot testing election reforms and new voting technologies could not be more different. The differences start at the capacities that have been statutorily granted to the nation's central election office. The Electoral Commission is required to conduct pilot tests of election reforms and new voting techniques, is provided funds to implement these pilots and to evaluate their effectiveness, and is then entrusted to make recommendations regarding how elections can be reformed. The goal is to create a large knowledge base for understanding the effects of reforms and to then use this knowledge to improve policy.

By contrast, the Election Assistance Commission has no authority to test and pilot election reforms and new voting techniques. It also has a very small budget for conducting studies, but this funding does not support any kind of evaluation of specific election reforms, let alone fund trials of specific new voting techniques in actual elections. There is no overarching strategic plan for conducting pilot evaluations of election reforms or voting techniques in the United States, and there is no systematic plan for gathering data to inform the decisions of policy makers regarding which reforms or voting techniques are effective, and under what conditions they are effective.

What is needed is for Congress to provide the EAC with the power to conduct such pilot evaluations of election reforms and voting technologies, and the resources to engage in such activities. The EAC has a 2004-2005 operating budget of roughly \$14 million, compared to the operating budget of the EC, which was roughly \$51.6 million for the same timeframe.⁴ Likewise, the EAC has a full-time equivalency staffing estimated at 23 employees for 2005, compared to 136 for the EC. In short, the EAC lacks the staffing and resources to carry out the type of evaluative work that is done by the EC, but the gap between the two agencies could easily be made up through improved legislative and budgetary changes.

If the EAC was granted pilot program authority similar to that held by the EC, it would allow for new voting technologies to be tested in small trials before they are deployed widely. For example, the current debate over voter-verified paper trails has been just that, a debate. The alternative would be to test such a system, evaluate its performance, and evaluate how the public view's these technologies. Several such public opinion studies have been conducted. The first, conducted by the University of Nevada, Las Vegas found that 85 percent of voters support the concept of voter verification on electronic voting machines, but also found that 1 in 3 voters did not use the verification process themselves.⁵ Moreover, the survey also found that voter-verification raised concerns about the ability of voters to read the print through the small screen that covers the paper, as well as concerns regarding how such systems could increase lines. Voter-verification was estimated to add 1 to 5 minutes to the time it took a voter to cast a ballot, which could prove substantial in a high turnout election.

⁴ The budget for the Electoral Commission was approximately £28.621 million for the 2005 fiscal year. See Electoral Commission 2005, 21. U.S. figures from the President's 2006 Budget, <http://www.whitehouse.gov/omb/budget/fy2006/pdf/appendix/oia.pdf>.

⁵ http://www.democracysystems.com/docs/press_release_nevada_study.pdf

A second survey on voter-verification in Nevada was conducted using exit polling in the 2004 general election by a private research firm that was contracted by VoteHere.⁶ This study found that 31 percent of voters either did not know what the voter-verified paper trail was on the voting system they had just used, or had not even noticed the paper system at all. Of those who did notice the paper trail, 14 percent did not use the paper trail to verify the ballot. Of those who did use the verification system, only 52 percent actually checked all of the races on the ballot, and 38 percent checked some of the ballot. One of the most interesting findings in this exit survey is that, given the choice between engaging in voter-verification in the polling place or engaging in voter-verification using a paper receipt—like those provided by cryptographic verification systems—the voters chose the latter by 60 percent to 36 percent.

Our own national survey of public attitudes toward voter-verified paper trails produced results similar to those in the two surveys noted previously.⁷ Table 4 shows that roughly half of all voters prefer paper ballots and half prefer electronic ballots. When asked about voter-verification, 78.8 percent support the idea of their being a paper audit trail that is produced with the electronic ballot. However, when asked the type of receipt that they would prefer, by 44.7 to 36.8 percent these voters would prefer a paper receipt that they can take home with them, such as those produced by cryptographic voter-verification systems.

⁶ <http://www.lombardoconsultinggroup.com/docs/nvvotersurvey.pdf>

⁷ The survey was funded by the Carnegie Corporation of New York and was implemented by International Communications Research (ICR), using their twice-weekly EXCEL National Telephone Omnibus Study. Interviewing was conducted March 9-15, 2005. This survey asked respondents a series of questions about voting technologies and election governance. The complete sample totaled 2,032 respondents, a randomly-selected subset of the complete sample (n=1176) were asked the questions about election governance. The sample was weighted to provide nationally representative estimates of the adult population, 18 years of age and older. On a typical survey fraction (50% and a sample size of 1000 respondents), a sample of this size produces a 95% confidence interval of approximately plus or minus 3.1%.

[Table 4 here]

In addition to these empirical findings, there are many other issues associated with voter-verification. For example, a recent law review article questions whether voter-verified paper trails affect four equality norms: racial equality, disability access, multi-language access, and inter-jurisdictional equality (Tokaji 2005). There have also been questions arise regarding the engineering involved with voter-verification (Canham 2005) and whether the laws associated with what constitutes a ballot have kept pace with changes in technology (Warchol 2005).

Research into these questions should be done at the national level, with pilot testing accompanying the research, in order to inform election officials about the issues associated with these voting technologies.

Similar debates are occurring in other areas of election reform, such as whether to move to vote centers, how to count provisional ballots, and the efficacy of early and expanded no-excuse absentee voting. Given the differences that exist across the United States in the laws that govern elections and the governance structures that determine how elections are managed and implemented, pilot testing is critical for ensuring that changes in election law are rational and effective. This change requires both additional resources and a change in mindset regarding how changes in election laws are made and implemented.

Bibliography

Alvarez, R. Michael and Thad E. Hall. 2004. *Point, Click, and Vote: The Future of Internet Voting*. Washington, DC: Brookings Institution Press.

Alvarez, R. Michael and Thad E. Hall. 2004. "The History of Military Voting." Unpublished manuscript. Caltech, Pasadena, California.

Bienen, Henry and Jeffrey Herbst. 1996. "The Relationship between Political and Economic Reform in Africa." *Comparative Politics*. 29, 1: 23-42.

Bone, Robert C. 1955. "Organization of Indonesian Elections." *American Political Science Review*. 49, 4: 1067-1084.

Canham, Matt. "Are new voting devices flawed?" *Salt Lake Tribune*. August 17: A-1.

Choi, Sung-il. "The Electoral Reform, the New National Assembly, and Democracy in South Korea. A Functional Analysis." *Asian Survey*. 13, 12: 1092-1101.

Cos, Gary W, Frances McCall Rosenbluth, and Michael F. Theis. 1999. "Electoral Reform and the Fate of Factions: The Case of Japan's Liberal Democratic Party." *British Journal of Political Science*. 29, 1: 33-56.

Crisp, Brian and Rachael E. Ingall. 2002. "Institutional Engineering and the Nature of Representation: Mapping the Effects of Electoral Reform in Columbia." *American Journal of Political Science*. 46, 4: 733-748.

Electoral Commission. 2004. *Delivering Democracy? The Future of Postal Voting*. August: London, UK.

Electoral Commission. 2003. *The Shape of Things to Come: A Strategic Evaluation of the 2003 Electoral Pilot Schemes*. July: London, UK.

Electoral Commission. 2002. *Modernising Elections: A Strategic Evaluation of the 2002 Electoral Pilot Schemes*. August: London, UK.

General Accounting Office. 2003. "Defense pilot Programs." *DOD Needs to Improve Implementation Process for Pilot Program*. Washington, DC: GAO-03-861).

Hrebenar, Ronald J. 1977. "The Politics of Electoral Reform in Japan." *Asian Survey*. 17, 10: 978-996.

Keyssar, Alexander. 2000. *The Right to Vote*. New York: Basic Books.

Knack, Stephen. 1995. "Does 'Motor Voter' Work? Evidence from State-Level Data." *Journal of Politics*. 57, 3: 796-811.

Olson, David M. "Compartmentalized Competition: The Managed Transitional Election System of Poland." *Journal of Politics*. 55, 2: 415-441.

Rossi, Peter H. and Howard E. Freeman. 1993. *Evaluation: A Systematic Approach*. Newbury Park: Sage Publications.

Tokaji, Daniel P. 2005. "The Paperless Chase: Electronic Voting and Democratic Values." *Fordham Law Review*. LXXIII, 4: 1711-1836.

Warchol, Glen. 2005. "New snag for voting machines." August 19: A-1.

Wolfe, Eugene L. 1992. "Japan's LDP Considers Electoral Reform: A Neglected Political Debt." *Asian Survey*. 32, 9: 773-786.

Womack, Brantly. 1982. "The 1980 County-Level Elections in China: Experiment in Democratic Modernization." *Asian Survey*. 22, 3: 261-277.

Table 1: Criteria for Evaluating UK Election Pilot Schemes

Criteria	Requirement Source
Facilitates voting, the counting of votes, or informed vote choices by voters	Statutory
Increases turnout	Statutory
Is easy to use	Statutory
Effect on electoral offences rate or malpractice in elections	Statutory
Increased costs or created savings	Statutory
Encouraged participation by particular communities, especially minorities, the young, and people with disabilities	Commission
Effectiveness of outreach efforts associated with the pilots	Commission
Attitudes and opinions of key stakeholders to determine level of confidence in election reform in question	Commission
Effect on efficiency and service delivery to voters	Commission
Improved or Impaired election administration	Commission
Was a good “value for money”	Commission

Table 2: GAO Criteria for Effective Pilots

Clear Statutory Authority for Pilots
Clear Pilot Proposal Requirements that Link to Overall Goals and Measurable Objectives
Clear Standards for Prioritizing Proposals
Clear Standards for Proposal Review and Approval
Pilot Implementation
Pilot Evaluation

Table 3: Pilot Types by Year

Year	Total Number of Pilots	Postal		Electronic Voting Mechanisms						Early Voting or Longer Hours
		All-Postal	Postal Channel	E-Counting	E-Voting	Telephone Voting	Text Message Voting	Internet Voting	Interactive Television	
2002	30 localities	15	9	14	7	3	2	5	0	9
2003	59 localities	35	4	8	8	12	4	14	3	3
2004	4 Regions	4								

Table 4: Public Attitudes Toward Voter-Verification of Electronic Ballots

	Response	Fraction
If you had a choice, would you rather vote using a paper ballot or an electronic ballot?	Paper ballot	49.4
	Electronic ballot	46.8
	Don't know	3.1
	Refused	0.7
If you had a choice, would you rather vote using an electronic ballot, that has a paper audit trail or an electronic ballot without a paper audit trail?	Electronic ballot with paper audit trail	78.8
	Electronic ballot without paper audit trail	12.0
	Don't know	8.5
	Refused	0.7
If you were to vote using an electronic ballot, which would you prefer the most?	No paper audit trail	12.8
	A paper receipt that you could take home	44.7
	A paper receipt that you have to leave in precinct	36.8
	Don't know	5.2
	Refused	0.5

The survey was implemented by International Communications Research (ICR), using their twice-weekly EXCEL National Telephone Omnibus Study. Interviewing was conducted March 9-15, 2005. The complete sample totaled 2032 respondents, a randomly-selected subset of the complete sample (n=1176) were asked the questions about election governance. The sample was weighted to provide nationally representative estimates of the adult population, 18 years of age and older. On a typical survey fraction (50% and a sample size of 1000 respondents), a sample of this size produces a 95% confidence interval of approximately plus or minus 3.1%.

Figure 1: Model of Reform for Election Reform Evaluations in the UK

