Internet Voting: What Can Canada Learn?
Internet Voting Workshop Summary of Proceedings

Based on its report *A Comparative Assessment of Electronic Voting*, the Canada–Europe Transatlantic Dialogue (Strategic Knowledge Cluster) helped organize a public policy workshop entitled "Internet Voting: What Can Canada Learn?", with the collaboration of Elections Canada. The workshop was held at Carleton University on January 26, 2010, and brought together academics, technical experts, parliamentarians, political party representatives, government officials, representatives from electoral administration authorities and other professionals from Canada, the United States and Europe. This report summarizes the proceedings of the Internet Voting workshop. Additional information regarding the panels can be found on the Canada-Europe Transatlantic Dialogue (Strategic Knowledge Cluster) Web site.

Opening Remarks

- Rennie Molnar, Deputy Chief Electoral Officer, Electoral Events, Elections Canada

As part of his opening remarks, Molnar explained that Elections Canada is examining Internet voting as part of an ongoing strategic objective to continue to increase accessibility to the electoral process. Internet voting is designed to offer an alternative and convenient method to vote. By easing access and providing convenience, it may have a positive effect on encouraging voter turnout. He pointed out that an amendment to the *Canada Elections Act* in 2000 permits Elections Canada to conduct an electronic voting experiment with the prior approval of Parliament. Gathering additional information about existing electronic voting projects is an initial step in developing a secure pilot project for certain electors to vote by Internet during a federal by-election. The target group selected to test on-line voting could include electors with disabilities or limited mobility, overseas electors or electors who are away from their electoral district on polling days, such as snowbirds or students. Molnar went on to explain that Elections Canada has no plans to introduce voting or vote-counting technology in polling stations; it is considering Internet voting as an on-line service only. However, he noted that Elections Canada is exploring opportunities to use technology to assist voters with disabilities to cast their ballot independently. Furthermore, he added that maintaining the level of integrity that Canadians have come to expect from the electoral process is a key consideration; any new voting method must be secure, accurate, reliable and auditable. Molnar also mentioned that Elections Canada is part of a recently established working group, led by Elections Ontario, that is tasked with developing a consistent framework for electronic voting across federal, provincial and territorial electoral agencies.

Overview of Internet Voting

- Michael Alvarez, California Institute of Technology (CalTech)

In a keynote address, Alvarez explained the development of Internet voting as well as rationales for introducing it. He emphasized that there has been an evolution in how technology is used in elections in the United States. He indicated that the US has seen a shift from paper ballots to paper-based electronic voting (i.e. punch card and optical scan) to paperless electronic voting. According to Alvarez, the US has a decentralized electoral administration as well as complex electoral ballots, regulations and procedures, and there has been hope that the technology could help simplify and streamline some of these complexities.

Alvarez stated that interest in Internet voting is a result of potential outcomes that may be improved with new election technologies. These include the potential for improved electoral participation, particularly among young electors; increased accessibility, especially for those who have difficulty with paper ballot systems; enhanced security, such as improving the integrity of ballot casting and tabulation processes; accuracy; efficiency; and cost. He explained, however, that US election officials and stakeholders are reluctant to take on the risk of innovating with new technology because of the many controversies associated with Internet voting projects in the US.[1] Also, cost is an issue, since the US electoral administration does not have a lot of resources to innovate with new technology at this time.

Despite a number of cancelled projects, Alvarez argued that the US experience has helped structure some of the ways in which Internet voting projects have developed and the way in which social scientists are studying those projects. US research has shown that the technology seems to work well, but there is still not a good sense of how Internet voting affects outcome variables such as accessibility, participation and security. Alvarez concluded by saying that Internet voting pilot projects to date have not been done with the science in mind. They need large samples of voters or election jurisdictions, projects with variability over time and space, repeated trials using the same system and the collection of more data to be made available to the research community.

Canadian Experiences with Internet Voting

- Kimberley Kitteringham, Town Clerk and Andrew Brouwer, Deputy Town Clerk, Town of Markham
- Cathy Mellett, Acting Clerk/Manager, Halifax Regional Municipality
- John McKinstry, Sales Manager, Dominion Voting Systems

Kitteringham and Brouwer declared Markham's experience with Internet voting a success, drawing on data that show an increased voter turnout in the advance polls of those elections as well as reports of enhanced convenience. They pointed out that Internet elections in Markham have shown that it is important to engage candidates in the process early on, educate them about the process and encourage their questions. In addition, the scrutineer function changes, since scrutineers do not have the ability to view on-line voters receiving a ballot. Candidates have to start campaigning earlier, because on-line voting makes the advance polls more popular. The presenters also stressed the importance of communication, imparting the message that the on-line

[1] Alvarez specifically referred to the issues that occurred in the 2000 presidential election in Florida as well as the use of electronic voting technologies in precincts in 2004 and 2006.

voting process is simple and informing electors about the process and how they can make use of it.

Mellett felt that Halifax Regional Municipality's (HRM) experience with Internet voting has been a very positive one. She explained that although extensive research and discussion was necessary prior to its introduction, Internet voting has worked well in Halifax, it is well received by voters and candidates, can be cost effective, and is the "greener" option of casting a ballot. She also indicated that Internet voting can deliver faster and more reliable voting results than traditional ballot methods. In addition, Mellett pointed out that trial and error has shown HRM the importance of having a plan in place to manage the issues, risks and media interest surrounding Internet voting. In support of the Markham comments, she noted that Internet voting also changes the nature of campaigns for candidates and political parties.

McKinstry presented the Peterborough experience, and addressed ways to improve the process for future elections. He pointed out how Peterborough's experience to date has helped identify the need for a dedicated marketing team to promote the system, ensuring the complete understanding of the process and technology by all who are involved in developing the process. In future Internet elections, Peterborough would like to implement some important elements to assure that the system runs well. These elements are: including advance polls at special locations (such as retirement homes) to increase accessibility; increasing the number of locations from which, and the duration of time in which, on-line ballots can be cast; increasing the number of laptops available for use at each voting location; and finally, generating and issuing Internet registration cards and managing information calls regarding on-line voting in-house.

The driving force for all three municipalities to implement Internet voting was identified as the desire to enhance service excellence, as well as the belief that Internet and telephone voting are a natural extension of election services. As the municipal participants expressed it, introducing Internet voting is a means of taking leadership with respect to electronic service delivery and is also an important step in enhancing convenience and accessibility for electors. Not only has it allowed the municipalities to better adapt to meet the changing lifestyles of electors, it has also improved accessibility, especially for special populations of electors such as university students, retirees and persons with disabilities.

The municipal experiences raised several questions among members of the audience. In answer to the question as to how ballots and personal information are destroyed, Kitteringham explained that Markham retained the data from both on-line ballots and paper ballots for a period, and that on-line ballots were to be "destroyed" in the same manner as paper ballots. The list of electors was a separate database from the actual ballots cast. Mellett pointed out that HRM requested a certificate of destruction from the vendor and the voter data and ballot information were also kept separately.

The issue of potential household pressures on voters that might cause them to vote a certain way was mentioned. Kitteringham noted that Markham took this into consideration as part of its risk assessment and as a consequence, it facilitated public communication (with both candidates and electors) around the elections act, which requires voting only once, and in secret. Officials found no evidence that these rules were being contravened. Mellett explained that HRM amended a

bylaw to address these privacy concerns, adding penalties of up to $10,000 and up to two years in jail for fraud or influencing the vote.

Concerns were also expressed regarding the method for recounts. Mellett explained that Halifax had conducted a recount and took care ahead of time to outline in its procedures and bylaw what would be involved ("reopening the encrypted file"). A third party verified that the file was indeed the data and then a judge reopened the data file and verified that the numbers matched. She mentioned that there is no possibility of linking the ballot to the voter because the data points are encrypted by the auditor at the time the polls close. Kitteringham noted that Markham and Peterborough followed a similar process with respect to recount procedures and guidelines. She said that in the case of Markham, the Town relied on Ontario case law, which states that a recount must be conducted in the same manner as an ordinary ballot count in the election.

Questions also addressed the auditing process and its transparency. When asked whether there was an audit before the election to test the system, whether candidates had access to this information and what was done after the election to verify that the system operated properly, Mellett explained that HRM worked closely with its auditor, Ernst & Young, to develop the processes. The audited ballots were made available to any candidate representatives who participated in the process. McKinstry mentioned that Peterborough also had a third party audit the system beforehand and Kitteringham pointed out that Markham followed a process similar to HRM.

European Experiences with Internet Voting

- Alexander Trechsel, European University Institute, Florence
- Tarvi Martens, Development Director, Certification Centre, Estonia
- Urs Gasser, Harvard University
- Tom Hawthorn, Electoral Commission, United Kingdom

Trechsel provided an overview of Internet voting in Europe. He pointed out that a number of countries considered but decided against implementing Internet voting (i.e. France [legal complications], the Netherlands [technological distrust] and Lithuania [political hurdles]). Switzerland and Estonia are at present the two main countries that have managed to successfully develop Internet voting programs. Trechsel reported that civil society groups in Switzerland were initially opposed to the introduction of Internet voting whereas such groups in Estonia were actually trying to push electronic voting forward. Also, Switzerland relies on traditional identification (ID) methods while Estonia has instituted digital ID. Trechsel suggested these commonalities and differences highlight that while there may be some important preconditions that appear to be necessary, much is context dependent.

In Estonia, Trechsel reported, language remains a problem, since a Russian-speaking minority cannot easily use the Internet voting site because it is only available in Estonian. He also pointed out that usage of on-line ballots is steadily increasing (presently 16 percent of all voters can be considered on-line voters) and appears to have some effect on turnout. As well, sporadic or occasional voters are more likely to vote on-line. He explained there also seems to have been a "growing into" Internet voting in Estonia, as distinguishing factors such as gender, age and other

socio-economic variables are becoming less relevant over time. Finally, Trechsel emphasized that trust is the most important variable in the consideration of Internet voting.

Martens pointed out that Estonia has used Internet voting in a variety of levels, including local, national and European Parliament elections. He echoed the importance of trust in his presentation, since if voters lose confidence in the reliability and security of the system, they are unlikely to participate. Martens highlighted the fact that an electronic identity card, which residents of Estonia use for a wide range of functions, is the cornerstone of the Estonian Internet voting model. According to Martens, all system components should be transparent; it is best to involve all major influences and specialists in the development process; the system should be as simple as possible; and all procedures must be well documented, managed and audited. He described in detail several of the technical and security features of Estonia's Internet voting approach. Among them are a two-envelope system to assure security and voter anonymity, the possibility for the voter to recast the ballot either electronically or in person on election day (reducing the likelihood of outside influence), and methods to monitor security problems while Internet voting is being carried out.

Gasser discussed challenges and lessons that emerge from the Swiss experience, some of which are not unique to the Swiss case. He noted that despite high broadband penetration there remains a digital divide, particularly in rural areas such as the Swiss Alps and mountain villages. Digital literacy is also an issue, given that only two thirds of electors are experienced Internet users. Gasser explained that Internet voting can enhance individual autonomy by allowing some voters to cast ballots more freely and securely. In Switzerland voters aged 30 to 65 are the most frequent users of Internet voting. He emphasized the importance of utilizing all of the tools available (legal, technical and organizational) when creating an Internet voting system and mastering the interplay among these elements to ensure a successful and well-developed system.

Hawthorn spoke about what can be learned from the Internet voting trials in the UK, which have been terminated. He explained that the UK Electoral Commission has been able to identify multiple areas where improvement is needed if subsequent projects are to occur and succeed. Most importantly, he pointed out the need for a specific, strategic context and plan for developing an electronic voting process. Within this, he said, there needs to be a scientific design for trials and capacity for analysis; conducting a series of "piecemeal" trials is not sufficient grounds for adequate research or development. The plan should be made publicly available for consultation to build trust among electors. In addition, timing to plan and organize trials is essential. Previous UK experiments have revealed that six months was not sufficient time for design, implementation and development to take place.

In the discussion following the panel, a question was posed concerning whether all of the security attention to Internet voting has raised new concerns about the security of postal voting. Alvarez pointed out that sometimes studying new methods or systems of voting is a better way to understand the benefits and risks of existing voting systems. While there are many logistical problems with postal voting in obtaining and returning a ballot (in the US), it is hoped that these issues will be improved from the development of electronic voting.

It was also asked what is done in Estonia to assure security of individual users' computers and minimize risk. Martens explained that Estonia educates the public about potential viruses and Trojans (which pose the largest hazard) and encourages them to check their computers regularly; it also sets up traps to catch viruses or malware. The country's computer security experts are also on alert during the period of Internet voting, undertaking thorough monitoring of the situation. He noted that in the event of a security issue there is the legal possibility in Estonia to officially call off Internet voting results and require on-line voters to cast paper ballots, although there has been no need to rely on this legal mechanism to date.

Technical Considerations in Implementing Internet Voting

- Adam Froman, President, Delvinia Interactive
- Dean Smith, President, Intelivote Systems Inc.
- Jason Gallagher, Open Source Software Developer
- Jon Pammett, Carleton University, on behalf of Peter Wolf, International Institute for Democracy and Electoral Assistance (IDEA), Stockholm

Froman's presentation emphasized that there is need to educate electors about elections and to reach them in an appealing manner. Citizens need electoral procedures that reflect their lifestyles. Froman indicated the importance of a targeted on-line marketing and information program, including elector outreach education. A successful marketing and information campaign, Froman stressed, can be achieved through a process that allows for interaction between the elector and election administration.

The overall message from Smith's presentation was not to neglect Canada as a leader in Internet voting. Smith pointed out that since 1997, more legally binding municipal elections have taken place in Canada using the Internet as a voting option than anywhere else in the world. Smith feels that Canadian municipalities are opting to introduce Internet voting because it is a "greener" option, has the potential to enhance accessibility for electors and reduces the staffing costs involved in running elections.

Gallagher emphasized the importance of open source software, citing several advantages: the potential for peer review, the absence of vendor lock-in, the lack of dependence on the vendor for upgrades and the greater ease of making individual modifications to suit user needs. The nature of open source code, according to the presenter, allows all stakeholders, including individual electors, to audit the process, helping to reduce the secrecy that is sometimes associated with electronic and Internet voting systems. Gallagher explained that in his opinion a good voting system should not rely on secrecy to ensure security. Whether the source code is open or not, an effective Internet voting system must be designed with security as a key principle from the start.

The key points from the presentation prepared by Wolf include the importance of trust and transparency. According to Wolf, trust depends in important part on the transparency of the voting system. This means trust on behalf of public stakeholders such as citizens, political parties, observers, NGOs and activists is needed with respect to system vendors, electoral administration and the technology itself. Allowing source code to be open and transparent is an important strategy in opening the "black box" sometimes associated with computer operations.

Although there is yet no common certification or auditing standard for electronic voting systems, the presentation emphasized that the development of such benchmarks or guidelines is needed.

In answer to a question as to the role candidates are able to play in viewing the tallying of on-line votes, Smith pointed out the importance of incorporating candidates into the process and explained that in his company's system, candidates are able to log in to a "candidate module" and view electors who have cast their ballots being struck off the registry in real time.

Lessons for Canada from a Comparative Perspective

- Joan DeBardeleben, Carleton University (Moderator)
- Urs Gasser, Harvard University
- Tom Hawthorn, Electoral Commission, United Kingdom
- Tarvi Martens, Development Director, Certification Centre, Estonia
- Jon Pammett, Carleton University
- Alexander Trechsel, European University Institute, Florence

According to Trechsel, Canada possesses many of the preconditions that are considered necessary to successfully introduce Internet voting. These preconditions include the *political will* (support from government), *the legal basis* for such an endeavour, *high levels of legitimacy of the political process*, a *federal structure* of government[2] and *support for innovation*. He explained that similar characteristics are present in Estonia and Switzerland and have been instrumental in the success of their Internet voting systems. Pammett pointed out that federalism and multi-level governance systems provide a wide variety of policy laboratories from which to learn. The Canadian municipalities that have already successfully introduced Internet voting provide a good learning opportunity.

Many panellists stressed that despite the presence of these supportive elements, there is a need in Canada to conduct specific research trials with respect to Internet voting. Trechsel pointed out that while Canada shares many characteristics with other jurisdictions where Internet voting has been successfully implemented, an Internet voting model is context dependent. He explained that one model cannot be applied to all jurisdictions with the expectation that it will have the same effect. A unique system must be adapted to the Canadian context and culture. Both Trechsel and Hawthorn noted that the UK experience emphasizes the importance of multiple trials. Hawthorn reiterated that there is a need to adopt a scientific approach to testing, collecting research and survey data over time and closely observing patterns and effects.

Furthermore, according to Hawthorn, if Internet voting is pursued, it is better served if electoral administration is instigating change rather than other groups or interested parties. He expressed that although change can be initiated from either federal or provincial governments, it is important that the electoral administration of the jurisdiction spearhead the initiative and that there is the political will to support these efforts.

[2] Though Internet voting has been proven successful in unitary systems as well (i.e. Estonia), as in Switzerland, Canada's federal structure could support different regional or provincial projects, which could provide a basis for learning.

Hawthorn also noted that timing is an important consideration. Finding the best time to initiate trials and determining how quickly to move ahead with additional trials or development are key factors. He explained that the UK experience shows that moving too quickly or trying to do too much at once can be problematic. In retrospect, the UK experience indicates that more time spent on planning a series of successive trials and considering their effects might have increased the likelihood of a more positive outcome. He stressed that there needs to be time to fully prepare, communicate to various stakeholders and create support for and trust in the system. There was a consensus on the panel that the implementation of Internet voting should not be rushed. Electoral administration and government needs to be willing to listen and adapt to societal and technological changes. Martens said, however, that if the population is ready, and technology is ready, then waiting too long could run the risk of creating a lag behind societal expectations.

Other panellists noted that while it is not clear whether Internet voting actually increases overall turnout rates, if electoral systems do lag behind societal practice and expectations this could contribute to a further decline in turnout.

It also seems the development of standards or principles is crucial. Hawthorn pointed out that there is a need to work with government as well as other stakeholders to develop common standards with respect to access, integrity, transparency and trust. Furthermore, he explained that there needs to be a greater effort among countries to place electronic and Internet voting technologies in an international context and establish international benchmarks and lessons learned. Developing and sharing Canadian standards, Hawthorn suggested, is one means of working toward this goal.

Finally, all panellists asserted that a key component in the successful development of Internet voting in Canada is ensuring that stakeholders such as political parties, electors and other groups trust such a system. Martens pointed out that this primarily includes the security of the system and how it is operated. He warned that there will be people who will want to prove that the system does not work and so there must be adequate preparation and testing to ensure that the system is secure before it is launched.

In the discussion, concern was expressed that Internet voting will change campaigns and elections, by transforming some traditional elements and adjusting some roles and responsibilities, such as in the case of scrutineers. DeBardeleben noted that the implementation of Internet voting will no doubt affect elections and their campaigns; however, a certain degree of change will occur with or without the advent of Internet voting, given the penetration and general impact of the Internet itself, as well as its use by other stakeholders in the election process such as political parties, groups and individual electors. She commented that it may be wiser to develop with technological and societal changes, even if slowly and cautiously, than to resist them.

Another member of the audience raised the question of how Internet voting might fare in Canada federally, where there are higher levels of security concern and where elections are often more competitive than on the municipal level. Pammett noted that municipal elections can be very competitive, and often federal contests are not, so the level at which the election is conducted may not be the critical variable. Trechsel observed there is a greater need to trial Internet voting

technology in less competitive contexts as much as possible, before introducing it on a larger scale. According to Martens, it is unwise to introduce Internet voting at the national level for the first trial. Ultimately, panellists agreed that an Internet voting system should be trialled in multiple contexts and at all levels of government to observe how it will actually impact the electoral process and stakeholders affected by this process.

Some concern was raised about the costs of introducing Internet voting, especially when it is only used in advance polls. Trechsel argued that the consensus from Estonia and Switzerland is that although elections that add an Internet element do cost more money, this is offset by the benefit that the option brings to democracy. Municipal representatives explained that in Markham the costs of trials have been reasonable, and in Halifax the costs have been reduced since its largest election expense is staffing; Internet voting has reduced the need for staff. Smith pointed out that in October 2010 (the next municipal elections in Ontario), 800,000 electors (or one tenth of eligible electors in Ontario) will have the option of casting a ballot over the Internet, and most of the municipalities planning to offer this service expect to run elections at reduced costs.

Finally, a question was raised regarding what effect, if any, Internet voting can have on the turnout of young people, particularly since some of the data presented indicate that middle-aged electors seem to be making the most use of on-line ballots. Trechsel pointed out that youth turnout has always been a problem and historically young people have turned out less for elections than other groups of electors. According to him and others, it is too soon to tell whether the extension of Internet voting will positively impact turnout among the young, or any group of voters for that matter. DeBardeleben made the point that there seems to be a "youth effect" since characteristics that young people have such as computer literacy appeared to be qualities of electors who opt to cast their ballots on-line. With respect to on-line voting, she mentioned, controlling for variables like computer literacy seems to dilute the effect of age on voting. Pammett and others noted that it is unlikely that Internet voting will remedy the problem of declining electoral turnout among young people. Youth are not a homogenous group and there is not one solution that will wholly remedy their reluctance to turn out.

Conclusion

Overall, several key messages emerged from the presentations. With respect to the municipalities, it was stressed that a comprehensive communications plan is an essential component in the successful implementation of Internet voting. This includes early and thorough communications with stakeholders such as candidates, media and the public. Municipal representatives also explained that Internet voting changes campaigns by increasing the need for earlier campaigning and changing the role of the scrutineer. As well, they noted that a solid understanding of the electoral process is essential, especially for municipal and other staff that compose the Internet voting "team." Finally, with respect to security, there was a consensus that developing a reliable mechanism for voter identification that sufficiently manages risk, as well as a third-party auditor, are important components.[3]

[3] All three municipalities have plans to continue to offer Internet voting as an alternative voting method in their elections. Markham anticipates focusing on cultural and language diversity issues as well as accessibility for persons

With respect to the European cases, the main rationale for using Internet voting is that it increases convenience and accessibility for electors. Although in some instances it appears to have a positive effect, the impact of Internet voting on turnout is so far inconclusive. The data from Estonia and Switzerland indicate that voters reported casting ballots on-line for reasons of convenience, a point also reflected in the Canadian municipal presentations.

European panellists emphasized that public trust is the most important variable in assuring successful implementation of Internet voting. Martens observed that although confidence in the Internet voting system and its abilities is likely to be relatively fragile at the beginning, it is essential that trust is not only built, but also sustained over time. Panellists asserted that the probability of voting on-line is likely to increase with the presence of trust and that it is an essential prerequisite for success.

Panellists felt that there is a need to pursue a scientific approach to testing and to collaborate with technical professionals and social scientists in development. Finally, panellists remarked that many of the challenges associated with Internet voting are general ones that are not unique to electronic voting.

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with disabilities. It also plans to conduct a third-party review of on-line voting security. HRM plans to perhaps conduct focused marketing based on age groups.