THE EXPERIENCES OF CANADIAN MUNICIPALITIES WITH INTERNET VOTING

Nicole Goodman
Carleton University

Abstract

This article explores the viability of Internet voting by examining the approaches used by two major Canadian municipalities to conduct their local elections. The analysis is based on data from personal interviews with key officials and technical experts from Halifax and Markham that were conducted between July 2009 and April 2010. The article suggests that political will, a relatively high rate of Internet penetration and Internet access, public support and trust, a supportive legal framework, and a gradual development process are important requirements to ensure the effective introduction of an Internet voting model. There is evidence that Internet voting impacts the electoral process by eliminating the need for traditional scrutineers and forcing change in the campaign strategies and mobilization tactics of candidates. The findings also suggest that the extension of online voting may have the potential to engage non-voters, develop a faithful following, and increase turnout.

Keywords: Internet, elections, e-voting, participation, turnout, Canada

1. Introduction

Several countries have initiated Internet voting trials in binding elections at various levels of government, including Canada, Estonia, Switzerland, the United Kingdom, and the United States.[1]

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1   There have been several instances on Internet voting in the United States, but these have all been small scale, one-time events. In 2000, for example, Internet voting was used in a state-wide straw poll of Republican party members, the Arizona Democratic Party primary, and in an experimental project (Voting Over the Internet Pilot Project) as part of the Federal Voting Assistance Program (FVAP) in conjunction with the presidential election that year. In 2004 Internet ballots were made available in the Michigan Democratic Party's Democratic caucus vote. However, no substantial Internet voting trials have been introduced in the

While some have come farther than others in the development of these e-voting approaches, the literature on Internet voting and electronic election projects only addresses trials and research in Europe and the United States.[2] There has been little scholarly focus on Internet voting in Canada despite its widespread usage among municipalities and the unique features some local Canadian approaches embody. While Internet voting has yet to be used nationally or provincially in Canada, it has been actively used in binding Canadian municipal elections since 2003. Internet voting activity is most highly concentrated in the province of Ontario, which by October of 2010 has plans to extend the option of casting an online ballot to about 800,000, or one tenth, of the eligible electors. This figure suggests that Canadian municipalities are a good place to learn about the effects of online ballots and Internet elections.

This article takes a closer look at how Internet voting is taking shape in Canadian municipalities by examining two of the more prominent jurisdictions, Markham and Halifax, as case studies. Although no broad conclusions concerning the effects of Internet voting can be made from these examples, the article sheds light on various elements of these models that may be useful in the development of Internet voting programs in other jurisdictions or regions and assesses what particular factors make these models work. Based on these cases, it is argued that Internet voting appears to be an effective method to enhance convenience and accessibility for electors and also holds promise to positively impact voting turnout. Moreover, this article asserts that Canada

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United States and all remote Internet voting projects have been cancelled prior to their introduction, primarily because of security concerns.

2   See Michael R. Alvarez and Thad E. Hall. *Point, Click & Vote: The Future of Internet Voting.* (Washington: Brookings Institution Press, 2004); Michael R. Alvarez and Thad E. Hall. *Electronic Elections: The Perils and Promises of Digital Democracy.* (New Jersey: Princeton University Press, 2008); Michael R. Alvarez, Thad E. Hall and Alexander H. Trechsel, "Internet Voting in Comparative Perspective: The Case of Estonia." *PS: Political Science and Politics* 42 (2009):497–505; Michel Chevallier, Michel Warynski and Alain Sandoz. "Success Factors of Geneva's E-Voting System." *The Electronic Journal of e-Government* 4 (2006):55–62; Alexander Trechsel. *Report for the Council of Europe: Internet Voting in the March 2007 Parliamentary Elections in Estonia.* (Council of Europe, 2007); available at http://votingtechnologyproject.org/drupal/files/report/internet_voting_estonia_2007.pdf.

is an important research case with regards to Internet voting and should be the focus of further investigation.

While Internet voting is commonly associated with electronic machines, there are several different types of Internet voting that can involve kiosks, polling place machines, and computers from remote locations.[3] The type of Internet voting considered here however is remote Internet voting, which involves casting a ballot over the Internet from a remote location such as an elector's home or other potential site.[4] The concentration on remote Internet voting is justified for several reasons. For one, although it can be associated with many types of electronic voting, generally the term *Internet voting* is often considered one in the same with remote Internet voting.[5] Also, remote Internet voting has the most promise to positively impact electoral participation by making the electoral process more accessible and convenient for electors than other types, which have a greater opportunity cost for potential voters. This type of Internet voting can also be considered "most consistent with the development of other political aspects of society that have changed with technology."[6] Finally, the greatest frequency of trials has occurred using remote Internet voting and this appears to be an ongoing trend.

2. Methodology

The primary data for this article comes from a series of unstructured qualitative interviews conducted with relevant experts, professionals, and municipal representatives from Markham and Halifax between July 2009 and April 2010. While some of the interviews took place as part of another, larger research project[7] others were carried out specifically for this article. Interviews were either conducted over the phone or in person and all interviewees were made aware of the nature of the

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3   Alvarez and Hall, *Point, Click & Vote: The Future of Internet Voting*.

4   Nicole Goodman, Jon H. Pammett and Joan DeBardeleben, *A Comparative Assessment of Electronic Voting* (Report prepared for Elections Canada, 2010).

5   Bryan Mercurio, "Democracy in Decline: Can Internet Voting Save the Electoral Process?" *John Marshall Journal of Computer and Information Law* 12 (2004): 101–143.

6   Goodman, Pammett and DeBardeleben, *A Comparative Assessment of Electronic Voting*.

7   Goodman, Pammett and DeBardeleben, *A Comparative Assessment of Electronic Voting*.

project. Survey data collected by the municipalities themselves, or other companies involved in the electronic portion of the election, are also drawn upon to highlight some potential patterns.

Criteria for Case Selection: Why Canada?

Aside from the United Kingdom, there have been more legally binding elections with an Internet voting option in Canadian municipalities than anywhere else in the world.[8] However, while the United Kingdom has since abandoned trials, the number of Canadian municipalities using Internet voting in local elections is growing, as is the number of electors who are opting to cast their ballots online. Canadians are considered the most active Internet users compared with other countries given that three-quarters report regular Internet use.[9] Furthermore, Canada boasts an Internet penetration rate of 84 percent, which is the third highest worldwide.[10]

Internet voting was first used in Canada to conduct an NDP leadership vote in Halifax, Nova Scotia in 2003. Shortly after, an Internet voting option was offered in the 2003 local elections of 12 Ontario municipalities, the largest being Markham with an electorate of 158,000.[11] All together this first trial reached approximately 260,000 electors. In 2006 the number of Ontario municipalities offering an Internet voting option grew to 20, and the number of electors who were able to vote online rose to

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8   Dean Smith, Personal communication, April 8, 2010

9   Tamara A. Small, "Still Waiting for an Internet Prime Minister: Online Campaigning by Canadian Political Parties," in *Election,* ed. Heather MacIvor (Emond Montgomery, 2010).

10   J-F Belisle, "Canada in the Worldwide Top 3 for Internet Penetration Rate," *E-Marketing, Trends, Technology and Society* 3 (2009).

11   Markham currently has an electorate of 164,000. The eleven other municipalities and townships include Champlain, Clarence-Rockland, East Hawkesbury, Hawkesbury, North Dundas, North Glengarry North Stormont, South Dundas, South Glengarry, South Stormont and the Nation. North Glengarry is the only municipality in Ontario to not offer Internet voting in subsequent elections and this is because council voted against its use. North Glengarry now uses only paper balloting in its elections.

approximately 400,000 (see Figure 1).[12] As of June 1, 2010 (the date by which municipalities were required to declare whether or not they planned to offer Internet voting in the 2010 elections) 44 towns and cities had confirmed they will offer online ballots in the October 2010 municipal elections. This will affect approximately 800,000 Ontario electors (see Figure 2 for a list of Canadian municipalities that have used Internet voting in binding local elections as well as the projected figures for 2010).[13]

Figure 1. The Spread of Internet Voting in Ontario
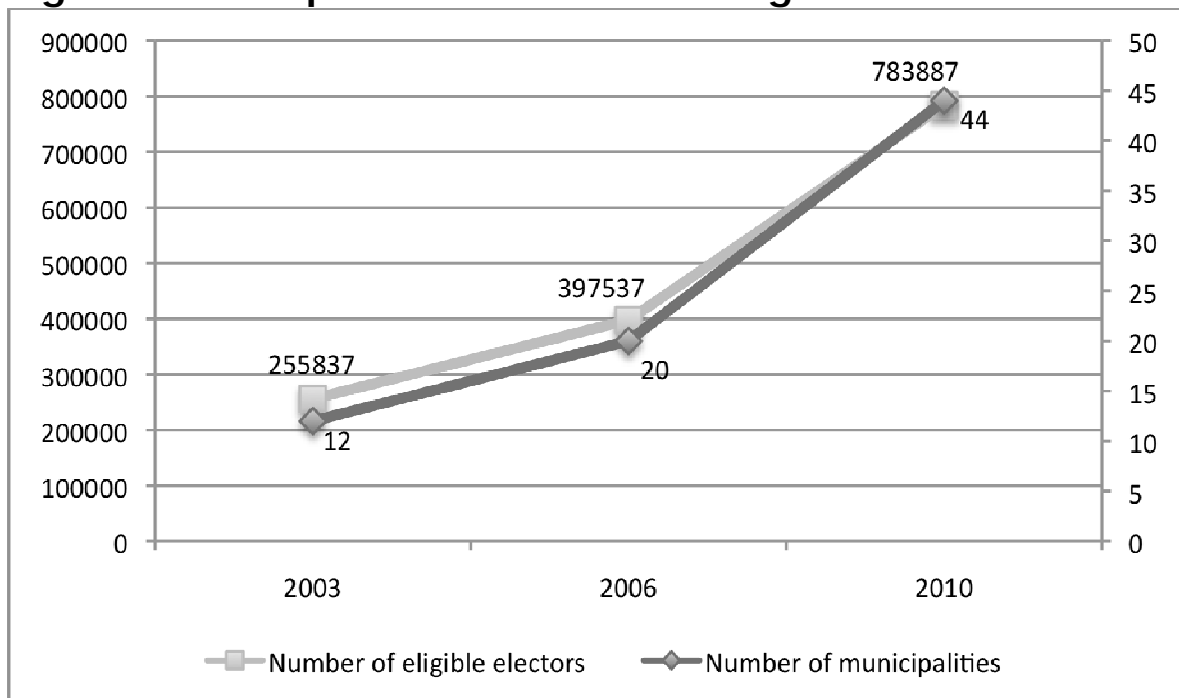
Aside from Ontario, four Nova Scotia municipalities, Halifax, Berwicke, Windsor, and Stewiacke recently introduced Internet voting in their 2008 municipal and school board elections, and Halifax used an expanded version of this Internet voting model in a more recent by-election.[14] Overall, the number of municipalities

12   The 2010 figures are projected based on the number of Ontario municipalities that have confirmed they will be offering an Internet voting option in the October 25, 2010 election and their electorates.

13   Dean Smith, Personal communication, June 1, 2010.

14   The Halifax by-election took place on September 19, 2009. Many of these Internet voting initiatives also offered a telephone voting component for electors. This was the case in all Nova Scotia municipalities.

Figure 2[15]. Internet Voting in Canadian Municipalities

Ontario		Ontario		Nova Scotia		Ontario	
2003	# of electors	2006	# of electors	2008	# of electors	2010	# of electors
Champlain	8000	Addington Highlands	5135	Berwick	1696	Addington Highlands	5135
Clarence-Rockland	15343	Augusta	6500	Halifax	279326	Arnprior	6600
East Hawkesbury	3100	Champlain	8000	Stewiacke	1002	Augusta	6500
Hawkesbury	10100	Clarence-Rockland	15343	Windsor	2744	Belleville	49500
Markham	158000	Cobourg	15500	**Total**		Brockton	3500
North Dundas	8289	East Hawkesbury	3329		284,768	Brockville	15000
North Glengarry	8900	Edwardsburgh/Cardinal	5700			Burlington	125000
North Stormont	5500	Hawkesbury	10100			Carling	3800
South Dundas	8417	Markham	164000			Champlain	8000
South Glengarry	10988	North Dundas	8700			Clarence-Rockland	15343
South Stormont	10100	North Stormont	5500			Cobourg	15500
The Nation	9100	Perth	5200			East Hawkesbury	3329
	Total	Peterborough	75000			Edwardsburgh/Ca	5700

15   Three by-elections have also been conducted in municipalities using Internet voting, these include Tay Valley in 2007, Montague in 2008, and Halifax in 2009. This data is original research obtained from contacting various municipalities and personal communication with Dean Smith, President, Intelivote.

255,837	South Dundas	9000	rdinal	
			Elizabethtown-Kitley	7500
	South Frontenac	19000	Greenstone	5000
	South Glengarry	9230	Hawkesbury	10100
	South Stormont	10100	Huron-Kinloss	7200
	Tay Valley	7800	Huntsville	19000
	The Archipelago	5300	Laurentian Valley	10000
	The Nation	9100	Leeds-Thousand Islands	7000
			Markham	164000
	Total		McNab/Braeside	5700
	397,537		Mississippi Mills	11000
			Montague	3500
			North Dundas	8700
			North Grenville	10000
			North Stormont	5500
			Pembroke	10000
			Perth	5200
			Peterborough	75000
			Port Hope	13900
			Prince Edward	23000
			Renfrew	5700
			South Bruce	8350
			South Dundas	9000
			South Frontenac	19000
			South Glengarry	9230
			South Stormont	10100

				Stratford	20000
				Tay Valley	7800
				The Archipelago	5300
				The Nation	9100
				West Elgin	4000
				Whitewater	7100
				Total	783,887

that offer online ballots is on the rise and municipal officials express what appears to be a growing trend of support for electronic voting methods. In addition, many provincial election agencies have expressed interest in the prospect of Internet voting, as well as Canada's national election agency, which is currently pursuing research to fulfill a parliamentary mandate to conduct an electronic voting experiment by 2013. Growing interest, research, and a hotbed of activity at the municipal level suggests that use of, and support for, Internet voting in Canada is likely to increase, making it an important research case.

The cases of Markham and Halifax are focused upon given that they have the largest electorates and arguably use more developed approaches than some of the others. The following section examines the experiences of Markham and Halifax with Internet voting by assessing their rationales for implementation, significant characteristics of the models, and effects on the electoral process and voting turnout.

3. Markham

The Town of Markham used remote Internet voting in both its 2003 and 2006 municipal elections and has plans to continue to do so in the forthcoming October 2010 election. Markham is a significant case with regards to Internet voting because it was the first major Canadian municipality to embrace the concept of electronic voting. It is the only jurisdiction that has conducted election surveys to measure public attitudes toward Internet voting and to orchestrate a comprehensive online communications plan to inform and educate its electors. The Markham approach also serves as a model of development for all other Canadian municipalities that have adopted, or are considering, Internet voting as well as election agencies from other levels of government. Although the success of any model is context dependent, this case shows that Internet voting can work in a diverse[16] community and can have positive effects for

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16   58 percent of Markham residents are non-English, the largest groups of which are Chinese (29 percent) and South Asian (12 percent).

election stakeholders.[17] It also produces evidence that suggests the extension of Internet voting has the potential to positively affect voting turnout, particularly by encouraging previous non-voters to participate.

Rationale

The motivation to introduce remote Internet voting was based on a number of factors. First, the decision to offer online ballots was part of a multi-channel service delivery strategy that also sought to position Markham as a leader in electronic service delivery. It was also spurred by a need to adhere to the changing lifestyles of electors, appeal to younger potential voters, and to enhance accessibility and convenience for voters, particularly by enhancing ballot accessibility for special populations of electors such as persons with disabilities.

Characteristics

Online voting was made available in Markham's advance polls for a five-day period in 2003 and a six-day period in 2006. The model was based upon a two-step security process[18] wherein all electors received two notification cards by mail. The first card was sent along with the regular voter notification materials. This card enabled electors to register to vote online and prompted them to create a unique security question and answer, which was required prior to officially submitting an online ballot.[19] While some question options were pre-determined such as *"What is your mother's maiden name?"* it was possible for an elector to

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17   Kimberly Kitteringham, "Markham's Online Voting Experience" Power point presentation, January 26, 2010.

18   There are essentially two methods of Internet voting – a one-step and two-step process. In the one-step process a card is mailed to the elector which allows him or her to cast an online ballot. This method assumes the same risks as traditional poll voting along with added risks associated with the Internet such as denial of service attacks, server malfunctions, etc and mail system risks. The two-step process requires another, second notification card to cast a ballot. This option has the same risks as poll voting and the online portion of one-step Internet voting, but not the same mail system risks because a thief would have to steal the mail twice.

19   Once registered to vote online electors' names were removed from the traditional, paper ballot voters lists.

formulate his or her own question. The second card was sent out only to those who registered and provided electors with a unique PIN (a randomly generated alpha-numeric credential), which was also a requirement to vote online.[20] It was reasoned that this two-step process sufficiently mitigated the risks associated with Internet voting while maintaining the integrity of the vote.[21]

To educate and inform electors of the option to vote online Markham partnered with Delvinia, a Toronto-based company that specializes in producing digital marketing experiences. Delvinia created an interactive website which prompted electors to register to vote online and presented them with information regarding online voting, the campaign, and candidates. The goal was not only to educate electors about the opportunity to vote online, but also to emphasize the importance of voting more generally. The website was advertised by the Town through mailings, print advertising, email, and telephone notifications. Delvinia was also responsible for facilitating election surveys, which has been the first effort to systematically collect attitudinal data regarding electors' experiences with online election services in Canada.[22]

Effect on electoral process and turnout

Overall, electors report that online voting made the voting process more accessible and convenient. In 2003 for example, 86 percent of respondents cited convenience as their primary reason for voting online and 100 percent reported being likely to vote online in future elections. 99 percent of respondents reported satisfaction with the online voting process and 79 percent of online voters stated they voted from their home computer.[23] In 2006, 88 percent of online voters reported having cast their ballot online because of its convenience. Voters again expressed

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20   Andrew Brouwer, Personal interview, August 27, 2009; Andrew Brouwer, Personal communication, April 8, 2010.

21   City of Peterborough, *Report FACLK05-018 Alternative Voting Methods for the 2006 Municipal Election* (Peterborough City Council, 2005).

22   Adam Froman, Personal communication, April 7, 2009.

23   Delvinia, *Internet Voting and Canadian Democracy in Practice: The Delvinia Report on Internet Voting in the 2003 Town of Markham Municipal Election*, 2003.

satisfaction with the process (99 percent) and approximately 26 percent of online voters in 2006 reported having cast an online ballot in 2003 as well.[24] Although it is too soon to confirm, there appears to be the presence of a *faithfulness effect*, which has been documented in European cases[25], whereby those who cast their ballots online in one election are likely to continue to do in the future.

In 2003, 11,708 (or 7.5 percent of eligible voters) registered to vote online, and 7,210 of them cast online ballots. In 2006, 16,251 (9.7 percent of eligible voters) electors registered and 10,639 of those actually voted online.[26] Not only did electors make use of online voting, but the number of users also increased (see Figure 3). Voting turnout noted positive increases as well. Turnout in the 2003 advance poll, for example, increased by about 300 percent, and in 2006 rose by another 43 percent (see Figure 4 for overall turnout comparisons). Survey data also indicates that the option of online voting enticed some reported non-voters to participate electorally. For example, 25 percent of online voters in 2003 reported having not voted in the 2000 election and 21 percent of electors who cast an Internet ballot in 2006 claim they did not vote in 2003. This pattern has also been detected in research on European Internet voting trials, particularly in Estonia.[27]

Aside from its ability to enhance accessibility for electors, Internet voting also impacted other elements of the electoral process. For one, it altered the nature of the campaign. While canvassing door to door, candidates encountered some electors who had already voted.[28] The extension of online voting in advance polls made

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24   According to the 2007 report published by Delvinia 89 percent of those surveyed report being likely to make use of Internet voting in a federal election and 90 percent say they would be likely to do so in a provincial election.

25   Alvarez, Hall and Trechsel, "Internet Voting in Comparative Perspective: The Case of Estonia."

26   Kimberly Kitteringham, "Markham's Online Voting Experience".

27   Alvarez, Hall and Trechsel, "Internet Voting in Comparative Perspective: The Case of Estonia."; Delvinia, *Understanding the Digital Voter Experience: The Delvinia Report on Internet Voting in the 2006 Town of Markham Municipal Election*, 2007; Goodman, Pammett and DeBardeleben, *A Comparative Assessment of Electronic Voting*.

28   Adam Froman, Personal interview, October 2, 2009.

early voting more popular and, as a consequence, required candidates to rethink traditional campaign strategies. Permitting online ballots also changed the traditional function of election scrutineers[29] since they were not able to monitor online voters receiving their ballot in the same manner they would be able to in traditional paper ballot polls.[30] As for election officials, they consider the addition of the Internet a success and view its presence as a continued opportunity to offer service excellence to electors and encourage electoral participation.[31]
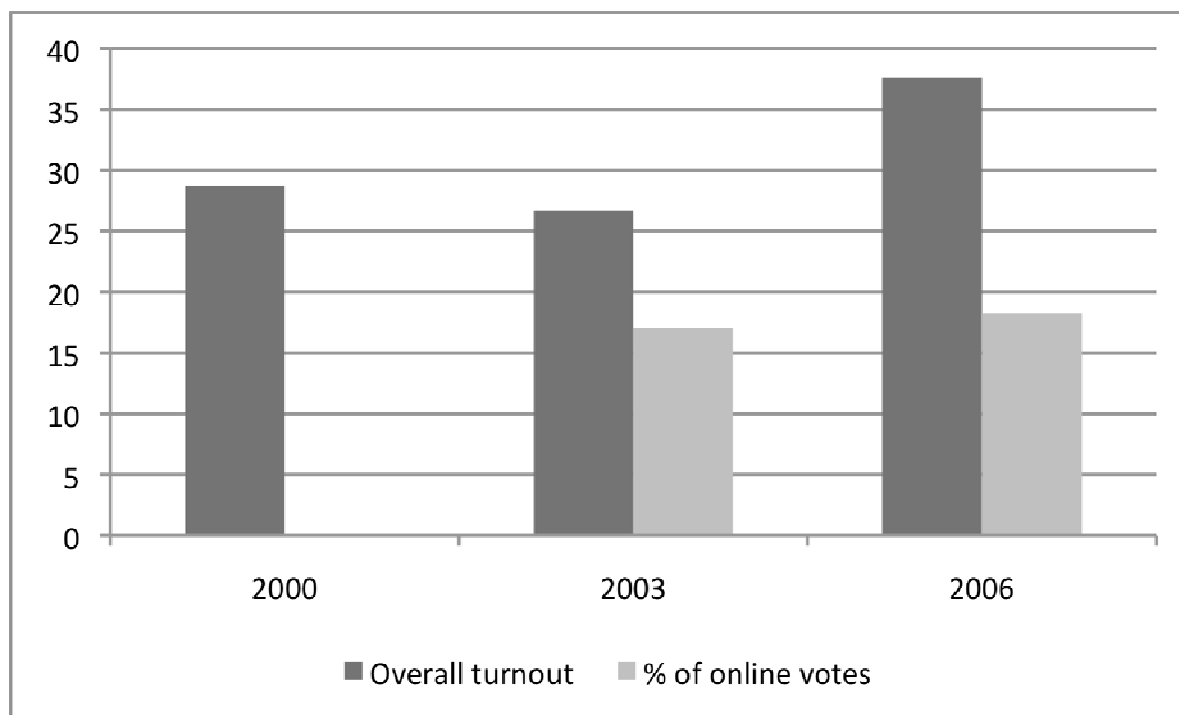
Figure 3. Method of Voting Used
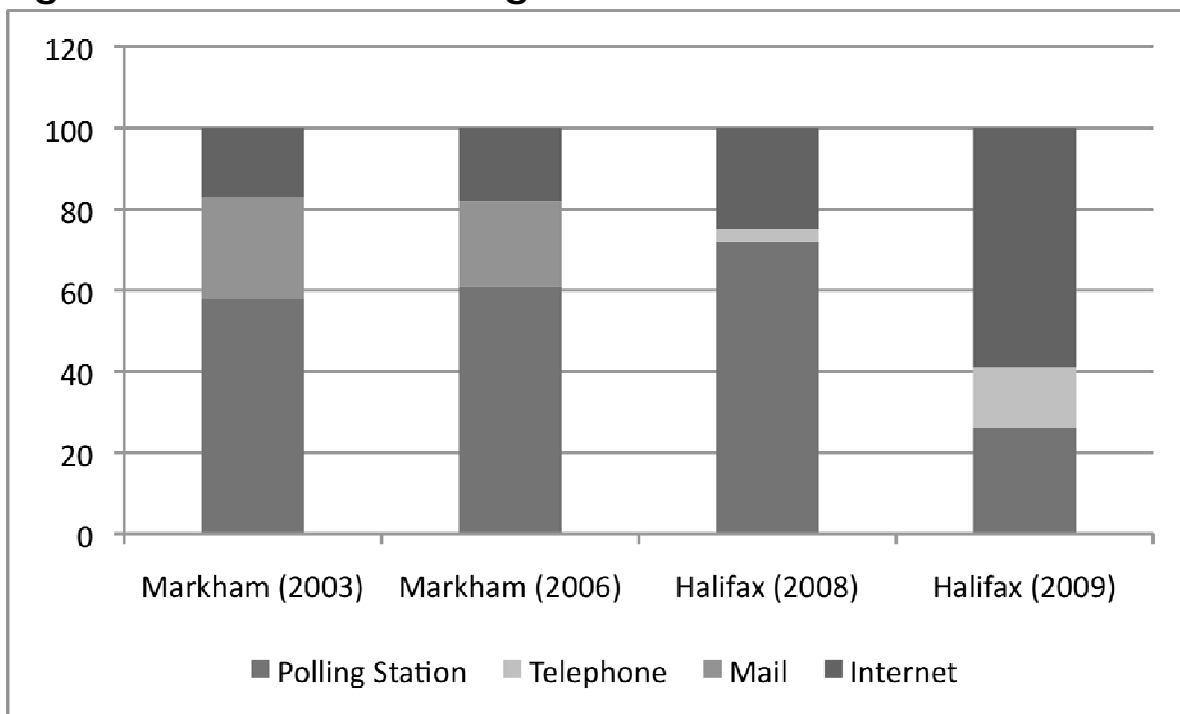
Figure 4. Voter Turnout in Markham and Percentage of Votes Cast Online

4. Halifax

Halifax Regional Municipality (HRM) introduced remote Internet voting with a telephone option[32] in its 2008 municipal and school board elections and in a more recent 2009 by-election. There are several reasons for examining HRM's experience with Internet voting. First, HRM is the largest municipality to have trialed online voting in Canada with an electorate of approximately 280,000. Second, the HRM approach did not require electors to pre-register to vote as in Markham. The model has also evolved beyond advance polling, extending the online voting period right up until and on election day in the recent by-election. Finally, the model adopted by HRM possesses unique features that serve to address some of the concerns raised by opponents of Internet voting. Examination of the HRM case reinforces the position that Internet voting has the potential to improve accessibility and convenience

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[32]   Telephone voting was offered as a complimentary electronic method because there were concerns about Internet accessibility since there are many parts of HRM which are rural and may experience limited connectivity as a consequence.

for electors, and as a consequence, promote electoral participation.

Rationale

The motivation to adopt Internet voting was part of a pilot project whose goal was to establish electronic voting as a reliable and viable alternative voting method. It was also a step in providing improved election service for potential voters based on their changing lifestyles. Officials regard electronic voting as a natural extension of services given recent technological advancement. Another consideration was improving rates of electoral participation, which are typically quite low in elections at the municipal level in Canada (usually ranging from 28 to 32 percent overall). This included engaging younger voters, a group that typically votes at lower rates than older cohorts of potential voters.[33]

Characteristics

Remote Internet and telephone voting were offered for three days during the advance polls in the 2008 election, about two weeks prior to the actual election day. In the 2009 by-election the option to vote online or via telephone was expanded to the entire election period including election day. In both cases electors were not required to pre-register and were not removed from the manual voting lists if they chose to vote online. The HRM system allowed electors to select their preferred method of voting when they decided to cast a ballot, and not before. HRM decided not to require pre-registration because improving electoral turnout was an important motivation and evidence from trials in the United Kingdom suggested that mandatory pre-registration greatly reduced electronic participation rates.[34]

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33   Delvinia, *Internet Voting and Canadian Democracy in Practice: The Delvinia Report on Internet Voting in the 2003 Town of Markham Municipal Election*; Cathy Mellett, *Voter Participation 2008 Municipal and School Board Elections*, (Halifax Regional Municipality, 2008); Jon H Pammett and Lawrence LeDuc, *Explaining the Turnout Decline in Canadian Federal Elections: A New Survey of Non-voters*, (Ottawa: Elections Canada, 2003).

34   Cathy Mellett, Personal communication, September 11, 2009.

Not requiring electors to pre-register meant that only one card would be mailed to eligible electors (one-step process). However, HRM decided that one PIN was not secure enough to sufficiently mitigate security risks and so decided on a security model that relies on two shared secrets. The shared secrets approach necessitates that the electoral administration has access to a reliable second data source, which in this case was electors' Date Of Birth (DOB). The online voting process prompted electors to complete a CAPTCHA challenge[35] and then use their unique PIN and DOB to verify their identity. Once these security requirements were met, electors were able to access the online voting menu, make their selections, and cast a ballot.[36]

Voters were also able to switch voting channels at any point during the selection of candidates or ballot validation. For example, an elector could start selecting certain candidates using the Internet connection on his or her home computer (i.e. school board representatives) and then leave the house and continue the voting process on a cell phone (i.e. selections for councilor and mayor). This feature sought to maximize convenience and accessibility for voters.[37]

A Deputy Returning Officer (DRO) module enabled election administration at traditional polling locations to verify whether an elector had previously cast an online ballot when he or she appeared at a poll. Once the prospective voter presented identification the DRO was able to access the voter's profile using an on-site computer and confirm whether he or she had participated. The DRO then selected a "Manual Vote" box beside the elector's name and handed the elector a paper ballot. There were no reported instances where an elector claimed to have not voted but the system indicated otherwise. If this had occurred the

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35   CAPTCHA stands for Computer Assisted Program to Tell Computers and Humans Apart. It is a security procedure wherein a user is required to re-type a group of distorted characters that are located in a blurred box.

36   Bousquet, Tim, "iVote: Can Electronic Voting Save Democracy?" *The Coast*, September 18, 2008; Cathy Mellett, Personal communication, September 11, 2009.

37   Dean Smith, Personal communication, August 26, 2009.

voter would have been required to sign an affidavit confirming that he or she had not voted already.[38]

Also unique to the HRM approach was a feature that allowed electors to spoil a ballot. Often times Internet voting is both praised for not permitting ballot errors, but also criticized for not allowing spoiled ballots to be submitted. Although not a legal issue in Canada, in some countries such as France voters are legally entitled to spoil their vote, and so not having this option violates this right. Intelivote, the company hired to administer the electronic portion of the election, designed a *decline to vote* button that was offered as an option along with the candidates' names so that electors would have the choice to spoil their ballot.[39]

Finally, the 2009 by-election trialed a special candidate module, which allowed candidates to identify whether an elector had participated by selecting the elector's name on the voters' list.[40] Since electors' statuses were updated at paper ballot polls as well, candidates were able to track all methods of voting online. Though scrutineers were legally able to attend traditional polls, the features of the candidate module eliminated the need for this. [41] Interestingly, the candidate who made the best use of the system won the by-election.[42]

Effect on electoral process and turnout

Though there is not as much data for HRM given that election surveys were not administered as comprehensively as in Markham, overall the effect of Internet voting on electors, candidates, and electoral administration appears to be positive. Of the electronic ballots cast, 86 percent were Internet ballots,

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38   Dean Smith, Personal communication, October 2, 2009.

39   Goodman, Pammett and DeBardeleben, *A Comparative Assessment of Electronic Voting*.; Dean Smith, Personal communication, October 2, 2009.

40   Candidates were also able to search electors by name and address.

41   Based on feedback from this trial the system has been modified to allow candidates to create special lists of electors such as undecided voters who may have expressed the possibility of support or organize electors by their street names, etc.

42   Dean Smith, Personal communication, October 2, 2009.

and the remaining 14 percent were submitted via telephone. These numbers suggest that Internet voting was the preferred method and offered electors the greatest convenience. Furthermore, in 2008 about 30 percent of all ballots cast were electronic and in 2009 59 percent of all votes were online ballots. Interestingly, middle-aged electors (those between 40 and 59) were more likely than other cohorts to cast their ballots online confirming trends of use by age group found in some European trials.[44] This trend is also apparent in the Markham data (see Figure 5).

Although there have not been sufficient elections to draw conclusions about patterns or trends, turnout in the advance polls in Halifax increased from 12 percent (15,386 voters) in 2004 to 28 percent (28,709 voters) in 2008 (see Figure 6). Turnout in the 2009 by-election was 35 percent, an average increase of 51 percent compared with the turnout rates of the three previous by-elections (21, 10 and 23 percent respectively).[43] While there is not much evidence, results so far have been positive; at least in the portion of the election in which online voting was available.[44] Furthermore, in the other smaller Nova Scotia towns where Internet voting was offered in 2008 for a longer period of time (over 10 days), turnout was substantially higher (e.g. 53 percent in Berwick and 73 percent in Stewiacke).[45]

In terms of other effects, the HRM model eliminated the need for traditional scrutineers because observing the online list could fill the function. This list also affected the ability of candidates to campaign and mobilize voters because a number of electors voted prior to election day and because candidates were able to observe, search, and sort who had voted and who had not, using the candidate module. While it is too early to tell what the effects

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44   Alvarez, Hall and Trechsel, "Internet Voting in Comparative Perspective: The Case of Estonia."

43   Cathy Mellett, Personal communication, September 11, 2009.

44   While overall turnout did not increase in 2008, it actually decreased, advanced turnout was up from previous elections and online voting was only an option in advanced polls.

45   Cathy Mellett, Personal communication, September 11, 2009; Dean Smith, Personal communication, April 8, 2010.

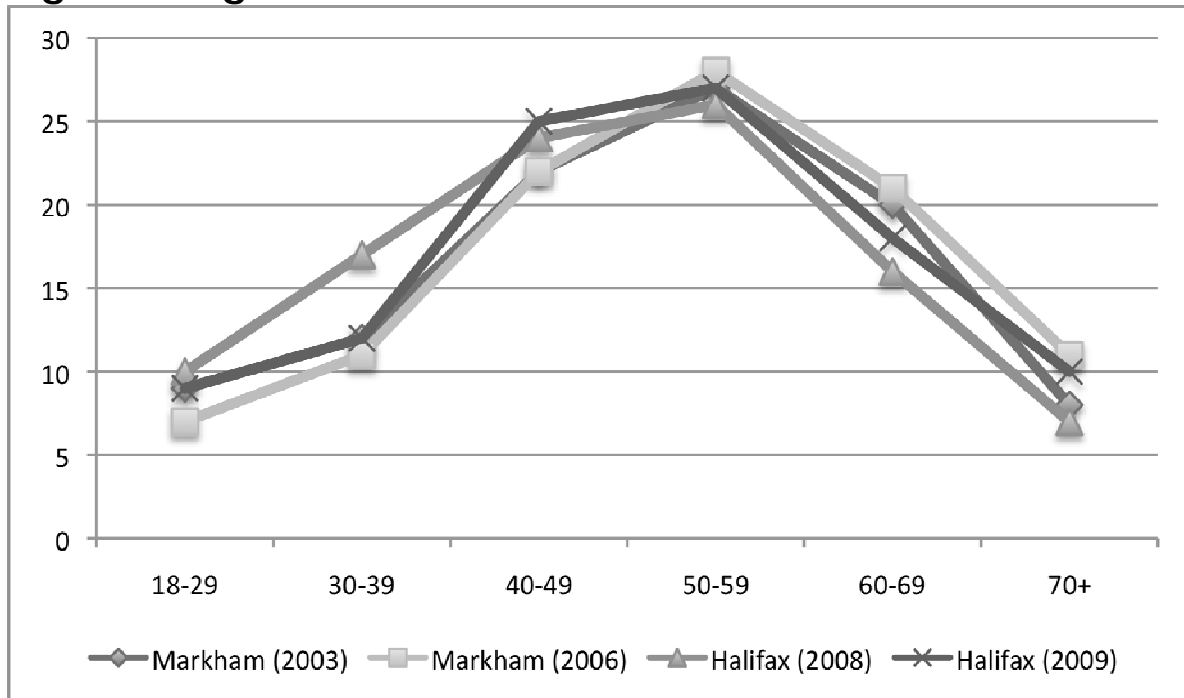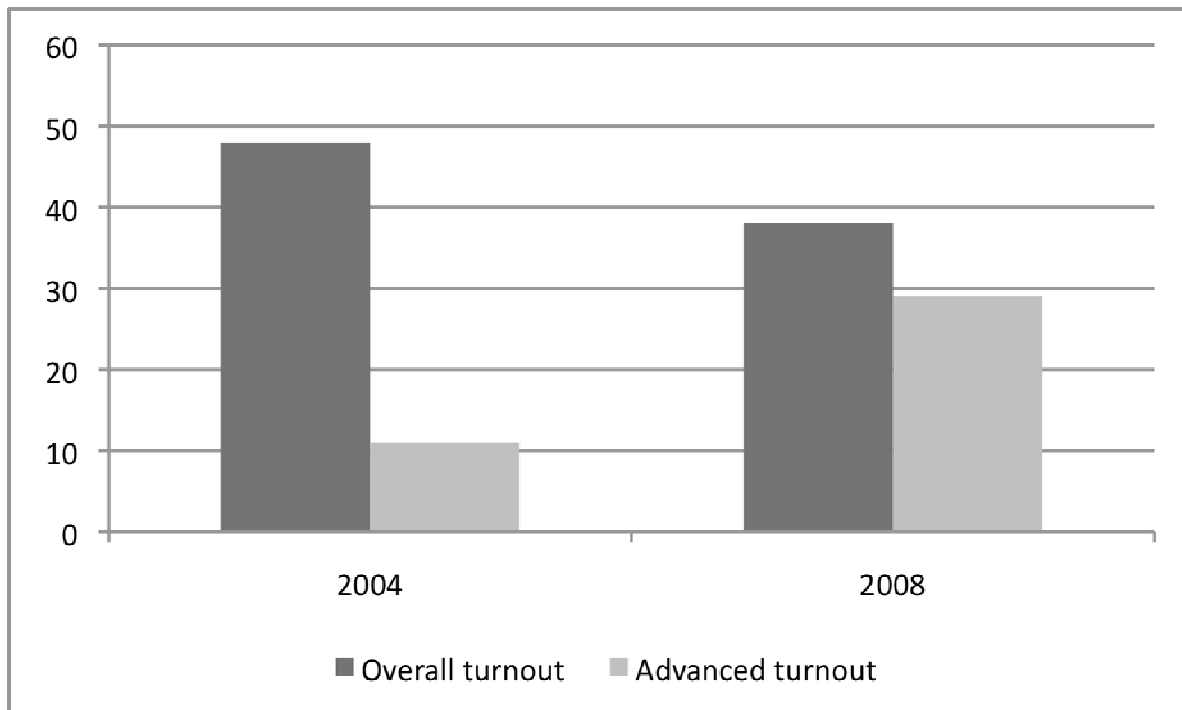**Figure 5. Age of Internet Voters**

Figure 6. Overall and Advance Turnout in HRM Before and After Internet Voting

Elections officials are also sufficiently pleased with how Internet voting has fared, giving it a rating of 90 percent based on their evaluation criteria, particularly the convenience it provided to electors and its potential to enhance civic engagement. Cost is also a factor. Though HRM did not reduce the number of in person polling locations in 2008, officials plan to reduce these locations in subsequent elections and state that the reduction in cost will help to stabilize the rising costs of administering an election. The presence of a call centre in the advanced polls however, reduced costs by two thirds and also increased the quality of support available to electors.[46]

5. What makes these models work?

Although it may be too soon to classify the Markham and HRM e-voting projects as a "success," so far the results have been positive. Aside from the characteristics of the models and effects they have imparted, equally important are the presence of supportive factors that have made Internet voting workable in these jurisdictions. Namely, there are five central elements which have fostered the effectiveness of these Internet voting projects, these include: (1) political will (2) Internet penetration and access, (3) public support and trust, (4) a supportive legal framework, and (5) gradual testing and implementation. Most of these features are also cited as contributing to the success of Internet voting projects elsewhere[47] (see Figure 7). As such, it is probably wise to assume that they are central prerequisites to the effective implementation and development of an Internet voting program.

Foremost, in Markham and HRM there was a political will to introduce and trial alternative voting methods. In both cases officials viewed the introduction of Internet voting as an opportunity to establish themselves as a leader in electronic service delivery, meet the changing needs of electors' lifestyles,

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46   Cathy Mellett, Personal communication, September 11, 2009.

47   Alvarez, Hall and Trechsel, "Internet Voting in Comparative Perspective: The Case of Estonia."; Chevallier, Warynski and Sandoz, "Success Factors of Geneva's E-Voting System."

Figure 7.[48] Primary Factors That Make Internet Voting Models Work

Factors[49]	Country		
	Canada	Estonia	Switzerland
Political will	X		X
Internet penetration	X	X	
Public support and trust	X	X	
Legal framework	X	X	
Gradual implementation, testing & research	X		X
Digital identification system		X	
Interdisciplinary involvement			X

and encourage civic engagement among citizens. Their motivation to pursue such a program is one of the critical factors for its success. The effectiveness of these trails has also helped foster political motivation among other municipal governments and encouraged them to introduce Internet voting. Academics and other experts have suggested that along with trust, the political will to pursue Internet voting is perhaps one of the most significant requirements for the effective development of an Internet voting project.[50] In addition, political will has been an essential factor in the effectiveness of Internet voting programs in countries like Estonia and Switzerland. Ironically, a lack of political will has contributed to the failure of such projects in countries such as the United Kingdom and the United States.[51]

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48   The cases of Estonia and Switzerland are compared here because they are the only other jurisdictions to successfully implement and maintain Internet voting models. While Internet voting has been presented, trialed, or researched elsewhere, these projects were either stopped or not pursued for various reasons, usually relating to security risks. As noted earlier, although there has been an abundance of research in the United States, all planned trials in regular American elections have been terminated prior to actual implementation.

49   Estonia factors taken from Alvarez, Hall and Trechsel, "Internet Voting in Comparative Perspective: The Case of Estonia."; Swiss factors taken from Chevallier, Warynski and Sandoz, "Success Factors of Geneva's E-Voting System."

50   Internet voting Workshop, Ottawa, ON, 2010.

51   Alvarez and Hall, *Point, Click & Vote: The Future of Internet Voting*.; Alvarez, Hall and Trechsel, "Internet Voting in Comparative Perspective: The Case of Estonia."; Chevallier, Warynski and Sandoz, "Success Factors of Geneva's E-Voting System."; Goodman, Pammett and DeBardeleben, *A Comparative Assessment of Electronic Voting*.

Second, sufficient Internet penetration and access is an essential requirement – electors must be able to easily use the service if it is to prosper. These communities have substantially higher Internet penetration than other countries and regions where Internet voting is working well, such as Estonia, where 53 percent of households had Internet access in 2007, and Switzerland, where 70 percent of households had broadband access in 2006.[52] Comparatively, more than 80 percent of Markham residents report having access to a home computer and 80 percent say they have high-speed Internet access.[53] The Canadian Department of Economic and Rural Development reports that as of November 2009 more than 93 percent of Nova Scotians had access to broadband.[54] In addition, local data indicates that 78 percent of HRM households have an Internet connection, which is one of the highest percentages of users by region in Canada.[55] These figures suggest that Markham and Halifax have relatively high rates of Internet penetration, which is a prerequisite for access and use.

Public support and trust are a third element that has been instrumental in the development of Internet voting projects in these municipalities and elsewhere.[56] Prior to implementing Internet voting, HRM council conducted polls to gauge public opinion toward online voting and found that over 70 percent of respondents reported they would be in favour of such an initiative.[57] Markham data also highlights relatively supportive feelings toward online voting, although this is among online voters specifically. For example, online voters in Markham were likely to encourage others to vote online – 79 percent of survey respondents report that at least one other person in their

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52   Alvarez, Hall and Trechsel, "Internet Voting in Comparative Perspective: The Case of Estonia."; Organisation for Economic Co-operation and Development, Stat Extracts. *Country Statistical Profiles 2009: Switzerland.* http://stats.oecd.org/Index.aspx?DatasetCode=CSP2009
(April 8, 2009).

53   Kimberly Kitteringham, "Markham's Online Voting Experience."

54   Linda Grant, Personal Interview, August 25, 2009.

55   Cathy Mellett, "HRM's Experience with Electronic Voting: The 2008 Municipal Election and beyond" Power point presentation, January 26, 2010.

56   Internet Voting Workshop, Ottawa, ON, 2010.

57   Cathy Mellett, Personal Communication, September 11, 2009.

household voted using the Internet. Additionally, 80 percent of online voters report they would be likely to recommend it to others.[58] More generally, data collected by Canada's national election agency confirms that overall support is growing for Internet voting in the country as a whole. Whereas in 2000 47 percent of the general population reported they would be likely to make use of online voting, in 2008 this figure had risen to 54 percent overall.[59]

Aside from public opinion it is important to have the support of other election stakeholders such as candidates, election administration, and the media. To foster this support it was imperative for election officials to communicate with all affected parties. Officials from both municipalities ensured they engaged candidates early by educating them on the process and encouraging questions. Part of this included holding meetings where candidates could voice concerns.[60] Creating access to information about online voting and communication were key tools toward building and nurturing public support and trust.[61]

Fourth, a legal framework that allows for alternative voting methods is an important condition. Municipal election legislation in Canada is regulated and passed provincially. Currently, six provinces (Alberta, British Columbia, New Brunswick, Nova Scotia, Ontario and Saskatchewan) have enacted legislation within their respective *Municipal Elections Act* that permits the use of alternative voting methods in elections or allows for the passage of by-laws (by municipalities), which would allow the incorporation of electronic voting in local elections. Although this legislation exists, many municipalities, Markham and HRM in particular, were required to pass an additional by-law prior to the introduction of Internet voting which specified the type of voting method to be used and a rationale for doing so. HRM was actually

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58   Delvinia, *Understanding the Digital Voter Experience: The Delvinia Report on Internet Voting in the 2006 Town of Markham Municipal Election*.

59   Goodman, Pammett and DeBardeleben, *A Comparative Assessment of Electronic Voting*.

60   In the Canadian municipality of Peterborough negative media was an issue and was mitigated by educating the media and providing information resources that explained the system and affirmed its security.

61   Goodman, Pammett and DeBardeleben, *A Comparative Assessment of Electronic Voting*.; Internet Voting Workshop, Ottawa, ON, 2010.

required to pass two separate by-laws for the 2008 and 2009 elections given that one offered Internet voting in the advanced polls only, whereas the other expanded the timeline of use for the entire voting period, including election day.[62] Along with this, a formal list of procedures and policies was necessary to outline elements of the vote such as recount procedures, ballot forms, etc.[63] European cases went through similar procedures, although in most of those cases the process was much more drawn out and complex, especially in Estonia.[64]

Finally, gradual implementation and extensive prior research were essential components. HRM delayed extending Internet voting through to election day and employing the candidate module in the first election where online ballots were offered to ensure they were able to mitigate any risks which arose and take advantage of any unforeseen opportunities. After council deemed the Internet portion of the 2008 election a success, these features were tested in a subsequent by-election. Prior to the introduction of Internet voting more generally however, HRM conducted extensive research by following the experiences of other municipalities that had trialed online voting, ensured a comprehensive understanding of the electoral process, and established key objectives and electoral principles. Security and privacy issues were concerns, particularly the integrity of the voter's data. These issues were handled by creating a detailed matrix for criteria of evaluation and procedures to be followed. Overall, HRM is systematically building on the accepted success of its trials.

Markham also conducted extensive research, which included a comprehensive risk analysis and careful study of previous trials. In addition, officials conducted consultations with various experts. Although the Markham approach was more fulsome from the

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62   Linda Grant, Personal Interview, August 25, 2009.

63   Goodman, Pammett and DeBardeleben, *A Comparative Assessment of Electronic Voting*.; Linda Grant, Personal Interview, August 25, 2009.

64   Alvarez, Hall and Trechsel. 2009. "Internet Voting in Comparative Perspective: The Case of Estonia."

start, election officials have been able to develop their research by expanding the election survey initiative, which has plans to probe the attitudes of candidates and election administration toward Internet voting as well as more closely examine Internet security and voter authentication in the upcoming election. At any rate, both cases took time and care in development. Step by step approaches have also been cited in literature addressing European trials as a key success factor, particularly Switzerland.[65]

6. The Future of Internet Voting in Canada and Beyond

Several conclusions can be drawn from the experiences of Markham and HRM. For one, although most models are context dependent it is likely that political will, a relatively high rate of Internet penetration and access, public support and trust, a supportive legal framework, and a gradual development process are important requirements to ensure the effective introduction and refinement of an Internet voting model. While some items may be of greater importance than others they all appear to play a role in successfully deploying an Internet voting system.

Furthermore, while Internet voting has the potential to make the electoral process more convenient and accessible for electors, it also has broader effects on the electoral process, such as eliminating the need for traditional scrutineers and forcing change in the campaigning and mobilizing tactics candidates employ. We are likely not yet aware of all the effects the emergence of online voting will have on candidates, the campaign, and the electoral process. Continued research is important as a consequence.

Although there is not enough data to confirm or refute the potential of Internet voting to engage electors in the electoral process, there are indications that the extension of online voting may have the potential to engage non-voters, develop a faithful following, and increase turnout. There are mixed results overall, but in most municipalities in which online ballots were offered turnout increased, sometimes tenfold. By comparison, in Estonia and certain Swiss cantons where Internet voting has been

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65   Chevallier, Warynski and Sandoz. "Success Factors of Geneva's E-Voting System."

successfully developed and maintained by government, use of electronic ballots and voting turnout has increased over time.[66] It is too soon to tell for certain, but there is some empirical support that Internet voting can encourage non-voters to participate and promote turnout.

There are also specific characteristics of these models such as a comprehensive online marketing campaign, candidate and DRO modules, multi-channel electronic voting, and the feature which permits spoiled ballots that are useful for consideration in the development of Internet voting systems elsewhere.

In sum, the future of Internet voting in Canada appears promising and future research should be focused here. 2010 will be the third election year wherein Ontario municipalities offer an Internet voting option to electors. Compared with the 2006 elections, more than double the amount of cities and towns has confirmed that they will be using online ballots. Interest from additional municipalities and from provincial and federal levels of government suggests there is a good chance Internet voting programs will expand across the country. While nations like Estonia and Switzerland have developed fairly refined approaches, which have been used to conduct binding elections for higher levels of government, Canada is emerging as an important research case. If Canadian municipalities continue to offer online ballots as a method of voting, Canada will soon have more instances of local Internet elections than any country worldwide. Canadian municipal elections should be the focus of greater research and data collection if we are to learn about the effects and outcomes that come from Internet voting.

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66   Alvarez, Hall and Trechsel. 2009. "Internet Voting in Comparative Perspective: The Case of Estonia."; République et Canton de Genève, *E-Voting: The Geneva Internet Voting System*, www.geneve.ch/evoting/english/presentation_projet.asp (August 16, 2009).

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