Online Voting in Local Government Elections

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EXECUTIVE SUMMARY

Introduction and Objectives

CivicInfo BC is a not-for-profit organization that provides a co-operative information service for British Columbia's local government sector. CivicInfo BC collects and disseminates information on issues affecting local governments, including local government electoral candidate information and election results.

In the past, self-governing First Nations in BC, entities unencumbered by provincial legislation, have also considered implementing online voting. In addition, local governments in British Columbia (BC) have sought permission from the provincial government to pilot online voting in local government elections. The legislation that governs local government elections does not currently allow for online voting.

In 2012, the provincial government directed the creation of an independent panel (Independent Panel) to review the potential of online voting in local and provincial elections. The Independent Panel submitted their final report to the Legislative Assembly of BC in February 2014.

The purpose of this report is to gather information that would be valuable for local governments and self-governing First Nations wishing to pursue online voting. The report focuses on the experiences of online voting in other jurisdictions, both domestic and international, to garner insights that can be applied to the BC context.

Methods

The jurisdictional scan includes all current international examples of online voting in binding elections in European countries, as well as Australia and the United States. All of the governments share similarities to BC: a democratic tradition, a cultural shift towards increasing technological fluency, and a decrease in voter participation and engagement.

Local governments in Nova Scotia and Ontario have been conducting elections using online voting for some time. Representatives from each of the local governments that have conducted election(s) using online voting were invited to participate in a web-based survey. The survey focused on procedures, costs, turnout rates, communications and security issues. Respondents were also asked to list the key advantages and disadvantages of online voting, as well as any recommendations they may have for local governments considering implementing online voting.

Findings

The Survey results were analysed and formatted, and frequency counts were conducted. To gain a better understanding of certain findings, cross-tabulation between question responses was also performed. Altogether 39 surveys were completed; a 64% response rate was achieved.

- **Online Voting Process**: For all five of the online voting-enabled local government elections that have taken place, the majority of survey respondents used online voting during advanced polls and on general election day.

- **Change in Voter Turnout Rates**: Just over half of respondents (51%) noticed an increase in voter turnout rates since first adopting online voting. One-quarter (28%) of respondents did not notice a change in voter turnout rates, and less than one-tenth (8%) noticed a slight decrease.

- **Percentage of Votes Cast Online**: A large minority of respondents (40%) received 100% of the ballots in their last general election electronically, which implies they did not accept paper ballots. Out of the respondents who accepted both paper and electronic ballots, the percentage of electronic ballots received varies; almost half of the respondents received between 60-79%, only one received less than 19%, and only one received more than 80%.

- **Advanced Registration**: Nearly three-quarters (73%) of respondents did not require voters to register in advance to be eligible to vote, and the remaining 27% did require advanced registration.

- **Security Issues or Incidents**: A large majority of the respondents (92%) did not report any security related issues or incidents with online voting. Three respondents described the issues they experienced, all of which were related to system design, and none of which were caused by nefarious intent.

- **Voter Identity Authentication:** All of the survey respondents mailed PINs to voters in advance of the election(s), and 21% of survey respondents required voters to answer personal identifying questions.

- **Cost**: Respondents gave an approximate total cost of implementing online voting: $600,000 maximum, $3,500 minimum, and $47,000 on average.

- **Cost Savings Realized**: Just over half (55%) of the survey respondents reported realizing cost savings, the majority of which were related to reducing the number of physical polling stations.

- **Communication:** Almost all of the respondents used multiple media to communicate with voters: newspaper (95%), print mail-outs (92%), internet (84%), radio (61%), public presentations (21%), television (8%) and social media (8%).

- **System Vendor**: All survey respondents collaborated with private online voting software vendors: Intellivote Systems Inc. (79%), CanVote (13%), Dominion Voting (5%), and Scytl (3%).

- **Future Use**: In the next general election, the majority of respondents (79%) plan to use online voting during advanced polls and on general election day.

- **Key Advantages**: The key advantages listed by respondents are related to reducing barriers to participation for voters and increasing ease of administration for election staff.

- **Key Disadvantages:** The key disadvantages listed by respondents are related to managing concerns, those of voters and of election administrators, about the use of online voting.

- **Recommendations for Other Local Governments**: A number of respondents (44%) explicitly endorsed online voting. Close to one-quarter (22%) stressed the importance of proactive communication with voters, and a small remainder made administrative recommendations to smooth the implementation of online voting.

Recommendations

The recommendations were formed based on the findings of the jurisdictional scan, literature review and survey. Given the existing legislative constraints, the applicability of the recommendations for local government is contingent on the provincial government pursuing legislative change. The recommendations by the Independent Panel have been taken into consideration as the best available information on the factors that will influence the provincial government's decision on whether to allow local governments to use online voting.

- **Cross-Jurisdictional Collaboration**: Local governments and self-governing First Nations may be able to enter into a cross-jurisdictional agreement, whereby one local government administers the online portion of an election on behalf of another government. In particular, regional districts may play a role in coordinating online elections on behalf of their member municipalities. In addition to potential cost savings, cross-jurisdictional collaboration would create a common voter experience.

- **Phased Implementation:** Piloting online voting by restricting its application by jurisdiction or by voter group will allow administrators to test logistics, security risks, and voter acceptance prior to full-scale implementation. Limiting online voting to electors who currently qualify for mail ballots under the existing legislation would align with the Independent Panel's recommendation to limit online voting to those electors who have accessibility challenges.

- **Province-Wide Voting Platform Procurement:** The Independent Panel recommends the establishment of a technical committee to assist local governments with voting system selection. Procurement models range from complete autonomy for local governments to choose a private voting system vendor to provincial government sponsored creation of a public voting platform. There is an opportunity to ensure that all local governments have access to an online voting system that meets provincial standards on system transparency and security, and creates a common online voting experience for all electors.

The recommendations are broad in scope, applicable to all local governments, and sensitive to the current provincial government context.

Conclusion

Conducting elections using online voting is possible for self-governing First Nations and may become possible for local government in the future. For self-governing First Nations and those local governments that wish to advocate for online voting, this report will provide them contextual information and insights into the experiences of other jurisdictions. When online voting becomes possible, implementing some or all of the recommendations will allow local governments to provide a consistent, cost effective online voting experience for all eligible voters.

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1. CLIENT BACKGROUND

CivicInfo BC is a not-for-profit organization that delivers information services for those who work in, or have an interest in, British Columbia's (BC) local government sector. In 2000, seven existing local government organizations, listed below, came together to sponsor the incorporation of the CivicInfo BC not-for-profit society to sponsor inter-government cooperation and information sharing.

CivicInfo BC Founding Organizations:

- British Columbia Assessment Authority
- Local Government Institute, University of Victoria
- Ministry of Community Services, Government of British Columbia
- Municipal Finance Authority of British Columbia
- Municipal Officers Association of British Columbia
- Municipal Insurance Association of British Columbia
- Union of British Columbia Municipalities

CivicInfo BC is a member-based organization that caters to local governments in British Columbia – 27 regional districts, 161 municipalities – as well as First Nations, improvement districts, and the Islands Trust. Governed by a Board of Directors and managed by an Executive Director, CivicInfo has grown incrementally to include a seven-member operations team.

From its inception, the CivicInfo BC website (www.civicinfo.bc.ca) has facilitated the free and open exchange of local government-related information. The local government sector in BC is responsible for service delivery, by-law enforcement, solid waste management and a multitude of other services that affect the daily lives of British Columbians. As an organization driven by a membership of approximately 99% of BC local governments, CivicInfo BC strives to provide resources in support of local government public servants and elected officials as they do their work.

In 2005, CivicInfo BC began acting as the primary agency responsible for collecting and disseminating province-wide candidate information and election results during the triennial local government general elections. During the last general local government election held in 2011, well over 2,000 candidates competed for positions on local government councils and boards through the province.

1.1. Research objectives

Interest in online voting is part of a broader movement towards e-government internationally. This is driven largely by recent advancements in information and communication technology, such as widespread internet access and affordable personal computers. As a result, constituents are increasingly demanding electronic service delivery from local governments, with examples ranging from electronic property tax transactions to broadcasting council meetings.

Online voting has many potential benefits, particularly increased convenience and accessibility compared to traditional voting methods, which also may reduce costs and increase voter turnout rates overtime. However, despite these potential benefits, online voting also has numerous

potential drawbacks, including concerns related to privacy, security and auditability. Governments considering adopting this method of alternative voting must weigh these concerns against the benefits. The purpose of this report is to explore the applicability of online voting in a BC local government election context. The research has been guided by the following questions:

- How have other jurisdictions in North America, Australia and Europe approached online voting?

- Should online voting be permitted at a future date in British Columbia, what recommendations can be made to local governments based on the experiences of the 44 local governments in Ontario and 17 local governments in Nova Scotia that have conducted elections using online voting?

- If the *Local Government Act* (*LGA*) is one day amended to allow online voting, what can interested local governments do to overcome existing barriers to implementation?

This report includes a review of the online voting experiences in European countries, Australia and the United States, as well as other jurisdictions in Canada. If Internet voting comes to BC in the future, the experiences in other jurisdictions may provide election administrators with examples to emulate or avoid, depending on their outcomes and context. BC has many international examples from which to draw comparisons, as well as a number of Canadian local government forerunners from whom to garner insights. To provide further understanding of the Canadian experience, a survey has been made available to Ontario and Nova Scotia local government chief election officers from local governments that have adopted online voting.

1.2. Rationale for This Project

The *LGA*, the legislation governing local government elections, currently does not allow for online voting. In the past, Kelowna, Vancouver and Nanaimo have all expressed interest in piloting online voting in their local government elections; however, they have all been checked by the existing legislation (*LGA* and *Vancouver Charter*), which would require amendments to make online voting pilot results legal. Self-governing First Nation governments are not subject to the restrictive legislation and may choose to pursue online voting in the near future.

Adopting online voting is seen by some local governments as a way to help reverse low voter turnout trends. Other possible benefits include lowering election costs and increasing electorate accessibility. Although it is very difficult to isolate single variables that affect voter turnout rates, some jurisdictions have conducted post-election surveys that indicate that online voting may have had a long-term positive effect on voter turnout rates. For example, in the report on the 2003 online election in Markham, Ontario, online voting attracted more participants who did not vote in the previous election than traditional voting methods, indicating that online voting may attract new voters (Delvinia Interactive Inc., 2004).

In August 2012, BC's Attorney General asked Elections BC to convene an independent panel (Independent Panel) to "examine opportunities and challenges related to potential implementation of Internet-based [online] voting for provincial and local government elections" (Main, 2012). The Independent Panel's final report was submitted to the *Legislative Assembly* in February 2014. The Independent Panel (2013) puts forth the following recommendations:

1. Do not implement universal internet [online] voting for either local or provincial government elections at this time. However, if internet [online] voting is implemented, its availability should be limited to those with specific accessibility challenges. If internet [online] voting is implemented on a limited basis, jurisdictions need to recognize that the risks to the accuracy of the voting results remain substantial.

2. Take a province-wide coordinated approach to internet [online] voting.

3. Establish an independent technical committee to evaluate internet [online] voting systems and support jurisdictions that wish to implement approved systems.

4. Evaluate any internet [online] voting system against the principles established by the panel: Accessibility, Ballot anonymity, Individual and independent verifiability, Non-reliance on the trustworthiness of voter's device(s), One vote per voter, Only count votes from eligible voters, Process validation and transparency, Service availability, Voter authentication and authorization.

CivicInfo BC believes that local governments will continue to advocate for online voting in the future, regardless of how the provincial government chooses to act upon the Independent Panel's recommendations. Self-governing First Nations may choose to pursue online voting in the near future. In addition, local government are currently able to conduct non-binding referenda using online voting. The experiences with online voting in other jurisdictions, both nationally and internationally, provide valuable insights that may be useful for self-governing First Nations and local governments as the debate continues.

1.3. Scope

The scope of this project is limited to online voting. It excludes other types of electronic voting such as kiosk or electronic touch-screen. The terms electronic, internet, and online voting are often used interchangeably in the literature to describe more than one type of electronic voting; however, all other alternative online voting methods are excluded from the scope of this project. For the purpose of this project, the term online voting will be used to describe remote internet voting where an elector's vote is cast via secure and secret ballot, from a remotely located computer, to a secure electronic storage location and then included in the final vote tally. For consistency, online voting will be the only term used in this report.

This report focuses on online voting in local government elections. Elected local government is defined as the council of a municipality or the board of a regional district (*LGA*). The twenty-seven regional districts, which are federations of municipalities and unincorporated electoral areas, are included in the scope of this project. Self-governing First Nations are also within the scope of this project. School trustee elections are held in conjunction with local government elections in BC (*School Act*), and as such, are included in the scope of this report. Other local government bodies, such as regional health boards, are outside the scope of this report.

1.4. Report Structure

The report is structured as follows:

- **Background** - provides the context for undertaking the research project. Research objectives, rationale, client background, and report structure are outlined.

- **Methodology** - discusses the research methods used to create the jurisdictional scan and literature review. Procedures, ethical implications and limitations of the survey instrument used to gather information about local government online voting experiences in Ontario and Nova Scotia are included.

- **Context** - details information about the existing online voting systems in Europe, Australia and the United States. Also includes information on the Canadian legislative context for online voting, online voting examples from other provinces, as well as a summary of the existing BC local government election procedures.

- **Literature Review** - evaluates the existing body of literature on online voting, determines which materials have made a significant contribution to the understanding of the topic, and includes a discussion on the findings of that literature.

- **Results** - analyzes the findings from the survey to answer the research objectives outlined in this report. The analysis informs the report's recommendations.

- **Discussion & Recommendations** - presents the recommendations to local governments based on the jurisdictional scan, the literature review, and the survey results.

- **Conclusion** - summarizes the research and offers final insights on the subject of online voting.

1.5. Terms and definitions

The literature on online voting requires a degree of fluency on the technical terms used to describe security threats and privacy measures. The following definitions of terms used in this report will provide consistency of meaning for more technical explanations in later sections.

- **CAPTCHA -** A random test generated by a computer, usually requiring a person to type a series of letters and numbers that appear in a scrambled image that proves the question is being answered by a human and not a computer.

- **Distributed Denial-of-Service Attacks -** Deliberate attempts to make a server temporarily or indefinitely unavailable for its intended purpose by overwhelming it with false communication requests. A distributed denial-of-service attack on an online voting system would consist of hackers overwhelming the system with illegitimate votes, originating from many different sources, so that legitimate voters would be unable to access the system.

- **Malware -** Malicious software, called Malware, installs itself on a user's computer and is able to manipulate the regular functions of the computer. Malware may be able to undermine an online voting system, either changing or destroying a vote, through manipulating the user interface. Online voting systems may be challenged by varying security levels on elector's

computers.

- **Two-Envelope System -** A two-envelope system, a type of online vote encryption system, is often used to keep the ballot and the voter's identity separate (Madise & Martens, 2006). A cast ballot is encrypted, which masks its content (the first envelope), and then the voter adds their identity to the ballot which is encrypted separately (the second envelope). The identity and ballot are stored separately by the system and the results are shuffled before counting, so that the results do not correspond with the voters list. Estonia and Switzerland use this system.

- **Verifiability of Results -** Election results must be able to be verified, to prove that votes are stored and not modified, without revealing the voter's choices, by way of traceable audits.

- **Voter Authentication -** The process of confirming an elector's identity, typically by showing government issued identification to an election official. During the online voting process, where visual authentication is impossible, there are three commonly used types of identity verification: Pre-registration; Personal Identification Number (PIN); and, Two Shared Secrets, often a birthday or place of residence (this requires election officials to have access to reliable second source data).

- **Voter Turnout Rates -** The portion of eligible voters who choose to participate in an election compared to the total number of eligible voters provides a voter turnout rate. Voter turnout rates are measured by comparing population estimates of eligible voters to the number of ballots cast. Factors influencing voter turnout rates are numerous and difficult to measure, such as close mayoral races, special election issues, local weather etc.

2. METHODOLOGY

The research into online voting in local government elections was conducted in the fall of 2013 and winter of 2014 by a University of Victoria Master of Public Administration candidate who was also a CivicInfo BC staff member (investigator), in consultation with the CivicInfo BC Client and the investigator's academic supervisor.

This section of the report describes the research methodology adopted. The section includes information on data source of the literature review and jurisdictional scan sections, as well as, the survey instrument, procedure, ethics, and limitations.

2.1. Data Source

The literature review includes sources that explore one or more aspects of online voting, including information about online voting experiences in other jurisdictional levels. Information was sourced from University of Victoria online journal databases, World Wide Web search engines (Google Scholar), and government websites. Bibliographies of relevant documents were mined for other sources. The research material includes published, and where available, grey literature (reports and other documents) that has been produced on electronic voting.

2.2. Instrument

The online voting survey was designed to collect information about each local government`s experience with online voting (See Appendix A). Prior to implementation, the survey was presented to one individual from a local government in British Columbia, two individuals from CivicInfo BC and one individual from the School of Public Administration at the University of Victoria. Their feedback was used to optimize question phrasing and response options.

A web-based survey was selected over other data collection options. CivicInfo BC owns a license for online survey software, which made this option the most convenient, efficient, and cost effective. The target audience is geographically diverse, making in-person interviews unfeasible. In addition, local government administrators have demanding work schedules, which made telephone interviews impractical.

The survey data was collected on a secure server located in Canada. The survey was programmed and hosted by CivicInfo BC. Email invitations sent to participants included a unique web address, which was individualized for each participant to make tracking participant responses feasible. In addition to the primary investigator and the client, the unique web address was only known to invited participants.

The survey was designed to take a maximum of 15 minutes to complete. The average response time was 20 minutes, which may be attributed to respondents leaving the survey open while looking up information. Participants were asked to complete 26 questions, in a combination of closed- ended and open-ended formats.

The survey was divided into seven sections:

- **Voter Turnout –** gathered information about province, year and time online voting occurred, what percentage of voters chose online voting, and whether online voting had an impact on overall voter turnout rates.

- **Security –** gathered information on voter authentication methods, advanced registration requirements, and any security issues or incidents experienced.

- **Vendor –** gathered information on which online voting vendors were selected.

- **Cost –** gathered information on the costs incurred and savings realized implementing online voting.

- **Communications –** gathered information on how local governments communicated to the public that online voting was available to them.

- **Future Use of Online Voting –** gathered information whether local governments plan to use online voting in the next general local government election and, if not, their reasons why.

- **Recommendations –** gathered information on the key advantages and disadvantages of adopting online voting, in addition to any recommendations local government administrators have for local governments considering adopting online voting.

2.3. Procedure

In November 2013, an email invitation to participate in the survey was sent to Clerks or Chief Administrative Officers from each of the 61 municipalities in Ontario and Nova Scotia that have implemented online voting in one or more local government election (17 in Nova Scotia and 44 in Ontario). The survey was conducted between November 28th and December 13th, using an online survey tool (FluidSurveys). One follow-up email was issued on December 9th. The survey was closed between December 14th and January 5th.

In the hope of increasing the response rate and gaining a more representative sample group, on January 6th and 7th, unresponsive invitation recipients were contacted by telephone to request their participation. The survey was opened again between January 6th- 12th.

Missing results, when participants did not respond to the question, are excluded from the percentage of total calculations. The qualitative analysis of open-ended question responses is designed to be descriptive; the data have been organized to show patterns in the responses. The six-step process of thematic analysis outline by Braun and Clark (2006) was used as the model for analysing the qualitative open-ended questions.

2.4. Ethics

The University of Victoria's Human Research Ethics policies for academic research required that participant provide informed consent prior to participating in the research. The email invitation

included an informed consent message, which explained the risks and benefits, expected completion time, right to withdraw, and the policy on confidentiality and anonymity (see Invitation to Participate in Appendix B). The welcome page of the survey also included a summarized version of the informed consent message. Only participants who indicated their consented to participate in the study were able to proceed with the survey.

2.5. Limitations

The survey was designed to gain the highest quality data possible; none the less, the potential limitations of the data collection method should be considered when interpreting the results. The limitations include:

- **Survey Fatigue –** Local government administrators are frequently asked to complete surveys by municipal agencies and senior levels of government. Respondents may have been less likely to participate because they are inundated with survey invitations from other organizations.

- **Respondent Fatigue –** The respondents may have become less engaged by the end of the survey leading to deterioration in the quality of the answers towards the end of the survey.

- **Small Sample Size** – The sample size was limited by the small number of local governments that have implemented online voting in local government elections. The census nature of this survey made it impossible to open it up to a larger sample group.

- **Staff Turnover –** The last general local government election was held in Nova Scotia in 2012 and in Ontario in 2010. The staff members most closely involved with administering online voting, and therefore best suited to answer the survey questions, may have left the local government in the intervening years.

- **Timeliness –** The survey was open just prior to, and just after, the holiday season. Respondents may have been unusually busy due to vacations taken over the holiday season. In addition, many local governments were working to finalize their 2014 budgets at the end of 2013. The timing of the survey may have adversely affected the response rate.

3. CONTEXT

The context section of this report outlines the existing circumstances, both locally and internationally, that affect local governments in BC considering implementing online voting. In this section, the jurisdictional scan reviews online voting experiences in other jurisdictions around the world. A summary of the history of online voting in Canadian jurisdictions is also included. As well, this section includes a brief synopsis of the local government legislative framework, local government election procedures, and other contextual factors, such as voter turnout rates and internet connectivity rates.

3.1. Jurisdictional Scan

The jurisdictional scan focuses on European countries, Australia and United States, all of which share a liberal democratic tradition with Canada. They also share low voter participation trends and a cultural shift towards increased usage of technology for day-to-day tasks. European countries, in particular, have been the forerunners in alternative voting method experimentation, including trials and implementation of a variety of electronic voting methods.

Norway, Switzerland, France and England have all piloted various forms of online voting in local government or regional elections, while Estonia has introduced online voting for national elections (Madise & Martens, 2006). In all of the European examples, the move towards online voting has come from the national level of government (Goodman, Pammett, & DeBardeleben, 2010a). In each of the cases, the pilot projects were administered by the national government, with varying degrees of input from the local authorities.

New South Wales, Australia, has implemented online voting in state elections. The iVote project was implemented to provide voters with visual impairments the ability to vote by secret ballot, part of Australia's international legal obligation as a signatory to the United Nations *Convention on the Rights of Persons with Disabilities.* Interestingly, both Canada and Australia share the Westminster style of government, large remote or rural populations and a legal commitment to improving electoral access for voters with disabilities as signatories to the *Convention on the Rights of Persons with Disabilities* (Allen Consulting Group , 2011).

In the United States, the literature has focused on the technical requirements of online voting. While there has been some trepidation surrounding the adoption of online voting, the first government sponsored pilot study was considered technically successful, although underutilized (Guerin & Akbar, 2003). Despite these reservations, the legislative emphasis on ensuring that overseas service men and women are able to participate in elections has renewed interested in online voting.

In most of the examples included in this jurisdictional scan, excluding Australia and the United States, each country began their foray into online voting by introducing it at the local government level. In addition to other similarities, Canada shares the experience of having introduced online voting at the local government level. Only Estonia and Switzerland have expanded online voting beyond pilot studies for higher levels of government.

3.1.1. Australia

New South Wales introduced an online voting option for the 2011 state election. The project is called iVote, and has been used since in subsequent state by-elections. According to the New South Wales Electoral Commission website, local governments may choose to adopt the iVote system in local government elections; however, none have yet to do so (2012).

The New South Wales Electoral Commission website outlines the procedures used in the iVote project (2012). The iVote project began in an effort to assist voters with visual impairments cast their vote independently. The legislation that enabled the iVote project broadened the eligibility to include electors who are illiterate, or have other disabilities, live more than 20 kilometers from a polling place or were out of State on Election Day. Internet voting was available in advanced polls, only for those that meet the requirements and preregister online or by phone. The elector supplied a 6-digit PIN of their choosing when they applied to use iVote, and prior to the election they were mailed an iVote number. Both numbers were required when voting online. When the advanced polls closed, all electronic votes were printed, sorted and mailed to the correct district to be counted along with the regular paper ballots on Election Day.

An independent auditor conducted pre and post implementation audits of the online voting technology to ensure that it met the requirements of the legislation. The independent evaluation report issued after the 2011 state election found that of the 46,864 online voters, there was a three-fold larger than predicted uptake amongst electors from remote or rural areas of the state (Allen Consulting Group , 2011, p. v). The study also found that by far the largest group of users (92%) were people outside of New South Wales at the time of the election (p. 19). Altogether, the post election study found that the iVote system provided a convenient, reliable and secure option, with the majority (96%) satisfied with the experience casting their vote (p. 48).

3.1.2. Estonia

Estonia introduced online voting for local elections in 2005, 2009, and 2013; national parliamentary elections in 2007 and 2011; and the European Parliamentary elections in 2009. In a report on the International Experience with E-Voting, Barrat-Esteve, Goldsmith and Turner explain that Estonia was the first country in the world to have implemented online voting for the election of a national parliament (2012). Estonia is the only country in the world to have legislated internet access as a social right. In addition, Estonia is one of very few countries to have implemented a *Digital Signature Act (2002)*, which allows citizens to legally authenticate their online transactions. Online voting has become a common occurrence in Estonia; in the 2011 parliamentary election, 24% of all votes cast were submitted online (p. 142).

Alvarez, Hall and Trechsel, scholars who have written extensively on online voting, identify a number of features unique to the Estonia online voting system (2008). All Estonians have been issued an identity card that has been embedded with a digital certificate, and each registered voter receives a unique personal identification number (PIN) by mail prior to each election. When voting online, voters insert their identity card into a card-reader, which they must purchase in advance, enter their PIN and seal their ballot with a digital signature. Voters are also able to cast multiple ballots, a feature designed to reduce voter coercion. Only the final ballot will be counted, and a physical ballot will trump any previously cast online ballots. Alvarez et al. explain that these procedural features, along with "widespread Internet penetration, a legal structure that addresses Internet voting issues, an identification system that allows for digital authentication of the voter,

and a political culture that is supportive of Internet voting" seem to be what makes online voting workable in Estonia (p. 5).

In a later paper assessing the impact of online voting in the 2007 election, Alvarez et al. (2009) found that the introduction of online voting has had neutral impact on voting participation rates based on income, education, gender and geography (p. 501). Age did seemed to be a factor however, the system seemed to be slightly biased towards voters 55 years old and over (16%) who had a higher turnout rate than voters 18 to 25 year olds (11%) (p. 501). Their research also indicates that the impact of online voting has not resulted in an advantage for parties on either end of the political spectrum (p. 501).

An international audit firm is hired to supervise each online election; however, the audit process is limited to ensuring procedural accuracy (Esteve, Turner, & Goldsmith, 2012, p. 31). In 2011, the Organization for Security and Cooperation in Europe Office for Democratic Institutions and Human Rights (OSCE/ODIHR) was invited to observe the parliamentary elections. The OSCE/ODIHR report made a number of online voting related recommendations that focused on enhancing transparency including issuing formal reports on the testing of the online voting system (2011). The Estonian National Election Committee website indicates upcoming elections will use online voting (Vabariigi Valimiskomisjon , 2013). In addition, as of 2013, the source code of the online voting software has been made publically available for scrutiny.

3.1.3. France

In 2003, the French Ministry of Foreign Affairs allowed French citizens residing abroad to use online voting to elect members of the Assembly of French Citizens Living Abroad (Esteve, Turner, & Goldsmith, 2012, p. 149). In the French bicameral system, expatriates are not eligible to vote directly for the Lower House representatives; rather they are able to elect 155 delegates to a separate Assembly of French Citizens Living Abroad. The Assembly of French Citizens Living Abroad is then responsible for electing twelve senators to represent expatriates in the Upper House. The opportunity to use online voting to elect the member of the Assembly of French Citizens Living Abroad was again made available to French Expatriates in the 2006 and 2009 elections.

The OSCE/ODIHR sent an Election Assessment Mission to France to observe the 2012 parliamentary elections (2012). According to the OSCE/ODIHR Election Assessment Mission report, the French constitution was amended in 2012 to allow French expatriates to directly elect eleven representatives to the Lower House of parliament. To be eligible to vote online in the 2012 parliamentary election, expatriates were required to register in advance at the French Consulate in their country of residence. Voters were required to identify themselves by entering a password and a PIN, both of which had been emailed to them in advance.

The French commitment to pursuing online voting was made clear by the 2009 purchase of a permanent license from a voting technology provider, Scytl (Esteve, Turner, & Goldsmith, 2012, p. 150). The license requires that Scytl track an unlimited number of ballots and store them on a server located in France. According to Scytl, in the 2012, the majority (55%) of all expatriate votes, approximately 240,000, were cast online (Savoy, 2012).

3.1.4. Norway

Norway conducted an internet voting pilot project in the 2011 local government elections. The OSCE/ODIHR sent an Election Expert Team to observe and document the pilot study (2012). According to their report, the intention of the pilot study was to increase voter accessibility. Voters registered in ten municipalities, both residents of Norway and those living abroad, were given the option of casting their ballot online. Online voting was available during the one-month advanced voting period. Over twenty-seven thousand (16%) electors chose to vote online.

The Norwegian pilot study included a number of steps designed to ensure the public's trust in the online voting system's technical features (OSCE/ODIHR Election Expert Team, 2012). The system employed a cryptographic system to allow voters to confirm that they had cast their vote and that their choice had been recorded properly. Voters were issued a voter's card with a series of unique codes printed on it. The codes represented the party affiliations of each of the electoral candidates. Once they cast their ballot, voters received a confirmation email with a code that they could match to the code representing their candidate's party affiliation on their voter's card.

Norway implemented repeat voting in a manner similar to Estonia (Esteve, Turner, & Goldsmith, 2012, p. 33). Voters were able to cancel their online vote by visiting a physical polling station either during the advanced voting period or during general election day. The paper ballot trumped any previously cast online vote. Another important measure to ensure transparency, the Ministry of Local Government and Regional Development required their software vendor, Scytl, publish the software code used in their online voting pilots (Esteve, Turner, & Goldsmith, 2012, p. 27).

The OSCE/ODIHR report concluded that the pilot project "was conducted in an open and inclusive manner" although it made some technical recommendations for improvement (2012). The Ministry of Local Government and Regional Development also issued an evaluation of the trial (2012). The report concluded that although the users of the online voting system were pleased with the ease of voting, the online voting pilot had no effect on voter turnout rates.

3.1.5. Switzerland

Geneva has conducted more elections using online voting than any other jurisdiction in the world (Alvarez, Hall, & Trechsel, 2008, p. 498). According to Michel Chevallier, the Deputy Secretary of the Geneva State Chancellery, the Swiss system of semi-direct democracy allows citizens the opportunity to vote four to six times a year on legislative changes (2009). In 1982, the parliament passed a law allowing the testing of new voting methods. Postal voting was added in the mid-nineties, establishing a tradition of voting from home, which led to a reversal of the decreasing voter turnout rates. The Canton of Geneva began implementing online voting trials limited to referendums, holding Europe's first binding referendums using online voting in advanced polls in 2003. The transition to online voting capitalized on the trust establish by the successful postal voting system.

A recent report on online voting issued by the Geneva State Chancellery, explains that in 2006, due in part to the success of the Geneva trials, the federal government legalized online voting throughout the country and began to roll out online voting capabilities at a national level (Republique et Canton de Geneve, 2012). In 2009, Swiss voters living overseas were allowed to cast their ballots online. The Geneva Canton has collaborated with other urban cantons, sharing the online voting system they have developed at no cost.

The security measures used to guarantee voter identity in Geneva are also outlined in the Geneva State Chancellor's report. Voters are sent cards with a voter card number, a control code and a secret code concealed under scratch away opaque covering in advance of elections. To validate their identity, voters must enter their voter card number. The system then generates a code that must match the control code printed on the voter cards for self-authentication. The voter must enter the secret code number and two shared secrets: their date and place of birth. A two-envelope encryption system is used to encrypt and store voter's ballots and identities separately. The voter will also receive confirmation that their ballot has been received.

The Chancellor's report goes on to explain the audit process. The system used in Geneva is audited by the electoral commission, a government appointed body selected by political parties. A randomized group of two-percent of voters are called by the Geneva administration to verify vote selection and ensure that ballots were cast freely, without coercion. In addition, a virtual constituency is created and used as an audit control. Prior to the election, the control constituency votes are cast and the results checked to ensure that the system is correctly recording and storing the votes. Systematic forensic statistic checks are also performed on the results to ensure their accuracy. Finally, Geneva has proactively guaranteed transparency of the system by publishing the source code of online voting software.

3.1.6. United Kingdom

The United Kingdom (UK) conducted extensive online voting trials well before many other jurisdictions began experimenting with online voting, but has since decided to return to the status quo. In 2000, the government created an Electoral Commission to examine voter reform. The Electoral Commission conducted research that indicated the British electorate would favourably receive online voting. Prior to conducting online voting trials, an amendment to the existing legislation was required to enable the central government to exert control over local elections; the *Representation of the People Act* accomplished this in 2000 (The Electoral Commission, 2007). The United Kingdom piloted online voting in English local government elections in 2002, 2003, 2004 and 2007.

Altogether, twenty-four online voting pilots were conducted in the UK. In many instances, online voting was offered in conjunction with other types of alternative voting: telephone, kiosk, and postal voting. The Electoral Commission found that there were issues concerning public understanding of the pre-registration process, connectivity issues, and accessibility concerns. The pilots were also difficult to compare because each jurisdiction used a different combination of voting options and technology.

The Electoral Commission recommended that four elements be put in place before they would be willing to sanction any further alternative voting trials.

- There must be a comprehensive electoral modernisation strategy outlining how transparency, public trust and cost effectiveness can be achieved.

- A central process must be implemented to ensure that sufficiently secure and transparent e-voting solutions that have been tested and approved can be selected by local authorities.

- Sufficient time must be allocated for planning e-voting pilots.

- Individual registration must be implemented.

The Electoral Commission (2007) ultimately recommended that pilot studies of remote online voting be discontinued until the four elements were met.

3.1.7. United States

Much like in Canada, there is a decentralization of election administration in the United States. Voting methods used to elect officials are set at the state, county or national level (Smith, 2009). There is significant variation in voting procedures across jurisdictions, from traditional paper ballots to touch-screen kiosk voting. Despite this variation, there have only been a few forays into online voting. Four pilot studies reached the planning stage; however, due to security concerns, only two have actually been implemented. The Voting Over the Internet (VOI) pilot in 2000, and the 2010 West Virginia Uniformed Services and Overseas Voter Pilot Program were actualized; the Secure Electronic Registration and Voting Experiment (SERVE) in 2004 and the 2010 District of Columbia (DC) Internet Voting Pilot Project were cancelled before the implementation stage.

The VOI pilot, headed by the Federal Voting Assistance Program in the 2000 presidential elections, has been the only multiple-state government sponsored pilot of online voting in the US (Federal Voting Assistance Program , 2001). The VOI project was implemented after two and a half years of collaboration among local, state and federal governments; the small-scale pilot program saw 84 overseas military service members, in 21 states and 11 countries, cast online ballots (Federal Voting Assistance Program , 2001). The VOI program, although fully compliant with all state and Federal legal requirements, has been heavily criticised due to the small number of users, 84, relative to the $6.2 million dollar price tag of the pilot (Guerin & Akbar, 2003, p. 30).

In 2004, the Department of Defense intended to make online voting available for up to 100,000 absentee U. S. military personnel and overseas civilians (Goodman, Pammett, & DeBardeleben, A Comparative Assessment of Electronic Voting, 2010a). The SERVE system was developed, but cancelled just weeks prior to its implementation. The Department of Defense cited unresolved security concerns for cancelling the project (p. 12).

Despite security fears, the *Military and Overseas Voter Empowerment (MOVE) Act*, 2009, now requires states to improve ballot access for Uniformed Service Members and overseas citizens (West Viriginia Secretary of State, 2011). The legislation mandates that states make electronically transmitted ballots available to overseas military personnel and civilians 45 days prior to elections. Because of this legislation, during the 2010 election cycle, thirty-one states provided military and overseas voters with “electronic delivery of ballots, online access to ballots, and a variety of ballot return options” (p. 7). West Virginia and DC chose to abide by the legislative requirements by procuring online voting systems accessed through websites. DC developed their own open source online voting system and West Virginia allowed participating counties to choose between pre-approved online voting system vendors, Scytl and Everyone Counts Inc.

West Virginia emailed pre-registered eligible participants a PIN and the link to the secure voting website. During the voting process, electors were asked to enter the PIN and another piece of personally identifying information. The votes were stored using a two-envelope system. Five West Virginia counties piloted online voting in the 2010 primary election, and an additional three counties participated in the 2010 general election. The West Virginia Secretary of State (2011)

reported to the legislature that in the general election, one hundred and sixty-five eligible voters applied to participate and 125 cast online ballots. The pilot project experience was positive, the integrity of the system was not compromised and the turnout rate for military and overseas voters was double the rate of previous elections (p. 3).

The West Virginia Secretary of State's report to the legislature (2011) includes information on the DC pilot project because its failure affected the Secretary's recommendation to legislature. Before the DC pilot project was implemented in the 2010 primary election, the public was invited to participate in a system test where interested participants were able to cast non-binding mock votes. During the test, the system was hacked by a group of graduate students and DC subsequently abandoned the online voting pilot project. Despite the overall success of the West Virginia pilot project, the public failure of the DC pilot in part contributed to the West Virginia Secretary of State's recommendation to the legislature that a study committee be convened to review online voting in depth before proceeding with any future online voting projects (p. 9).

3.2. Canadian Context

Canadians are eligible to vote for three distinct levels of government: federal, provincial and local. Elections for each level of government are enabled by separate pieces of legislation. The legislation enabling government elections outlines strict procedural guidelines that are unique to each jurisdiction. Federally, the *Canada Elections Act* dictates how federal elections are conducted. Provincial election acts outline each province's electoral procedure*s.* In addition, in each province, a separate piece of provincial legislation enables local governments to conduct elections. Each province also had separate pieces of legislation that govern local elections for school board trustees, which in most provinces are held in conjunction with local government elections.

Online voting as a possible electoral channel did not exist prior to the relatively recent invention of the Internet. Each level of government responsible for election administration has had to decide if online voting is appropriate for their elections. Federal, provincial and local government responses to online voting vary significantly across jurisdictions in Canada. When deciding whether to amend legislation to allow for online voting, governments must weigh the potential benefits and drawbacks, as well as factors such as internet penetration rates and public attitudes towards e-government. Some jurisdictions have already implemented legislation allowing for online voting, while other governments in Canada are approaching online voting with caution.

3.2.1. Online Voting in Canadian Federal Elections

Online voting has not yet been tested in a federal by-election or general election. The *Canada Elections Act* (*Section 18. a1*) allows for research into alternative voting methods, and allows for a pilot study of online voting to be conducted. Elections Canada requested approval to pilot online voting in by-elections in 2013. However, they have since abandoned plans for an online voting pilot in the near feature, stating that they will "continue to monitor such trials and developments in other jurisdictions to evaluate the feasibility of undertaking an I-voting [online voting] project at a later date" (Chief Electoral Officer of Canada, 2013, p. 19).

3.2.2. Online Voting in First Nations Elections

First Nations that have not entered into treaty relationships with the Federal and Provincial governments are obliged to follow the election processes outlined in the *Indian Act,* which does

not allow for online voting. Self-governing First Nations in BC are able to create their own election legislation; therefore, the self-governing First Nations may choose to conduct elections using online voting. There are three self-governing First Nations in BC: Nisga'a, Tsawwassen, Maa-nulth (comprised of five First Nations). Yale and Sliammon First Nations have completed final agreements and are waiting for the agreements to be fully ratified (Ministry of Aboriginal Relations and Reconciliation, 2014).

Online voting may be particularly applicable to the First Nation governments, as it is common for a significant portion of eligible voters to reside outside of First Nation territory. For First Nations not part of a treaty relationship, non-resident voters are currently able to submit ballots by mail according to the *Indian Act* processes. In addition, all of the self-governing First Nations in BC, except for the Uchuklesaht First Nation, accept mail-in ballots from non-resident voters. Only one self-governing First Nation, the Huu-ay-aht First Nation, currently allows for electronic (online) voting in their *Election Act* (*Section 49 (1)*). The Huu-ay-aht First Nation has not yet carried out an online voting-enabled election.

3.2.3. Online Voting in Canadian Provincial Elections

Once again, online voting has not been piloted in a Canadian Provincial by-election or general election. The governments of Ontario, Nova Scotia, British Columbia and Alberta have begun the process of reviewing whether to allow for online voting in provincial elections. Elections Nova Scotia has recommended to the Legislative Assembly that it is "premature to entertain either Internet based or telephone voting options;" the Chief Electoral Officer's Annual Report cites unresolved security, accessibility, and secrecy issues as reasons for caution. Ontario's Chief Electoral Officer announced in June 2013 that Elections Ontario would not be moving forward with an online voting pilot study at this time (Chief Electoral Officer of Ontario, 2013). The government of Alberta made the legislative changes necessary to allow for online voting pilot studies in 2010; however, the Province has not taken any further steps in pursuing online voting (Goodman, 2012). As mentioned earlier in this report, BC has recently convened an Independent Panel to study online voting and make recommendations to government on whether to allow for it in local and provincial elections. The Independent Panel's final recommendations report does not support pursing online voting in BC provincial elections at this time.

3.2.4. Online Voting in Canadian Local Government Elections

Ontario and Nova Scotia are the only two provinces that allow online voting in local government elections. The legislation governing local government elections varies from province to province. Some provincial legislation, like that of British Columbia, is very prescriptive and does not allow for online voting, while other provinces, such as Ontario and Nova Scotia, give local governments more leeway (Laronde, 2012). The permissive legislation provides a tacit endorsement of online voting; however, the provincial governments do not actively support any voting method over another. Alberta has taken the approach of allowing the City of Edmonton to implement an online election pilot study, a Jelly Bean election, before allowing local governments to conduct binding elections using electronic ballots.

3.2.1. Alberta Online Local Government Election

The City of Edmonton, in collaboration with the Centre for Public Involvement, sought to address the question "Is Edmonton Ready for Internet [online] Voting?" (City of Edmonton, 2013). In 2012,

the City commenced a three-fold public-involvement campaign to address this question. The campaign included a mock Jelly Bean online election designed to "gauge the interest of Edmontonians. . . and to test the technology and ensure the internet [online] voting system met the City's expectations for voter privacy, security, auditability and usability" (City of Edmonton, 2013).

Voters were encouraged to login to the electronic voting system and choose their favorite colour of jellybean. According to a presentation by Laura Kennedy, the Director of Elections and Census for the City of Edmonton, the Jelly Bean election used the existing procedural requirements of the mail ballot process (2013, June 12). The vote was considered successful, with over one thousand voters registered and four-hundred and ninety votes cast. The City of Edmonton collaborated with an online voting company, Scytl, to administer the election and hired a third party security company to test the integrity of the system. Kennedy also felt that the communications team played a large role in the success of the pilot.

The results of the Jelly Bean election were then audited as if it were a binding election. The audit report was presented to a Citizen's Jury, which along with other expert evidence presented, helped them to form a recommendation to council whether or not the City should continue to pursue online voting in their elections. The campaign culminating in the Citizen's Jury verdict: "Yes – Edmonton should adopt Internet voting as an option for future municipal elections" (City of Edmonton, 2013, p. 3).

According to Kennedy, based on the success of the Jelly Bean election, the Ministry of Municipal Affairs gave their approval for the City of Edmonton staff to expand the scope of their recommendations to council. Originally, Edmonton staff had intended to recommend to Council that they pursue a pilot study implementing online voting as an alternative to the mail-in ballot, which is only available to constituents who apply in advance and meet the eligibility requirements. However, the Ministry of Municipal Affairs endorsed staff to recommend to Council that online voting be available to all Edmonton voters during the advanced polls. When presented with this broader recommendation, Council voted against using online voting in the 2013 local government election. Nevertheless, the Alberta Ministry of Municipal Affairs has committed to future discussions with the City regarding enabling Edmonton to pilot online voting in a future local government election.

The Edmonton approach of implementing a non-binding pilot study prior to proceeding with introducing online voting has many merits to commend it. It gave the citizens time to review and understand the process. As well, asking a Citizens' Jury to make a recommendation to Council(s) created buy-in amongst the electorate and provide an opportunity to resolve process issues in advance of a binding election.

3.2.2. Ontario Online Local Government Elections

According Goodman, Pammett and DeBardeleben (2010b), in their report titled *Internet Voting: The Canadian Municipal Experience*, the City of Markham was the first large municipality in Canada to offer online voting. In 2003, along with 11 other municipalities, Markham piloted online voting (see Appendix C for a list of municipalities). It was made available only during advanced polls, and electors were required to pre-register. Prior to the election, Markham implemented an aggressive public education campaign including establishing a "Markham Votes" information website (Delvinia Interactive Inc., 2004).

In the 2006 local government elections, Markham, along with Peterborough and 19 smaller municipalities, again offered online voting as an option (Goodman, 2012). In the following election year, 2010, the use of online ballots as an alternative method of voting more than doubled to 44 Ontario municipalities (See Appendix C for a list of municipalities). The next scheduled local government elections will be held in 2014; online voting will be made available in many municipalities, including Greater Sudbury, which has recently approved the use of online voting in their next local government election. Other communities are choosing to wait; Toronto and Vaughn have announced that they will not yet be introducing online voting (Chief Electoral Officer of Ontario, 2013).

The legislation governing local government elections in Ontario is quite permissive regarding how local governments choose to implement online voting. The *Ontario Municipal Elections Act, 1996,* states that "council of a local municipality may pass by-laws authorizing electors to use an alternative voting method, such as voting by mail or by telephone, that does not require electors to attend at a voting place in order to vote. " The lack of specificity in the legislation has allowed local governments to implement a wide variety of online voting procedure*s.* For example, Stratford completely replaced in-person paper ballots with telephone and online voting in the 2010 local government election, while Markham only allowed online voting in advanced polls in all three of their online enabled elections (Chief Electoral Officer of Ontario, 2013).

Markham has engaged a research firm to assess the online voting experience. After each of the last three elections, Delvinia Interactive Inc. conducted exit poll surveys of online voters to gather online voting public opinion time series data (Interactive Inc., 2004; Delvinia Interactive Inc., 2007; Delvinia Interactive Inc., 2011). In 2010, Delvinia Interactive Inc. received a grant from the Natural Science and Engineering Reserach Council to expand the scope of their research. Their 2011 report includes time-series comparisions of the online voting opinion polls, a survey of the candidates, and information from electors that did not vote. Markham has experienced an increase in voter turnout rates over the last three elections; in the report 2011 report, Interactive Inc. states that online voting "can encourage the electoral involvement of people who previously identified as non-voters" and that "there is evidence to suggest turnout rates can experience modest increases from the extension of online voting" (p. 13).

In 2010, a total of forty-four local governments, including Markham, provided online voting in the general municipal election. Of these municipalities, thirty-three engaged Intellivote as their online voting partner. Intellivote experienced a higher than anticipate user volume during the final hours of the election, which overloaded the system for almost an hour for all thirty-three partner municipalities (Zajac, 2010). Some of the affected municipalities chose to extend their voting hours by half an hour or more to compensate for the delays.

The Association of Municipal Managers, Clerks, and Treasurers of Ontario (AMCTO) conducted a post-election survey of all Ontario local governments in 2011. The survey included questions tailored for those municipalities that had implemented online voting. The majority (86%) of local government administrators who responded to the online voting questions indicated high levels of satisfaction (55% satisfied, 31% very satisfied) with online voting (2011, p. 12). When asked about satisfaction with vote counting methods, 96% of respondents who used online voting indicated high levels of satisfaction (27% satisfied, 69% very satisfied). In addition, 21 (out of 30 respondents who indicated they used online voting) said that providing online voting was a factor that affected

the voter turnout rates (p.8). Out of the 30 municipalities who reported using online voting in the AMCTO survey, only 2 (Markham and Peterborough) used it only during advanced voting and not on the general election day.

3.2.3. Nova Scotia Online Local Government Elections

Berwick, Clare, Halifax, Stewiacke, and Windsor piloted online voting in 2008 (see Appendix C for a list of municipalities). According to Goodman et al. (2010b), in Halifax, the largest municipality in Nova Scotia, both internet and telephone voting options were made available during advanced polls only, pre-registration was not required, and electors were able to switch between modes at anytime during the voting process. The system used in Halifax also allowed electors to spoil their ballots. A very detailed bylaw, in addition to a policies and procedures document, ensured the credibility of the four-step audit process to give voters confidence in the process (p. 18).

Goodman et al. (2010b) go on to explain that in 2009, during a special by-election, Halifax again offered online and telephone voting. These options were not only available during advanced polling, but also up until the polls closed on Election Day. The system also included a candidate module, which allowed candidates to track elector participation to tailor their campaigning (p. 19).

Online voting continues to spread in Nova Scotia. A more recent report by Goodman (2012) explains that in 2012, 16 local governments offered online voting in the local government elections. The Halifax model of online voting - particularly the flexibility between modes, the option of spoiling ballots, and the candidate module – offer procedures for BC election administrators to consider. In addition, BC local governments may choose to emulate Halifax's focus on ensuring voter confidence by implementing a thorough audit process.

3.3. British Columbia Local Government Legislative Context

Local governments in BC operate under a provincial legislative framework outlined in the *LGA*; this piece of legislation, along with the *Community Charter* and other provincial statutes lays out powers, functions, and prescriptive procedural guidelines for local governments. According to two local government scholars, Bish and Clemens in *Local Government in British Columbia* (2008), local governments are "mechanisms through which local residents can undertake preferred collective activities" as well as being an "administrative extension of the Province" (p. 2). In addition to being the general-purpose local government for unincorporated areas in BC, regional districts also act as a framework for inter-municipal cooperation and regional government for mandated and voluntary activities.

The *LGA* includes strict procedural guidelines for local government elections. Local government elections adhere to the principles common to most democratic elections: voting must be by secret ballot (*Section 113*) and each elector is entitled to one vote in the jurisdiction in which they live (*Section 114*). In addition, non-resident landowners are also entitled to one vote in the jurisdiction in which they own property.

Elections determine who will represent each municipality as mayor and council, as well as who will represent each electoral area of the regional districts as director. Council members and mayors are typically elected at large, using two separate candidate lists to fill the mayor and councillor positions, with the entire municipality considered one district. Furthermore, Local governments also have the rarely used option of establishing neighbourhood constituencies through enacting a

bylaw (*Section 36*). Currently, Lake Country is the only local government in BC to use a (partial) ward system.

Elections for regional district representatives for unincorporated areas are also held during general local government elections. Electoral area directors are elected using a single member district plurality. Municipal regional district representatives are appointed from among municipal councils. Each regional district board appoints a chair from amongst its members; the chair may be an electoral area director or municipal elected representative. In BC, school district trustee elections are also held in conjunction with general local government elections.

The local government election cycle will change from a three-year to a four-year election cycle beginning with the 2014 elections (Ministry of Community, Sport and Cultural Development, British Columbia, 2014). By-elections may be held in one or more ridings at anytime during the four years between elections (By-elections may be held to replace one or more elected officials who have vacated their position). It is not necessary to hold by-elections to replace a vacancy on council if it is less than one year prior to the next scheduled general election day. By-elections are costly and time consuming for local governments and voter turnout rates are typically much lower than during general local government elections. By-elections in other jurisdictions have been selected for online voting pilot studies for precisely these reasons.

3.4. British Columbia Local Government General Election Procedures

General local government elections are held on the third Saturday of November, every three years, as dictated by the *LGA*. The Local Government Election Task Force (2009 -2010) undertook a review of local government elections and made recommendations for legislative change to improve the electoral process. They suggested that local government elections should be moved from the third Saturday in November to the third Saturday in October in the hope that milder October weather may "increase accessibility of voting for some people who travel during the winter" (Local Government Elections Task Force, 2010, p. 24). The province does not plan to change general election date to October until the 2018 general local government election (Ministry of Community, Sport and Cultural Development, 2014) ; however, commitment to changing the voting day shows that the province is aware of issues of access to the polls in some communities when winter conditions are experienced.

On a general voting day, voting hours begin at 8 am and cannot extend beyond 8 pm local time (*Section 96*). However, if the integrity of the proceedings is at risk, the election official may adjourn voting (*Section 47*). In addition, if the start of voting is delayed, the election official may extend voting hours by the amount of time that would have been permitted had voting not been delayed (*Section 112*). All local governments must establish at least one advanced voting day (*Section 97*), and local governments with a population of over 5,000 must hold two advanced voting days, from the hours of 8 am to 8 pm. Online voting could increase voting hours significantly by providing electors with the opportunity to cast their ballots outside of traditional voting hours. (See Appendix D for a table outlining BC local government election procedures).

3.4.1. Voter registration and proof of identity

Local governments may choose to either create their own voters list (*Section 61*), adopt the most recent provincial list of voters (*Section 59*), or implement a bylaw limiting registration to electors registering at the time of voting (*Section 54*), typically called a "voting book" election. The voting

day procedures on registration and proof of identity vary depending on whether local governments choose to use a pre-existing voter list.

One major drawback of online voting is the difficulty of proving the identity of the voter. In the existing BC electoral procedures, the test to prove identity is quite permissive, particularly if the elector appears on an eligible voters list. Online voting may be able to strengthen the test used to prove identity, depending on how it is implemented.

3.4.2. Voting List Procedures

If local governments choose to use a voters list they have two options: they may create their own or they may adopt a bylaw (*Section 59*) allowing them to purchase the provincial list and adapt it to align with their jurisdictional boundaries.

According to a presentation by the Elections BC Director of Corporate Planning on *Measuring the Quality of BC's Voters Lists*, 93% of eligible voters were on the list and 90% of the addresses for those voters were current after the May 2013 general election (Lawrence, 2013). Elections BC works continuously to maintain an accurate voters list; however, it is most accurate after the enumeration process conducted prior to each provincial general election. Because provincial elections are on four-year fixed cycles and local government elections have been on three-year fixed cycles, the currency of the provincial voters list at the time of the local government general election has varied, depending on the synchronicity of the two election cycles. Beginning with the 2014 local government elections, a four-year election cycle will be implemented and local government elections will take place approximately six months after provincial elections every four years (Ministry of Community, Sport and Cultural Development, 2014).

Local governments may also choose to conduct their own enumeration process and create their own voters list. If a local government creates its own voter list, advanced registration must be made available to both residents and non-resident landowners (*Section 56*). If the provincial voters list is used, advanced registration is not required (*Section 53(3)(c)*), but may be made available to both residents and non-resident landowners.

Voter identification is not required if a local government is using a pre-existing voters list and the elector's name appears on that list. Identification is required if the voter is not on the list (see Voting Book Procedures for more details on identification). The current voting list procedures do not require any proof of identity; therefore, implementing online voting with strict authenticity requirements may provide an opportunity to introduce more stringent identity authentication requirements.

3.4.3. Voting Book Procedures

Local governments may forgo the voters list and pass a bylaw allowing same day registration for all voters. If the local government has chosen to conduct a voting book election, all electors must present proof of identification and place of residence. Electors must present two pieces of identification; picture identification is not necessary, although one piece must have a signature. The election official must accept types of identification listed in the *LGA (Section 156)*. In addition, the election official may also accept other types of identification, for example medical prescriptions or magazine subscriptions, which provide evidence of identity and place of residence; electors must only "provide evidence satisfactory to the election official respecting the matter"*(Section 57 (3)).* If their identification does not prove place of residence, voters may

swear a solemn declaration as to their place of residence. Non-resident property owners may also vote in a local government election if they can provide identification and the title of the property.

In the eventuality that online voting is implemented, the existing threshold to "provide evidence satisfactory to the election official" would make it possible for local governments to choose from a variety of tests used to prove identity. Entering predetermined PINs and codes, answering personal questions, or using a chip-enabled identity card are all tests which are equal to, or stricter than, the current proof of identity requirements.

Table I - Registration and Proof of Identity

Registration and Proof of Identity		
	Voting List Procedures	**Voting Book Procedures**
Voting List	**Purchased from Elections BC; OR Created by Local Governments**	**None**
Registration	**Same day; AND Advanced**	**Same day only**
Proof of Identification	**Not Required if Name on Voting List; OR Must "provide evidence satisfactory to the election official" of proof of identity if name not on voting list**	**Must "provide evidence satisfactory to the election official" of proof of identity**

3.4.4. Special Voting Opportunities

Establishing special voting opportunities for voters who are unable to attend the regular voting hours, for example people in long-term care facilities, is not mandatory (*Section 99*). However, special voting opportunities may be established, and they may be established outside the local government boundaries (*Section* 99(5)). The *LGA* (*Section* 402 (2)) also states that local governments can, by agreement, conduct all or part of an election for another local government. If this piece of the legislation remains, it may make it possible for local governments to collaborate on online elections and perhaps share the burden of purchasing and implementing the technology.

Mail-in ballots is another type of special voting opportunity. Some local governments accept mail-in ballots if an elector cannot physically attend a voting place. Accepting mail-in ballots is not required; however, a bylaw may be implemented to establish procedure and time limits in relation to mail ballot voting (*Section 100*). Electors have just three weeks in which to request a mail-in ballot, receive it from the local government, mark it and mail it back to the local government before the legislated deadline. The correspondence delays associated with traditional mail-in ballots make this timeline impractical for many absentee voters, which is something that an online voting system would eliminate. In addition, mail-in ballots have long been accepted in BC as having an acceptable level of risk of voter coercion and fraud relative to increasing accessibility for some electors. Online voting has the same level of risk of voter coercion and fraud as mail ballots.

3.4.5. Vote Count

The ballots in local government elections are counted in much the same way as any other level of government, with one exception: unlike provincial or federal elections, local governments may

pass a bylaw allowing them to use counting machines to tally ballots (*Section 102*). The vote takes place after the close of the voting place at 8 pm. Once the results have been determined, the chief electoral officer for each local government may announce the preliminary results; CivicInfo BC receives the results from all local governments in the province to be posted on the website (www.civicinfo.bc.ca/elections) for province-wide dissemination. The chief election officer then has the opportunity to conduct any necessary recounts prior to declaring the official results sometime before 4 pm on the fourth day following the close of general voting.

3.5. Election Turnout Rates

The potential of online voting to increase voter participation rates will likely be a major consideration for local governments if the *LGA* is amended. Low voter turnout rates, which can lead to low levels of public endorsement for policy decisions, are a concern for many local governments. An average of approximately 30% of eligible voters participated in the most recent local government general election (CivicInfo BC, 2011). In some communities, the rate of participation is much lower. In Langford, for example, the election participation rate was as low as 14% of eligible voters (CivicInfo BC, 2011). Low voter turnout rates in local government elections is a trend that anecdotally holds true across all of Canada. Exact turnout rates are difficult to ascertain due to a lack of centralized information agencies like CivicInfo BC in other provinces.

The Ontario, Alberta and British Columbia provincial voter turnout rates in the most recent elections, while still quite low at 49%, 54%, and 52% of eligible voters respectively, offer a benchmark by which to judge local government electoral participation (Elections Ontario, 2011; Elections Alberta, 2012; Judd, 2013). The last federal election saw a marginally higher turnout rate at 61% (Elections Canada, 2011).

3.6. Internet Penetration Rates

The International Telecommunications Union (ITU-D), a United Nations specialized agency, ranks Canada amongst the top 20 countries in the world based on percentage of population with access to the internet (United Nations, 2011). According to the ITU-D's estimates, Canada's rate of internet penetration is 83%, which is significantly higher than Estonia (76%) and not far behind Switzerland (85%), both of whom have implemented online voting in more than one election. Canada's high internet penetration rate is particularly remarkable because of it geographically diverse population; Canada's internet penetration rate is comparable to other countries with significantly more compact geography.

A research paper by Elections Canada reported the results of the 2010 Internet Use Survey (Laronde, 2012). The majority of respondents (80%) aged 16 and over indicated that they access the internet for personal use. People under 45 years of age reported the highest level of internet use (94%), with a steady decline amongst other age groups: 45-64 years (80%), 65-75 years (51%), 75 years and older (27%). The survey found that older people and individuals from households reporting low income were more likely than the rest of the population to report being non-users.

The BC Government estimates that 93% of British Columbians currently have the ability to access to high-speed internet service (Network BC, 2013). The remaining 7% of the province without access to high-speed internet are in rural or remote areas. In response to this, BC has committed to raising connectivity rates to 97% of the province over the next 10 years.

3.7. Public Attitudes towards Online Voting

Local governments must take public attitudes towards online voting into consideration before adopting this method of voting. Trust of government, the internet, and existing electoral processes all influence public attitudes towards online voting. The Canadian Elections Study, supported by Elections Canada, sought to assess Canadians' attitudes towards online voting.

The Elections Canada paper includes survey results from various Elections Canada Surveys (Laronde, 2012). In 2011, Elections Canada undertook a Survey of Electors, which included questions related to online voting. The study provides interesting insight into the electors' attitudes about online voting. A majority (57%) of self-identified non-voters indicated that they would have voted in the last election had that possibility been available through the Elections Canada website (2012, p. 2). Not surprisingly, 18-to-24-year-olds ranked 10 percentage points higher than other groups on this question. Elections Canada also conducted a Survey of Candidates, and while the majority supported online voter registration, only half of candidates (50%) expressed support for online voting.

The Elections Canada paper also cites the 2011 *Canadian Election Study*, a collaborative study undertaken in 2004, 2006, 2008, and 2011 by researchers Fournier, Soroka, Cutler, and Stolle, conducted with the primary objective of explaining what makes people decide to vote (Laronde, 2012, p. 2). When asked if "Canadians should have the option to vote over the Internet in federal elections" 49% agreed (32% somewhat and 18% strongly), while 39% disagreed. More than half of electors surveyed (59%) said they would be likely (17% somewhat and 42% very) to vote over the internet if given that option, and 38% indicated that they would be unlikely. However, only 30% of the electors surveyed indicated that voting over the internet is not "risky," while half of electors surveyed (50%) indicated that it is "risky."

4. LITERATURE REVIEW

The literature review section of this report summarizes the prevailing academic discussion on online voting. It is an account of published work by researchers and academics who study various aspects of this topic.

4.1. Benefits and Risks of Online Voting

Online voting increases the convenience and accessibility of voting. By reducing barriers to participation, online voting has the potential to increase voter turnout rates, particularly of underrepresented population groups. Online voting may also reduce staffing costs for municipalities, enhance the quality of the ballots received, and increase secrecy for electors with disabilities. Despite these potential benefits, and numerous examples of successful implementation, online voting continues to be a contentious issue. Opponents express concerns about the security, privacy and transparency of online voting. Academics debate whether the potential benefits will be realized and, if they are, whether they will outweigh the risks associated online voting. Some argue that system design and a well-managed implementation process can overcome the risks associated with online voting (Alvarez & Hall, 2004). The debate continues because making amendments to the long-established democratic processes requires prudence; democratic legitimacy relies upon sound, transparent electoral processes.

4.1.1. Accessibility

The convenience associated with voting from home, avoiding line-ups and conventional polling hours, reducing confusion over polling locations and eliminating transportation issues caused by inclement weather, may increase the participation of those electors who are unable or unwilling to attend conventional voting places. Guerin and Akbar (2003) suggest that online voting may encourage typically underrepresented groups to participate in elections. This is echoed by Goodman et al. (2010b, p. 14), who mention factors such as technological fluency, and mobility associated with work or school that may make online voting appealing for youth in particular.

Online voting is less physically demanding than traditional voting methods, which may lead to increased participation by electors with mobility issues. Online voting could also make it possible for people with visual impairments and other disabilities to vote without assistance and increase the secrecy of their ballots (Goodman et al., 2010b; Goodman 2012). The BC Independent Panel on Internet (Online) Voting, while they have not endorsed universal online voting, has recognized that increased accessibility and convenience for voters is the "most significant potential benefit of... [online] voting" (p.13). They also recognized that online voting technology has the potential to allow voters with disabilities to vote independently (p. 12).

There is concern amongst researchers that online voting may exacerbate existing inequalities in democratic participation. Because online voting requires electors to have access to the internet and some computer skills, access to online voting may not be equally distributed amongst the electorate. Commonly referred to as the "digital divide," many factors may contribute to limiting certain population groups from having access to and comfort with a particular technology. Alvarez and Hall argue that "(i)f a digital divide exists between classes of voters, the Internet could promote biased representations rather than extend the benefits of democracy to everyone" (2004, p. 33). Belanger and Carter (2010) conducted a survey of 372 participants to discover whether certain socio-economic variables - age, income, frequency of internet use and education

– affect individuals' decision to vote online. Interestingly, they found that education and internet usage did not have a significant impact on voters' likelihood to vote online (p. 309); however, age and income levels did affect the digital divide: younger, more affluent electors were more likely to participate in online voting (p. 310).

Increasing the convenience and accessibility of voting, by allowing electors to vote from home, eliminates the opportunity for constituents to participate in the democratic process as a collective; the act of attending a physical ballot station creates a feeling of inclusion and commonality, as well as increases social networks for some people. Goodman et al. (2010b) argues that civic engagement reaches a culmination during elections, and is something valuable that may be lost if online voting is adopted. Alvarez and Hall also discuss this potential drawback, they state that "[online] voting is the antithesis of the community-based electoral process that many believe is desirable" (2004, p. 9).

4.1.2. Voter Turnout Rates

Adopting online voting is seen by some governments as a potential vehicle for reversing low voter turnout trends. The literature is inconclusive on whether online voting affects voter turnout rates. Researchers point to the difficulty of isolating variables that affect voter turnout rates due to a multitude of factors such as a close mayoral race, campaigning efforts, special election issues, timing of other government elections and even weather (Goodman, et al. 2010a, p. 52; Chief Electoral Officer of Ontario, 2013).

The Issues Guide prepared by Goodman in advance of the 2012 City of Edmonton Jelly Bean Election pilot study, informed the citizen jury that there is:

"(N)o conclusive evidence that shows introducing Internet voting will have a positive impact on turnout… Internet voting will not fix the problem of voter turnout decline completely – it is not a solution to the social and political causes of non-voting. However, it does have the potential to lower the opportunity cost of voting sufficiently that some electors may be encouraged to participate. "

A study by Blais, Debrozynska, and Massicotte (2003) also concluded that increasing the ease of voting might have a positive impact on voter participation rates. They found that turnout rates are 10 percent higher in countries where it is possible to vote in advance, by proxy, or by mail, than in countries without these options (p. 12). Although their study excluded online voting, their results on the effects of increasing the ease of voting may be extrapolated to apply to online voting.

4.1.3. Cost

The human resources costs of setting up and staffing polling stations during elections are significant. The Chief Electoral Officer of Ontario's submission to the Legislative Assembly (2013) on Alternative Voting Methods outlines how cost savings may be realized only if implementing online voting allows governments to reduce the number of physical polling stations, and the set-up and staffing costs associated. However, online voting is frequently implemented as a supplementary channel for collecting ballots in addition to the traditional collection of paper ballots. The purchase or development of the online voting technology without significant reductions in the number of physical polling stations will increase the overall price of elections significantly. There are also major costs associated with educating voters about the new system.

Online voting may also reduce the cost to voters, in both time and resources, by allowing them to vote from home (Chief Election Officer of Ontario, 2013). Transportation costs, particularly for geographically diverse electors, will be eliminated, which also benefits the environment. In addition, by creating more access points, online voting may help reduce polling station line-up wait times for conventional voters (Goodman et al., 2010b, p. 14).

4.1.4. Improved Ballots

Goodman et al. (2010b) emphasize the opportunity presented by online voting to improve the overall quality of the ballots received. Online voting systems eliminate ballot errors by disallowing unintentionally and intentionally (protest) spoiled ballots. Online voting systems may also be able to adjust the language and font size to accommodate voters with special needs. Alvarez and Hall also suggest that the ability to link the online voting platform to candidate platform information could create a more informed electorate (Alvarez & Hall, 2004, p. 57).

4.1.5. Voter Authentication and Anonymity

Voting from a remote location makes voter authentication difficult; however, it is essential to the integrity of any election that only eligible voters are able to vote, and that all eligible voters are able to vote only once. Online voting systems have the task of ensuring that the elector is eligible to vote while at the same time protecting the voter's anonymity (Schryen & Rich, 2009). Various combinations of preregistration, self-authentication, security questions, CAPTCHA, identity cards, and Personal Identification Numbers (PINs) have been used in the online voting trials to ensure the security of the authentication process. There continue to be concerns amongst online voting opponents that these requirements may not be insurmountable for fraudsters (Goodman et al., 2010b).

Schryn and Rich argue that online voters should not receive a receipt of how their vote was recorded because there is a possibility that a receipt could be used in voter coercion, or vote selling (p. 2). Madise and Marten argue that because online voters are unable to verify their results, the legitimacy of the election results depends upon the electorate having "absolute faith in the accuracy, honesty, and security of the whole electoral apparatus" (2006, p. 17).

4.1.6. Ballot Secrecy

Online voting from remote, unsupervised locations cannot guarantee that voters cast their ballots without coercive influence. The Internet Voting Discussion paper published by Elections BC (2011, p. 27) explains that the distributed nature of online voting increases vote tampering compared to traditional voting methods. According to Barrat-Esteve et al. (2012, p. 40) vote coercion or vote buying, manipulating a voter's choice through persuasion or threat of repercussion, as well as increased risk of fraud, such as voting on behalf of someone else without their permission is also frequently included in the arguments against adopting online voting. There is an ongoing debate on whether electoral bodies are obligated to ensure secrecy of all ballots cast or simply ensure that voters have at least one opportunity to cast their ballot in secrecy (p. 41). Barrat-Esteve et al. argue that if electoral bodies interpreted the obligation to ensure ballot secrecy broadly, requiring them to ensure all ballots are cast in secrecy, then all remote voting channels, including mail voting, would be disallowed.

4.1.7. Security

The debate surrounding the security of online voting continues because if security issues arise the public's confidence in the system will be undermined and the results called into question. In

addition, if it were necessary to repeat an election the costs would be significant (Alvarez & Hall, 2004, p. 13). Online voting systems must ensure that ballots are protected from tampering at all stages of the voting process: casting the ballot from a remotely located computer, the communication path of the ballot to the server, and the server where the ballot is stored. The first two stages of the online voting process are typically the focus of security concerns.

The voter interface, Olsen and Nordhaug (2012) argue, is the weakest stage in the online voting process. Difficult to detect Malware, malicious software, may be able to change the interface that voters see when trying to vote online, redirect users to alternative web addresses, send fake confirmation message and make it possible to manipulate or destroy votes by giving users false instructions. Rubin also warns of the risk of Malware infections. He cautions against "holding an election that allows people to cast their votes from a computer full of insecure software that is under the direct control of several dozen software and hardware vendors and run by users who download programs from the internet" (2002, p. 42).

Information transmitted over the internet can be encrypted so that it is difficult to read in a digital format. Even online voting sceptic Rubin argues that transferring votes can be secure and confidential, thanks to reliable cryptography technology (2002, p. 42). However, the communication network connection between personal computers and the system server is potentially vulnerable to unintentional interruptions, such as power outages or internet connectivity issues, or intentional interruptions, such as distributed denial-of-service-attacks (DDOS). Communication path interruptions are most commonly mentioned as threats that would jeopardize the real and perceived security of the vote (Goodman et al., 2010a, p. 14; Goodman et al., 2010b, p. 16; California Secretary of State, 2000). According to Rubin, tools necessary to carry out a DDOS attack are easy for computer hackers to locate, and may be formatted to target attacks against particular voter demographic groups to try to influence the election results (p.43).

Alvarez and Hall point out that significant resources are devoted to the security processes of paper-based elections, and they argue that the same type of administrative controls can be placed on online voting systems (2004, p. 82). Through an examination of existing cyber technologies in 2003, Alvarez and Hall reached the conclusion that secure online voting is possible (p.93). They believe that there is potential for online voting systems to be an improvement upon traditional voting systems, and in particular, upon the existing absentee voting systems (p.91).

4.1.8. Transparency

Transparency is fundamental for fostering trust in any democratic process. Alvarez and Hall define transparency of the voting process as "(t)he property of a democratic election that ensures that voter's preference are translated into counted votes in a way that is not biased by the attributes of the voter or by the voter or registration system" (2004, p. 36). Alvarez and Hall go on to argue that online voting has the potential to increase the transparency of elections by "reducing the possibility of errors, imposing uniformity and facilitating access" (p. 41).

Barrat-Esteve et al. (2012) explain that online voting, because the high degree of technical expertise necessary to understand how the system works, is inherently opaque to the average voter. Voters must therefore be able to trust the electoral body to ensure that the system is working properly, including implementing testing, auditing, and evaluation (p. 26). Nestas and Hole (2012) believe that it is the availability of information about the system - including audit reports, manuals, and the software source code – encourages the electorate to trust that the

electoral body, or other independent observers, are reviewing the reliability of the online voting system (2012).

Goodman et al. (2010b, p. 15) raise concerns about the privatization of electoral administration. The purchase of proprietary online voting systems from privately owned service providers may cause some distrust for some electors. A particular area of contention is the proprietary nature of the private vendors' software source code, which they are reluctant to publish due to the competitive nature of the online voting technology market. The alternative option, which is seen as more transparent, is to publish the source code of the online voting software, making it "open source" so that members of the electorate with the technical expertise are able to test the system for security issues (Goodman et al., 2010a, p. 55). According to Barrat-Esteve et al. (2012) making the source code public remains an area of debate; there is concern that publishing the source code may make a system more vulnerable to nefarious attacks. In addition, because reviewing source code requires a high degree of expertise, time, and effort the gesture of publishing the source code may have limited impact on transparency (Barrat-Esteve et al. 2012; Hole & Nestas, 2012).

5. RESULTS

The purpose of this section is to present the findings from the survey of Ontario and Nova Scotia local government administrators that have used online voting in one or more elections. The data was analysed and formatted using Fluid Surveys web-based survey software.

Cross-tabulations by provincial groups were performed for some questions to determine if the trends were unique to each province, and in some instances between question responses to gain a better understanding of the findings. Responses to open-ended questions have been coded and grouped to reveal specific themes in the responses. The percentage of totals calculations exclude any blank responses where respondents chose not to provide answers.

5.1. Response Rate

The response rate is useful to gauge how representative the survey results are of the target population. The list of 62 local governments that have used online voting in Canada, compiled by Goodman (2012), was used to determine which local governments were invited to participate in the survey (See Appendix C). North Glengarry, Ontario, was removed from the list of invited participants after they responded to say that they had not used online voting in an election. Excluding the removed participant, 61 local governments were invited to participate in the survey, 17 in Nova Scotia and 44 in Ontario. The survey was completed by 39 respondents and an overall response rate of 64% was achieved. There were 10 responses from Nova Scotia, 59% of the sample group in that province, and 29 responses from Ontario, 66% of the sample group.

Table II - Response Rate

Province	Total Possible Reponses	Surveys Completed	Response Rate
Nova Scotia	17	10	59%
Ontario	44	29	66%
TOTAL	61	39	64%

5.2. Online Voting Process

Local governments have used online voting in five separate general local government elections: 2003 (Ontario), 2006 (Ontario), 2008 (Nova Scotia), 2010 (Ontario), and 2012 (Nova Scotia). Respondents were asked to indicate what year their local government used online voting, and whether they used online voting only during the advanced polls, only during general election, or during both the advanced polls and general election day. For each of five online voting-enabled local government general elections, a very large majority of respondents (75%-100%) indicated that they used online voting during both the advanced polls and on general election day.

A number of local governments used online voting in more than one election; however, none of the local governments changed how they used online voting from election to election. For example, the local government that used online voting only during advanced polls in 2003, once again used online voting only during advanced polls in 2006 and 2010. This trend was consistent across all of the respondents. The data also revealed that one local government, Clare, Nova Scotia, used online voting in a general election, and then did not use online voting again in the

subsequent general election.

5.3. Change in Voter Turnout Rates

As mentioned previously in this report, the variables affecting voter turnout rates are difficult to isolate. Over half of the respondents (51%) found an increase in voter turnout rates since first adopting online voting. Of those, 11 respondents (28%) found turnout rates to be up significantly and 13 respondents (33%) found turnout rates to be up slightly. Over one-quarter of respondents (28%) noticed no change in voter turnout rates. Only three respondents (8%) indicated a slight decrease in voter participation rates. These are subjective measurements, and were not quantified using turnout rate ranges.

Table III - Change in Voter Turnout Rates

Response	Chart	Percentage	Count
Up Significantly		**28%**	**11**
Up Slightly		**33%**	**13**
No Change		**28%**	**11**
Down Slightly		**8%**	**3**
Down Significantly		**0%**	**0**
Not Sure		**3%**	**1**
	Total Respondents		**39**

5.4. Percentage of Votes Cast Online

Thirty-five respondents provided a percentage of votes cast electronically in the last general election. Fourteen respondents, a large minority (40%) said that they received 100% of the ballots in the last election electronically, which implies that they did not accept traditional paper ballots. Out of these fourteen respondents who received all of the ballots in the last general election electronically, 22% reported a significant increase in voter turnout rates, 50% found a slight increase and the remain 28% didn't notice any change in voter turnout rates since adopting online voting.

Excluding the respondents who did not accept paper ballots, ten respondents (47%) said they received between 60 – 79% of ballots electronically, and an addition ten respondents received 59% or less of the ballots in their last general election electronically. Only one local government reported receiving less than 20% of the ballots electronically and only one local government received more than 80% of the ballots electronically (See Table IV).

Out of those respondents who accepted paper ballots in their last general election, a large majority (81%) offered online voting during both advanced polls and on general election day. To ensure that eligible voters did not cast both an electronic and paper ballot, these local

governments would have had to use either a real-time, electronic voter list or a two-envelope online ballot system, where online ballots would only be counted if the voter did not also submit a paper ballot.

Table IV - Percentage of Votes Cast Online

Response	Chart	Percentage	Count
1 - 19%		5%	1
20 - 39%		24%	5
40 - 59%		19%	4
60 - 79%		47%	10
80 - 99%		5%	1
	Total Respondents		21 (18 Missing)

5.5. Security Issues or Incidents

The majority of respondents (92%) did not have any security related issues or incidents with online voting in a local government election. However, there were three respondents (8%) who described having security issues or incidents, of which the details and their resolution(s) are listed below.

- One respondent's local government experienced an issue with ineligible voters voting for a school board candidate. This was addressed in court and the judge ruled the election results invalid. A new election has been called using paper ballots only.

- Two respondents reported that online voting was interrupted for approximately one hour on the final day of voting due to system overload. One of those respondents indicated that they extended the voting period by one hour.

- One of the local governments who experienced the voting interruption also had an issue with electors' PINs being visible through mail-out envelopes. The PINs were canceled and reissued prior to the election.

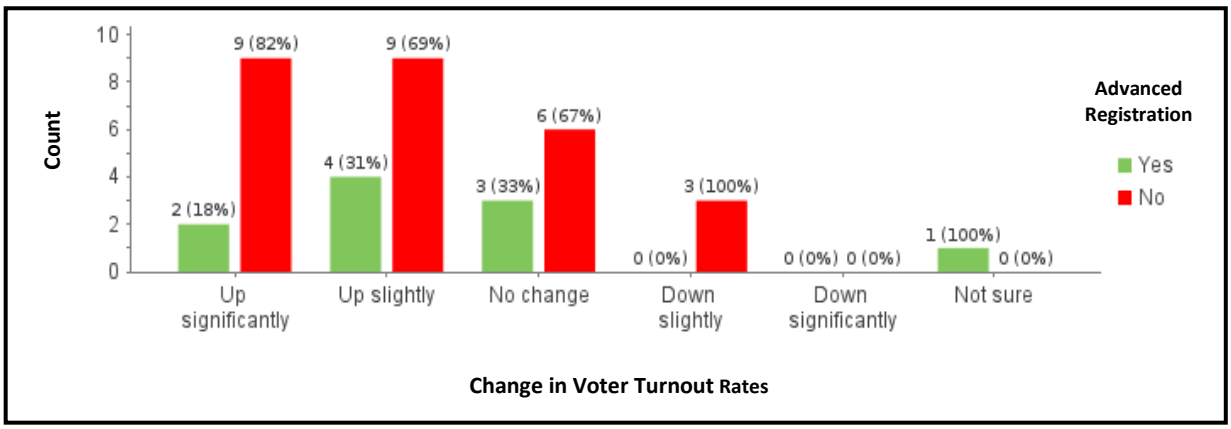
All of the security issues detailed administrative issues, rather than nefarious incidents. The design and administration of online voting systems can potentially mitigate the issues reported.

5.6. Advanced Registration

Almost three-quarters (73%) of respondents did not require voters to register in advance to be eligible to vote online. The remaining 27% did require respondents to register in advance to be eligible for online voting. Two respondents chose not to answer this question.

There appears to be a clear correlation between not requiring voters to register in advance and voter turnout rates (See Figure 1). Out of those respondents who answered both questions, 82% of those that reported a significant increase in voter turnout rates did not require preregistration. An additional 69% of those respondents that reported a slight increase in voter turnout rates did not require preregistration.

Figure 1 - Advanced Registration and Voter Turnout Rates



5.7. Authenticate Voter Identity

All of the respondents indicated that they used a PIN number, which was mailed to voters prior to the election, to authenticate the voters' identity. Two local governments also emailed PINs to voters prior to the election. The distribution of PINs prior to the election indicates that all of the local governments in Ontario and Nova Scotia who implemented online voting used a pre-existing voters list. Eight local governments (21%) also required voters to answer personal identifying questions (e.g. Birth Date). These local governments must have acquired an accurate list of personal voter information to be able to verify the personal identifying questions.

5.8. Cost

Respondents were asked to specify an approximate total cost for using online voting in the last general election. There were 33 respondents who gave an estimated total dollar amount. One local government gave an amount per elector, which has been excluded from the calculations. The maximum cost given is $600,000, the minimum is $3,500, and the average is $47,000. Respondents were not asked to report the cost per electorate; however, that measurement would have provided a more accurate basis from which to compare traditional paper ballot costs.

5.9. Cost Savings Realized

Respondents were asked if they realized any cost savings when online voting was adopted, to which 38 local government representatives responded. A slight majority (55%) indicated that their local government realized cost savings, while 45% indicated their local government had not. When cross-tabulated with the data on the frequency of online voting, cost savings were realized for 75% of respondents from local governments who used online voting only in advanced polls, 100% who used online voting on general election day only, and 56% who used online voting for both advanced polls and general election day.

Table V - Cost Savings Realized

	Advanced Polls Only		General Election Day Only		Both Advanced Polls and General Election Day	
	Yes	No	Yes	No	Yes	No
2003 (Ontario)	0	0	0	0	3	2
2003 (Ontario)	1	0	0	0	7	5
2008 (Nova Scotia)	0	0	0	0	1	2
2010 (Ontario)	1	0	2	0	13	9
2012 (Nova Scotia)	1	1	0	0	2	4
TOTAL	3 (75%)	1 (25%)	2 (100%)	0	26 (56%)	20 (44%)

All of the respondents who reported cost savings elaborated upon how the cost savings were realized: 90% mentioned reduced staffing costs, 38% described reduced printing costs, and 28% discussed reduced poll location rental costs. One respondent said that postage costs were reduced, presumably when compared to conducting elections using postal ballots. One respondent described cost savings realized because of competitive online voting vendor pricing, which they suggested might not be offered in future elections.

Local governments that completely replace physical polling stations with online voting will likely realize cost savings associated with eliminating physical polling stations: a majority of the respondents (79%) who indicated that they only accepted electronic ballots in the last general election reported that they realized cost savings since adopting online voting.

5.10. Communication

Communication about the opportunity to vote online is an important factor influencing the level of uptake from the electorate. The responses to the question of how local governments communicated to the public about online voting indicate that most local governments used a variety of media to communicate about online voting (see table VI): newspaper advertisements (95%), distributed print material by mail (92%), website advertisements (84%), and radio

advertisements (61%). Only three of the respondents used television advertisements (8%), eight used public presentations (21%), and three used social media (8%).

Table VI – Communication

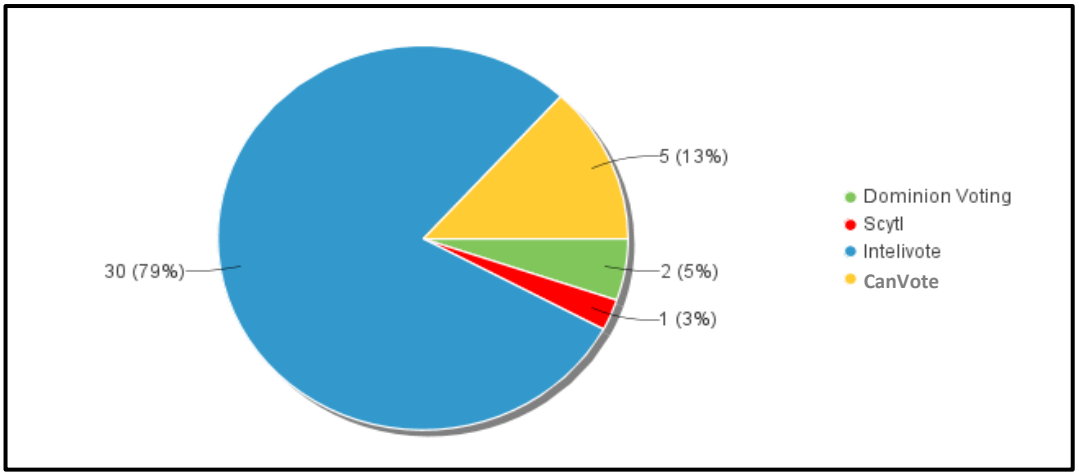
Response	Chart	Percentage	Count
Television Advertisements		8%	3
Mail out		92%	35
Newspaper Advertisements		95%	36
Website Advertisements		84%	32
Radio Advertisements		61%	23
Public Presentations		21%	8
Social Media		8%	3

5.11. Online Voting System Vendor

Out of the 38 respondents who answered the question about online voting vendor selection, a large majority (79%) collaborated with Intellivote Systems Inc. (90% of Nova Scotia respondents; 72% of Ontario respondents). The remaining Nova Scotia respondents selected Scytl. In Ontario, five respondents (13%) chose CanVote and two (5%) chose Dominion Voting (See Figure 2).

Online voting dissenters argue against the privatization of democratic processes (see Literature Review section). In Ontario and Nova Scotia, only private online voting software vendors have been used, as opposed to developing a publically owned voting platform. In addition, out of the four software vendors selected by survey respondents, only two are Canadian companies: Intellivote (Nova Scotia) and CanVote (Ontario).

Figure 2 - Online Voting Vendor



5.12. Future Use of Online Voting

Respondents were asked if their local government planned to use online voting in the next general election and, if so, whether they planned to use online voting during advanced voting only, general election day only, or for both advanced polls and general election day. A large majority, 30 respondents (79%), indicated that their local government planned to use online voting in both advanced polls and on general election day. One respondent (3%) indicated that their local government would be using online voting only during advanced polls, and one respondent (3%) indicated that their local government would be using online voting only on general election day.

Respondents who answered "no" or "not sure" to whether their local government planned to use online voting in the next general election were asked to provide more details. There were five responses, listed below:

- One respondent said that they would not be using online voting because online voting increased the cost of administering an election and they had not experienced an increase in voter turnout rates.

- One respondent said that Council would decide whether to continue using online voting based on the experience of having to hold a repeat election after a court decision ruled the results of the online election invalid because ineligible electors voted for a school board candidate.

- Three respondents indicated that their local government council had not yet made a decision on whether to use online voting in the next general election, and that the decision would be forthcoming prior to the next general election.

The detailed responses indicated that the continuing use of online voting depends upon the elected officials' perception of the local government's previous experience with online voting.

Table VII - Future Use of Online Voting

Response	Chart	Percentage	Count
Advanced Polls Only		**3%**	**1**
General Election Day Only		**3%**	**1**
Both Advanced Polls and General Election Day		**79%**	**30**
Not Sure		**13%**	**5**
No		**3%**	**1**
	Total Responses		**38**

5.13. Key Advantages of Online Voting

When asked about the key advantages of online voting, respondents provided a wide range of answers. Out of the 36 respondents to this question, well over half (62%) indicated that a key advantage of online voting is improved accessibility for voters: twelve (33%) mentioned absentee voters, six (17%) mention voters with disabilities, and two (6%) mentioned voters experiencing inclement weather. Increased convenience for voters, specifically the increased hours that polls are open and the ability to vote from a remote location, was mentioned by 21 respondents (56%). Reduced commitment of staff time, including reduced administrative work for existing staff as well as less need to hire and train poll workers, was listed by 17 respondents (45%). Over one-third of respondents (40%) listed improved accuracy and/or speed of results calculation. While other advantages listed by respondents include:

- Reduced costs
- Increased voter turnout rates
- Increased youth participation
- Improved ballot quality (elimination of intentionally or unintentionally spoiled ballots)
- Reduced environmental impact
- Improved audit process
- Availability of a Candidate Module (updates of eligible voters)

The key advantages overwhelmingly have to do with either reducing the barriers to participation for voters or increasing the ease of election administration.

5.14. Key Disadvantages of Online Voting

Respondents were asked to list the key disadvantages of online voting. The themes identified in the answers are varied. Out of the 34 answers, half of the respondents (50%) identified managing user concerns as a key disadvantage of online voting. Nine of the respondents, close to one-third, listed potential issues with voting technology. Other key disadvantages listed include:

- Potential voter fraud
- Unequal elector access (digital divide)
- Loss of the polling station/paper ballot experience
- Voter list inaccuracy

The key disadvantages are predominately concerns about the online voting technology. Well-managed public communication, voting system design and implementation may address most of the key disadvantages listed.

5.15. Recommendations for Local Governments Considering Online Voting

When asked if the survey respondents had any recommendations or suggestions for local governments considering adopting online voting, 12 respondents explicitly endorsed implementing online voting (44%). For example, one survey respondent wrote:

"Where budgets permit, governments should embrace this technology as an added tool, an added level of service, and accessibility for the citizens of our communities."

In addition to these prevalently positive endorsements, the 27 respondents to this question also gave a wide variety of other recommendations, including:

- Acquire an accurate voters list
- Ensure all legal requirements have been met
- Eliminate paper ballots
- Compare online voting software vendors
- Seek advice from other local governments
- Conduct an external security audit
- Create procedures to cover all eventualities

Other respondents stressed the importance of public communication and voting assistance: communicate early to the public (22%), engage seniors specifically (11%), and set up computer-enabled stations to assist voters (18%).

The recommendations offer valuable insight into successful procedures, as well as suggestions of how to overcome or avoid issues.

6. DISCUSSION & RECOMMENDATIONS

Overall, the survey respondents positively endorse online voting. In addition to revealing aspects of online voting that are considered advantageous, the survey results also outline issues to be aware of when considering implementing online voting. Many of the respondents made suggestions of ways to address these issues. The survey results, along with information gathered in the jurisdictional scan and the literature review, form the basis of the following recommendations.

Given the existing legislative constraints to implementing online voting, the applicability of the recommendations for local governments is contingent on the provincial government pursuing legislative changes to allow online voting. In addition, the recommendations of Independent Panel on Online Voting have been taken into consideration where applicable.

The Independent Panel recommendations prescribe a role for a non-partisan, independent office, in implementing a province-wide coordinated approach to online voting in local government elections, and in establishing a technical committee to support jurisdictions that pursue online voting. The idea of an external, supportive entity's involvement in assisting local governments to implement online voting has been incorporated into the recommendations. Finally, the applicability of these recommendations will depend on the permissiveness of any forthcoming *LGA* legislative amendments.

6.1. Cross-Jurisdictional Collaboration

The cost of procuring online voting technology may be prohibitive for many local governments and self-governing First Nations, particularly if online voting is offered in addition to traditional polling methods. Furthermore, the Independent Panel recommends limiting online voting to electors with accessibility issues. Limiting the poll of eligible voters will make it impossible for many local governments to justify the cost of online voting on a per ballot basis. However, there is potential for collaboration and cost sharing amongst local governments and self-governing First Nations.

The *LGA* allows local governments to conduct elections on behalf of other jurisdictions (*Section* 402 (2)). Local governments could conduct the online portions of an election on behalf of another local government. Regional districts may also play a role in administering online voting on behalf of their member municipalities and self-governing First Nations. It may also be possible to jointly procure the online voting system and enter into a cost-sharing agreement.

In addition to mutually beneficial cost-sharing, cross-jurisdictional collaboration would have the benefit of creating a multi-jurisdiction common voting experience. Those that move from one jurisdiction to the next between elections would be familiar with the common voting platform used. Sharing a common voting system would also avoid confusion for electors eligible to vote in

more than one jurisdiction because of absentee property ownership.

If online voting is made possible, limited to particular voters or not, the potential for cross-jurisdictional collaboration may make delivering online voting possible for many budget conscious governments in BC.

6.2. Phased Implementation

Phased implementation will allow administrators to test logistics, security risks and public experience prior to full-scale implementation. Referenda or by-elections, which typically experience very low voter turnout rates in BC, provide an opportunity to conduct pilot studies on a comparatively small scale. Local governments may currently use online voting during non-binding referenda as a means of piloting online voting. Alternatively, phased implementation could mean limiting the number of eligible voters based on particular parameters. The Independent Panel recommends that online voting be "limited to those with specific accessibility challenges." Using the existing mail ballot voting eligibility requirements (*LGA s. 100*) would be a logical way of limiting access to voters with accessibility challenges, including electors with disabilities, electors who live in remote locations and electors who are abroad at the time of the election.

If online voting were limited to mail ballot voters, the existing pre-registration process would provide an opportunity to obtain personally identifying information that can later be used to verify voter identity. For example, Queensland, AU, and Edmonton ask electors to create a secret password during registration process that they will be required to enter at the time of voting to verify their identity.

Phased implementation will also give local governments the opportunity to develop proactive procedures. Survey respondents recommended that local governments implementing online voting plan for all eventualities. Although survey respondents from Ontario and Nova Scotia did not report any serious security issues experienced with online voting, it would be prudent to plan for all possible issues and create appropriate procedures to deal with them. Depending on the permissiveness of the local government legislation, there may be some leeway to develop and implement local government specific procedures. For example, based on the experience in 2010 of the unintentional vote interruption in 33 Ontario local government elections, local governments may wish to communicate clearly to staff and the public the procedure that will be implemented if, for whatever reason, voting is interrupted.

In pilot studies, as in full-scale implementation, reducing the number of physical polling stations will help to offset some of the cost of the online voting technology. Survey respondents found that there were cost savings realized due to reduced staffing costs, printing costs, and rental costs. However, some voters will wish to vote using paper ballots and, as discussed in the Literature Review, there is social value in providing physical polling stations. Providing a choice between

voting methods may also help to alleviate some of the concerns surrounding voter coercion and online voting security.

6.3. Province-Wide Online Voting Platform Procurement

If the *LGA* is amended to allow for online voting, the provincial government will have an opportunity to influence how voting platform procurement is undertaken through the wording of the legislation: direct local government procurement or provincial government procurement on behalf of local governments.

Local governments in BC currently procure vote tabulation systems through independently managed request for proposal processes. Local government in both Ontario and Nova Scotia are given the same degree of autonomy when procuring online voting systems. BC local governments could go to the open market to find an online voting vendor with which they wish to partner. This would ensure local governments are able to choose the platform that met their specifications and their budget. However, without the support of the provincial government, the cost of procuring an online voting platform may be prohibitive for many local governments.

The Independent Panel report includes the recommendation that a technical committee be established to provide external oversight of local government online voting platform procurement. There is a variety of procurement models from which to choose. The provincial government may direct the technical committee to:

- **Create a pre-approved list of vendors –** The technical committee could be tasked with evaluating online voting systems to create a pre-approved software vendors list. West Virginia used this method of standardization across counties in 2010. Creating a pre-approved voters list would ensure common standards are met for security measures, server capacity, voter authentication processes and transparency.

- **Partner with an existing online voting system vendor** – The provincial government could issue a request for proposals to procure the services of a private sector voting software vendor on behalf all interested local governments in BC. The technical committee could be involved in reviewing the proposals and recommending the successful proponent. Norway pursued this option by collaborating with Scytl to administer online voting in their local government pilot project. The size of this contract would create competitive pricing among voting vendors; as well, economy of scale would reduce the overall price of the vendor contract.

- **Support local government(s) to develop a public online voting system** – The provincial government could provide funding to a local government to enable them to commission the development of an online voting system, which could then be shared amongst other local governments. The technical committee could have a role in supporting the development of the online voting system. This is the model used in Switzerland; the Swiss federal government

supported the Canton of Geneva to develop an online voting system, which they later made available to other Cantons. This model is less paternalistic than direct procurement and supports local governments to collaborate across jurisdictional boundaries.

- **Develop a public online voting system** – The provincial government could emulate Estonia and Australia by developing a publically funded online voting system that would be made available to local governments. The technical committee could oversee the platform development. Moreover, if a publicly owned voting system were developed, it would be possible to publish the source code to increase transparency and provide an opportunity for the public to test the system prior to implementation.

The provincial government has an opportunity to create a common experience for voters across BC by standardizing the voting platform through one of the procurement options outlined above. Whichever option is selected, the communication with the public about the opportunity to vote will have a significant impact on voter uptake. The provincial government could also assist by conducting a voter education campaign. Survey respondents listed managing voter concerns as a key disadvantage of implementing online voting. Consistent, province-wide messaging about online voting system specifications, security measures, and voting processes would help to alleviate voter concerns.

7. CONCLUSION

CivicInfo BC is an information service for local government staff and elected officials. As part of this role, CivicInfo BC staff work to maintain a repository of information on current local government sector topics. In the past, self-governing First Nations have considered implementing online voting. In addition, a number of local governments have explored the option of implementing online voting, only to be limited by the existing legislation. In 2012, when the provincial government directed Elections BC to convene an Independent Panel to review the topic of online voting, the issue again gained salience. The Independent Panel released their Recommendations Report to the Legislative Assembly in February 2014. Whether or not the provincial government chooses to amend the *LGA* to allow for online voting in local government elections at this time, CivicInfo BC members will be monitoring this topic as it evolves over time.

Jurisdictions in Europe, Australia, and the United States have been online voting forerunners. The examples included in this report possess qualities that make them similar to BC: democratic tradition, low voter turnout rates, and a cultural shift towards increasing technological fluency. Each of these jurisdictions demonstrates procedural difference in how they have approached online voting. BC local governments and self-governing First Nations have an opportunity to learn from this wide variety of experiences with online voting.

In addition to international examples of online voting from which to learn, Canadian local governments have conducted the highest volume of elections using online voting in the world. Local governments in Ontario and Nova Scotia have acquired an incredible amount of collective experience with online voting in local government elections.

To gain a better understanding of Canadian local governments' experiences with online voting, a survey was developed and distributed to local governments in Nova Scotia and Ontario, which have conducted online voting in one or more local government elections. Online voting was used in 2003, 2006, and 2010 local government elections in Ontario, and in 2008 and 2012 in local government elections in Nova Scotia. Altogether, 61 local governments in Canada (44 in Ontario and 17 in Nova Scotia) have conducted binding elections using online voting. The survey was open for three weeks, two weeks in November-December and one week in January. Out of the 61 local government representatives invited to participate in the survey, 39 responses were received. An overall response rate of 64% was achieved.

Once the survey data were coded and cleaned of any identifying information, a series of frequency counts and cross-tabulations were performed. The results provided an overview of the Canadian local government experience with online voting. More specifically, the results showed trends in how online voting has been implemented in Canadian jurisdictions. In addition to identifying the common administrative processes selected, the survey results also revealed information about the impact on voter turnout rates and costs of implementing online voting. Survey respondents were also asked to outline the key advantages and disadvantages of implementing online voting, and

make recommendations for other local government administrators considering implementing online voting.

The survey results, literature review and jurisdictional scan informed the recommendations put forward at the end of this report. The applicability of the recommendations is dependent upon the provincial government making changes to the *LGA* to allow local governments in BC to pursue online voting. The recommendations from the Independent Panel are the best available source of information on what factors the provincial government will take into consideration when debating whether to allow online voting. The recommendations are based on the current provincial government circumstances:

- Cross-jurisdictional Collaboration
- Phased Implementation
- Province-Wide Voting Platform Procurement

It is likely that someday the provincial government will choose to amend the legislation that governs local government elections to allow for online voting; however, given the conservative nature of the Independent Panel's report, it is unlikely that this will happen in the immediate future. In the meantime, this report will provide useful insight for self-governing First Nations, who have an opportunity to become forerunners in online voting in BC, as they weigh the many procedural choices they will be obliged to make. As well, the information in this report may be useful for local governments who wish to advocate for online voting. When the *LGA* is to allow for online voting, adopting some or all of the recommendations will allow local governments to conduct cost effective, consistent online voting enabled elections.

APPENDIX A: ONLINE VOTING IN LOCAL GOVERNMENT ELECTIONS SURVEY

Welcome to the Online Voting in Local Government Elections Survey

Thank you for your interest in participating in this survey regarding Online Voting in Local Government Elections. As you may know, British Columbia has recently convened an Independent Panel to examine opportunities and challenges of internet-based (online) voting for provincial and local government elections. The provincial government will consider their findings sometime in 2014. The information you provide will be useful to British Columbia local government election administrators if online voting is possible in future local government elections.

Professionals from Nova Scotia and Ontario local governments are invited to answer questions pertaining to their experience with implementing online voting. The survey will take approximately **15 minutes** to complete. It is divided into sections that cover voter turnout, security, costs, public communication, and recommendations.

Participation in this survey is **completely voluntary**. Please be assured that all answers you provide will be confidential.

This research is being carried out with a not-for-profit municipal agency called CivicInfo BC, which is an information sharing service for British Columbia's local government sector. CivicInfo BC may distribute some of the findings of this survey to local government administrators in British Columbia.
Do you consent to participate in this study?

○ Yes ○ No

Voter Turnout

What year(s) did your local government use online voting during a general election?

Please only select the options that pertain to your local government and indicate whether online voting was used in advanced polls only, on general election day only, or both.

	Advanced Polls Only	General Election Day Only	Both Advanced Polls and General Election Day
2003 (Ontario)	○	○	○
2006 (Ontario)	○	○	○
2008 (Nova Scotia)	○	○	○
2010 (Ontario)	○	○	○
2012 (Nova Scotia)	○	○	○

In your last general election, what percentage of votes received were cast electronically?

[ ] %

Have you noticed any changes in voter turnout rates since first adopting online voting?

- ○ Up significantly
- ○ Up slightly
- ○ No change
- ○ Down slightly
- ○ Down significantly
- ○ Not sure

Security

In the last general election, did your local government require voters to register in advance to be eligible to vote online?

- ○ Yes
- ○ No

In the last general election, which of the following methods were used to authenticate online voter identity?

- ☐ Mailed Personal Identification Numbers
- ☐ Emailed Personal Identification Numbers
- ☐ Digital Signatures
- ☐ Personal Identifying Questions (e.g. Birthday)
- ☐ Other, please specify... _____

Has your local government experienced any online voting related security issues or incidents?

- ○ Yes
- ○ No

Please describe the issue(s)/incident(s) and the resolution to the issue(s)/incident(s).

[ ]

Vendor

In the last general election, with which online voting vendor did your local government partner?

- ○ Dominion Voting
- ○ Scytl
- ○ Electoral Software and Systems (ES&S)
- ○ Intellivote
- ○ Other, please specify... _____

Cost

In the last general election, how much did online voting cost your local government?

Please give an approximate dollar amount

Overall, did your local government realize any election cost savings when online voting was adopted?

- ○ Yes
- ○ No

Please describe the costs savings realized when online voting was adopted.

Communications

In the last general election, how did your local government communicate to the public that online voting was available to them?

- ☐ Television Advertisements
- ☐ Mailout
- ☐ Newspaper Advertisements
- ☐ Website Advertisements
- ☐ Radio Advertisements
- ☐ Other, please specify... _____

Future Use of Online Voting

Does your local government plan to use online voting in the next general election?

- ○ Advanced Voting Only
- ○ General Election Day Only
- ○ Both Advanced Polls and General Election Day
- ○ Not Sure
- ○ No

Please explain why your local government does not plan to use online voting in the next general local government election.

Recommendations

Overall, what are the key advantages of adopting online voting?

Overall, what are the key disadvantages of adopting online voting?

Do you have any suggestions or recommendations for local governments that may be considering adopting online voting?

APPENDIX B: INVITATION TO PARTICIPATE

Dear <Full Name>,

I am writing to invite you to participate in a short survey related to your local government's experience with online voting. As the final requirement of my graduate degree in Public Administration from the University of Victoria, I am researching the topic of Online Voting in Local Government Elections. I am working with a not-for-profit municipal agency called CivicInfo BC in researching this topic.

Your answers will be very helpful for administrators and elected officials if online voting is made possible in future local government elections in British Columbia. The survey should take approximately 15 minutes and will include questions about voter turnout, security, cost, vendors, and communications.

Please follow the link below to complete this survey at a time that is convenient to you. The survey will be closed on December 13th. If you have any questions, please do not hesitate to contact me.

THE SURVEY MAY BE ACCESSED HERE: http://surveys.civicinfo.ca/surveys/civicinfo/online-voting/

This link is uniquely tied to this survey and your email address. Please do not forward this message.

Thank you in advance for your time.

Sincerely,
Paige MacWilliam
Research and Information Officer
CivicInfo BC | www.civicinfo.bc.ca
7th Floor - 620 View Street
Victoria BC, V8W 1J6

Participant Consent
Because this survey is part of a Masters Project in the School of Public Administration at the University of Victoria, it has been approved by the university's Human Research Ethics Board. The following sections are required by the Board to give you information about the survey itself.

Project Rationale
British Columbia has recently convened an Independent Panel to examine opportunities and challenges of internet-based (online) voting for provincial and local government elections. The provincial government will consider their findings sometime in 2014 and may choose to allow online voting in British Columbia local government elections.

How You Have Been Selected

You are being asked to participate in this study because of your involvement with online voting in one or more local government elections in Nova Scotia or Ontario.

What is Involved if You Participate

Participants who agree to voluntarily participate in this research will complete a web-based survey, which is designed to take approximately 15 minutes. The survey will close on December 13th, 2013.

Potential Inconvenience to You

Participation in this study may cause some inconvenience to you, including the time you spend on the survey. However, there are no known or anticipated risks to you by participating in this research.

Voluntary Participation

Your participation in this research must be completely voluntary. If you decide to participate, you may withdraw at any time without any consequences or any explanation. If you do withdraw from the survey, any data you have submitted will be impossible to remove from the database given that the survey information is collected anonymously.

Dissemination of the Results

A report will be prepared based on the responses to this survey. Sections of the report will be distributed to local government administrators and elected officials through CivicInfo BC, an information sharing service for British Columbia's local government sector.

The final project report will be publicly available once it has been published on the University of Victoria's Research and Learning Repository. You may search for this project, using my name or the title of the report as search terms, once the report is complete by accessing https://dspace.library.uvic.ca:8443/handle/1828/1012.

Disposal of the Survey Data

All of the data will be stored on a password protected, secure server located in Canada until April 2014.

Contact Details

Individuals who may be contacted regarding this study include:

Paige MacWilliam, Principal Investigator
CivicInfo BC | 250-383-4898
pmacwilliam@civicinfo.bc.ca

Dr. Jim McDavid, Professor
University of Victoria | 250-472-4293
jmcdavid@uvic.ca

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250 472-4545 or ethics@uvic.ca).

Implied consent if you complete the survey

By completing and submitting the questionnaire, your free and informed consent is implied and indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

APPENDIX C: ONLINE VOTING IN CANADIAN MUNICIPALITIES

Table CI - Online Voting in Nova Scotia and Ontario Local Government Elections

	Ontario		Nova Scotia	Ontario	Nova Scotia
	2003	2006	2008	2010	2012
1	Champlain	Addington- Highlands	Berwick	Addington-Highlands	Argyle
2	Clarence- Rockland	Agusta	Clare**	Arnprior	Bridgewater
3	East Hawkesbury	Champlain	Halifax	Agusta	Cape Breton
4	Hawkesbury	Clarence-Rockland	Stewiacke	Belleville	Chester
5	Markham	Cobourg	Windsor	Brockton	~~Clare~~**
6	North Dundas	East Hawkesbury		Brockville	Digby (district)
~~7~~	~~North Glengarry~~*	Ewardsburgh/Cardinal		Burlington	Digby (town)
8	North Stormont	Hawkesbury		Carling	East Hants
9	South Dundas	Markham		Champlain	Halifax
10	South Glengarry	North Dundas		Clarence-Rockland	Kentville
11	South Stormont	North Stormont		Cobourg	Middleton
12	The Nation	Perth		East Hawkesbury	Stewiacke
13		Peterborough		Ewardsburgh/Cardinal	Truro
14		South Dundas		Elizabethtown-Kitley	Victoria
15		South Fortenac		Greenstone	Windsor
16		South Glengarry		Hawkesbury	Yarmouth
17		South Stormont		Huron-Kinloss	
18		Tay Valley		Huntsville	
19		The Archipelago		Laurentian Valley	
20		The Nation		Leeds – Thousand Islands	
21				Markham	
22				McNab/Braeside	
23				Mississippi Mills	
24				Montague	
25				North Dundas	
26				North Grenville	
27				North Stormont	
28				Pembroke	
29				Perth	
30				Peterborough	
31				Port Hope	
32				Prince Edward	
33				Renfrew	
34				South Bruce	
35				South Dundas	
36				South Frontenac	

37				South Glengarry	
38				South Stormont	
39				Stratford	
40				Tay Valley	
41				The Archipelago	
42				The Nation	
43				West Elgin	
44				Whitewater	

List adapted from the list created by Goodman (Issues Guide: Internet Voting, 2012).

*North Glengarry, Ontario, indicated that they had not used online voting.

**Clare, Nova Scotia, indicated that they used online voting in 2008, not 2012.

APPENDIX D: BC LOCAL GOVERNMENT ELECTION PROCEDURES

Table DI - Local Government Election Procedures (Independent Panel, 2013, p.7)

Frequency	3 –year (general elections); by-elections as required
Elected Offices	• Municipal (mayor and council) • Regional Districts (electoral areas) • Park Boards • School Boards (trustees) • Islands Trust (trustees)
Number of positions filled	~ 1,650 individuals to ~250 government bodies
Administered by	~ 190 local governments (Chief Election Officers appointed by council or board)
Funded and budget set by	Local governments
Legislation	*Local Government Act, Vancouver Charter*
Voters list used	Subsets of provincial voters list; OR local government voters list; OR No voters list (election day registration)
Vote by mail	At discretion of local government
Advanced Voting	1 day (consistent across province) 1 additional day for communities over 5000 (day and time set by local government); Additional days at discretion of local government)
Special Voting Opportunities	At discretion of local government (inside or outside jurisdictional boundaries)
Qualifications to vote	Resident elector: • 18 years of age or older • Resident of the jurisdiction where intend to vote for 30 days • Resident of BC for at least 6 months • Registered as a voter • Not disqualified by law from voting Non-resident property elector: • Canadian citizen • 18 years of age or older • Have owned property in the jurisdiction where intend to vote for at least 30 days • Resident of BC for at least 6 months • Registered as a voter • Not disqualified by law from voting

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