INTERNET **VOTING**

in the Québec Context: A Study

élections Québec

Introduction

Background to the study

On June 6, 2018, Québec's National Assembly adopted Bill 185, *An Act to defer the next general school election and to allow the Government to provide for the use of a remote voting method*. During the special consultations on this draft legislation, and in his remarks to the Committee on Institutions the previous year (2017), the Chief Electoral Officer proposed studying the partial or complete introduction of Internet voting for provincial, municipal and school elections.

Following those consultations, the National Assembly unanimously passed a motion on June 14, 2018, in which the Chief Electoral Officer was mandated to conduct a study for the purpose of proposing a remote voting system within the space of two years.[1]

In spring 2019, the Québec government announced plans to do away with school elections in the province. Subsequently, the Chief Electoral Officer refocused his mandate on studying Internet voting in the Québec context.

This study, here summarized, is designed to shed a comprehensive and neutral light on the advantages and disadvantages of partially or completely introducing remote Internet voting for provincial, municipal and school elections in Québec.

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1. National Assembly of Québec, *Procès-verbal de l'Assemblée*, June 14 2018, p. 4801 (French only).

Remote Internet voting

The study focuses exclusively on remote Internet voting, i.e. voting that takes place in locations other than polling stations using Internet-connected devices such as computers, electronic tablets or smartphones.

Under a remote Internet voting procedure, electors would no longer need to travel to cast their ballots. All voting-related steps would be carried out online: identifying electors, marking ballots and counting votes. The introduction of Internet voting in Québec could improve access to voting for many electors, including persons outside Québec or their municipality when the election is held, persons in remote regions and persons with disabilities. For the electorate as a whole, remote Internet voting would offer greater flexibility regarding thetime and place of voting, as well as the option used.

Internet voting, however, raises a number of issues. The fact that voting takes place remotely in an unsupervised environment poses a risk to the freedom and confidentiality of the vote. It also makes verifying electors' identity more difficult. Dematerializing and centralizing the voting procedures also raise issues regarding the integrity of the electoral process and of the results. Internet voting also leads to a loss of transparency: other voting options are easier to observe and understand.

Presenting the study

The study gauges the potential effects of introducing Internet voting within Québec's electoral system, in particular its impact on core democratic voting principles and the current legal framework. It also addresses issues regarding the introduction of Internet voting based in part on experiences involving this technology in other parts of Canada and around the world. The study presents the risks associated with Internet voting and available mitigation mechanisms. It highlights the results of Élections Québec's consultations with Quebecers aimed at evaluating the social acceptability of Internet voting and

at identifying stakeholders' expectations and concerns regarding this new voting option. In addition, the study explores different perspectives on introducing this voting option and provides guidelines for further reflection, together with recommendations on developing a scenario for the introduction of Internet voting in Québec.

Democratic voting principles

A government's authority and legitimacy are based on the will of electors casting their votes freely by secret ballot as part of an accessible, egalitarian, transparent and honest electoral process. These core democratic voting principles are reflected in the spirit of Québec's electoral legislation and its electoral procedures. Forming the basis for international standards, these principles are promoted by numerous intergovernmental and non-governmental organizations, including the United Nations. Before any new voting option is introduced, it must be assessed in terms of its adherence to these principles. These principles, then, represent the cornerstone of the study and guided the analyses carried out within it.

Accessibility

An accessible electoral system is one that is equitable and within reach of all voters. The right to vote can be exercised under equal conditions, without discrimination. All voters can exercise this right autonomously.

Free exercise of the right to vote

Electors can exercise their right to vote without influence or constraint. They enjoy complete freedom and independence of mind, belief, opinion and expression of their personal will.

Secrecy of the vote

Each vote is cast anonymously and cannot be matched to a given voter.

Integrity of the process and of the election results

The election results are a true reflection of the voters' will. The identity of each elector is duly verified; each elector is entitled to cast only the legally allowed number of votes and their vote cannot be modified in any way.

Transparency of the electoral process

Voters and other election stakeholders can monitor the integrity of each step in the electoral process. They understand how the process functions and can ensure that effective verification mechanisms are in place.

The introduction of remote Internet voting poses certain challenges regarding adherence to these core principles. The Venice Commission, of which Canada is a member, developed a set of legal, operational and technical standards for Internet voting designed to ensure adherence to democratic voting principles. These international standards should be taken into account whenever the prospect of Internet voting in Québec is being considered.

Throughout the study, we present various ways in which adherence to these democratic principles could be ensured during the introduction of Internet voting in order to maintain or strengthen electors' trust in the electoral process.

Voting options in Québec

Internet voting is of interest primarily because it could make it easier for electors to exercise their right to vote. The prospect of the introduction of this option ties in with evolving trends in Québec's electoral legislation aimed at making voting ever more accessible. For example, a number of measures were gradually introduced to make voting easier and to boost turnout. This was achieved without compromising the integrity of the electoral process, thanks in particular to the creation of a permanent list of electors and the verification of electors' identity when they vote.

Québec's electoral legislation currently includes measures designed to ensure polling station accessibility and to provide special assistance to voters unable to mark their own ballots. While the option of voting in advance polls is a longstanding feature of Québec's electoral legislation, it was previously reserved for certain groups. Back in the 2000s, advance poll voting was made more democratic: all electors are now able to vote in advance, with no restrictions.

During provincial elections, various voting options are made available to certain categories of electors to make up for obstacles they may encounter when voting, i.e. living in isolated areas or mobility problems. All electors can vote at the office of the returning officer, even those who are temporarily absent of their electoral division. In addition, polling stations are set up in vocational training centres and post-secondary educational establishments to enable electors enrolled as students to vote for a candidate in the electoral division in which they are domiciled.

The *Election Act* provides for the organization of polling stations in residential and long-term care centres (CHSLDs), as well as in certain private residences for seniors. Mobile polling stations are available for voters with health-related mobility issues, whether they reside at home or in a hospital, rehabilitation centre or residential facility. Voters in certain isolated communities or work camps can also take advantage of mobile polling stations to cast their ballots. Voting by mail is also available to electors who are outside Québec or are housed in provincial and federal detention centres or youth centres, in addition to electors in isolated communities or work camps.

A number of measures aimed at facilitating the voting process have also been brought in over the years for municipal and school elections, although to a lesser extent than for provincial elections.

Surveys of Québec voters show that making multiple voting options available over a period of several days contributes to their level of satisfaction. That might explain the gradual shift away from voting on Election Day to alternative voting options: in the most recent provincial election, over one-quarter of the electorate took advantage of those options.

At times, the prospect of Internet voting is raised with a view to boosting turnout. However, data and research studies show that, generally speaking, introducing a new voting option is not an effective way of boosting turnout. As with other voting options, Internet voting should rather be regarded as a way to facilitate the participation of electors wishing to exercise their right to vote.

If Internet voting is introduced in Québec, a decision will have to be made as to whether it will apply to the electorate as a whole (i.e. with a view to providing greater flexibility regarding the time and place of voting), or only to certain groups for whom exercising their right to vote remains more difficult. The latter option is often favoured when bringing in new voting options in Québec. However, a balance must be struck between ensuring access for the largest possible number of voters and imposing reasonable constraints designed to ensure the integrity and security of the electoral process.

In light of the widespread availability of access and extensive Internet use, it is safe to assume that the vast majority of electors already have the required tools and abilities for online voting. Nevertheless, a certain percentage of voters would be unable to take advantage of this option. For that reason, Internet voting should be introduced in addition to the existing voting options.

Internet voting would enhance the range of options currently available to electors wishing to exercise their right to vote. However, significant changes would be required since elections are currently conducted using paper ballots only. In addition, with the exception of voting by mail, all ballots are cast in the presence of election officers tasked with verifying voters' identity and ensuring compliance with the various provisions of Québec's electoral legislation.

Electronic voting in Québec

The introduction of Internet voting in Quebec would place technology at the heart of the electoral process, whereas online technology is only used to a limited extent during elections in Québec. That has not always been the case: in municipal elections in the early 2000s, a number of municipalities tried out electronic voting devices (electronic ballot boxes and voting terminals). Until 2003, the outcomes were mostly positive, not only for electors but also for returning officers. In the latter case, the main advantage of electronic voting was the reduction in the number of election officers required, compared to traditional polling stations. However, the expected benefits in terms of rapid reporting of election results did not materialize and there were no significant cost-related advantages.

Problems during the 2005 general municipal elections led to the suspension of electronic voting trials. During those elections, a number of significant failings were observed, in particular system breakdowns as well as difficulties transmitting results or producing lists of electors who had voted. Consequently, the Chief Electoral Officer imposed a moratorium on any new requests to use electronic voting. In December 2006, the adoption of the *Act to again amend various legislative provisions respecting municipal affairs* suspended all

agreements authorizing electronic voting trials in Québec municipalities. Discussions regarding Internet voting in Québec must consider the lessons learned from those experiences. For example, rigorous standards and technical specifications should be established, roles and responsibilities should be clearly shared between stakeholders and independent audits should be conducted.

Internet voting in Canada and around the world

Internet voting has been tried out or implemented in various locations worldwide since the turn of the millennium. Few countries, however, have adopted it definitively. A number of countries that conducted trials decided to rule out the option permanently (Norway) or temporarily (France). Internet voting is used in some jurisdictions, where it has generally proved free of major problems; they include Estonia, the Swiss cantons and New South Wales (Australia), as well as a number of Canadian municipalities and the Northwest Territories.

These cases reflect the scale of the challenges that must be addressed when applying core democratic voting principles in a digital environment. The way Internet voting is implemented vary from place to place, for example as regards to the type of elections during which the option is available, the electors who stand to benefit, the development model used for the online voting platform, and the procedures used for registering voters and verifying their identity. Based on similar features and on some difficulties experienced, a list of findings can be drawn up from these cases to shed light on best practices for the introduction of Internet voting.

Gradual and limited approach

Internet voting is usually brought in gradually, in part to limit related risks. Sometimes pilot projects are used: Internet voting may be available at first for local elections (e.g. Estonia and Norway) or offered only to certain groups. Sometimes the option is restricted to persons who face voting-related obstacles, primarily those who have disabilities or mobility issues or

who are outside their electoral division (e.g. New South Wales, France and the Northwest Territories). In other jurisdictions, Internet voting is more broadly available, although limited to a certain percentage of the electorate (e.g. Switzerland). Estonia and municipalities in Nova Scotia and Ontario currently make the Internet voting option available to all electors.

Additional option

Internet voting is primarily implemented to improve accessibility for electors, particularly those who face voting-related obstacles. Except for some Ontario municipalities, when Internet voting is available, it is offered in addition to the existing voting options. When online voting is available to all electors, its use tends to increase gradually from one election cycle to another. However, its use rarely exceeds the 60% threshold, even after multiple elections. In Estonia, for example, Internet voting was used by 44% of electors during the legislative elections of 2019, up from approximately 5% in 2007. In Halifax Regional Municipality (Nova Scotia), Internet voting was used by 60% of voters in the most recent elections (2012 and 2016). In other words, a significant portion of the electorate continues to prefer traditional voting options. These figures underscore the importance of maintaining other voting options, including in-person voting.

Importance of transparency

To maintain voters' trust in online voting, election authorities must embrace transparency. Audits and monitoring processes are put in place and the results are made public. The transparency requirement is particularly essential when problems arise or if there are doubts as to the integrity of the online voting process. The cases studied also underscore the importance of clearly defining the roles and responsibilities of election authorities and service providers with a view to ensuring proper accountability to the electorate if any problems arise.

Time for implementation, evaluation and adaptation

These cases also indicate that online voting is not free of vulnerabilities or from events that could compromise the integrity or the smooth functioning of the voting process. To reduce those risks, time must be set aside to develop a secure voting Internet platform using state-of-the-art technologies, to conduct testing and to make the necessary corrections and adaptations prior to the election. These experiences also underscore the importance of evaluating the system's functioning after each election and of taking the necessary time to implement the required updates and improvements between elections.

Voter satisfaction and turnout

Gauging the satisfaction and trust of voters and other election stakeholders also seems essential. Based on the cases studied, electors generally appear satisfied with Internet voting. However, these cases do not allow us to draw conclusions on online voting's impact on turnout, particularly among young people. The goal of boosting turnout is sometimes cited as a justification for allowing Internet voting. Some researchers have found that this voting option has a positive albeit marginal effect on turnout (approximately 3%). In various jurisdictions, there has rather been a shift away from voting by mail to online voting (e.g. Switzerland, New South Wales and France).

Above and beyond the technical aspects, these cases also shed light on certain measures that should be implemented to ensure that Internet voting is successfully introduced. They also highlight the importance of having a political and social will for Internet voting prior to its introduction. Trust must also be forged among voters and political stakeholders; indeed, trust can be quickly undermined if problems arise. This trust is based on the smooth functioning of the online voting system, as well as on the security and transparency measures in place and how effectively these measures are communicated to voters.

Technical considerations

The introduction of Internet voting requires election authorities to reflect, along with specialists in the field, on the main technological and security considerations associated with this option. Internet voting entails specific risks associated with three different environments: the personal digital devices used by voters; network-based communications; and the voting platform. Certain solutions may help to enhance the availability, integrity and confidentiality of the voting process. Although they may serve to minimize these risks, they do not eliminate them altogether.

Personal digital devices

Internet voting risks include the security of personal digital devices and how vigilant electors are when using the Internet and digital tools. Personal computers, smartphones or digital tablets used by voters may be infected or undermined by spyware or malware, which may be able to manipulate their vote. In those cases, the encryption processes of the online voting system would be useless. The election authorities, however, could make the vote transmission process more secure by requiring electors to take an additional step by validating their own vote. Persons with malicious intent could also create bogus voting platforms enabling them to steal an elector's digital identity and passwords and to then vote using his or her identity in the official system.

These malicious acts do not have a direct impact on the integrity of the digital voting platform; rather, they affect one elector at a time, i.e. when he or she is voting alone. Nevertheless, since it is impossible to monitor voters' personal digital devices, device security and reliability cannot be guaranteed in the case of Internet voting. The human factor plays a key role when it comes to online

voting security. To help all voters comply with best practices when using their devices, election authorities could propose a code of digital conduct, in addition to providing voters with information on best practices and raising their awareness of related risks.

Voters' Internet connections may also be limited. Internet service providers could fall victim to an attack designed to overload or slow down their networks or disrupt them altogether. In other words, some electors could have difficulty voting online, even if the digital voting platform is up and running.

Network-based communications

An Internet voting platform could be targeted in an attack designed to overload the network's bandwidth or to overload the servers via a massive but artificial increase in traffic (known as a distributed denial-of-service attack). In that case, the platform may be inaccessible, or its functioning may be slowed down for a period of time. These malicious acts have no impact on the security or confidentiality of server data, although they may still disrupt voting and could undermine the efficiency and credibility of the electoral process.

To avoid the risks of system-wide failures and slowdowns, state-of-the-art technology must be used. Similarly, recovery tests, load tests and security audits must be carried out to ensure that the system has the capacity to absorb such attacks. Other measures, including agreements signed with telecommunication service providers, are aimed at ensuring an immediate and secure response with a view to blocking any suspicious activities. To minimize the repercussions of any such attacks on the conduct of elections, the Internet voting option may be made available over a period of several days in the run-up to Election Day. That way, if there is a system-wide failure or slowdown, electors could simply return to the voting platform at a later time. As a last recourse, they could vote in a polling station on Election Day.

Man-in-the-middle attacks could be used by malicious persons to spy on digital communications between users and the voting platform server and then to access and modify votes before they are recorded in the virtual ballot box. To prevent this type of attack, TLS and HTTPS protocols may be an effective solution providing and encrypted and secure Internet connection guaranteeing that votes are transmitted fully and accurately.

Furthermore, the measures taken must guarantee the uninterrupted encryption of digital votes, in addition to ensuring data confidentiality and protection, including identification and authentication data, in particular personal information appearing on the list of electors. Information communicated on how personal information is processed on the voting platform must be concise and intelligible so voters can give their informed consent.

Online voting platform

One of the main challenges of Internet voting is verifying electors' identity. Authentication may be carried out using a secure digital ID card (e.g. Estonia) or by means of digital ID processes used to access other government services. Authentication may also be based on information shared between voters and the election authorities, such as a unique access code, the answer to a secret question or a personal information. The voter registration procedure may also provide election authorities with an opportunity to carry out the first step in verifying electors' identity before they cast their ballots.

These various mechanisms, however, do not provide the same degree of assurance regarding an elector's identity as in-person verification does. Voters, for example, could sell their access codes or could have them stolen. Someone may know someone else's personal information required for online voting or could acquire it and vote in his or her name. If a government mechanism exists for digitally identifying citizens and has already been tested, election authorities tend to use it to authenticate voters. The Québec government hopes to implement such a digital IT mechanism in the next few years.

Another challenge of Internet voting is maintaining the secrecy of the vote in the online system while safeguarding the integrity of the votes cast. The voting platform must be able to guarantee that an elector's identity is completely disconnected from his or her vote: once a vote has been recorded, it must no longer be possible to match up the ballot with the person who cast it. The platform must, however, make it possible to verify certain information, including confirming that votes have been recorded and counted. In other words, a certain level of traceability must be ensured. Maintaining secrecy of the vote while verifying the integrity of the voting process entails a form of inverse logic: one goal is achieved by making each vote anonymous, while the other is achieved by ensuring traceability. The systems used by other institutions providing digital services, including financial institutions, are not required to reconcile these opposing principles.

To maintain the secrecy of the votes, the Internet voting system must use reliable communication mechanisms, secure servers and cutting-edge encryption processes. Once the official period for contesting election results has ended, all encrypted votes and back-up copies should be destroyed to avoid any possibility of undermining voting secrecy in the future.

Remote Internet voting takes place in an unsupervised environment. Election authorities cannot guarantee that electors are alone when they mark their online ballots, nor can they guarantee that electors were not pressured into voting for a given candidate. Therefore, electors themselves are partly responsible for this aspect of voting confidentiality.

Internet voting also dematerializes the electoral process, leading to a loss of transparency. Overall, the digital processes involved are hard to understand for members of the public, who must place their trust in specialists: in effect, technical expertise ends up superseding public oversight. Certain solutions, however, enable electors to verify steps in the voting process, without undermining confidentiality. These solutions help to win the electorate's trust. Thanks to individual verifiability, electors can check that the digital platform recorded their vote properly; they can also ensure that the vote recorded

matches their choice and that it was correctly entered into the system. Universal verifiability enables observers with the required technical skills to ensure that all votes recorded in the system were cast by legitimate electors, that the votes were not manipulated in any way and that they were correctly counted. Despite everything, Internet voting does not allow for recounts due to the absence of material evidence. In the event of a contested election, if the dispute is deemed valid, the solution is to conduct the voting all over again.

Using an open-source digital voting platform helps to boost electors' trust in the Internet voting system. This allows specialists to test the system before an election is held. In addition to ensuring transparency, this serves to defend the integrity of the process. It is also important to put in place rigorous frameworks for independent audits and external evaluations at all stages of the process.

The Internet voting platform must be easy to use for all electors. It must also meet recognized digital accessibility standards and the needs of persons with disabilities so they can vote autonomously. In general, the more secure the system, the more steps there are for users. For that reason, a secure system may be difficult to use. The challenge lies in striking a reasonable balance between user-friendliness, ergonomics and robustness. In this regard, it may be wise to work with electors and specialists to assess the online voting system's simplicity, user-friendliness, ergonomics and accessibility.

Internet voting cannot be introduced without considering all those risks, together with related mitigation measures. All steps must be taken to ensure the highest possible security of online voting. To achieve that goal, all stakeholders must work together. Nevertheless, some risks will remain; they will have to be accepted in order to move forward with the project.

Quebecers' opinions on Internet voting

Élections Québec conducted wide-ranging consultations in the fall of 2019 with a view to identifying Quebecers' expectations and concerns and evaluating Internet voting's social acceptability. These consultations included a telephone survey of a representative sample of the population; an online consultation in which participants responded to a short survey or submitted an information document; and a citizens' panel. Élections Québec also consulted with members of the committees it coordinates, the Citizen Round Table and the Accessibility Committee, as well as with representatives of the provincial political parties.

These wide-ranging consultations provide a snapshot of public opinion in Québec regarding Internet voting while gauging the views of individuals who have a keen interest in this topic and gathering the informed opinions of voters who had previously received related information.

In light of those consultations, Élections Québec found that opinions are polarized on Internet voting. On the one hand, proponents would like to maximize accessibility to the electoral process; on the other hand, opponents are concerned about voting security and election integrity. This split was observed in the various types of consultation used.

The introduction of Internet voting was supported by a slim majority of 57% of Quebecers who took part in the telephone survey. The citizens' panel results were similar: a majority of the panelists (9 out of 14) would like to see this option introduced in Québec. The results of the online consultation also saw majority

support for Internet voting. However, a significant proportion of the population (43%) said they were opposed to the idea. A slim majority (54%) of those surveyed stated that they would vote online if the option were available.

Quebecers have various expectations regarding Internet voting. They believe that it should make voting easier for all electors, in particular for persons with disabilities or living in isolated regions or outside Québec. Based on the consultation results, there is support for maintaining a variety of voting options. Therefore, to meet the expectations of a majority of Quebecers, current voting options should be maintained if Internet voting is introduced. For a majority of the respondents (71%), in-person voting is still important.

Citizens expressed the view that the online voting system must be secure and must ensure election integrity. Their main concerns in this regard are the risks of manipulating the election results (70%) and the risk that someone else could vote using their name without their knowledge (68%). The respondents did not spontaneously raise the issue of the cost of Internet voting in justifying their opinion on the subject. However, over one-third (36%) of the Internet voting proponents expressed implementation-related reservations if the introduction of this option increased the cost of holding elections. The panelists in favour of Internet voting declared that the costs of the online voting system (not including development costs) should be similar to or less than current costs. The panelists opposed to Internet voting, meanwhile, mentioned cost-related considerations in support of their position.

The opinions gathered from the committee members show that they would be in favour of any process aimed at pursuing more in-depth research on Internet voting, particularly as regards system-related security mechanisms. In this regard, the opinions of Internet voting proponents and opponents coincided.

In terms of how Internet voting should be introduced in Québec, some of the online consultation participants suggested offering this option for school or municipal elections only. The panelists in favour of Internet voting agreed on that point: they proposed a gradual roll-out, initially as pilot projects at the school and municipal levels. The Citizen Round Table members also suggested organizing pilot projects with a limited number of voters. A majority of the telephone survey respondents (66%) stated that if this voting option were available, it should be accessible to all voters. However, the respondents opposed to Internet voting preferred reserving this option for certain electors only (52%). Taking that approach could thus boost the level of social acceptability.

Furthermore, the panelists in favour of Internet voting stated that the Québec state should own the required IT infrastructure. That ties in with another issue that emerged from the telephone survey results: over one-half of the respondents (58%) expressed concerns that the online voting system could be designed and managed by a private company. If Internet voting is subjected to testing, a gradual approach would in all likelihood make it possible to gain the support of the largest number of electors.

Finally, the electors expressed a need for information on the ultimate objectives of online voting, on related risks and on system-related security. If Internet voting is introduced, ensuring the transparency of election authorities and providing information to voters would be two key components to ensure social acceptability. If Internet voting is not introduced, it would still be advisable to provide electors with information on the reasons for that decision, as well as on the conditions to be met before the decision could be revisited, as applicable.

Internet voting in the Québec context

A variety of scenarios for introducing Internet voting could be considered for Québec; they are explored in the study. For example, this option could be offered during provincial, municipal or school elections; it could be offered to specific groups, to a limited segment of the electorate or to all voters; and it could be offered for a variable time period during the electoral calendar. The ways in which the election process is adapted, the approach and the preferred legislative vehicle, as well as the process of developing or acquiring the online voting system could also vary. The ultimate choice would depend on multiple factors. In light of the information presented in the study, however, it is possible to identify certain principles and criteria that should be complied with to ensure the successful introduction of this option in Québec; as well as certain necessary adaptations to the electoral process.

Introduction parameters

The Chief Electoral Officer should be entrusted with the responsibility of administering Internet voting, whether during provincial, municipal or school elections. Élections Québec should be given the opportunity to develop specialized expertise in the field of Internet voting. To ensure better control over the testing process, pilot projects should initially be carried out during provincial elections.

Regardless of the level at which Internet voting is introduced, existing voting options should be maintained. The more options voters have, the easier voting becomes. Internet voting should thus be offered in addition to existing voting options and should not be accompanied by reduced services in polling stations. In other words, no electors should be penalized by the introduction of this voting option.

Initially, the number of electors authorized to vote using the Internet should be limited. To evaluate the project's feasibility and to ensure the voting system's reliability and security, pilot projects could be carried out among specific categories of electors who face voting-related obstacles or among a limited segment of the electorate. The process of introducing Internet voting should also include groups representing persons with disabilities.

How elections are conducted

Allowing Internet voting would mean making changes to how elections are conducted. An information campaign should be used to provide information on this voting option, with full transparency, with a view to gaining the trust of the electorate and other stakeholders. In addition, specific information tools should be given to electors authorized to use this option. These tools should serve to remind Quebecers that voting is personal and confidential, in addition to explaining related risks and recommending best practices in the areas of digital security, protection of personal information and voting environment. In addition to meeting universal accessibility standards, voting materials should be written in plain language and should be ergonomically designed. Furthermore, remote technical support should be provided to electors using this voting option.

To ensure better oversight of electors' identity and the votes cast, prior registration for Internet voting should be required. The voting period should be established so that electors have a comparable length of time to follow the electoral campaign and to obtain information, regardless of the voting option they use. They must also have enough time to register. It would be preferable

not to allow Internet voting during the advance poll, unless registered electors no longer have access to advanced polling or unless computerized electoral lists enable centralized real-time monitoring of which electors have already voted. Furthermore, Internet voting should not be available on Election Day because this final day should be reserved for in-person voting and should be open to all electors.

Political parties, candidates and their representatives play a key role in overseeing electoral operations. Steps must be taken to ensure that they have the necessary resources and information to carry out their various duties. For that reason, they should be given a monitoring role during the various steps in the voting process, as with other options. Accommodation should also be made for the presence of independent observers able to evaluate and attest to the reliability of the process. The counting of Internet votes should require the participation of multiple people (this is aimed at ensuring that no one person has sole access to the results). Using a fragmented decryption key would therefore be desirable when counting Internet votes.

Legislative framework

A gradual approach should be used to introduce Internet voting in Québec. The legislative framework for Internet voting should reflect this approach. The introduction process could begin by carrying out pilot projects under agreements describing all procedures governing how voting is conducted. These agreements should provide for accountability mechanisms to ensure a complete evaluation of the trials. If these trials are subsequently deemed conclusive, Internet voting oversight mechanisms should be set out in the electoral legislation or by regulation. A balance should also be struck between the legitimacy and the flexibility of the adopted legal framework.

Certain aspects should be defined in the legal framework before Internet voting is introduced. For example, standards and technical specifications as well as electoral procedures should be adopted with a view to ensuring compliance with core democratic voting principles. These requirements should be developed together with specialists and should be the focus of a consultation process. They should draw inspiration from international standards and should be adapted to Québec's electoral context. In addition, the roles and responsibilities of electoral stakeholders should be clearly defined. The creation of an independent committee tasked with monitoring the online voting process should also be considered.

The legal framework should set out oversight and corrective measures at various steps in the process. That would make it possible to prevent, detect or correct any deficiencies that may arise. These measures should also contribute to the transparency of the process and to the level of trust among various stakeholders. Adaptations should be made to provisions concerning judicial recounts and contested elections. The criteria for using these remedies should be defined, particularly as regards cancelling or re-running elections. Finally, new criminal penalties taking Internet voting risks into account should be included in the electoral legislation.

Online voting system

The remote digital voting platform selected should feature the most advanced technologies and should demonstrate its capacity to function under the expected electoral conditions. Quebecers' trust in Internet voting and the social acceptability of this option are at stake.

The introduction of this voting option should not be reduced solely to technological factors. After the digital voting platform has been selected and implemented, Élections Québec would be prepared to undertake related initiatives, including communication, consultation, dialogue, training, evaluation and testing geared towards electors, political parties and election officers.

The voting platform should be easy to use, including for individuals with no particular technical skills. The interface should meet recognized digital accessibility standards and should be adapted to the specific needs of persons with disabilities.

Québec should opt for an open-source voting platform free of any known flaws, vulnerabilities or deficiencies. To ensure the transparency of the electoral process, this platform should be end-to-end verifiable, individually as well as universally.

It would be important to draw up a risk governance policy, to consider changing requirements for ensuring Internet voting security, to use road-tested state-of-the-art technologies and to apply high-level digital protection measures. Steps should be taken to ensure the uninterrupted encryption of digital votes while maintaining data confidentiality and protecting personal information. Vulnerability testing and security audits should also be carried out on a regular basis.

Based on the cases described in the study, different avenues may be used to develop or acquire an online voting system. Acquiring a road-tested platform designed by an external partner with a view to adapting and operating it seems more likely to meet Élections Québec's needs.

If Internet voting is to be introduced in Québec, these recommendations should be considered to strike a reasonable balance between the core principles of accessibility, free exercise of the right to vote, secrecy of the vote and integrity and transparency, upon which Québec elections are based. These proposals, nevertheless, leave the door open to various introduction scenarios.

Conclusion

Introducing Internet voting in Québec would have the advantage of increasing voting access, particularly for certain groups. However, a number of issues would be raised, particularly as regards the free exercise of the right to vote, secrecy of the vote, verifying electors' identity, integrity of the vote and election results and transparency of the process. There are solutions available to mitigate these risks, although they cannot be eliminated altogether. In order for the introduction of Internet voting to be considered and implemented, these risks must be understood and accepted by the political class and by voters.

Including Internet voting in Québec's electoral process is more than a technical question: it involves numerous democratic and social considerations. For example, it raises questions about the meaning of the act of voting, equitable access to it and the conditions under which the right to vote is exercised. As much attention must be paid to these issues as to technical considerations. All stakeholders must be involved in the process of reflection and the implementation of this voting option, as applicable.

The consultations undertaken in connection with this study reveal that opinions in Québec are divided on the question of Internet voting. A slim majority of the population, however, appears to be in favour of this option. Providing electors with relevant information and ensuring the transparency of the election authorities would be key components in the process of introducing Internet voting in Québec. An approach that limits risks to the integrity of the electoral process while maximizing accessibility gains stands to win the approval of the largest number of electors.

Introducing Internet voting within Québec's electoral process should fit within a financial framework but should not involve any democratic, operational, technical or security-related compromises. The project would have to be accompanied by major investments in human, technical and financial resources. The necessary time should be devoted to the project; under no circumstances should implementation be rushed.

As the authority in charge of the process, Élections Québec would work with partners providing access to specialized expertise while developing its own expertise in the area. It would draw upon Canadian and international cases and ensure that Québec's experiences are shared in turn. Élections Québec would also ensure that stakeholders take part in the electoral process at each step of the way. It would make sure the process includes consultations and accountability mechanisms.

Internet voting should be phased in gradually. The pre-introduction process should be divided into three steps: defining the trial phase; conducting the trials; and formally adopting Internet voting. Pilot projects should target a limited number of electors and should preferably take place during provincial elections, at least initially. Adding the Internet voting option should not lead to reduced services at polling stations, nor should any existing voting options be eliminated. In order to foster trust in Internet voting, stakeholders in the electoral process should be informed and consulted between each of these three steps.

Considering the nature of this project, particularly the resources and time required, a clear statement from the National Assembly in favour of pursuing this work with a view to introducing Internet voting in Québec would be a prerequisite for Élections Québec to take the next steps. If a new mandate is given to the Chief Electoral Officer under Section 485 of the *Election Act*, Élections Québec would begin by defining the parameters and objectives of the trial phase of Internet voting.

Chief Electoral Officer's recommendations

Recommendations regarding the introduction of Internet voting in Québec, its operationalization, the regulatory framework, as well as the selection of a voting platform.

Recommendations regarding the main parameters for the introduction of Internet voting in Québec

If Internet voting is introduced in Québec, the Chief Electoral Officer recommends:

- Entrusting the Chief Electoral Officer with responsibility for administering this voting option during provincial, municipal or school elections.

- Developing specialized expertise within Élections Québec.

- Carrying out initial pilot projects, preferably during provincial elections, with a view to ensuring better control over the trials.

- Maintaining existing voting options, regardless of the introduction parameters adopted.

- Carrying out pilot projects with specific categories of electors or a limited segment of the electorate, with a view to evaluating project feasibility and ensuring the voting system's reliability and security.

- Including groups representing individuals with disabilities during the development of a process to introduce Internet voting.

Recommendations regarding how elections with Internet voting would be conducted in Québec

If Internet voting is introduced in Québec, the Chief Electoral Officer recommends:

- Conducting a campaign to inform the population about this voting option with complete transparency and to foster the trust of the electorate and other electoral stakeholders.

- Providing specific information tools to electors authorized to use this voting option, reiterating the personal and confidential nature of voting, explaining the risks associated with this option and recommending best practices in the areas of digital security, protection of personal information and voting environment.

- Ensuring that Internet voting materials are written in plain language and meet ergonomic and universal accessibility standards.

- Providing remote technical support to electors who use this option.

- Requiring electors to register in advance for this voting option, regardless of the electorate in question, with a view to achieving more effective oversight over their identity and the votes cast.

- Establishing the Internet voting period so electors have a comparable length of time to follow the election campaign and obtain information, regardless of the voting option they use; they should also have enough time to register.

- Not allowing Internet voting at the same time as the advance poll, unless electors who registered for online voting no longer have access to advance polling or unless computerized electoral lists are available in polling stations to enable centralized real-time monitoring of which electors have already voted.

- Not allowing Internet voting on Election Day, so that this final day is reserved for in-person voting and is open to all electors.

- Giving political parties, candidates and their representatives a monitoring role at various steps along the voting process, as with other voting options.

- Accommodating the presence of independent observers with the ability to evaluate and attest to the reliability of the process.

- Ensuring that the counting of votes cast online requires the presence of multiple people, using a fragmented decryption key so that no one person has sole access to the results.

Recommendations regarding the regulatory framework for Internet voting in Québec

If Internet voting is introduced in Québec, the Chief Electoral Officer recommends:

- Carrying out pilot projects under agreements describing all procedures used to oversee the Internet voting process.

- Providing for accountability mechanisms in these agreements with a view to ensuring a complete evaluation of the trials conducted.

- If the trials are deemed conclusive, providing a legal framework for Internet voting, either in the electoral legislation or by regulation, while striking a balance between the legitimacy and the flexibility of the framework selected.

- Adopting, on a prior basis, standards and technical specifications as well as electoral procedures aimed at ensuring compliance with core democratic voting principles. These requirements should be drawn up together with specialists and should be the focus of a consultation process. They should draw inspiration from relevant international standards and should be adapted to Québec's electoral context.

- Clearly defining the roles and responsibilities of electoral stakeholders and evaluating the possibility of setting up an independent committee tasked with monitoring the online voting process.

- Providing for oversight and corrective measures at various stages of the process with a view to preventing, detecting or correcting any deficiencies that may arise. These measures would also contribute to increasing the transparency of the process and would foster the trust of stakeholders.

- Adapting provisions regarding judicial recounts and contested elections, considering the specific features of this voting option, and defining the conditions under which individuals are entitled to avail themselves of these remedies, as well as criteria regarding the cancellation and re-running of elections.

- Including criminal penalties in the electoral legislation, considering the risks associated with this voting option and their larger-scale repercussions.

Recommendations regarding the Internet voting platform and security

If Internet voting is introduced in Québec, the Chief Electoral Officer recommends:

- Opting for a voting platform that is easy to use and does not require specific technical skills, and whose interface meets recognized digital accessibility standards and is adapted to the specific needs of persons with disabilities.

- Using an open-source voting platform that is free of any known flaws, vulnerabilities and deficiencies, that is end-to-end verifiable, both individually and universally, in order to ensure the transparency of the electoral process.

- Drawing up a risk governance policy, considering changing requirements to ensure Internet voting security, using road-tested state-of-the-art technologies and applying high-level digital protection measures. In particular, steps must be taken to guarantee the uninterrupted encryption of digital votes while ensuring data confidentiality and the protection of personal information.

- Conducting regular independent vulnerability tests and external security audits.