INTERNET
VOTING

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in the Québec context:
A study

élections
Québec

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Introduction

A mandate from the Assemblée nationale

On June 6, 2018, the Assemblée nationale du Québec adopted Bill No. 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*.[1] During particular consultations on this bill and, the previous year (2017) before the Committee on Institutions, the Chief Electoral Officer proposed to conduct a study on the partial or complete introduction of Internet voting in provincial, municipal and school elections.[2]

Following those consultations, the Assemblée nationale unanimously passed a motion on June 14, 2018, in which the Chief Electoral Officer was mandated to [translation] "conduct a study for the purpose of proposing a remote voting method within the space of two years, in accordance with the adoption of Bill No. 185 by the National Assembly."[3]

In the spring of 2019, the government announced its intention to abolish school elections in Québec.[4] Subsequently, the Chief Electoral Officer refocused his mandate to concentrate on studying Internet voting in the Québec context.

Furthermore, the worldwide COVID-19 pandemic that has been raging since the beginning of 2020 is generating some interest in Internet voting. At first glance, having the option to vote via the Internet may appear to be an interesting solution for holding elections in a context where unprecedented physical distancing measures are required. However, such a decision cannot be taken lightly and requires careful consideration, which we hope to nourish with this study. The introduction of Internet voting, if it occurs, will require time and caution. It cannot be done in a hurry.

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1. This Act provides that the Government may, "by regulation, after consulting the Chief Electoral Officer, allow the use of a remote voting method for the general school election of 1 November 2020 and determine the applicable conditions and procedure." (SQ, 2018, c 15, s. 5.)

2. Directeur général des élections du Québec, *Audition du directeur général des élections devant la Commission de la culture et de l'éducation sur le projet de loi no 185: Loi reportant la prochaine élection scolaire générale et permettant au gouvernement d'y prévoir l'utilisation d'un mode de votation à distance*, [Act to defer the next general school election and to allow the Government to provide for the use of a remote voting method], SQ 2018, c 15 [Online], 2018. [https://www.electionsquebec.qc.ca/francais/a-propos-de-nous/allocutions/allocutions_30_mai_2018.php]; Directeur général des élections du Québec, *Audition du directeur général des élections devant la Commission des institutions*, [Online], 2017. [https://www.electionsquebec.qc.ca/francais/a-propos-de-nous/allocutions/allocutions_17_octobre_2017.php].

3. Assemblée nationale du Québec, *Procès-verbal de l'Assemblée*, Thursday, June 14, 2018, p. 4801.

4. Radio-Canada, *Un projet de loi pour abolir les commissions scolaires à l'automne*, [Online], April 23, 2019. [https://ici.radio-canada.ca/nouvelle/1165713/abolition-commission-scolaire-caq-automne].

Objectives

The main objective of this study is to provide a comprehensive and neutral perspective on the advantages and disadvantages of introducing remote Internet voting, in whole or in part, in the context of provincial, municipal and school elections in Québec.

More specifically, its aim is to:

- Identify issues related to the introduction of Internet voting based on experiences with the use of this technology in Canada and around the world;

- Evaluate the effects of the introduction of Internet voting on Québec's election system requirements, which stem from core democratic voting principles;

- Examine the concordance between Internet voting and the current legal and constitutional framework;

- Analyze the risks associated with Internet voting and the measures and mechanisms available to date, to prevent, eliminate or mitigate those risks;

- Explore the advisability of using Internet voting in a variety of electoral contexts: during provincial, municipal or school elections; by-elections or general elections; referendums; for specific groups of voters only; or for the entire electorate;

- Assess the social acceptability of Internet voting and define the expectations and concerns of voters and various stakeholders in Québec electoral process with respect to this voting option.

The purpose of this study is not to analyze the introduction of telephone voting or the extension of voting by mail, even though some parallels may be drawn between these different remote voting options.

A definition of remote Internet voting

Internet voting is a form of electronic voting.[5] It is done on an Internet-connected electronic device such as a computer, tablet or smartphone.

Internet voting can be conducted at a polling place, under the supervision of election officers, or remotely, at a location chosen by the voter. In accordance with the Assemblée nationale's mandate, this study focuses on remote Internet voting, which eliminates the need for voters to

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5. In electoral, political and academic circles, electronic voting refers to several types of technical means used to vote. In addition to Internet voting, the main forms of electronic voting are voting terminals (or voting machines) and electronic ballot boxes (or tabulators).

travel. In this specific context, all the steps related to voting take place online: the person establishes his or her identity as a voter, marks the ballot, records the vote and transmits it to the virtual ballot box, where it will be counted on election day.

In this study, the terms *Internet voting, voting online* and *online voting* are used interchangeably to refer to this method of remote voting.

The presentation of the study

The study consists of six chapters. They provide an overview of the status of the exercise of the right to vote in Québec, explore the issues related to Internet voting and project how this voting option could be introduced in Québec.

The first chapter evokes the core democratic voting principles: accessibility, the free exercise and secrecy of the vote, the integrity of electoral process and results, and transparency. These principles guided the analysis and represent the cornerstone of this study. The second chapter examines the current situation in relation to access to voting in Québec, since accessibility is one of the main advantages attributed to Internet voting. This chapter explores the evolution in the electoral legislation on this subject, the voting options currently available, voter turnout in Québec, as well as the use of technology in electoral process and, more broadly, among the Québec population.

The third chapter discusses Canadian and international experiences with Internet voting. It highlights the best practices adopted by these States as well as the difficulties they have encountered. Cases from Canada, Estonia, France, Norway, Switzerland and the State of New South Wales (in Australia) are documented. The fourth chapter deals specifically with the technical dimension of Internet voting. The risks associated with the Internet voting option are discussed in relation to the three digital settings used: the voters' device, network communication and the voting platform. This chapter outlines, for each of these settings, the solutions available to ensure the availability, integrity and confidentiality of the Internet voting process.

The fifth chapter presents the results of the consultations carried out on Internet voting in the context of this study. It makes it possible to assess the social acceptability of this voting option in Québec and to identify the main expectations and concerns of citizens in this area. The sixth chapter examines different options for the introduction of Internet voting in provincial, municipal and school elections. It includes analysis and recommendations for maximizing benefits of Internet voting while mitigating associated risks. Finally, the conclusion proposes a general approach on how to introduce Internet voting in Québec, as well as a phased introduction approach that we could adopt should there be a willingness to make this voting option available to Québec voters.

Democratic Voting Principles

In Western societies[6], elections are at the core of representative democracy and cannot be separated from the political, cultural and historical context in which they occur. In general, political systems and modes of governance are intended to be inclusive, egalitarian and democratic. But this has not always been the case.

Over time, many people have mobilized and fought tirelessly to extend the right to vote (based on universal suffrage, equality and uniqueness of exercise) to all citizens, regardless of gender or social status.[7] With a strongly asserted intent to strengthen political freedom and democracy, this struggle has gradually led to the recognition of voting as a fundamental right in different societies.

Today, a government's authority and legitimacy are based on the will of electors casting their votes freely by secret ballot as part of accessible, egalitarian, transparent and honest electoral process.[8]

Elections must respect core democratic voting principles and use means that guarantee their implementation, regardless of method used for voting. Internet voting is not excepted from these obligations.

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6. [translation] "More than a region or a relative indication in space, the West is a form of society, a set of convictions and attitudes that have shaped its history and supported its economic and political expansion. It is no longer only the countries of Western Europe that represent the West, but also the United States, Canada and Australia. It is, in fact, a representation, i.e. an idea that is used to interpret what happens in a democratic society." Concept discussed by Roger-Pol Droit, *L'Occident expliqué à tout le monde*, Le Seuil, Paris, 2008.

7. Élisabeth Dupoirier, « Le vote », *Le dictionnaire du vote*, Presses universitaires de France, Paris, 2001.

8. Yves Déloye et Olivier Ihl, *L'acte de vote*, Presses de Sciences Po, Références, Paris, 2008.

1.1 International conventions and concerted multilateral commitments

International bodies have recognized core democratic voting principles. The first global affirmation of the dignity and equality of all human beings is the *Universal Declaration of Human Rights*[9], adopted by the United Nations in December 1948. Without any real legal[10] impact, this multilateral declaration specifies and proclaims the fundamental rights of the individual.

Article 21.3 of the *Declaration* sets out a fundamental right related to elections and voting:

> "The will of the people shall be the basis of the authority of government; this will shall be expressed in periodic and genuine elections which shall be by universal and equal suffrage and shall be held by secret vote or by equivalent free voting procedures."[11]

After endorsing the *Universal Declaration of Human Rights*, the United Nations General Assembly began work on an international instrument that would be binding and recognizing the need for all countries, nations and political systems to respect the inalienable fundamental human rights.

After lengthy multilateral negotiations, the *International Covenant on Civil and Political Rights*[12] was adopted in December 1966. It came into force in March 1976. The Covenant states in article 25b that every citizen has the right and opportunity, without any discrimination and without unreasonable restrictions, "to vote and to be elected at genuine periodic elections which shall be by universal and equal suffrage and shall be held by secret ballot, guaranteeing the free expression of the will of the voters."[13]

Respecting the particularities of their political system, many countries have incorporated this right to vote and its principles into their national legislation, charters of rights or constitutions.

Various intergovernmental and non-governmental organizations mobilized around the cause of enhancing the rule of law and democratic and pluralistic governance, have enriched and concretized these concepts and principles through concerted commitments on elections and the

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9. United Nations, *Universal Declaration of Human Rights*, [Online]. [https://www.un.org/en/universal-declaration-human-rights/index.html]. Canada contributed to the adoption of this declaration.

10. Yannick Lécuyer, *The right to free elections*, Council of Europe Publishing, Strasbourg, 2014.

11. United Nations, *op. cit.*

12. United Nations, *International Covenant on Civil and Political Rights*, [Online]. [https://www.ohchr.org/en/professionalinterest/pages/ccpr.aspx]. Canada ratified this Covenant in 1976.

13. *Ibid.*

exercise of the right to vote. These include the Venice[14] Commission of the Council of Europe[15], the Organisation for Security and Co-operation in Europe[16] (OSCE), the International Foundation for Election Systems (IFES)[17] and the International Institute for Democracy and Electoral Assistance (International IDEA)[18].

For example, the *Copenhagen Document*[19], adopted by the OSCE in 1990 and endorsed by many organizations, contains provisions on free and democratic elections and is a reference for the assessment of elections and the exercise of the right to vote. This document was the first political agreement concluded between sovereign states that undertake to invite each other to observe their respective electoral processes and the conditions they put in place to guarantee the free expression of the vote.

Similarly, the *Universal Declaration of Human Rights*, the *International Covenant on Civil and Political Rights* and several joint multilateral commitments have established the concepts and principles that form the basis of democratic voting.

1.2 Core democratic voting principles in Québec

Based on international conventions and inspired by multilateral consensus, Québec's core democratic voting principles reflect its history and take into account the specific features of its election system. These principles are not explicitly mentioned in Québec's electoral legislation. Nevertheless, the spirit of the laws as well as electoral process taken as a whole show that these principles are taken into account.

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14. The European Commission for Democracy through Law, better known as the Venice Commission (for the city where it meets), is a consultative body of the Council of Europe on constitutional matters [https://www.venice.coe.int/WebForms/pages/default.aspx?p=01_Presentation&lang=en]. See the *Declaration of global principles for non-partisan election observation and monitoring by citizen organizations*, [Online]. [https://www.venice.coe.int/webforms/documents/?pdf=CDL(2012)032-e].

15. Council of Europe, *European Convention on Human Rights*, Paris, 20.III, 1952, art. 3, p. 32. [https://www.echr.coe.int/Documents/Convention_ENG.pdf].

16. The Organization for Security and Co-operation in Europe [https://www.osce.org/en] published the report *Election Observation* [https://www.osce.org/files/f/documents/3/9/17164.pdf].

17. IFES, *Electoral Management*, [Online]. [https://www.ifes.org/issues/electoral-management].

18. IDEA (2010), *Electoral Justice: The International IDEA Handbook*, [Online]. [https://www.idea.int/sites/default/files/publications/electoral-justice-handbook.pdf].

19. Organization for Security and Co-operation in Europe, *Document of the Copenhagen Meeting of the Conference on the Human Dimension of the CSCE*, [Online], 1990. [https://www.osce.org/files/f/documents/9/c/14304.pdf]. Canada is one of the co-signatories to this document.

CHAPTER 1 : Democratic Voting Principles

Adherence to these principles is essential to maintaining voter confidence in the voting process. These principles are complementary and interlinked; they are materialized in the various voting options. The following principles demonstrate a balancing[20] with the formulations[21] of each democratic society.

Accessibility

An accessible election system is fair and available to all voters. In this sense, the exercise of the right to vote is carried out under equal conditions regardless of age or nationality, without discrimination and without regard to other characteristics relating to physical condition, place of residence or socio-economic status. Also, accessibility to voting is intended to be universal: any voter can exercise it independently, without being prevented from doing so, including a person with a disability.

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, is individual in nature and cannot be matched to a given voter. No individual may be able to show proof of the expression of their vote to anyone.

Integrity of the process and results[22]

The electoral process and the election results are fair when they faithfully reflect the will of the voters expressed by their vote. The identity of the voter is duly verified to certify that the voter is who he or she claims to be and that he or she is authorized to vote. Uniqueness and inalterability of the vote are assured: 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 process

Voters and other stakeholders can monitor the integrity of each stage of the voting process. With complete transparency, they understand the electoral process and can ensure that effective verification mechanisms are in place.

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20. *Pierre Garrone, "Le patrimoine électoral européen – une décennie d'expérience de la Commission de Venise dans le domaine électoral," Revue du droit public de la science politique en France et à l'étranger,* [Online], No. 5, Paris, 2001. [https://www.venice.coe.int/files/articles/Garrone_patrimoine_electoral.pdf].

21. Jean-Claude Colliard, "Les systèmes électoraux dans les Constitutions des pays de l'Union européenne," *Cahiers du Conseil constitutionnel,* [Online], No. 13, January 2003. [https://www.conseil-constitutionnel.fr/nouveaux-cahiers-du-conseil-constitutionnel/les-systemes-electoraux-dans-les-constitutions-des-pays-de-l-union-europeenne].

22. In Europe, the notion of "sincerity of the vote" is, without doubt, one of the most widespread in electoral legislation. It indicates that the result of the election is the exact reflection of the will expressed by the majority of the electorate. See Richard Ghevontian, "La notion de sincérité du scrutin," *Cahiers du Conseil constitutionnel,* [Online], No. 13, January 2003. [https://www.conseil-constitutionnel.fr/nouveaux-cahiers-du-conseil-constitutionnel/la-notion-de-sincerite-du-scrutin].

1.3 Internet voting and core democratic voting principles

One of the challenges of implementing Internet voting is to respect and apply the core democratic voting principles by taking into account the particularities of dematerialized voting, expressed digitally rather than in a controlled environment such as a polling station.

When an elector casts a traditional vote, the polling booth and ballot box symbolize[23] the principles of secrecy and the free exercise of the vote. The active involvement of citizens at every stage of the voting process, direct observation and understanding of the various electoral process elements embody[24] the principle of transparency. The core democratic voting principles are shared, but their implementation can take many analogous forms.

When an elector votes by Internet, these principles are put into practice in a different way. The dematerialized[25] process is invisible to citizens, which can lead to uncertainties about the integrity and accuracy of the election results, for example. In the various chapters of this study, we will examine some of the measures implemented in Internet voting experiments conducted outside of Québec. We will also consider other provisions to ensure compliance with core democratic voting principles in order to maintain or strengthen the confidence of voters.

With the goal of harmonizing and refining the implementation of the core democratic voting principles in the expression of dematerialized suffrage, the Venice Commission has adopted concerted international standards on electronic voting. This commission includes 62 member States[26]: the 47 member States of the Council of Europe as well as 15 other countries, including Canada and the United States.

Since their adoption in 2004, these first and only concerted international standards have been subject to biennial evaluations related to the evolution of digital technologies. New standards related to electronic voting were adopted in 2017.[27] These standards are accompanied by guidelines that set out specific requirements for their implementation.

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23. Alain Garrigou, *Les secrets de l'isoloir*, Le Bord de l'eau, 2012.

24. Transparency & Accountability Initiative, *Electoral Transparency, Participation and Accountability*, [Online], London, 2011. [http://www.transparency-initiative.org/archive/wp-content/uploads/2011/11/Electoral-transparency.pdf].

25. Milad Doueihi, "Préface," *La démocratie dématérialisée – enjeux du vote électronique*, [Online], Paris, Le Seuil, 2011. [https://www.cairn.info/revue-le-genre-humain-2011-2-page-9.htm].

26. "The Venice Commission" [https://www.venice.coe.int/WebForms/pages/?p=01_Presentation&lang=FR].

27. Council of Europe (2017), *Recommendation CM/Rec(2017)5[1], Committee of Ministers to member States on standards related to electronic voting*, [Online]. [https://search.coe.int/cm/Pages/result_details.aspx?ObjectId=0900001680726f6a]; *Explanatory memorandum* [https://search.coe.int/cm/Pages/result_details.aspx?ObjectId=090000168071bc84]; *Guidelines* [https://search.coe.int/cm/Pages/result_details.aspx?ObjectId=0900001680726c0b].

These legal, operational and technical standards, which are voluntary and non-binding, provide a unique source of reference to provide a framework for a voting option via the Internet based on the principles of universal, equal, free and secret suffrage; transparency, observation and integrity of digital electoral process; accessibility of paperless voting for persons with disabilities; and digital security to ensure the accuracy of poll results.

These international standards should necessarily be taken into account with any project to introduce Internet voting in Québec in order to ensure it is based on core democratic voting principles.

Voting in Québec

Internet voting is seen as an option that can facilitate voting and promote voter turnout. In order to assess the possible effects of this option in the Québec context, an analysis of the current voting situation in Québec is an essential first step. That is the purpose of this chapter.

The first section of the chapter outlines the right to vote and the meaning given to it by Canadian and Québec courts. It also presents recent developments in provincial, municipal and school election laws and identifies improvements that have been made to facilitate voting. The second section looks at the current organization of elections and the options available to Québec voters when it comes to voting. It also examines the use of these options and the dynamics of voter turnout at the three elected levels. The last section of the chapter deals with the use of technology in voting. It revisits the electronic voting trials in Québec of the early 2000s, and the ever-increasing use of technology among Quebecers.

2.1 Regulation of the right to vote and voting

Internet voting could become another means by which electors can exercise their right to vote. The very notion of the *right to vote* is at the heart of all discussions on the subject. In the following paragraphs, we will first look at the scope of this right and what it implies, in light of the Canadian and Québec charters of human rights and freedoms and the legal interpretation of these rights and freedoms. We then examine the changes in electoral legislation with respect to access to voting since the mid-1980s, a period of significant legislative reform.[28] Both the observations made by the courts and the evolution of electoral legislation show that maintaining a balance between access to voting and the integrity of electoral process is challenging.

2.1.1 The right to vote

Definition and scope

In Québec, the right to vote is protected by the Canadian Charter of Rights and Freedoms and the Québec Charter of human rights and freedoms, which came into force in 1982 and 1976 respectively.[29] Section 3 of the Canadian Charter states that "every citizen of Canada has the right to vote in an election of members of the House of Commons or of a legislative assembly."[30] Section 22 of the Québec Charter does not refer to a specific elected level and states that "every person legally capable and qualified has the right to be a candidate and to vote at an election."[31]

Over the years, Canadian courts have repeatedly ruled on the purpose of the right to vote, mainly by analyzing the scope of section 3 of the Canadian Charter. They established that the right to vote is a right of participation whose purpose is to ensure effective representation of citizens[32]

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28. These reforms included: the adoption of the *Act respecting elections and referendums in municipalities* in 1987 (SQ, 1987, c. 57); the revision of the *Election Act* in 1989 (SQ, 1989, c. 1); and the adoption of the *Act respecting school elections* in the same year (SQ, 1989, c. 36).

29. Hereinafter referred to as the Canadian Charter and the Québec Charter, respectively. Canadian Charter of Rights and Freedoms, part I of *The Constitution Act, 1982, being Schedule B to the Canada Act 1982* (UK), 1982, c 11; Québec Charter of human rights and freedoms, CQLR, c. C-12.

30. Canadian Charter of Rights and Freedoms, part I of the *Constitution Act, 1982, being Schedule B to the Canada Act 1982* (UK), 1982, c 11, s. 3.

31. Charter of Human Rights and Freedoms, CQLR, c. C-12, s. 22.

32. Effective representation depends on two main conditions: equality of the vote of electors and respect for natural communities. (Commission de la représentation électorale du Québec, *La représentation effective* [Online]. [https://lacarte.electionsquebec.qc.ca/fr/representation_effective.php]).

and guarantee them the opportunity to play an important role in the electoral process.[33] They also held that the right to equality, protected by section 15 of the Canadian Charter[34], is an inherent value of the right to vote.[35]

According to the courts, the following rights are elements of the right to vote:

1. The right not to be denied the franchise on the grounds of race, sex, educational qualification or other unjustifiable criteria;

2. The right to be presented with a choice of candidates or parties;

3. The right to a secret ballot;

4. The right to have one's vote counted;

5. The right to have one's vote count for the same as other valid votes cast in an electoral district;

6. The right to sufficient information about public policies to permit an informed decision;

7. The right to be represented by a candidate with at least a plurality of votes in a district;

8. The right to vote in periodic elections;

9. The right to cast one's vote in an election system which has not been "gerrymandered" – that is, deliberately engineered so as to favour one political party over another;

10. The right to voting representation by population. [36]

Some of these rights, such as the right to a secret ballot and the right to have one's vote counted, echo the fundamental principles set out in the previous chapter.

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33. Reference: Provincial Electoral Boundaries (Sask.), 1991 CanLII 61 (SCC), p. 183(C), cited in *Haig v. Canada (Chief Electoral Officer)*, 1993 CanLII 58 (SCC), p. 1031, and in *Figueroa v. Canada (Attorney General)*, 2003 SCC 37, para. 25.

34. Section 15: (1) Every individual is equal before and under the law and has the right to the equal protection and equal benefit of the law without discrimination and, in particular, without discrimination based on race, national or ethnic origin, colour, religion, sex, age or mental or physical disability.
(2) Subsection (1) does not preclude any law, program or activity that has as its object the amelioration of conditions of disadvantaged individuals or groups including those that are disadvantaged because of race, national or ethnic origin, colour, religion, sex, age or mental or physical disability.

35. *Henry v. Canada (Attorney General)*, 2010 BCSC 610, para. 143.

36. Bryan Schwartz and Dan Grice, *Establishing a Legal Framework for E-voting in Canada*, Élections Canada, 2013, p. 20 and 21. (*Dixon v. British Columbia (Attorney General)*, 1989 CanLII 248 (BC SC), p. 16.)

CHAPTER 2 : Voting in Québec

The State's positive obligations[37]

Unlike other rights guaranteed by the Canadian Charter, the right to vote cannot be exercised without State intervention.[38] Thus, as early as 1985, the British Columbia Court of Appeal concluded that section 3 imposes a positive obligation on the State to take the necessary measures to facilitate voting by citizens. Without a positive obligation, this right would be devoid of substance. Therefore, the Court held that the failure to provide a voting mechanism for citizens who are absent from the province unreasonably limited the right to vote.[39]

This conclusion has been repeated in various judgments. In a decision rendered on the right to vote in a referendum, the Supreme Court of Canada stated that the State must take steps not only to ensure that citizens are not deprived of their right to vote, but also to ensure that they are able to exercise that right.[40] In another decision, the Court specified that the adoption of measures by the State must not, however, "enhance the capacity of one citizen to participate in the electoral process in a manner that compromises another citizen's parallel right to meaningful participation in the electoral process. Where legislation extends a benefit to some citizens, but not to others, it is necessary to consider carefully the impact of that legislation on the citizens who have not received the benefit. "[41] Similarly, it is the responsibility of the State to ensure that the effect of measures or requirements that it adopts with respect to voting do not create a disproportionate burden for certain groups of electors.[42]

Reasonable restrictions

Under section 1 of the Canadian Charter[43], the right to vote is subject to reasonable restrictions such as age, mental capacity, residence and registration on the list of electors. However, the administrative procedures put in place should not result in a denial of the right to vote. In such a case, the restrictions would not be reasonable.[44] For example, in a 2002 judgment in Alberta, the court concluded that the minimum voting age is a reasonable restriction on both the right to vote

37. "What distinguishes positive obligations from negative obligations is that the former require positive intervention by the state, whereas the latter require it to refrain from interference." Jean-François Akandji-Kombe, *Positive obligations under the European Convention on Human Rights. A guide to the implementation of the European Convention on Human Rights*, Human rights handbooks, No. 7, Council of Europe, 2007, p. 11.

38. *Figueroa v. Canada (Attorney General)*, 2003 SCC 37, para. 133.

39. *Hoogbruin v. A.G.B.C.*, 1985 CanLII 335 (BC CA), at para. 5 and 8.

40. *Haig v. Canada (Chief Electoral Officer)*, 1993 CanLII 58 (SCC), pp. 1032 and 1048.

41. *Figueroa v. Canada (Attorney General)*, 2003 SCC 37, para. 50.

42. *Henry v. Canada (Attorney General)*, 2010 BCSC 610, para. 143. Appeal dismissed: *Henry v. Canada (Attorney General)*, 2014 BCCA 30. Leave to appeal to the Supreme Court of Canada rejected: *Rose Henry et al. v. Attorney General of Canada* et al. 2014 CanLII 38981 (SCC). See also Bryan Schwartz and Dan Grice, *op. cit.*, pp. 20-22.

43. Section 1: The Canadian Charter of Rights and Freedoms guarantees the rights and freedoms set out in it subject only to such reasonable limits prescribed by law as can be demonstrably justified in a free and democratic society.

44. *Election Act (B.C.), Re*, 1986 CanLII 1084 (BC SC), para. 12. See also *Scott v. British Columbia (Attorney General)*, 1986 CanLII 1295 (BC SC), para. 12.

and the right to equality.[45] Similarly, the British Columbia Court of Appeal found that the provisions requiring electors to show identification in order to be eligible to vote constituted a reasonable and justified restriction on the right to vote. In the Court's view, these provisions introduced additional controls to prevent any potential for fraud and thus contributed to increasing public confidence in the integrity of the election system.[46]

In fact, the Supreme Court of Canada has recognized that the purpose of electoral laws is not only to allow every individual who is entitled to vote to participate, but also to preserve the integrity of the democratic process. "The same procedures that enable entitled voters to cast their ballots also serve the purpose of preventing those not entitled from casting ballots. [...] Fair and consistent observance of the statutory safeguards serves to enhance the public's faith and confidence in fair elections."[47] The Court also observed that:

> The balance struck by the Act reflects the fact that our electoral system must balance several interrelated and sometimes conflicting values. Those values include certainty, accuracy, fairness, accessibility, voter anonymity, promptness, finality, legitimacy, efficiency and cost. But the central value is the *Charter*-protected right to vote.[48]

The right to vote in municipal and school elections

The right to vote in municipal and school elections is not protected by section 3 of the Canadian Charter. It is, however, protected by section 22 of the Québec Charter, which guarantees the right to vote to "every person legally capable and qualified."[49] According to the courts, these terms effectively limit the scope of the right to vote protected by Section 22.[50] Unlike the right to vote in provincial elections, the right to vote in municipal and school elections is subject to conditions set out in electoral laws. These restrictions do not contravene the Québec Charter. They also do not have to meet a "reasonableness test", as provided for in the Canadian Charter.

In short, the right to vote is meaningful in light of a related series of other rights and values that are inherent to it. In order for citizens to fully benefit from their right, the State must provide the necessary means. From an equality perspective, these means may include special measures to address the difficulties faced by certain groups of electors. However, efforts to facilitate access to voting must be combined with restrictions that ensure the integrity of the electoral process and allow the population to have faith in it.

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45. *Fitzgerald v. Alberta*, 2002 ABQB 1086. Appeal dismissed: *Fitzgerald v. Alberta*, 2004 ABCA 184.

46. *Henry v. Canada (Attorney General)*, 2014 CanLII 30 (BCCA), para. 100.

47. *Opitz v. Wrzesnewskyj*, 2012 SCC 55, para. 35 and 38. Cited in *Frank v. Canada (Attorney General)*, 2019 SCC 1, para. 11.

48. *Opitz v. Wrzesnewskyj*, 2012 SCC 55, para. 44.

49. Charter of Human Rights and Freedoms, CQLR, c. C-12, s. 22.

50. *Cheers Management Inc. v. Montréal (Ville de)*, [1991] R.J.Q. 794, pp. 6-9. See also *Baie-d'Urfé (Ville) v.* Québec (Attorney General), 2001 CanLII 24845 (QCCS), paras. 261 to 263; *Tomlison v. Forget*, 2013 QCCQ 14612, paras. 54-56; and *Québec (Attorney General) v. Arnold*, 2015 QCCS 3369, paras. 60-64.

2.1.2 The evolution of electoral laws

The series of changes made to Québec's electoral laws is part of a clear trend to make the right to vote increasingly accessible, while maintaining the integrity of the electoral process. Over time, two components of this trend have become evident. On the one hand, the right to vote was granted to a growing number of citizens, especially during the 20th century. For example, the property ownership-based system[51] was abolished in 1936, and women and Indigenous peoples were granted the right to vote in 1940 and 1969, respectively.[52] On the other hand, various measures have gradually been added to electoral laws to facilitate voting and to encourage elector participation. For example, as early as the start of the 20th century, the law required employers to allow employees to take time off work to vote.[53] During the period that we are reviewing, many changes were introduced to facilitate voting.

Accessibility of polling places and special assistance measures

When the amended *Election Act* was passed in 1989 and the *Act respecting elections and referendums in municipalities* (AERM) was enacted in 1987, advance polling places had to be made accessible to persons with disabilities.[54] These laws also provided that, on election day, polling places should be easily accessible to the public, but they did not establish any specific accessibility requirements. This obligation was introduced into provincial law in 1995, and then into the school and municipal acts in 2002 and 2016.[55]

In the late 1980s, the provincial and municipal acts provided for assistance measures for electors who are unable to mark their ballot papers themselves, as well as for those who are visually impaired, deaf or mute. Similar measures were introduced in *An Act respecting school elections* in 2002.[56]

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51. In order to be eligible to vote, citizens had to own property, earn a certain income, or pay a certain amount of income tax or rent. (Élections Canada, *A History of the Vote in Canada*, 2007, p. 2 and Assemblée nationale du Québec, « Cens », *Encyclopédie du parlementarisme québécois*, [Online]. [http://www.assnat.qc.ca/fr/patrimoine/lexique/cens.html].)

52. Denis Laforte and André Bernard, *Législation électorale au Québec – 1790-1967*, 1969, pp. 120 and 127; Directeur général des élections du Québec, *Améliorer l'accès au vote et favoriser son exercice*, 2004, pp. 8-9.

53. *Ibid.*, p. 162.

54. The obligation was introduced in the *Election Act* as of 1985. (*Election Act* SQ, 1984, c. 51; *Act respecting elections and referendums in municipalities*, SQ, 1987, c. 57.)

55. *An Act to establish the permanent list of electors and amending the Election Act and other legislative provisions*, SQ 1995, c. 23; *An Act to amend the Act respecting school elections*, SQ 2002, c. 10; *An Act to amend various municipal-related legislative provisions concerning such matters as political financing*, SQ 2016, c. 17

56. *An Act to amend the Act respecting school elections*, SQ 2002, c. 10.

Registration and verification of elector identity

In 1995, adoption of *An Act to establish the permanent list of electors and amending the Election Act and other legislative provisions*[57] provided Québec with a computerized permanent list of electors. At the public hearing, the Chief Electoral Officer summarized the objectives sought by the implementation of this list as follows: [*translation*] "reduce the duration of the election campaign, reduce the costs of preparing the list of electors by eliminating a census at each of the three levels, protect personal information, make the elector's entry permanent, maintain the principle of electors' freedom to say whether they want to be on the list of electors, improve the quality of the lists, and facilitate the production of the lists of electors."[58] In 1998, changes were made to the law so that new electors who had turned 18 or who had become Canadian citizens would automatically be added to the permanent list of electors.[59]

The following year, another measure aimed at ensuring the integrity of the electoral process was adopted at the three elected levels. Ever since, electors must show a recognized identity document when voting to prove their identity.[60] In order to mitigate the effects of this measure on voting, the voter identity verification panel was also introduced. Thus, an elector who is unable to produce one of the required documents may be allowed to vote, after taking an oath, by presenting other documents that prove their identity or where accompanied by a person who can attest to their identity and address.

Advance polling, the end of an exceptional option

The option of voting at advance polls has long been a feature of Québec's electoral legislation.[61] However, in the late 1980s, this option was reserved for certain groups: election officers, persons with disabilities and anyone who had reason to believe they would be absent or unable to vote on polling day. In order to vote in an advance poll, the elector had to take an oath that they could not vote on election day. A note to this effect was then entered in the poll book.

Advance polling became more democratic in the 2000s. Firstly, the need to take an oath and record it in the poll book were abolished.[62] Then, in 2004, the Chief Electoral Officer recommended devoting two full days to advance polling. He pointed out that this option was "no longer being perceived as an exceptional voting measure"[63] and that the circumstances justifying its use were

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57. SQ 1995, c. 23.

58. Assemblée nationale du Québec, Commission permanente des institutions, *Journal des débats*, 35th Legislature, 1st Session, No. 7, December 19, 1994.

59. *An Act to amend the Election Act, the Referendum Act and other legislative provisions*, SQ 1998, c. 52.

60. *An Act respecting the obligation to establish one's identity before voting and amending other legislative provisions pertaining to elections*, SQ, 1999, c. 15.

61. The 1945 *Election Act* gives certain categories of electors the right to vote in advance polls. These electors can vote in special offices in 17 cities and towns and 5 villages across Québec. (Chief Electoral Officer, *op. cit.*, 2004, pp. 9-10.)

62. *An Act to amend the Election Act and the Referendum Act*, SQ 2001, c. 72; *An Act to amend various legislative provisions concerning municipal affairs*, SQ 2002, c. 37; *An Act to amend the Act respecting school elections*, SQ 2002, c. 10.

63. Chief Electoral Officer, *op. cit.*, 2004, p. 64.

bound to multiply. Following this recommendation, the opening hours of advance polls for provincial elections were extended to two consecutive days. Adjustments were also made to the *Election Act* to allow all electors to vote at advance polls without restrictions.[64] Such restrictions were also repealed for school board elections in 2006 and municipal elections in 2009.[65]

Diversification of voting options

Expansion of advance polling has been accompanied by a diversification of voting options, particularly in provincial elections. Beginning in 1989, the *Election Act* introduced measures to facilitate voting for certain electors. The Act provided for the installation of mobile polling stations in residential and long-term care centres (CHSLDs) and hospital centres so that electors who were living in these places and could not move about due to health reasons could vote. Electors outside Québec were also given the opportunity to vote by mail.

Fifteen or so years later, in 2004, the Chief Electoral Officer recommended the addition of other voting mechanisms.[66] In reaction to the draft bill incorporating several of the proposed measures, he stated that: [*translation*] "These special provisions will make it much easier for electors who are travelling, seniors and electors with functional limitations to vote, since some of these people would have no other means of exercising their right to vote. These measures will promote fairness and concrete access to voting [...]."[67]

As a result of this work, *An Act to amend the Election Act to encourage and facilitate voting* was passed in 2006. In particular, this law provided for the introduction of the following measures:

- Voting at the office of the returning officer, for electors of the electoral division or for those who are temporarily absent from their electoral division;

- Extending mobile polling to all public and private care facilities and to the domiciles of electors who are unable to move about for health reasons.

Changes were made to the mobile polling system as soon as the Act was passed. It was not until 2013 that provisions regarding voting at the office of the returning officer came into force.[68]

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64. *An Act to amend the Election Act to encourage and facilitate voting*, SQ 2006, c. 17.

65. *An Act to amend the Act respecting school elections and the Education Act*, SQ 2006, c. 51; *An Act to amend the Act respecting elections and referendums in municipalities and other legislative provisions*, SQ 2009, c. 11.

66. Chief Electoral Officer, *op. cit.*, 2004, pp. 65 et seq.

67. Assemblée nationale du Québec, Commission spéciale sur la *Loi électorale*, *Allocution du directeur général des élections et président de la commission de la représentation électorale devant la commission parlementaire chargée de l'étude de l'avant-projet de loi électorale*, November 1, 2005, p. 7.

68. However, agreements between the Chief Electoral Officer and the political parties represented in the Assemblée nationale have made it possible to test this method during general elections and by-elections. (*Gazette officielle du Québec*, January 9, 2008, 140th year, No. 2, p. 50; *Gazette officielle du Québec*, November 16, 2011, 143rd year, No. 46, p. 4968; *An Act to amend the Election Act with regard to on-campus voting by students in vocational training centres and post-secondary educational institutions*, SQ, 2013, c. 5.)

In addition, the original bill proposed that voting by mail be offered to all electors. However, this measure was withdrawn in favour of the voting options mentioned above, in order to balance accessibility to voting with the integrity of the electoral process.[69]

The last major change with regard to provincial elections was the introduction of polling stations in vocational centres and post-secondary educational institutions, in 2013.[70] These polling stations are reserved for voters who are studying in these institutions. Electors can vote in these polling stations for candidates of the electoral division where they are domiciled. The goal of passing this bill was to [*translation*] "[improve] and [increase] the participation of young electors in the democratic process".[71]

Municipal and school elections have not evolved in the same way. However, the AERM has provided for mobile polling since 2001 and voting by mail since 2009.[72] Voting by mail is made available through a resolution of the municipal council. It is reserved for voters who are not domiciled in the municipality, but who either own a property or have a business in the municipality. In addition to the high cost of introducing this measure in municipalities, it was the desire on the part of municipalities "to protect the integrity of the vote at the municipal level"[73] that justified the choice to limit voting by mail to a portion of the electorate. More recently, certain municipalities have tested voting at the office of the returning officer or at the domicile of electors who are unable to move about. However, these two methods have not yet been added to the law.[74] Mobile polling was introduced for school elections in 2006.

Testing new methods of voting

Some of the voting options offered today have been tested before being incorporated into electoral legislation. Since 1989, the *Election Act* has included a provision that allows the Chief Electoral Officer to recommend new ways that citizens can exercise their right to vote. The AERM has

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69. Assemblée nationale du Québec, *Journal des débats*, 37th Legislature, 2nd Session, vol. 39, No. 38, June 6, 2006, p. 2187 (L. Thériault).

70. *An Act to amend the Election Act with regard to on-campus voting by students in vocational training centres and post-secondary educational institutions*, SQ, 2013, c. 5.

71. Assemblée nationale du Québec, *Journal des débats*, 40th Legislature, 1st Session, vol. 43, No. 41, April 18, 2013, p. 2557 (B. Drainville).

72. The AERM was amended in 2008 and the regulation establishing terms and conditions and safeguards to ensure the integrity of voting came into effect in 2009. (*An Act to amend various legislative provisions concerning municipal affairs*, SQ 2008, c. 18; *Regulation respecting voting by mail*, CQLR, c. E-2.2, r. 3.)

73. Assemblée nationale du Québec, Commission de l'aménagement du territoire, *Journal des débats*, 38th Legislature, 1st Session, vol. 40, n. 34, May 29, 2008, p. 7 (N. Normandeau).

74. Bill No. 49 (*An Act to amend the Act respecting elections and referendums in municipalities, the Municipal Ethics and Good Conduct Act and various legislative provisions*), tabled at the Assemblée nationale du Québec on November 13, 2019, provides for the addition of these voting methods to the AERM.

contained this provision since 1996.[75] The provision allows municipalities to test new methods of voting once they have reached an agreement with the Minister of the Ministère des Affaires municipales et de l'Habitation and the Chief Electoral Officer. This option was added to *An Act respecting school elections* in 2002.[76] Under this amendment, once they had concluded an agreement, school boards could test new methods of voting which would allow to [*translation*] "envisage a progressive diversification of the terms and conditions for exercising the right to vote."[77]

The changes that were introduced illustrate the progress made with regard to access to voting in recent decades. These measures were related to the accessibility of polling places, assistance, increased access to advance polling and the diversification of voting options. They were all introduced with the stated objective of facilitating voter participation. These changes were made gradually and caution was exercised. They were accompanied by measures to ensure the integrity of the process. These measures include creating the permanent list of electors, requirements for verifying elector identity, restrictions for certain voting options and provisions for testing new methods of voting. As in case law, the evolution of electoral legislation reflects the need of preserving a balance between the principles and values that are the very foundation of the right to vote and democratic elections.

Internet voting considerations

The analysis of Internet voting is part of this desire to expand access to voting while preserving the integrity of the electoral process. The courts have recognized the State's positive obligation to facilitate voting. Moreover, the changes made to legislation over time reflect a clear will on the part of the legislators to facilitate voting and the active role that the Chief Electoral Officer plays in proposing improvements.

This review of the constitutional and legal framework also provides useful avenues for analysis. Thus, in order for Internet voting to be a feasible option, it should facilitate the exercise of the right to vote while ensuring, through a set of criteria, the integrity and security of the electoral process. Internet voting could also meet the specific needs of individual electors, but it should not disadvantage certain groups to the benefit of others. This voting option could be subject to certain conditions or restrictions to reduce or eliminate any associated risks. A balance should be struck between access to voting and imposing constraints that are reasonable and justified by the values and principles that govern elections. Finally, measures should be put in place to maintain the trust that stakeholders have in the electoral system. This approach is essential to the introduction of Internet voting.

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75. In 1996, the provision applied to general elections only. It was extended to by-elections and referendum polls the following year. (*An Act to amend the Cities and Towns Act, the Municipal Code of Québec and other legislative provisions*, SQ 1996, c. 77; *An Act to again amend various legislative provisions respecting municipal affairs*, SQ 1997, c. 93.)

76. *An Act to amend the Act respecting school elections*, SQ 2002, c. 10.

77. Assemblée nationale du Québec, *Journal des débats*, 36th Legislature, 2nd Session, vol. 37, No. 81, March 26, 2002 (S. Simard).

2.2 A summary of elections and voter turnout

In order to assess the potential advantages and disadvantages of Internet voting and the needs to which it could respond, we must first understand the context in which it could be introduced. With this in mind, we will now review the primary parameters for organizing provincial, municipal and school elections in Québec. We will also review the voting options offered at each of the three levels and will explain certain features. We will then turn our attention to Québec electors. Based primarily on data from provincial elections, we will explore the use of various voting options as well as the reasons behind voter abstention.

2.2.1 Organizing elections

Provincial elections

Québec has 125 electoral divisions, from which the 125 members of the Assemblée nationale are elected. The Chief Electoral Officer, who reports to the Assemblée nationale, is responsible for administering the *Election Act*. Therefore, the administration of elections is both independent and neutral. In each electoral division, a returning officer is responsible for organizing the election. Returning officers are appointed by the Chief Electoral Officer, whom they report to, for a 10-year term. Returning officers are responsible, among other things, for recruiting and training election officers, updating the list of electors, authorizing candidacies, setting up the various voting options, validating the results and declaring the election. In order to vote, electors must be eligible to vote and be registered on the list of electors for the electoral division where they are domiciled.

Municipal elections

There are approximately 1,100 municipalities in Québec.[78] Therefore, up to 1,100 general elections can take place simultaneously across the province. Municipalities in Québec are quite different from one another, however. Only 182 municipalities have more than 5,000 inhabitants, of which 10 have more than 100,000 inhabitants. However, these cities represent 85% of the Québec population. Conversely, more than 900 municipalities are home to fewer than 5,000 inhabitants. In these smaller municipalities, municipal staff is often limited to a secretary-treasurer, an assistant and a handful of support staff.

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78. Ministère des Affaires municipales et de l'Habitation, *General municipal regime*, [Online]. [https://www.mamh.gouv.qc.ca/organisation-municipale/organisation-territoriale/organisation-territoriale-municipale/regime-municipal-general/].

The vast majority of municipal councils are made up of a minimum of seven elected positions: one mayor and six councillors. In municipalities that are divided into districts[79], electors vote for the mayor and their district councillor. In other municipalities, electors vote for the position of mayor as well as for all councillor seats when there is more than one candidate. During the 2017 municipal general elections, just over half (56%) of the seats were filled unopposed.[80] In certain municipalities, electors can also be called on to vote for the position of warden (*préfet*) for their regional county municipality (RCM).[81] In 2017, 16 of Québec's 87 RCMs chose to elect their warden by universal suffrage.

While Élections Québec is responsible for overseeing provincial elections, application of the *Act respecting elections and referendums in municipalities* is the mandate of the Ministère des Affaires municipales et de l'Habitation.[82] Municipalities administer their own elections and either the clerk or the secretary-treasurer takes on the role of returning officer. The returning officer is responsible for the entire electoral process, from the preparation and revision of the list of electors to managing the poll, the counting of votes, and including authorization of candidacies. Élections Québec assists returning officers through the various stages of each poll, particularly by providing telephone support and training. The institution also provides municipalities with a list of electors domiciled in the municipality. Electors who are not domiciled in the municipality (owners or co-owners of a property or occupants or co-occupants of a business establishment) also have the right to vote. In the latter case, only one person per property or establishment may exercise the right to vote. They must submit a registration application to the returning officer in order to be entered on the list of electors.

School elections

Since February 8, 2020, following the adoption of *An Act to amend mainly the Education Act with regard to school organization and governance*[83], the governance structure of the Québec school system has changed. School boards have become school service centres. Modifications have been made to the structure of their Board of Directors and the way in which members are designated.

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79. Municipalities with more than 20,000 inhabitants are required to divide their jurisdiction into districts. In other municipalities, this division is not mandatory, but may be introduced following a resolution of the municipal council.

80. Ministère des Affaires municipales et de l'Habitation, *Portrait statistique des élections municipales 2017*, [Online]. [https://www.electionsmunicipales.gouv.qc.ca/fileadmin/publications/elections/portrait_statistique_elections_municipales_2017.pdf].

81. RCMs are made up of several municipalities in the same territory. The mayors of these municipalities comprise the RCM council. In most cases, the members of this council elect the warden. However, RCMs may choose to elect the council by universal suffrage. In this case, the election takes place at the same time as the municipal council election.

82. Bill 49 (*An Act to amend the Act respecting elections and referendums in municipalities, the Municipal Ethics and Good Conduct Act and various legislative provisions*) tabled at the Assemblée nationale on November 13, 2019, provides for amendments to the duties and powers of the Chief Electoral Officer, in particular with respect to directives.

83. SQ 2020, c. 1. This law modified *An Act respecting school elections*, which is now entitled the *Act respecting school elections to elect certain members of the boards of directors of English-language school service centres* (ASEESSC).

Henceforth, only certain members of English-language school service centres (parent members and community members) may be elected by universal suffrage. To date, this new Act has not yet been applied to elections.

There are nine English-language school service centres in Québec. These centres will continue to be responsible for organizing elections within their boundaries. The returning officer will be responsible for overseeing the entire process. Élections Québec will provide them with support services.

2.2.2 Available voting options

Voting options differ from one elected level to another, in particular since they must take into account the organizational capacities and characteristics of each type of election. Certain options are offered to the entire electorate. Others target specific elector groups in particular circumstances. These options are intended to alleviate the barriers associated with distance or with a trouble moving about. Currently, all voting is carried out using paper ballots. With the exception of voting by mail, votes are cast in the presence of election officers, who verify the identity of electors and ensure that they vote in accordance with the provisions of electoral laws.

TABLE 2.1 **Summary of voting options available to all electors**

These votes are cast at a polling station supervised by election officers, in a location chosen by the electoral administration.

Voting on polling day

Provincial elections	Municipal elections	School elections
1 day	1 day	1 day

Vote par anticipation

Provincial elections	Municipal elections	School elections
2 days	1 or 2 days (municipal decision)	1 day

Voting at the office of the returning officer

Provincial elections	Municipal elections
5 days	–
All electors in the electoral division and those temporarily residing there	Certain municipalities have experimented with voting at the office of the returning officer

TABLE 2.2 **Summary of voting options available to certain electors**

These votes are cast in advance in a polling station supervised by election officers where the targeted electors study or reside.

Voting in educational institutions (during general elections only)

Provincial elections	
All electors who attend the educational institution	**4 days**

Voting in residential facilities (facility included in the MSSS register where 50 or more persons reside)

Provincial elections	
All electors who either permanently or temporarily reside in the residential facility	**2 days** (specific periods only)

These votes are cast in advance at a polling station supervised by election officers who travel where targeted electors reside.

Mobile polling for people who are unable to move about

Provincial elections	
All electors who are unable to move about for health reasons At the elector's domicile or in a residential facility not listed in the MSSS register; in a hospital centre, rehabilitation centre or residential facility with fewer than 50 residents listed in the MSSS register.	**5 days** (specific periods only)
Municipal elections	
Certain municipalities have experimented with voting in the elector's domicile	**3 days** (specific periods only)
All electors who reside in the residential facility and are unable to move about In a residential and long-term care centre (CHSLD), a hospital centre, a rehabilitation centre or a private seniors' residence registered in the MSSS register.	
School elections	
All electors who reside in the residential facility and are unable to move about In a CHSLD or a private seniors' residence registered in the MSSS register.	**3 days** (specific periods only)

Mobile polling in remote regions

Provincial elections	
All electors who either permanently or temporarily reside in a workers' camp or in an isolated community identified by Élections Québec	**7 days** (specific periods only)

TABLE 2.2 **Summary of voting options available to certain electors (*continued*)**

These votes are cast remotely and without the presence of an election officer.

Advance polling by mail in remote regions

Provincial elections
All electors who either permanently or temporarily reside in a polling subdivision with special measures determined by Élections Québec

Voting by mail (electors outside Québec or not domiciled in the municipality)

Provincial elections	Municipal elections
All electors who reside outside Québec for less than two years and who intend to return to the province	All electors who are not domiciled in the municipality (municipal decision)

Voting by mail in correctional institutions

Provincial elections	Municipal elections
All electors who are inmates of a provincial or federal detention centre or youth centre	No measures are planned or in effect, even though the AERM provides that imprisoned electors have the right to vote

Voting on polling day and advance polling

Voting on polling day and advance polling are organized in a similar fashion, regardless of the election. On these days, several polling places are available within a certain proximity to voters' domiciles. For provincial elections, voting takes place on Monday, and advance polling is available on the preceding Sunday and Monday. A maximum of 425 electors are grouped into polling subdivisions according to their domicile. On polling day, one polling station in a public place is made available for each polling subdivision. On advance polling days, a polling station may serve more than one polling subdivision.

Municipal and school elections are held on Sundays and advance polling takes place on the preceding Sunday. Municipalities may schedule a second day of advance polling on the Monday before election day. Municipal and school laws are not as specific regarding the number of electors per polling station. However, the AERM provides that a maximum of 500 electors may be directed to the same polling station on polling day. It does not establish a similar limit for advance polling. The act governing school elections states that there must be at least one polling station per sector on polling day and one per electoral division for advance polls.

In order to vote, electors must present a piece of identification to the election officers at their polling station. Once electors have cast their vote, election officers check their names off the list of electors so they can only vote once. The lists used on election day show which electors have voted in advance polls in one of many ways.

Voting at the office of the returning officer

During provincial elections, five additional voting days are offered at the returning officers' primary and secondary offices. These polls are held on the Friday and Saturday preceding the advance poll and on the following Tuesday, Wednesday and Thursday. Electors who are not on the list of electors may register on the list at the same time. The office is open to all electors in the electoral division, as well as those who temporarily reside there, who can vote for a candidate from their domicile electoral division. This decompartmentalization of the vote is possible thanks to a computer system that allows for votes cast to be recorded on the list of electors in real time. As soon as an elector has cast their vote, the computerized list of electors is automatically updated.

This voting option has been tested in certain municipalities, but it is not provided for in the municipal and school electoral laws that are currently in force.

Voting in educational institutions

During provincial general elections, polling stations are also set up in post-secondary institutions (colleges and universities) and in vocational centres that have a minimum of 300 electors. Students attending these institutions can simultaneously register on the list of electors and vote for a candidate in their electoral division. Since many students leave home for the duration of their studies, this voting option allows them to vote without having to return to their electoral division. Voting in educational institutions takes place during the same period as voting at the offices of returning officers, apart from Saturdays. The real-time vote marking system is also used during these polls.

Voting in residential facilities

During provincial elections and in parallel to advance polling, polling stations are set up in residential and long-term care centres (CHSLDs) and private residences for seniors with 50 or more residents featured in the register of the Ministère de la Santé et des Services sociaux (MSSS). This option allows electors who are domiciled or temporarily residing in these residential facilities to vote without having to travel. They may vote for a candidate from the facility's electoral division or from another division, depending on their primary domicile. These polling stations operate in a similar way to advance polling stations, but their schedules are determined by the returning officers.

Mobile polling for people who are unable to move about

With the exception of voting on polling day and advance polling, the only other option available at all three elected levels is mobile polling for those unable to move about. If a request is made by an elector who is unable to move about for health reasons, a voting team may travel to their home. The voting options, the types of residences that are eligible and the voting days vary based on the elected level.

This applies to several types of residences during provincial elections: electors' homes, private dwellings, hospital centres, rehabilitation centres and all other residential facilities that do not meet the criteria for a polling station (see Table 2.2). The voting team travels on the days where electors can vote at the office of the returning officer. Where an elector has made a request for a specific establishment, other residents can vote at that office on a spontaneous basis. A caregiver to an elector who is eligible for voting at home may also vote if they live in the same polling subdivision.

During municipal elections, electors who are eligible for mobile polling include those who reside in a CHSLD, hospital centre, rehabilitation centre or private seniors' residence included in the MSSS register. Mobile polling is offered on the Saturday, Sunday and/or Monday preceding the election based on the schedule established by the returning officer. Electors who reside in a CHSLD or private seniors' residence included in the MSSS register are eligible for mobile polling during school elections. Mobile polling takes place on the Sunday of the advance poll before polling stations open and, if necessary, on Saturday and Monday based on a schedule established by the returning officer. Where an elector has made a request for a specific establishment, other residents can vote at that office on a spontaneous basis.

Mobile polling in remote regions

Québec's remote regions are distinctive compared to the rest of Québec due to their vast area and the fact that the population is dispersed. These characteristics make access to voting challenging. In response to this particular reality, section 489.1 of the *Election Act* provides that the Chief Electoral Officer may adapt certain provisions. Mobile polling is one such adaptation. Following a directive from the Chief Electoral Officer, voting teams may travel to isolated communities or workers' camps to allow electors who reside there on a permanent or temporary basis to vote. They can also change elector entries on the list of electors, as required. In cases where a team cannot travel to a location, the Chief Electoral Officer may organize voting by mail. During the 2018 general election, mobile polling was offered to communities in eight electoral divisions.

Voting by mail

In contrast to other voting options, voting by mail can be carried out remotely and does not require supervision on the part of election officers. These options are closest to the Internet voting option that is explored in this study. However, voting by mail requires ballot papers that are sent by mail. The voting by mail option is also reserved for certain groups of electors in particular situations. These groups differ according to the elected level. Voting by mail is not offered in school elections.

Three groups are eligible to vote by mail during provincial elections:

- Electors outside Québec who meet certain requirements;[84]
- Electors in provincial and federal correctional institutions and youth centres;
- Electors who are located in an isolated community or a workers' camp.

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84. In addition to the conditions required to vote in Québec, these electors must meet three requirements: (1) when they left Québec, they had been domiciled in the province for at least 12 consecutive months; (2) they intend to return to Québec; (3) they left Québec less than two years before or were posted outside Québec in the course of employment for the Québec or Canadian governments, an international organization of which Québec or Canada is a member and to which it makes a contribution, or the Canadian Armed Forces. Spouses and dependent persons who are eligible to vote and who live at the same address are also eligible to vote by mail.

During municipal elections, voting by mail is reserved for electors who are not domiciled in the municipality. The municipal council must decide whether or not to offer this option. During the 2017 general elections, 121 municipalities passed a resolution to allow this type of voting.

Voting by mail is administered centrally by Élections Québec during provincial elections and by returning officers during municipal elections. During provincial elections, voting by mail in remote regions is administered by returning officers. In order to vote by mail, eligible voters must apply to be registered. Electors may submit their application by mail, fax or email or, if they are outside Québec (during provincial elections), via a secure platform on the Élections Québec website.[85] Once registered, electors receive voting materials in the mail. Depending on the time that it is sent and the type of vote by mail, the ballot paper may be blank or show the names of the candidates.

Ballots are also returned in the mail. Electors insert their ballot into a first envelope, which they seal and insert into a second envelope, which they sign. The purpose of this double envelope system is, among other things, to confirm the identity of electors and to maintain the secrecy of the votes cast. Upon receipt of the envelopes, election officials first ensure that the signatures match those supplied for registration. They then separate the envelopes and place the envelope containing the ballot in a ballot box. Ballots are counted once polling stations have closed.

Electors pay the cost of returning the ballot papers, except for those in correctional institutions and youth centres, where the Chief Electoral Officer covers the cost. During provincial elections, electors must return their ballots no later than 8:00 p.m. on polling day. During municipal elections, the deadline is 4:30 p.m., two days before the poll. Any votes received after this deadline are not counted. All votes that are received on time are counted and included in the results of the electoral division (or district, if applicable) in which the electors are domiciled.

2.2.3 The use of voting options

Overall, electors who vote are satisfied with their experience.[86] The diversification of voting options appears to contribute to this. In a survey conducted following the 2018 provincial general election, 81% of respondents said that having multiple voting options was very important to them.[87] Similarly, 79% indicated that the opening hours of polling stations (days and hours) was also very

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85. During provincial elections, the names of electors who registered to vote outside Québec are removed from the list of electors so that they cannot vote twice. Their names will appear once more on the list of electors when they return to the province either on the date indicated in their registration application or when they notify Élections Québec.

86. Since 2003, Élections Québec has commissioned various research firms to measure elector satisfaction following each general election. Following these six elections, the satisfaction rate was maintained between 8.4 and 9.1 out of 10. (BIP Recherche (1), *Évaluation de la satisfaction des citoyens du Québec à la suite des élections générales du 1er octobre 2018*, 2018, p. 44.)

87. The question asked was: "On a scale of 1 to 10, how important are the following factors to ensure your satisfaction regarding the services provided during an election?" Where respondents answered 9 or 10, it meant that they considered this element to be very important. (*Ibid.*, p. 45)

important. These were the two satisfaction factors with the highest scores. Conversely, travel time to the polling station and wait times scored the lowest, although they were considered very important by 69% and 67% of respondents, respectively.[88]

This assessment of the various voting options is confirmed by a gradual shift of the vote on polling day toward the range of advance polling options. While only 7.2% of electors exercised their right to vote before polling day in 1998, 27.3% did so twenty years later.[89]

CHART 2.1 **Distribution of votes during provincial general elections since 1998**
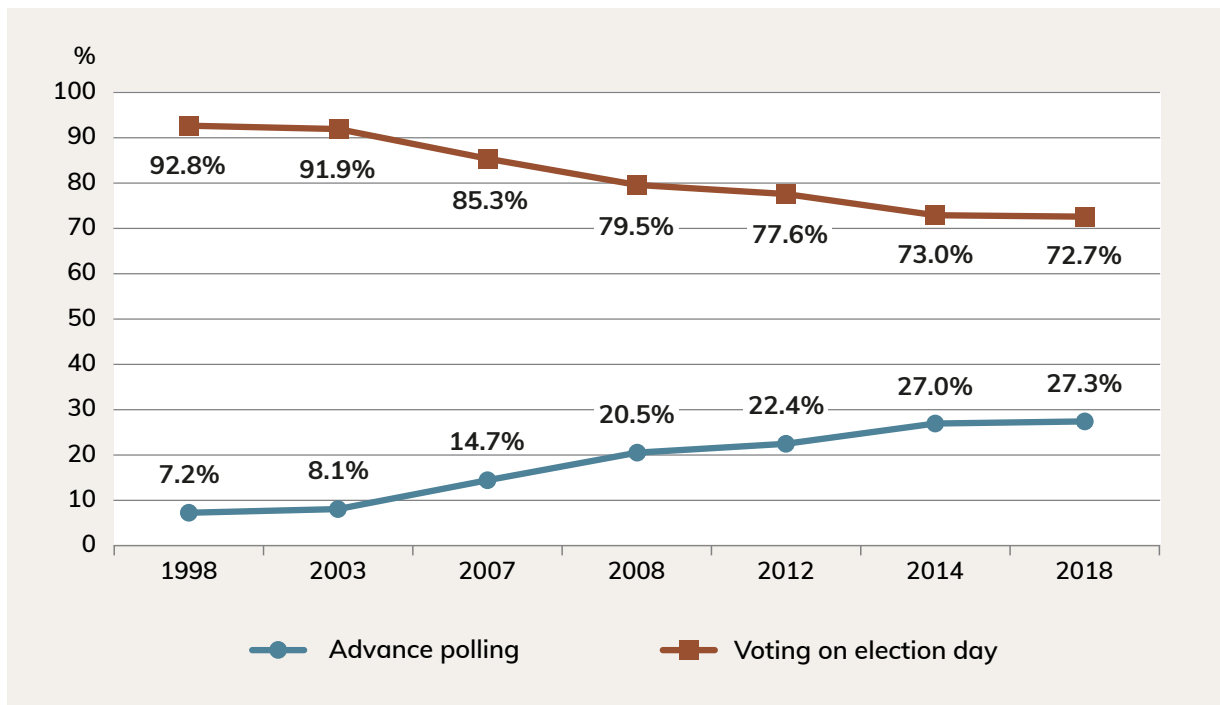
This shift in voting was mainly in favour of the two advance polling days and, since 2018, voting at the office of returning officers. None of the voting options reserved for specific groups exceed 2% of the votes cast, making it more difficult to determine a trend with regard to their use. Nevertheless, these arrangements make it easier for thousands of electors to exercise their right to vote. Participation rates during the last two general elections (shown in Table 2.3) indicate the number of electors who used these options for health or distance reasons.

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88. Other factors measured were staff courtesy; clarity and relevance of information received; and ease of access at the polling station.
89. Following the 2007 general election, advance polling was extended to all electors and extended to two full days.

TABLE 2.3 **Use of voting options during the 2014 and 2018 provincial general elections**[90]
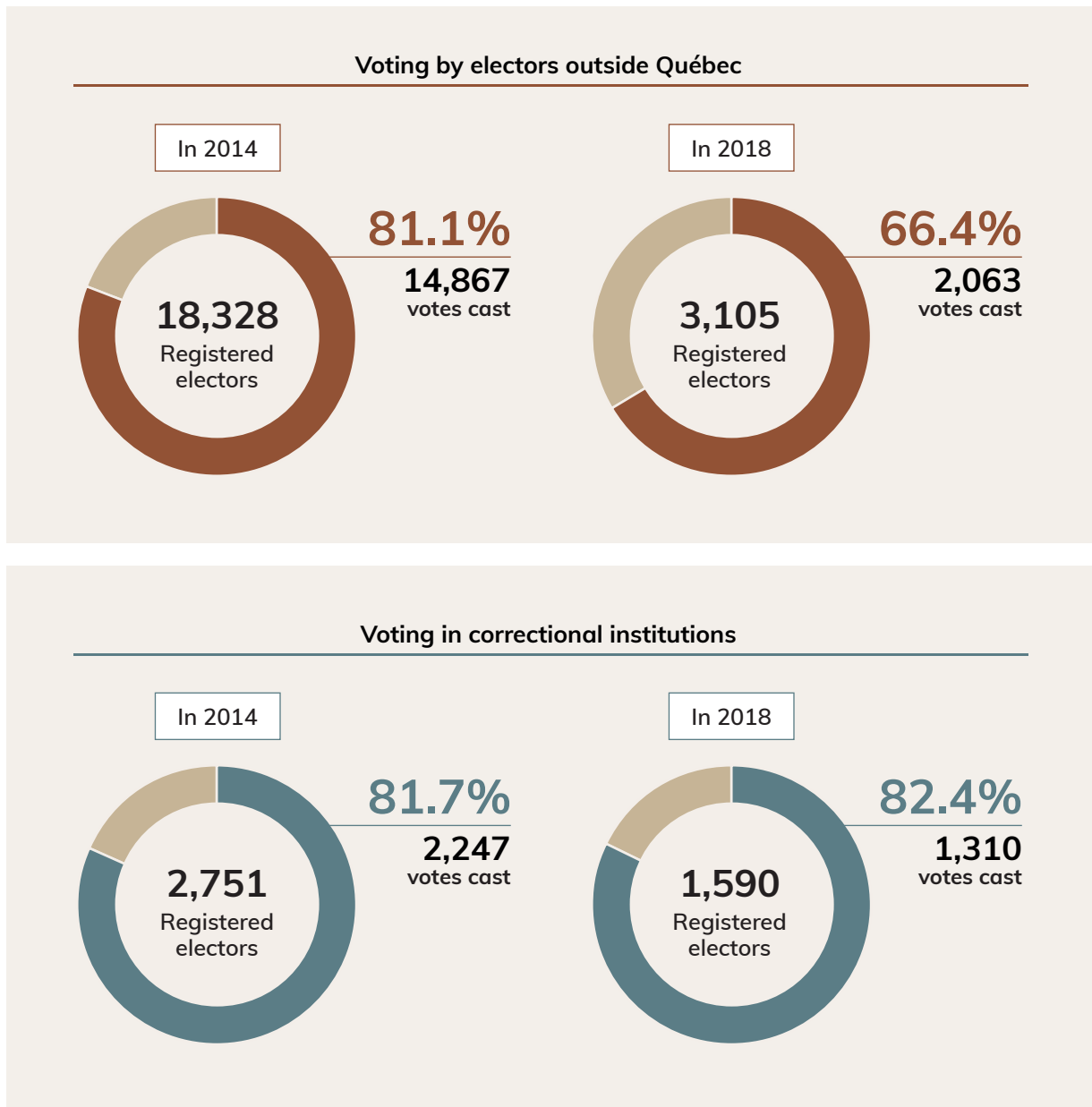
Voting options	Number of votes cast	
	2014	**2018**
Options available to all electors		
Voting on polling day	3,135,076	2,982,051
Advance polling	938,209	725,079
Voting at the office of the returning officer	62,571	268,502
Options available to certain electors		
Voting in educational institutions	54,670	43,634
Voting in residential facilities	67,779	71,719
Mobile polling (in elector's homes, residential facilities, hospital centres, rehabilitation centres)	19,636	13,139
Voting by electors outside Québec	14,867	2,063
Voting in correctional institutions	2,247	1,310

In general, the number of postal votes remains low from one election to the next. Indeed, voting outside Québec and in correctional institutions is relevant to smaller groups of the electorate. However, the April 7, 2014, general election was an exception, as a record number of electors outside Québec exercised their right to vote.[91] There is also a discrepancy between the number of registrations for voting by mail and the number of votes cast (see Chart 2.2). During the last two general elections, the ballot paper return rate was just over 80%, with the exception of the return rate for votes outside Québec, which was 66.4% in 2018. One reason for this difference is the geographical distribution of electors, since postal delays and costs vary from one part of the world to another.[92] This shows that voting by mail can be more challenging, depending on the location.

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90. Certain voting options are not shown in the table, in particular where the number of votes cast was too low. The results were therefore merged with another option to preserve the confidentiality of these votes.

91. This increase can be explained by the polling date, which coincided with a period when many Quebecers had left Québec for the winter and had not yet returned. The number of electors outside Québec changes throughout the year.

92. In 2014, the majority of requests for entry on the list of electors outside Québec came from Florida, which may have contributed to a higher ballot paper return rate. In 2018, electors were more dispersed.

CHART 2.2 **Use of voting by mail during the 2014 and 2018 provincial general elections**

Voting by electors outside Québec

In 2014

81.1%
14,867
votes cast

18,328
Registered
electors

In 2018

66.4%
2,063
votes cast

3,105
Registered
electors

Voting in correctional institutions

In 2014

81.7%
2,247
votes cast

2,751
Registered
electors

In 2018

82.4%
1,310
votes cast

1,590
Registered
electors

2.2.4 Reasons behind voter abstention

Although electors are appreciative of the diversification of voting options, voter turnout rates in provincial, municipal and school elections has not increased. On the contrary, voter turnout rates during provincial elections have decreased over the past twenty years. Voter turnout also decreased during school elections, while it remained stable in municipal elections.

CHART 2.3 **Participation in provincial, municipal and school general elections**[93]
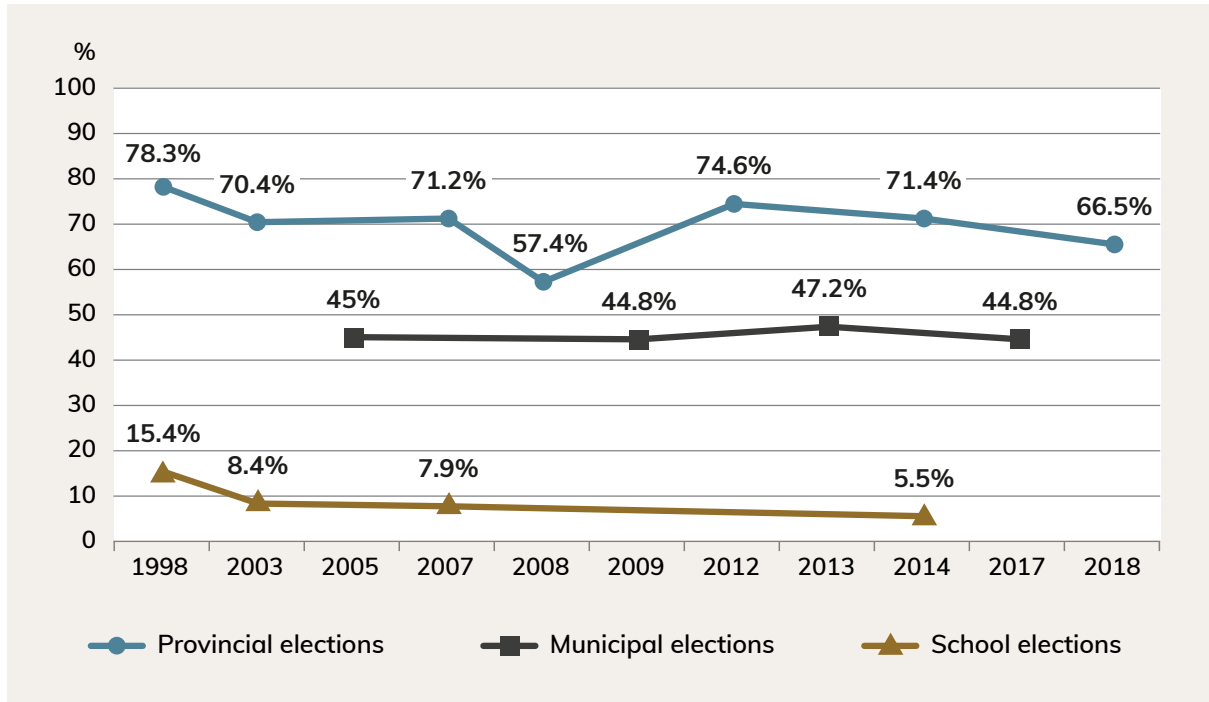

The decline in voter turnout during provincial elections is more pronounced over a longer period (Chart 2.4). Two main phenomena stand out. On the one hand, fewer young people than older people vote at any time. On the other hand, each generation of electors votes less than the previous one and this trend seems to be more pronounced in outlying regions.[94] Electors between 55 and 74 years of age are the most likely to vote. This observation has been confirmed in several general elections.[95]

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93. The period reviewed begins in 1998 for provincial and school board elections, following the creation of the permanent list of electors and the first election of school board chairs by universal suffrage. These events may have impacted voter turnout. For municipal elections, the period reviewed begins in 2005, when the first general elections were held simultaneously across Québec.

94. Justin Savoie, François Gélineau and Éric Montigny, *Note de recherche sur la participation électorale sur la période 1985-2014*, [Online], 2016, p. 3 [http://www.cms.fss.ulaval.ca/recherche/upload/chaire_democratie/fichiers/participation_regionsjeunesvf181016.pdf].

95. François Gélineau, *Participation électorale à l'élection du 1er octobre 2018* [Online], 2019, p. 10 [http://www.cms.fss.ulaval.ca/recherche/upload/chaire_democratie/fichiers/participation_electorale_2018.pdf].

CHART 2.4 **Overall participation and turnout of 18-to-34-year-olds in provincial general elections since 1970[96]**
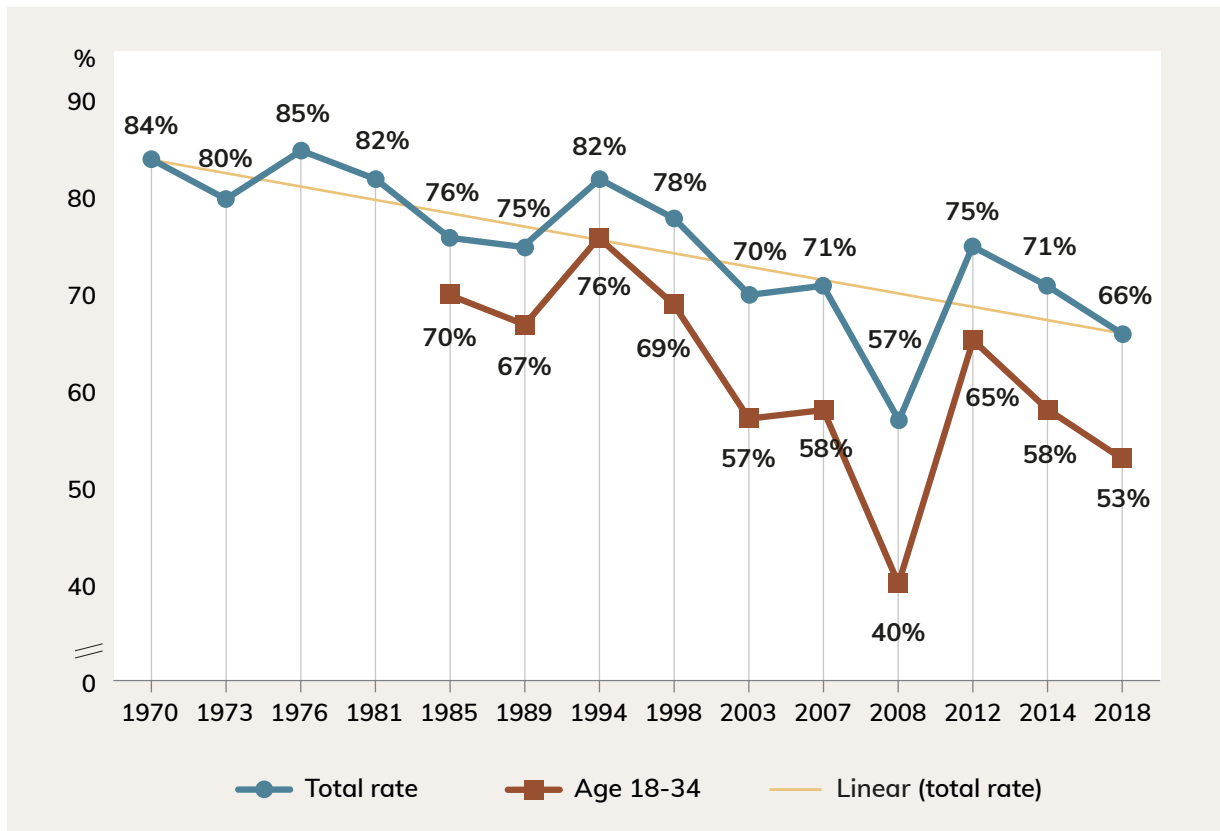
Age is not the only socio-demographic characteristic associated with changes in voter turnout. Lower voter turnout might also be associated with a lower education level, a lower income and the recency of electors becoming citizens.[97] Similarly, electors in certain regions, including Côte-Nord, Abitibi-Témiscamingue, Nord-du-Québec and the Island of Montréal voted in smaller numbers than electors in other regions in 2018.[98]

96. The data in this chart is taken from: Justin Savoie, François Gélineau and Éric Montigny, *op. cit.*, p. 2. The period reviewed begins in 1970, the year of the first general election in which Indigenous peoples were eligible to vote. The permanent list of electors was used for the first time in 1998, which may have had a downward effect on voter turnout by improving the coverage rate of the list of electors. (Directeur général des élections du Québec, *Depuis 70 ans, c'est la démocratie qui gagne*, [Online]. [https://www.electionsquebec.qc.ca/70ans/].)

97. François Gélineau and Alexandre Morin-Chassé, *Les motifs de la participation électorale au Québec: élection de 2008*, Cahiers de recherche électorale et parlementaire, 2009, p. 12. The effect of these characteristics on voter turnout was also confirmed in the 2018 general election. (BIP Recherche (2), *Enquête sur la participation électorale à l'occasion des élections générales provinciales du 1er octobre 2018*, 2018, p. 57 et seq.)

98. François Gélineau, *op. cit.*, p. 13.

However, abstention comes in several shapes. It can manifest itself in many different ways and for many different reasons. Electors may abstain from voting occasionally or regularly. For example, electors asked about their participation in the 2018 provincial general election could choose among four responses, three of which related to a certain form of abstention. Of the 33.5% of respondents who did not vote, 19.9% said that they had not voted; 6.6% said they had considered it, but then didn't, and 7% said they did not vote, but that they usually do.[99] While the first group seems to make a habit of abstaining, the other two groups appear more likely to vote in future elections.

The reasons behind abstention may be ideological, political, functional or circumstantial. In 2018, ideological and political reasons were mentioned more frequently.[100] However, functional and circumstantial reasons also influenced the decision of several electors who did not vote.

TABLE 2.4 **The main reasons that played a role in the decision not to vote[101]**

Ideological or political reasons		Functional or circumstantial reasons	
Lost confidence in elected officials and politics	53%	Was not sufficiently informed about candidates, parties and programs	37%
Didn't like any candidate, leader or party	45%	Was busy with family obligations	30%
Didn't feel affected by the issues	35%	Polling days and hours weren't convenient	29%
Believed their candidate or party had no chance of winning	27%	Was too busy with work	27%

99. BIP Recherche (2), *op. cit.*, p. 16.

100. The question asked was: "The following are some of the reasons why people do not vote. In each case, indicate whether the reason played a role in your decision not to vote in the October 1, 2018 provincial election." (BIP Recherche (2), *op. cit.*, p. 18.)

101. The reasons not shown in the table received fewer than 20% positive responses.

Voting options may not influence the first category of grounds for abstention, but they can serve to reduce the obstacles created by certain life circumstances. When asked which factors might have motivated them to vote, 13% of non-voters mentioned having more time to vote and 5% mentioned the possibility of remote or Internet voting.[102]

A more accurate snapshot of voter abstention during provincial elections shows that there are many factors at play. Non-voters do not make up a homogeneous category but are rather an assortment of people with different motivations. In certain circumstances, a voting option may influence an elector's individual decision to vote. Therefore, these voting options should not be seen as a means of increasing overall voter turnout, but as a way of facilitating, as much as possible, the participation of electors who want to exercise their right to vote.

Internet voting considerations

Internet voting may increase the already diverse range of options available to electors to exercise their right to vote. On the one hand, Internet voting could be seen as an additional option for the entire electorate which gives electors more flexibility as to when and where to cast their vote. Electors, regardless of whether they have voted or not, are interested in measures of this kind. On the other hand, Internet voting could be reserved for certain groups of electors for whom exercising their right to vote is more difficult. This option has been frequently chosen when introducing new voting options in Québec. Electors having trouble moving about or electors who are temporarily absent from their domicile could benefit from such an option. The organizational capacities at each elected level must be taken into account since most of the voting options were first introduced during provincial elections.

2.3 Technology and voting

Technology does not currently play an important role in the current voting processes in either provincial, municipal or school elections. One exception is the real-time vote marking system for electors who have voted, which is used for voting in offices of returning officers and in educational institutions. However, these votes are still recorded on paper and counted manually. This has not always been the case. In the early 2000s, several municipalities experimented with electronic voting mechanisms. However, issues that occurred during the 2005 municipal general elections led to the suspension of the tests. In the following paragraphs, we will review these experiences and the lessons we have learned. We are also interested in the increasing use of technology among Quebecers. Over the last fifteen years, technology has brought about lasting changes in the habits and expectations of citizens.

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102. This was an open-ended question which respondents were invited to answer spontaneously. Two particular factors were mentioned more often than those cited in the text: "having better candidates" (17% of choices) and "nothing would have truly encouraged me" (15% of choices). BIP Recherche (2), *op. cit.*, p. 20.)

2.3.1 Electronic voting in Québec

The initial tests

In 1995, Hull was the first municipality to use an electronic ballot box to compile votes.[103] During the following decade, 190 municipalities and three RCMs experimented with a new electronic or mail voting mechanism. In 2001, a pilot project was also planned for the provincial by-election in the electoral division of Blainville.[104] However, the project was brought to an end since, due to exceptional circumstances, the equipment supplier was unable to guarantee the delivery of the required goods and services.[105]

Municipalities have tested two types of technologies. Two thirds of the municipalities tested electronic ballot boxes, while the other third tested voting terminals.[106] Most of these tests were carried out in cities. During the 2001 municipal elections, 2.3 million electors cast their votes using one of these technologies, which represented 42% of the electorate.[107] Up until 2003, the results of the electronic voting tests were rather positive. The technology appeared to meet the expectations of both electors and returning officers. For returning officers, the primary advantage of electronic voting was the reduced number of staff required compared to a traditional polling station. However, the expected benefits in terms of rapid reporting of election results did not materialize and there were no significant cost-related advantages.[108]

The 2005 municipal general elections

The 2005 general elections were held simultaneously, for the first time, in each Québec municipality. Of the 1,106 municipalities that held elections, 162 tested a new voting mechanism: 81 used electronic ballot boxes, 59 used voting terminals, and 22 used voting by mail. These municipalities were home to 70% of the electorate registered on the permanent list of electors.[109] In the municipalities that tested electronic voting, this procedure completely replaced traditional paper-based voting.

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103. Directeur général des élections du Québec, *Élections municipales de novembre 2005. Rapport d'évaluation des nouveaux mécanismes de votation*, 2006, p. 10.

104. *Gazette officielle du Québec*, September 19, 2001, 133rd year, No. 38, p. 6367.

105. *Gazette officielle du Québec*, September 19, 2001, 133rd year, No. 40, p. 7058.

106. Electronic ballot boxes are comparable to optical readers. Electors mark their ballots and then slide them into the machine, which compiles the results. Voting terminals, or voting machines, allow electors to vote using the machine directly, by pressing the key that corresponds to their choice. These terminals also compile the votes cast.

107. Directeur général des élections du Québec, *op. cit.*, 2006, p. 9.

108. *Ibid.*, p. 11.

109. *Ibid.*, 2006, p. 13.

There were significant failings during the tests carried out in 2005, which included system outages, difficulties with transmitting results, problems with the computers containing the lists of electors, difficulty in producing the list of electors who had voted, abnormal rejection of ballot papers, etc. In its assessment report, the Comité de transition de l'agglomération de Montréal noted that:

> [*translation*] [the supplier] did not fulfil all of their contractual obligations in accordance with the requirements of the contract and, despite the arguments used to reassure the committee during the call for tenders, it seriously jeopardized elections in thirteen municipalities within the agglomeration of Montréal.[110]

In light of this situation, the Chief Electoral Officer introduced a moratorium on any new applications for the use of electronic voting. He also formed an evaluation committee to shed light on the problems relating to electronic voting.[111] Once the committee had completed its review, it made three main observations:

- [*translation*] The experience of the November 2005 municipal elections [demonstrated] that the legislative and administrative framework for the testing of new methods of voting by Québec municipalities [was] not sufficiently precise and exhaustive;

- The electronic voting systems [were used] without imposing sufficiently strict technical specifications or norms and standards for security and reliability. [Moreover], the verification conducted by the Chief Electoral Officer showed that considerations related to the security of the electronic voting systems had not been taken into account;

- To date, testing of new methods of voting has been carried out without a competent authority being mandated to oversee the process or granted verification and monitoring powers, and without incorporating the relevant expertise within the public service.[112]

The Chief Electoral Officer's recommendations

When he submitted his report, the Chief Electoral Officer stated that he was extending the moratorium until legislators decided [*translation*] "whether or not to continue to use voting mechanisms during municipal elections. And, if this were maintained, significant corrections [should] be made."[113] The report contained both general and specific recommendations, many of which are still relevant.

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110. *Ibid.*, p. 38.

111. *Ibid.*, p. 2.

112. *Ibid.*, pp. 219-220.

113. Assemblée nationale du Québec, *Conférence de presse de M. Marcel Blanchet, directeur général des élections*: Publication du rapport d'évaluation des nouveaux mécanismes de votation utilisés lors des élections municipales du 6 novembre 2005, [Online], October 24, 2006. [http://www.assnat.qc.ca/fr/actualites-salle-presse/conferences-points-presse/ConferencePointPresse-2815.html].

General recommendations [*translation*]

- That legislation governing the use of the new methods of voting be reviewed and better defined;

- That, with regard to the use of the new methods of voting, the roles and responsibilities of the Ministère des Affaires municipales et des Régions, the Chief Electoral Officer and municipalities be clearly defined;

- That, as a prerequisite for any future use of a new voting mechanism, rigorous technical specifications, and standards and norms governing safety and reliability be adopted and reviewed on a regular basis;

  – That a group of experts be formed for this purpose;
  – That the moratorium on the signing of new memorandums of understanding be maintained until their adoption;

- That technical specifications, and standards and norms governing safety and reliability be subject to verification and monitoring by an independent authority.[114]

Specific recommendations [*translation*]

- The introduction of measures to allow returning officers to verify that suppliers of electronic voting systems have the capacity to contract with a predetermined number of municipalities during the same election;

- The adoption by municipalities of specific contractual requirements and a comprehensive estimate for the professional services required and the electronic voting systems used;

- Clarification of the roles of returning officers and suppliers with respect to training election officers and reaffirming the primary responsibility of returning officers with regard to training;

- The development of specialized expertise in the area of new methods of voting within the office of the Chief Electoral Officer so as to support and advise returning officers who use such mechanisms;

- The introduction of measures to ensure that the information intended for candidates and their representatives is both clear and exhaustive so as to ensure the transparency of the electoral process for the various stakeholders;

- The drafting of contingency plans that address all potential issues;

- The establishment of plans for testing the operation and reliability of electronic voting systems and conducting tests on all devices that are to be used during a poll;

- The acquisition of basic IT security knowledge by municipalities who use an electronic voting system;

114. Directeur général des élections du Québec, *op. cit.*, 2006, p. 225.

- The obligation on the part of suppliers to provide access to all information concerning voting systems, including source code, software, characteristics, features, operational structure, IT infrastructure, parameters and data stored on devices and memory cards;

- The swearing-in of all staff assigned to managing systems and software programming, installation, technical support and troubleshooting;

- The adoption of strict measures for the secure storage and monitoring of the electronic voting systems;

- The adoption, on the part of the supplier, of measures for the destruction of data recorded on electronic voting systems following the poll;

- An obligation on the part of suppliers to ensure the protection of personal information contained in the lists of electors to which they have access.[115]

The adoption of *An Act to again amend various legislative provisions respecting municipal affairs* in December 2006 suspended any previous agreement entered into by a municipality to test a new voting mechanism.[116] The purpose of this measure was to obtain responses to the findings in the Chief Electoral Officer's report and thereby preserve the integrity of the democratic process.[117] According to the Minister of the Ministère des Affaires municipales, the use of electronic voting would no longer be authorized until such time as the government had a [*translation*] "firm and watertight guarantee with regard to the protection that [this] voting method can offer."[118]

Case law relating to electronic voting

A number of rulings have been made following applications for judicial recounts in municipalities that tested electronic voting. Although traditional recounts cannot be applied to Internet voting, some of the conclusions drawn from these decisions raise considerations that are applicable to our review.

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115. Directeur général des élections du Québec, *op. cit.*, 2006, pp. 227-228.

116. *An Act to again amend various legislative provisions respecting municipal affairs*, SQ 2006, c. 60.

117. Assemblée nationale du Québec, Commission de l'aménagement du territoire, *Journal des débats*, 37th Legislature, 2nd Session, vol. 39, No. 17, December 8, 2006, pp. 35-36 (N. Normandeau).

118. Antoine Robitaille, "Vote électronique - Les résultats de novembre 2005 remis en question", *Le Devoir*, [Online], October 25, 2006. [https://www.ledevoir.com/politique/regions/121276/vote-electronique-les-resultats-de-novembre-2005-remis-en-question].

CHAPTER 2 : Voting in Québec

The initial tests

In 1999, two applications for recounts were granted for elections held in Ville de LaSalle.[119] These decisions were based on the high number of ballots rejected by the electronic ballot boxes compared to the standard amount. According to the judge, this discrepancy justified a manual recount to verify the effectiveness of the process that was put in place.[120] A request for a recount was also granted in Ville de Trois-Rivières in 2001. In this case, the decision was based on the fact that the tabulator in one of the electronic ballot boxes was replaced by another tabulator during the advance poll without verification on the part of the representative of the applicant candidate. Although the returning officer complied with the prescribed procedure, the judge found, among other things, that the representative should have been able to ensure that the memory card inserted in the replacement tabulator was in fact from the defective tabulator.[121]

The following year, a request for a recount was denied in Ville de Repentigny. Since the electronic ballot boxes had been verified as required by the procedure, the judge could not conclude that they had either illegally counted or rejected votes or produced inaccurate statements.[122] According to the judge, due to a lack of evidence, neither the hypothesis that a machine can fail nor the number of rejected ballot papers are, in themselves, sufficient grounds for concluding that there were irregularities.[123]

The 2005 municipal general elections

Following the 2005 municipal general elections, at least 28 applications for judicial recounts were identified in municipalities that had tested a new voting mechanism.[124] The ruling made concerning the election held in Ville de Gatineau is particularly interesting, since it analyzes the criteria for accepting or rejecting electronic ballots as well as the burden of proof that must be presented when requesting a recount. The judge first found that the criteria that apply to electronic voting, which is designed to eliminate human counting of ballots, are not necessarily those that apply to traditional voting.[125] Thus, he concluded that in the event of a recount, he should refer to the eligibility criteria for the electronic ballot box, as outlined in the agreement.[126]

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119. *Lavinskas v. Leduc*, 1999 CanLII 10687 (QC CQ); *Massana v. Lucas*, 1999 CanLII 10257 (QC CQ).

120. *Lavinskas v. Leduc*, 1999 CanLII 10687 (QC CQ), para. 11.

121. *Bellemare St-Louis v. Caron*, 2001 CanLII 9017 (QC CQ), para. 21.

122. *Bourgon v. Picard*, 2002 CanLII 27435 (QC CQ), para. 28.

123. *Bourgon v. Picard*, 2002 CanLII 27435 (QC CQ), para. 23 and 25. Referring to the 1999 ruling cited above, the judge noted that several elections had since used electronic voting and that the results had been confirmed.

124. Chief Electoral Officer, *op. cit.*, 2006, p. 162.

125. *Larue v. Pilon*, 2005 CanLII 46006 (QC CQ), para. 34.

126. See section 6.30 of the *Entente concernant de nouveaux mécanismes de votation pour une élection avec urnes Accu-Vote ES 2000* [Agreement concerning new methods of voting for a poll with ballot boxes] signed by *Ville de Gatineau*, the Chief Electoral Officer and the Minister of the Ministère des Affaires municipales et de la Métropole, *Gazette officielle du Québec*, December 11, 2002, 134th year, No. 50, p. 8287.

With respect to the burden of proof, the judge observed that the use of electronic ballot boxes could deprive a candidate [translation] "of the opportunity to acquire reasonable grounds to believe there were irregularities in the initial count."[127] Indeed, "no one knows how an electronic ballot box processes a particular ballot and no individual has access to the ballots themselves."[128] Moreover, the fact that the tests were conducted following the signing of ad hoc agreements was, in the judge's opinion, indicative of the experimental and improvable nature of electronic voting.[129]

In light of this, the judge cautioned against an overly restrictive interpretation of the conditions for proceeding with a judicial recount: [translation] "[One must] be careful not to impose on the applicant a burden of proof such that they would face a presumption that the electronic ballot box voting system is infallible."[130] According to the judge, it would be difficult to reconcile such a position with [translation] "the general scope of electoral law, whose usual rules promote the highest level of transparency of the process by recognizing the right of candidates to be present or represented at each stage."[131] This position would also be contrary to the objective of all electoral processes, which is [translation] "to confer unquestionable legitimacy on elected officials, both in the eyes of the defeated candidates, and for electors and the general population."[132] Consequently, the judge proposed a broader and more liberal interpretation of the notion of "reasonable grounds to believe" with regard to irregularities in the counting process, until such time as electronic voting is passed into law. In this case, the judicial recount served two purposes: reassuring the candidates of the electors' verdict and helping ensure that the reliability of the electronic ballot boxes was recognized.[133]

A similar ruling was made concerning elections in Ville de Chambly. In this case as well, the judge recognized that the candidates were in a difficult position, as they did not have access to the ballots that were sealed in the ballot box. Given the issues encountered during the pre-poll tests, the judge stated that [translation] "special demands must be made on the reliability of electronic ballot boxes in order to ensure the integrity of the electoral process and to maintain public confidence in the results obtained using this voting method."[134] He also referred to the high percentage of rejected ballots and the slim margin of victory to support the decision to proceed with a recount.

Five candidates also requested a recount in Ville de Québec. Following these recounts, the judge indicated that [translation] "the reality on the ground does not always align with the provisions of the memorandums of understanding. [...] [T]hese MOUs should be updated so as to better reflect

127. *Larue v. Pilon*, 2005 CanLII 46006 (QC CQ), para. 57.

128. *Larue v. Pilon*, 2005 CanLII 46006 (QC CQ), para. 43.

129. *Larue v. Pilon*, 2005 CanLII 46006 (QC CQ), para. 63.

130. *Larue v. Pilon*, 2005 CanLII 46006 (QC CQ), para. 65.

131. *Larue v. Pilon*, 2005 CanLII 46006 (QC CQ), para. 66.

132. *Larue v. Pilon*, 2005 CanLII 46006 (QC CQ), para. 67.

133. *Larue v. Pilon*, 2005 CanLII 46006 (QC CQ), para. 70 and 77.

134. *Lavoie v. Bourbonnais*, 2005 CanLII 41585, para. 43.

and guide the voting process."[135] Acknowledging the important role that the supplier plays in an electronic poll, the judge also stressed the importance of [*translation*] "clarifying the supplier's role in the text of the memorandum of understanding to better guide its actions."[136]

Lastly, in Ville de Saint-Constant, an application for annulment of an election was dismissed because the applicant was unable to prove that the fact that certain formalities had not been observed had a decisive effect on the election results.[137] It should be noted that the returning officer had created the position of "terminal attendant" and this individual's role involved assisting electors by inserting their voting card into the terminal despite the fact that the law required electors to do so themselves. The elector then entered the polling booth alone to cast their vote.[138] The judge found not only that the secrecy of the vote had been protected but also that the returning officer had acted appropriately with regard to her responsibilities by facilitating voting and ensuring that the new process worked.[139]

The electronic voting tests carried out in municipalities remind us how important it is to be vigilant with regard to the reliability of new methods of voting. Voting mechanisms must maintain the secrecy of the vote and the integrity of the electoral process. They must also reassure candidates and electors when it comes to results. This confidence is essential to the introduction of new methods of voting and must be strengthened over time. Therefore, the procedures governing the use of these mechanisms must be transparent and precise enough to ensure elector confidence, but flexible enough to allow for the adaptations required to facilitate voting and ensure the smooth conduct of the election. The roles and responsibilities of all of those involved must be clearly defined. Lastly, the criteria for recounting votes or an equivalent measure must align with the realities of these voting mechanisms.

2.3.2 The digital portrait of Québec households

Since a moratorium on new methods of voting was adopted in 2005, there have been major developments in both information and communication technologies. They are now an integral part of the daily lives of most Quebecers. In a range of sectors, the State and companies have adapted their service offer to cater to this new reality. In this context, Internet voting could be a means of adapting the electoral process accordingly. However, before considering a voting option of this kind, we must assess the extent to which citizens would be able to benefit from it.

The Internet connection rate of Québec households is steadily increasing. In 2019, 93% of households reported having Internet access at home, either through a residential connection (91%) or a shared connection using a mobile device (2%). However, this rate was lower among certain

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135. Chief Electoral Officer, *op. cit.*, 2006, p. 164.

136. *Ibid.*, p. 165.

137. *Bourassa v. Ferland*, 2006 CanLII 5349 (QC CQ), para. 45 and 46.

138. *Bourassa v. Ferland*, 2006 CanLII 5349 (QC CQ), para. 25 and 31.

139. *Bourassa v. Ferland*, 2006 CanLII 5349 (QC CQ), para. 26, 32, 33 and 51.

segments of the population: those aged 65 and over, those with a high school education or less, and those with a household income of less than $40,000.[140] The residential connection rate was also lower in certain regions including Bas-Saint-Laurent (85%) and Abitibi-Témiscamingue (86%).[141]

TABLE 2.5 **Proportion of adults with an Internet connection in the home**[142]

Based on sex and age

Total 2019	Men	Women	18-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65-74 years	75 years and over
93%	94%	93%	98%	97%	96%	96%	96%	↓ **87%**	↓ **77%**

Based on education level

Total 2019	Primary/Secondary education	College	University
93%	↓ **87%**	95%	↑ **98%**

Based on income (in thousands of $)

Total 2019	< 20 k$	20-39 k$	40-59 k$	60-79 k$	80-99 k$	> 100 k$
93%	↓ **81%**	↓ **87%**	94%	97%	97%	↑ **99%**

The proportion of the population owning an electronic device is also growing. In 2019, 95% of adults in Québec owned at least one electronic device, of which 81% owned a computer and 77% owned a smartphone. The use of smartphones has steadily increased since 2016, when the number of adults who owned one was 58%.[143]

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140. CEFRIO (1), "Portrait numérique des foyers québécois", *NETendances* 2019, [Online], p. 11. [https://cefrio.qc.ca/media/2288/netendances-2019_fascicule-4_portrait-num%C3%A9rique-des-foyers-qu%C3%A9b%C3%A9cois_final.pdf].

141. The residential connection rate is also 86% in Gaspésie-Îles-de-la-Madeleine, but in this region, the result is not significantly lower, within a confidence interval of at least 95%. Note that no results are presented for Nord-du-Québec. (CEFRIO (2), "Fiche région 2018", *NETendances 2018*, [Online], p. 1. [https://cefrio.qc.ca/media/2166/netendances-2018-00-portrait-ensemble-du-qu%C3%A9bec_vf.pdf].)

142. Arrows pointing up in the table indicate results that are significantly higher than the total of the other groups in the same category, within a confidence interval of at least 95%. Arrows pointing down indicate results that are significantly lower. (CEFRIO (1), *op. cit.*, p. 11)

143. CEFRIO (1), *op. cit.*, p. 7.

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Technology use has also increased at a similar rate. In 2019, 93% of adults in Québec used the Internet. Eighty-five percent of adults used it every day, compared to 78% in 2016.[144] Furthermore, in 2018, 91% of Internet users in Québec responded that they had good online skills: 51% ranked their online skills as high and 40% as average. Individuals 55 years old and over, those with a high school education at most, and those with a household income of between $20,000 and $59,000 were less likely, proportionally, to report that they had good online skills.[145]

TABLE 2.6 **Skill level among Québec Internet users**[146]

Based on sex and age

Skill level	Total 2018	Men	Women	18-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65-74 years	75 years and over
High	51%	53%	50%	↑63%	↑69%	58%	56%	↓36%	↓24%	↓22%
Average	40%	37%	42%	37%	↓28%	37%	38%	↑49%	↑51%	↑55%
Low	9%	10%	9%	↓0%	↓4%	5%	7%	↑16%	↑25%	↑23%

Based on education level

Skill level	Total 2018	Primary/Secondary education	College	University
High	51%	↓32%	↑56%	↑60%
Average	40%	↑50%	36%	↓35%
Low	9%	↑18%	7%	↓5%

144. CEFRIO (1), *op. cit.*, p. 13.

145. CEFRIO (3), "Portrait numérique des foyers québécois", *NETendances 2018*, [Online], p. 14. [https://cefrio.qc.ca/media/2015/netendances2018-portraitnumeriquefoyersquebecois.pdf].

146. Arrows pointing up in the table indicate results that are significantly higher than the total of the other groups in the same category, within a confidence interval of at least 95%. Arrows pointing down indicate results that are significantly lower. (*Id.*)

TABLE 2.6 **Skill level among Québec Internet users (cont'd)**

Based on income (in thousands of $)

Skill level	Total 2018	< 20 k$	20-39 k$	40-59 k$	60-79 k$	80-99 k$	> 100 k$
High	51%	39%	↓ 38%	↓ 43%	53%	↑ 64%	↑ 64%
Average	40%	42%	↑ 47%	44%	38%	31%	↓ 32%
Low	9%	↑ 19%	↑ 15%	12%	8%	5%	↓ 4%

The use of online services is becoming more widespread across the population. In 2018, 56% of adults used the online services of at least one government body (Government of Québec or a municipality) to obtain information from a website, download an official form or send a completed form online. Only 44% of adults had done so in the previous year. In 2018, 77% of citizens considered that they were able to use the online services of the Government of Québec.[147] The use of banking services is even more widespread. In 2018, the rate of use of these services was 80% among persons aged 18 and over.[148] Lastly, 64% of Québec adults made at least one online purchase during that year.[149]

This snapshot shows the growing importance of digital technology in the lives of Quebecers. The widespread use of the Internet and online services is observed throughout the general public, although the rate of usage differs from one group to the other. Indeed, the rate of Internet access and use is lower in certain regions of the province and among older people and those with lower education levels or income.

Internet voting considerations

Information and communication technologies do not yet play a leading role in the electoral process in Québec. However, they are increasingly common in other sectors of our society. The omnipresence of technology and the digitization of many services could lead one to believe that Internet voting is the next step in the evolution of the electoral process. However, the introduction of this voting option would be a major change.

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147. CEFRIO (4), "Services gouvernementaux en ligne", *NETendances 2018*, [Online], p. 6 and 11. [https://cefrio.qc.ca/media/2113/netendances-2018-services-gouvernementaux-en-ligne.pdf].

148. CEFRIO (5), "Services bancaires en ligne", *NETendances 2018*, [Online], p. 6. [https://cefrio.qc.ca/media/1985/netendances2018_services-bancaires-en-ligne.pdf].

149. CEFRIO (6), "Le commerce électronique au Québec", *NETendances 2018*, [Online], p. 6. [https://cefrio.qc.ca/media/2083/netendances-2018_commerce_electronique.pdf].

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The widespread availability and use of the Internet suggest that a vast majority of electors would have both the tools and skills to vote online. However, a certain percentage of the electorate would still not be able to make use of Internet voting. As a result, Internet voting could only be added to the existing voting options. While we cannot draw many parallels between the technologies used in 2005 and Internet voting, we should take into account the lessons learned from these experiences in any attempt to introduce Internet voting. Certain elements would need to be introduced: rigorous standards and technical specifications, a clear division of roles and responsibilities among those involved, and independent audits.

Internet Voting in Canada and Around the World

The chapter discusses Canadian and international experiences with Internet voting. Cases from Canada, Estonia, France, Norway, Switzerland and the State of New South Wales (in Australia) are documented.

Each experience raises relevant and interesting questions. How did these States introduce Internet voting? What are the main reasons behind its introduction? What approach did these States take? What legal, operational and technical frameworks did they establish? Which groups of electors were allowed to use the Internet to vote? What impact has this voting option had on voter turnout? Does society consider this voting option acceptable? What are the particular features of a digital voting platform? How much did it cost? What best practices have these States adopted? What difficulties did they encounter?

Internet voting presents challenges that States address in different ways. As we consider the possibility of introducing Internet voting in Québec, we can learn from these experiences.

3.1 Canada

Canada is one of the few countries in which Internet voting can be used by the entire electorate during certain general elections. For several years, electors have been able to vote online during municipal and school board elections in certain municipalities in Ontario and Nova Scotia. Most recently, in 2019, the Northwest Territories made it possible for certain electors to vote online. In 2016, the province of Prince Edward Island held a consultative referendum during which electors could vote online. During these elections, polling was conducted on technological platforms developed and supplied by private companies. At present, the use of Internet voting in Canada is relatively limited.

In general, in Canada, the interest in Internet voting is due to the convenience it offers electors. In particular, Internet voting appears to have the potential to overcome the obstacles faced by voters with a disability and those who are outside their electoral division on election day. Internet voting is therefore seen as a complement to paper-based voting in the same way as are advance polling and voting by mail, which are typically offered during provincial, territorial and federal elections.

Even though Internet voting has not yet been introduced or tested during either provincial or federal elections, its potential benefits have generated interest in several governments and legislatures which have commissioned or conducted studies on Internet voting over the past decade. Ontario, British Columbia, New Brunswick and the federal government have all studied Internet voting. However, no electoral administration, nor expert, citizen or parliamentary committee mandated to conduct these studies, has recommended the adoption of Internet voting. This is primarily due to concerns about the security of online voting.

3.1.1 Studies on Internet voting

Ontario

In 2010, the Legislative Assembly of Ontario mandated the Chief Electoral Officer to examine alternative voting technologies. As part of this mandate, whose work continued through to 2013, Elections Ontario studied Internet voting to facilitate access to voting (for persons with disabilities, for example) and also to address challenges related to hiring election officers, the availability of polling places and declining voter turnout. In light of tests conducted in other countries, the electoral administration examined the benefits and risks of Internet voting following consultation with experts and electoral administrations that have either experienced or studied Internet voting. The institution then assessed the appropriateness of using online voting in Ontario, defined implementation criteria and developed a comprehensive network voting solution that met those criteria. Following this feasibility study, the electoral administration planned to test Internet voting in a 2012 by-election. Although the electoral administration confirmed that Ontarians were in favour of Internet voting, it subsequently cancelled the planned trial citing the complexity, costs,

and operational and security risks involved.[150] As the Chief Electoral Officer stated in the final report of this study published in 2013: "[...] someday there will be an effective solution that meets the province's needs and adheres to our criteria. At this point, we do not have a viable method of network voting that meets our criteria and protects the integrity of the electoral process."[151] Ever since, Elections Ontario has used other technological solutions, in particular to meet the challenge of recruiting election officers, such as computerizing the list of electors and counting the ballot papers.[152]

British Columbia

In 2012, the Government of British Columbia assigned the province's Chief Electoral Officer the responsibility of creating and chairing an ad hoc, non-partisan committee to study the benefits and challenges of implementing Internet voting for provincial and municipal elections. The Independent Panel on Internet Voting was made up of the Chief Electoral Officer and four other members with a variety of expertise, such as electoral and IT expertise. The panel carried out its studies between 2012 and 2014. During this time, the panel consulted, in particular, with provincial residents, Canadian and international Internet voting experts and private companies that specialized in online voting. In their final report, published in 2014, the members of the independent panel unanimously concluded that the risks of implementing Internet voting outweighed the potential benefits at that time.[153] However, they indicated that if elected officials wished to introduce Internet voting in the future, this voting option should be reserved for voters for whom access to voting is difficult. The panel specified that elected officials should be aware that the introduction of Internet voting presents risks with regard to the accuracy of recorded votes. Lastly, the panel proposed a set of criteria that a future Internet voting system would have to meet in order to be tested in the province.[154] These criteria were similar to those recommended by Elections Ontario in 2013.

The federal government

In 2016, the Canadian government established the Special Committee on Electoral Reform, made up of Members of Parliament from each party represented in the House of Commons. This committee's mandate was to identify and study alternative voting systems for Canada in addition to examining mandatory voting and online voting. In its final report which was drafted following consultations with experts and the Canadian public, the committee did not recommend the

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150. Elections Ontario, *Rapport sur les technologies permettant de voter d'autres façons*, 2013, p. 15; Elections Ontario, *Rapport sur les technologies permettant de voter d'autres façons. Appendix 5: Étude de cas sur le vote en réseau*, 2013, p. 17.

151. Elections Ontario, *Rapport sur les technologies permettant de voter d'autres façons*, 2013, p. 6.

152. To find out more about this technology-enabled staffing model: Elections Ontario, *Proposition de modèle de dotation technologique pour les élections provinciales de l'Ontario. Rapport d'évaluation finale de l'élection partielle dans la circonscription de Whitby-Oshawa*, 2016; Elections Ontario, *Vers la modernisation du processus électoral de l'Ontario. Rapport sur la 42ᵉ élection générale de l'Ontario*, June 7, 2018.

153. Independent Panel on Internet Voting, *Recommendations Report to the Legislative Assembly of British Columbia*, pp. 2 and 47.

154. *Ibid.*, p. 47

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adoption of Internet voting. The committee members felt that the secrecy and integrity of online voting could not be sufficiently guaranteed to allow for a large-scale implementation of this voting option.[155] During preparations for the subsequent federal election, in 2019, concerns were raised with regard to foreign influences and cyberattacks that could undermine the electoral process. In light of this, many viewed the fact that voting is still conducted exclusively on paper as a strength of the Canadian election system.[156]

New Brunswick

In November 2016, the New Brunswick government established the Commission on Electoral Reform. Made up of five citizens selected through a public recruitment process, the commission was mandated to examine various measures to reform the electoral process, including ways to increase participation in democracy such as offering Internet voting.[157] Following consultation with experts, interest groups and New Brunswick citizens, the commissioners advised against the implementation of Internet voting. In their opinion, this voting option could not offer sufficient guarantees with regard to the secrecy and security of the vote: "Cybersecurity [of an Internet voting system] cannot be guaranteed, at least not in the foreseeable future."[158] If these issues could be resolved in the future, members recommended the government conduct a pilot project prior to considering the introduction of Internet voting.

No matter whether they were parliamentarians, experts or citizens, the people tasked with conducting these studies and consultations on the issue and to render an opinion as to whether or not to introduce Internet voting, decided that it currently presents risks which outweigh the anticipated benefits. Nevertheless, the work that was carried out demonstrates that Internet voting has a number of benefits. The primary benefit is making voting more accessible for certain groups of electors who face obstacles that prevent them from voting. These groups include electors with mobility or visual impairments, and those who are living abroad or outside their electoral divisions during elections. The recommendations published following these studies reflect a cautious view of the risks associated with Internet voting, but they do not generally close the door to the introduction of this voting option in the future. In addition, these studies identified certain criteria that are essential to any future larger-scale implementation in Canada. Several of them incorporated concrete experiences with Internet voting in Canada into their analyses.

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155. House of Commons, *Renforcer la démocratie au Canada : principes, processus et mobilisation citoyenne en vue d'une réforme électorale*, 2016, p. 127.

156. Communications Security Establishment (Government of Canada), *Le point sur les cybermenaces contre le processus démocratique du Canada en 2019*, [Online], 2019. [https://cyber.gc.ca/fr/les-cybermenaces-et-la-democratie].

157. Commission on Electoral Reform, *En voie vers une démocratie inclusive*, [Online], 2017, p. 41. [https://www.gnb.ca/legis/publications/Electoral%20ReformVoieVersDemocratieInclusive.pdf].

158. *Ibid.*, pp. 20-21.

3.1.2 Canadian experiences with Internet voting

The limited use of Internet voting in Prince Edward Island and the Northwest Territories as well as in many municipalities in Nova Scotia and Ontario generally yielded positive results for both the electorate and the electoral administrations, even though everyone recognizes that this type of voting is not without risk.

Ontario municipalities

Starting in 2003, certain Ontario municipalities offered Internet voting during municipal and school board elections. These elections, which are held simultaneously, fall under the responsibility of municipal administrations. Over the course of the electoral cycles, the number of municipalities offering Internet voting has steadily increased across the 400 or so municipalities in Ontario.[159] It rose from 12 in 2003 to 97 in 2014, which represents approximately two million electors.[160] During the 2018 municipal and school elections, close to 200 municipalities offered Internet voting.[161]

Municipal administrations that are adopting Internet voting report that they are doing so primarily to improve accessibility and convenience for electors and, in some cases, in the hope of increasing voter turnout.[162] Many municipalities also view Internet voting as a means of addressing the challenge of recruiting election officers. In addition, thanks to this voting option, the period during which electors can cast their ballots may be extended.[163] The process used to introduce this voting option is not the same in every municipality, since each is responsible for administering its own elections.[164] For example, the number of days during which Internet voting is offered, the registration process and the combination of the different types of voting offered (paper, mail, telephone, Internet) vary from municipality to municipality.

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159. The number of municipalities that held general elections by universal suffrage in 2018 varies, depending on the source, between 414 and 417. Association of Municipalities of Ontario, *Élection municipale de 2018 – quelques faits saillants*, [Online]. [https://elections.amo.on.ca/web/fr/stats]; Association of Municipalities of Ontario, *2018 Municipal Election Analysis*, [Online]. [https://www.amo.on.ca/AMO-Content/Elections/Municipal/2018/2018MunicipalElectionAnalysis.aspx].

160. Association of Municipalities of Ontario, *Élection municipale de 2018 – quelques faits saillants*, [Online]. [https://elections.amo.on.ca/web/fr/stats]; Nicole Goodman and Heather Pyman, *Internet Voting Project Report*, 2016, pp. 10 and 12.

161. The number of municipalities that offer Internet voting is, depending on the source, between 178 and 194. Association of Municipalities of Ontario, *Élection municipale de 2018 – quelques faits saillants*, [Online]. [https://elections.amo.on.ca/web/fr/stats]; Mary Baxter, *How E-voting is Taking Over Ontario Municipal Elections*, [Online]. [https://www.tvo.org/article/how-e-voting-is-taking-over-ontario-municipal-elections]; Mark Gollom, *Glitches are Considered Unlikely to Curb Online Voting 'Tide' Sweeping Across Ontario*, [Online]. [https://www.cbc.ca/news/canada/online-voting-municipalities-ontario-1.4875457].

162. Nicole Goodman and Heather Pyman, *op. cit.*, p. 53; Mary Baxter, *op. cit.*, [Online]; Colin Butler, *Ontario Civic Elections: the Problem with Online Voting*, [Online]. [https://www.cbc.ca/news/canada/london/london-ontario-online-voting-1.4598787].

163. Mary Baxter, *op. cit.*

164. This decentralization makes the compilation and availability of information related to the use of Internet voting across all municipalities challenging.

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All Internet and telephone voting systems used during elections are supplied by private companies. The cost of elections that offer online voting varies due to the choices made by municipalities, e.g., the elector registration and authentication process (in one or more steps)[165], the period during which online voting is available, and other voting options provided. The introduction of Internet voting does not always result in additional costs: several municipalities have seen the cost of their elections decrease or remain unchanged.[166] Although certain academics are concerned about the risks associated with Internet voting,[167] the experiences of municipalities since 2003 have, overall, been without major incident. In 2014, some municipalities published their election results a few hours late.[168] In 2018, the online voting system used by about 50 municipalities, which was provided by the same supplier, experienced significant slowdowns and outages on election day.[169] Issues with bandwidth capacity during a period of high system usage affected voting process. As a result, certain municipalities extended the voting period to encourage voter turnout.[170] We must wait until the next elections, scheduled for 2022, to find out whether these incidents will influence the municipalities' decision to adopt Internet voting or not, either by itself or in conjunction with paper voting. While no issues with the integrity of online voting were reported, certain large municipalities, including Toronto and London, chose not to offer Internet voting due to the security risks involved.[171] Other municipalities also indicated that they would cease offering Internet voting for the same reasons.[172]

Since experiences with the introduction of Internet voting vary from one municipality to another, comparing the experiences and drawing conclusions is challenging. However, we have made a certain number of findings. Since 2003, the number of municipalities that offer Internet voting has increased significantly from election to election. Almost all municipalities that tested Internet voting continued to offer it in subsequent elections, which shows that the tests were successful.[173] Conversely, the number of municipalities that offer voting by mail is decreasing.[174] We can interpret this as a shift from one voting option to another, since these procedures meet similar needs. An increasing number of municipalities are also no longer offering paper ballots in polling places.

165. Compared to smaller municipalities, Ontario cities with over 100,000 inhabitants more often tend to require voter registration for online voting, include more authentication mechanisms and restrict the time period during which Internet voting is available. Nicole Goodman and Rodney Smith, *Internet Voting in Sub-national Elections: Policy Learning in Canada and Australia*, p. 169.

166. Nicole Goodman and Heather Pyman, *op. cit.*, p. 66.

167. Colin Butler, *op. cit.*

168. Nicole Goodman and Rodney Smith, *op. cit.*, pp. 169-170.

169. Beatrice Britneff, *Online Voting in 51 Ontario Municipalities Marred by Election-day "System Load Issue,"* [Online]. [https://globalnews.ca/news/4585577/ontario-voting-issues/].

170. Mark Gollom, *op. cit.*

171. City of Toronto, *Changes to the Municipal Elections Act and Related Matters Impacting the 2018 Election*, 2016; Colin Butler, *op. cit.*; Mark Gollom, *op. cit.*

172. Doug Hallet, *Guelph Council Turns its Back on Online Voting*, [Online]. [https://www.guelphmercury.com/news-story/7260450-guelph-council-turns-its-back-on-online-voting/].

173. Nicole Goodman and Heather Pyman, *op. cit.*, p. 12.

174. Association of Municipalities of Ontario, *Élection municipale de 2018 – quelques faits saillants*, [Online]. [https://elections.amo.on.ca/web/fr/stats].

In 2018, Internet voting was the only voting option available to electors in the majority of municipalities (approximately 150) that offered online voting.[175] However, certain municipalities continue to open polling places where electors can get help with online voting.[176]

A 2014 survey of 47 municipalities that used Internet voting during Ontario municipal and school board elections was conducted as part of the Internet Voting project conducted by the Centre for E-Democracy. The survey revealed that this voting option was greatly appreciated. The electorate, electoral administrations and candidates all found it convenient, accessible and user-friendly. In addition, 95% of electors were very satisfied with their Internet voting experience and said they would use it again and would like to be able to access it at all elected levels. The survey also showed that when Internet voting is offered, the majority of electors choose it.[177] It appears that older, urban, educated, tech-savvy and experienced electors make up the largest user base for Internet voting at a municipal level in Ontario.[178]

The impact of online voting on voter turnout in municipalities where it is offered has yet to be demonstrated. This impact is difficult to measure, given the large number of variables that influence voter turnout. Some studies show a positive, but modest impact of about 3%.[179] In 2014, 14% of individuals who responded to the Centre for E-Democracy's survey indicated that they probably would not have voted if online voting was unavailable.[180] A shift to online voting rather than a higher voter turnout was noted.[181] Despite the increasing number of municipalities offering Internet voting, voter turnout in Ontario municipal and school board elections has remained relatively stable over the past two decades, varying between 40% and 44%. This rate decreased in 2018, during the most recent elections, to about 38%.[182]

Elections in Halifax Regional Municipality

Four Nova Scotia municipalities offered Internet and telephone voting for the first time in 2008 during municipal and school board elections. This number has steadily increased since then, rising to 14 in 2012, and to 20 during the most recent municipal general elections in 2016, which represented 40% of the province's municipalities.[183] As is the case in Ontario, municipal and school board elections are held simultaneously and are the responsibility of the municipal electoral administrations. The Internet voting system is supplied by private companies.

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175. Mary Baxter, *op. cit.*

176. *Ibid.*

177. Nicole Goodman and Heather Pyman, *op. cit.*, pp. 32 and 65.

178. *Ibid.*, pp. 8 and 32.

179. Nicole Goodman and Leah C. Stokes, "Reducing the Cost of Voting: An Evaluation of Internet Voting's Effect on Turnout," *British Journal of Political Science*, 2018.

180. Nicole Goodman and Heather Pyman, *op. cit.*, p. 25.

181. *Ibid.*, pp. 64-65.

182. Association of Municipalities of Ontario, *2018 Municipal Election Analysis*, [Online]. [https://www.amo.on.ca/AMO-Content/Elections/Municipal/2018/2018MunicipalElectionAnalysis.aspx].

183. There are 50 municipalities in Nova Scotia. Nova Scotia Department of Municipal Affairs, *Municipal Statistics. Annual Report 2017-2018*, p. 3.

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Of the Nova Scotia municipalities that offer Internet voting to electors, Halifax Regional Municipality is a pioneer. This municipality introduced Internet voting as early as 2008. It has since offered Internet voting during three general elections and three by-elections. Halifax is by far the most populous regional municipality in the province, with 400,000 inhabitants and over 280,000 electors.

In 2016, it offered Internet voting to the entire electorate over a six-day period during advance polls. On election day, voting was solely with paper ballots, at the polling station. Electors were not required to register for Internet voting. Each elector received an information card a few days before the advance polls. In addition to information about the election and voting options, the card contained a unique personal identification number that allowed the elector to vote online or by telephone. Electors were also required to enter their date of birth as a second security feature.

Several security mechanisms serve to guarantee the security and integrity of online voting.[184] An audit firm also evaluates the integrity of the system throughout the polling process. The firm then drafts a report, which is published. Throughout the voting process, the audit firm tests the reliability and accuracy of the system in several ways. Every elector "transaction" in the system is recorded, which allows, if necessary, for the investigation of suspected fraud (the voter's choice, of course, remains anonymous). Another provider, Bell Canada, also monitors the system so as to prevent any cyberattacks aimed at overloading servers, for example. In 2016, the cost of Internet voting was estimated at $500,000.[185] The six general elections and by-elections that offered Internet and telephone voting in the Halifax Regional Municipality were conducted without any major hitches.

Electors in the municipality appear to have both adopted and integrated Internet voting. In 2012 and 2016, 60% of electors who voted chose to do so online or by telephone. In 2012, 90% of the electors who voted electronically chose Internet voting and 10% voted by telephone. Voting by telephone is appreciated by older voters[186] as well as those in rural areas.[187] Consultations with electors revealed that they generally like online voting since they find it user-friendly and convenient.[188] In 2014, approximately two thirds of respondents to a survey of electors reported that they trusted Internet voting.[189] However, the introduction of Internet voting did not increase voter turnout, which was 36.2% in 2008, remained stable at 36.9% in 2012, but then dropped to 31.8% in 2016.

The electoral administration pointed out that Internet voting allowed the number of advance polling stations to be reduced by approximately 25%, which meant cost savings. Since 60% of votes are cast online, paper ballots are counted more quickly and staff work shorter hours, which leads to lower payroll costs.

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184. Halifax Regional Council, *Electronic Voting Security and Increasing Voter Participation*, 2018, pp. 2-5.

185. This data was taken from Halifax Regional Municipality's reports to the regional council and from discussions with stakeholders in the municipality.

186. Jeffrey Roy, *Voter Engagement in Halifax: Starting the Discussion*, 2015, p. 8.

187. Halifax Regional Council, *Report on the Municipal and School Board Elections 2012*, 2013.

188. Karen Densmore, *2016 Voter Experience: Public Engagement Summary*, 2017, p. 20.

189. Jeffrey Roy, *op. cit.*, p. 7.

In 2019, for the first time in a by-election for a municipal council seat, online and telephone voting were the only voting options available. Certain polling places were open for advance polls and on election day, but electors could only cast their vote via Internet voting. The 22.4% voter turnout[190] which was recorded during this election appears low, but it is higher than the turnout rate during the previous municipal by-election held in 2016 (18%).[191]

In preparation for the next municipal and school board general elections which are scheduled for fall 2020, Halifax Regional Municipality confirmed that it will once again offer Internet and telephone voting. The municipality considered the possibility of offering only online and telephone voting during advance polls, and only paper ballots on election day. In the end, the municipal council decided to continue to offer paper ballots in polling places on certain advance polling days as well as on election day in order to make voting as accessible as possible.[192]

The Prince Edward Island experience

A non-binding referendum was held in Prince Edward Island in fall 2016. This Plebiscite on Democratic Renewal public consultation process focused on a reform of the voting system and was held using a preferential voting system. The poll marked the first time that Internet and telephone voting, under the responsibility of the electoral administration, was offered in the province.

An all-party committee of the Legislative Assembly, tasked with consulting electors and making recommendations to the government regarding the details of this plebiscite, suggested the use of online voting, in particular to "maximize the convenience and accessibility of voting for electors, provided the system used could ensure the security, accuracy, integrity, confidentiality and verifiability of the vote, and be cost-effective."[193]

The voting period was between October 29 and November 7, 2016. Internet voting was the main voting option offered to the electorate during the plebiscite. It was available throughout the voting period. However, electors who wished to do so could vote on paper in a reduced number of polling places over a two-day period (November 4 and 5). Electors were not required to register for Internet voting. All electors received a personalized information card either in the mail or by email at the beginning of the referendum period. The card contained information on the available voting options and a personal identification number. This identification number allowed electors to verify their identity, along with their date of birth, when voting online or by telephone. Once electors voted online, they received a code confirming that their vote had been registered. This code also allowed them to ensure that their vote was counted in the final results.

190. Halifax Regional Municipality, *Municipal Election Results Recap - Official Results for Councillor District 15 Special Election*, [Online], 2019. [https://www.halifax.ca/sites/default/files/documents/city-hall/elections/Oct5MunicipalElectionOfficialResults.pdf].

191. Halifax Regional Municipality, *Lower Sackville Special Election Advance Poll Turnout Promising*, [Online], 2019. [https://www.halifax.ca/home/news/lower-sackville-special-election-advance-poll-turnout-promising].

192. Halifax Regional Council, *Special Meeting Draft Minutes April 14, 2020*, [Online], p. 4 [https://www.halifax.ca/sites/default/files/documents/city-hall/regional-council/200414rc-DraftMins.pdf].

193. Special Committee on Democratic Renewal, *Recommendations in Response to the White Paper on Democratic Renewal: a Plebiscite Question*, 2016, p. 4.

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The Internet and telephone voting system was supplied by a private Canadian company. Elections PEI worked with other companies on administering the various components of the electoral process, including the real-time computer vote marking system and electronic counting of paper ballots. Elections PEI also commissioned an independent audit of the polling process and of online and telephone voting, and then published the audit report.[194] According to Elections PEI, Internet and telephone voting cost $106,112 and the audit cost $57,734. The electoral administration estimates that the cost per registered elector for this plebiscite was $6.25, compared to $10.54 for the 2015 general election, which did not offer Internet voting.[195] This decrease in cost was mainly due to the reduced number of polling places during the plebiscite, which led to lower payroll costs for election officers.[196]

Voter turnout for the plebiscite was 36.5%. This rate is considerably lower than the rate during provincial general elections in Prince Edward Island, which is usually about 80%. In total, just over 100,000 individuals were eligible to vote, which included young people aged 16 and 17. Of those who voted, 81.1% did so online (some 30,000 people), 9.4% by telephone and 9.5% in person. It should be noted that the times and locations for casting paper ballots in person were considerably reduced for this plebiscite. In light of this, it is difficult to assess the effects of introducing Internet voting on voter turnout, as is drawing conclusions with regard to the uptake of Internet voting among voters who participated in the referendum.

The independent audit concluded that a high level of integrity was maintained throughout the process and that "every reasonable effort was made to keep electronic voting methods secure."[197] No major incidents related to Internet voting proceedings were reported. Nevertheless, the auditors noted, as did the Chief Electoral Officer of Prince Edward Island, that risks remained, and that certain elements were not optimal, such as using date of birth as information to access the online voting system.[198] However, given the consultative nature of this poll, these risks seemed to be acceptable. The auditors did caution against implementing Internet voting on a larger scale during a provincial or federal election. The authors of the audit report (many of whom are members of Canadian electoral administrations) suggest that the risks of introducing Internet voting during provincial or federal elections should be carefully assessed in relation to the electoral context, and that reducing these risks by making online voting available only to certain categories of electors should be considered.[199]

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194. Independent Technical Panel on Voting Integrity, *Voting Integrity Audit Report*, 2016.

195. Elections PEI, *2016 Annual Report of the Chief Electoral Officer*, 2016, p. 31.

196. During the plebiscite, there were 22 polling places across 27 electoral divisions. Elections PEI, *op. cit.*, p. 27.

197. Independent Technical Panel on Voting Integrity, *op. cit.*, p. 2.

198. *Ibid.*, p. 9.

199. *Ibid.*, pp. 22-25.

The experience in the Northwest Territories

Online voting was introduced in the Northwest Territories following a request by the Chief Electoral Officer who wanted to reduce the number of rejected ballots from absentee voters. Absentee voters must send in their ballot by mail, but postal delays result in rejected ballots.[200] Absentee electors in the Northwest Territories were therefore able to benefit from Internet voting during the territorial general election of October 1, 2019. For the very first time, they could choose to vote either online or by mail. When registering as an absentee voter, they made their choice, which was definitive. Electors who selected Internet voting received an email containing a personal identification number, voting instructions and a link to the online voting platform. Online voting was available a little over three weeks before election day and until the poll was closed. The online voting system was supplied by a private Canadian company.

In response to concerns expressed about the security of the online voting system, the Chief Electoral Officer noted that an independent company was carrying out vulnerability tests aimed at countering any potential system hacking. The Chief Electoral Officer was of the opinion that the risk of cyberattack was very low for small-scale elections such as those in the Northwest Territories.[201]

There are approximately 25,000 electors in the Northwest Territories. Voter turnout in 2019 was 54%, which represented approximately 13,000 votes. A total of 489 absentee electors chose Internet voting and 49 opted for voting by mail. This number of votes is higher than the 111 postal votes registered by absentee voters during the previous election in 2015 (for that election, 244 people registered as absentee voters).[202] The Chief Electoral Officer believes, however, that the registration rate among eligible absentee electors is probably not very high. In particular, she hoped that online voting would be popular among young electors studying outside the Northwest Territories, but only a small number of them actually registered to vote online or by mail.[203]

In 2016, Elections NWT estimated that the cost of implementing Internet voting would be between $50,000 and $60,000.[204] We must wait until the electoral administration publishes its report on the event (which was not available at the time of writing) to find out the actual cost and the electoral administration's assessment of this first experience with Internet voting.

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200. Elections NWT, *Modernizing Election Administration in the Northwest Territories*, 2016, pp. 67 and 75.

201. Mario De Ciccio, « Les Ténois pourront voter en ligne lors des élections territoriales », *Radio-Canada*, [Online], 2019. [https://ici.radio-canada.ca/nouvelle/1218646/tno-elections-vote-internet-en-ligne].

202. Elections NWT, *op. cit.*, p. 47.

203. John Last, "NWT youth not thrilled with electronic voting", *Radio-Canada*, [Online], 2019. [https://ici.radio-canada.ca/nouvelle/1315860/vote-electronique-jeunes-elections-territoires-nord-ouest].

204. Mitch Wiles, *Online Voting Should Be an Option for 2019 N.W.T. Election, Says Official*, [Online], 2016. [https://www.cbc.ca/news/canada/north/online-voting-should-be-considered-2019-nwt-election-official-1.3756377].

3.2 Estonia

Estonia is recognized as a centre of excellence in technology. The country is a modern democracy that uses Internet voting.

Following the restoration of Estonian independence in 1991, public authorities prioritized the reaffirmation of Estonia's national identity and the transformation of its administration. Therefore, this country of 1.3 million inhabitants committed to the challenge of digitizing administration and democracy.[205]

Estonia is now an example of the successful introduction of Internet voting. It is the first country that officially adopted Internet voting and instituted a legislative framework.

Estonia has been using Internet voting during its municipal elections since 2006 and in all elections across the country since 2007, with the exception of presidential elections, since the president is elected by members of Parliament.

3.2.1 Introduction of Internet voting

By implementing Internet voting, Estonia intended to facilitate voting by offering all citizens an additional way to vote. The government wanted to encourage more citizens to vote, especially certain categories of electors, including young people.

The Estonian National Election Commission initiated the introduction of this voting option. In 2002, the Estonian Parliament laid the legislative groundwork for Internet voting, which is governed by provisions of its *Election Act*. Internet voting also complies with the rules of the National Electoral Committee and the provisions of the *Digital Signature Act*.

In order to facilitate Internet voting, the Estonian government introduced a digital national identification card. This official document is used across Estonia for civil identification purposes and digital authentication. The national identification card includes a chip and two personal identification numbers. One number launches the Internet voting process and the other is used to digitally sign the card to confirm one's vote on the digital platform. This digital platform was designed by a private company, under the supervision of the Independent Electoral Committee.

Estonians must insert their digital card directly into a computer or a box-style card reader, which businesses can buy for approximately 20 euros.[206] The public can also use card readers to access various government digital services.

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205. "Estonia, rebuilding itself through digital technology", *Digital Renaissance*, [Online], February 2015. [https://www.renaissancenumerique.org/publications/estonie-se-reconstruire-par-le-numerique].

206. Epp Maaten, "Toward Remote E-Voting: Estonian Case", *Electronic Voting in Europe – Technology, Law, Politics and Society: Workshop of the ESF TED Program Together With GI and OCG*, under the direction of Alexander Prosser and Robert Krimmer, Bonn, Köllen Druck & Verlag GmbH, 2004.

The widespread use of digital identity cards is a secure means of authenticating voters. In addition to fingerprints (on most recent identity cards), these cards contain a unique, encrypted electronic signature. By using such cards, the electoral authority can ensure verification of elector identity. However, in 2017, hackers managed to exploit a flaw in the application on digital identity card chips and successfully decrypted the personal data of 760,000 citizens. In order to correct this flaw, the digital application for all identity card had to be updated by the Estonian authorities.[207]

Once work on establishing an Estonian digital identity had been completed, the government adopted an initial law that outlined the conditions and measures necessary for the introduction of online voting, in the context of an overhaul of the *Local Government Council Election Act* in 2002.[208]

Although most parliamentarians were in favour of introducing Internet voting, some people expressed dissatisfaction with this project. The president, who served from 2001 to 2006, took the matter to the Constitutional Court in 2005 to determine whether Internet voting, which provides for the possibility of voting online more than once, respected the principle of equality of voting rights by giving Internet voters an undue advantage over those voting in the traditional way.

In its review, the Constitutional Court concluded that the electoral authorities could not guarantee either the privacy or secrecy of Internet voting, which made manipulation and pressure on electors theoretically possible. The Court noted that this type of voting requires that the electorate have confidence in the accuracy and security of the software and procedures ensuring the integrity of the vote. Therefore, in order to be constitutional, Internet voting must provide for the establishment of a system equivalent to a virtual polling station. It must allow a voter who was pressured into voting online to cancel their vote and cast a new vote freely and privately before the end of the polling period.[209]

In its ruling, the Court concluded that Internet voting could not replace paper ballots in terms of the requirements and procedures that guarantee compliance with voting principles. Nevertheless, Internet voting should be viewed as a complement to traditional voting. The Court ruled that the proposed Internet voting system did not violate either the country's constitution or electoral principles. In response to the Court ruling, Estonia conducted successful Internet voting pilot projects during municipal elections in January and October 2005. With the support of the President, the Court then passed an amendment to the *Local Government Council Election Act* so as to allow Internet voting to be used across the country by all eligible voters.

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207. "Security flaw forces Estonia ID 'lockdown'", *BBC News*, November 2, 2017. [https://www.bbc.com/news/technology-41858583].

208. Now known as the *Municipal Council Election Act*, the Act was amended again in 2012 to have Chapter 7 refer directly to Chapter 7 of the *Riigikogu Election Act*, which outlines all provisions relating to Internet voting. See *Riigikogu Election Act* [https://www.riigiteataja.ee/en/eli/ee/514112013015/consolide/current] and *Local Government Election Act* [https://www.riigiteataja.ee/en/eli/506112013004/consolide/current].

209. Mihkel Slovak and Kristjan Vassil, *E-voting in Estonia: Technological Diffusion and Other Developments Over Ten Years (2005-2015)*, Solvak & Vassil, Priit Vinkel, chapter 3.

The laws governing the various elected levels specify how Internet voting is to be offered. They specify the timeline for offering Internet voting, which is from the 10th to the 4th day before the election, as well as the procedure for digital voter identification and authentication.[210]

Estonian election law provides for the possibility of advance polling for 7 days before the date set for the poll. During this period, voters can vote, cancel and change their online vote as many times as they wish, which ensures that they are not being pressured by another individual. They may also go to a polling station that is open during this period and deposit a paper ballot in the ballot box. In this case, only the vote cast on paper is counted as it cancels all previous online votes. However, on polling day, electors may not change the online vote that they cast during the advance poll.

3.2.2 Using Internet voting

The published statistics show significant growth in Internet voting among the votes cast.[211]

- During local elections, these votes represented:
  - 1.9% of the votes in 2005;
  - 15.8% in 2009;
  - 21.2% in 2013;
  - 31.7% in 2017.

- During legislative elections, they represented:
  - 5.5% of the votes in 2007;
  - 24.3% in 2011;
  - 30.5% in 2015;
  - 44% in 2019.

Internet voting allows Estonians who live outside the country to cast their votes. During the 2009 European elections, 4.69% of the digital votes were cast from 98 different countries.[212]

Assessing the impact of Internet voting on voter turnout is difficult. The most extensive study on the subject was conducted in 2010. It was carried out before the 2011 legislative elections and covered the four previous elections.[213] The research team concluded that voter turnout during the 2009 local elections could have been as much as 2.6% lower if the electorate had not had the opportunity to vote online.

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210. These laws apply to national legislative elections (*Riigikogu Election Act*), local elections (*Local Government Council Election Act*), referendums (*State Referendum Act*) and European Parliament elections (*European Parliament Election Act*).

211. "Riigikogu Elections," *Valimised*, [Online]. [https://www.valimised.ee/et/valimiste-arhiiv/toimunud-riigikogu-valimised].

212. "Estonia, rebuilding itself through digital technology", *Digital Renaissance*, [Online], February 2015. [https://www.renaissancenumerique.org/publications/estonie-se-reconstruire-par-le-numerique].

213. Alexander H. Trechse and Kristjan Vassil, *Internet Voting in Estonia: A Comparative Analysis of Four Elections since 2005*, [Online], 2010. [https://cadmus.eui.eu/bitstream/handle/1814/15688/Report_-_E-voting_in_ Estonia_2005-2009.pdf?sequence=2&isAllowed=y].

Since the 2011 legislative elections, electors have the opportunity to cast their votes online using smartphones and tablets: 11% of electors voted using mobile devices during the 2014 European elections. During the 2019 legislative elections, electors who cast their votes using mobile devices accounted for nearly 25% of those who voted online (45,000 people).

Contrary to what one would expect, online voting does not particularly interest the younger generation and the distribution of voters by age is relatively balanced across various voting options.[214]

A team of academic researchers[215] calculated the cost of electoral operations for all types of voting during the 2017 local elections in Estonia.

- 186,034 electors used Internet voting. This represents operating costs of €431,599 ($670,705), which does not include the cost of designing and technically adapting the digital voting platform.

- Each vote cast using Internet voting cost €2.32 ($3.61). Internet voting is the least expensive option.

- Each vote cast at the ballot box on polling day cost €4.37 ($6.79).

- Each advance poll vote in the central counties cost €6.24 ($9.70).

- Each advance poll vote at a local polling station in a peripheral county cost €20.41 ($31.72).

The costs associated with the Internet voting platform are not explicitly mentioned in the various documents that were consulted.

3.2.3 Digital security

The voting platform allows an individual to cast their vote and encrypt it. Once the elector makes their choice, they confirm it and seal it with their own digital signature. Their digital signature is transmitted using their digital identification card, which can be read by an electronic reader and by software that is downloadable from official Estonian websites.

Electors can also use a digital identification certificate (Digi-ID) which is issued by the authorities and can be used only online. A Digi-ID allows electors to establish their identity by means of a digital signature.

The electorate can also confirm and seal their votes using smartphones (using the Mobile-ID application) which generates a specific identification code and a second security code that is sent by text message. Electors must have previously activated the Mobile-ID application using their identification card which contains digital personal data.

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214. "Statistics About Internet Voting in Estonia", *Valimised*, [Online]. [https://www.valimised.ee/en/archive/statistics-about-internet-voting-estonia].

215. "Scientists Calculate Administrative Cost to State of Electronic Votes", *News err.rr*, [Online], September 21, 2018. [https://news.err.ee/863027/scientists-calculate-administrative-cost-to-state-of-electronic-votes].

Lastly, since 2015, in order to improve the security and transparency of the vote and to detect potential flaws, a digital application has been available to enable electors to verify, after the fact, that their votes have truly been counted and that the integrity of the procedure was not compromised by a virus or bug. In order to verify their vote, electors must use a device (smartphone or tablet) different from the one they used to cast their vote. In 2015, only 4% of votes were verified in this way by electors.

3.2.4 Overall observations

To date, the Internet voting experience in Estonia has been positive. The government took the time to develop a legal framework that supported the introduction of Internet voting. The use of a national digital identification card facilitated the rollout of this remote digital voting option. The number of people who vote online increases with each election, which shows that the system is successful. After several experiences with online voting, Estonian electors now trust the system.[216]

However, security questions remain.[217] Concerns about the security of Internet voting are justified. In 2014, a University of Michigan researcher (Alex Halderman) and his team hacked Estonia's Internet voting system.[218] From their laboratory, the team was able to penetrate the system, including electors' personal computers and the digital voting platform, to tamper with the results. The tools required to achieve these results were within the reach of criminal or state organizations. In response to this attack, Estonia upgraded its Internet voting system.

In short, the Estonian model is based on three principles[219]: a digital identification card for electors; the possibility of changing one's vote, since only the last vote cast is counted; and the priority given to the traditional ballot (if an elector votes on paper, their digital vote is cancelled).

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216. Mihkel Slovak and Kristjan Vassil, *E-voting in Estonia: Technological Diffusion and Other Developments Over Ten Years (2005-2015)*, Solvak & Vassil, Priit Vinkel.

217. *Our Response to the National Election Committee's Statement*, [Online]. [https://estoniaevoting.org/press-release/response-national-election-committees-statement/].

218. Drew Springall, Travis Finkenauer, Zakir Durumeric, Jason Kitcat, Harri Hursti, Margaret MacAlpine and J. Alex Halderman. *Security Analysis of the Estonian Internet Voting System*, 21st ACM Conference on Computer and Communications Security, Scottsdale, U.S.A., 2014. [https://dl.acm.org/doi/pdf/10.1145/2660267.2660315].

219. Canada-Europe Transatlantic Dialogue, *A Comparative Analysis of E-Voting*, February 2010.

3.3 France

In France, Internet voting is reserved for French citizens living outside the country. Internet voting allows these citizens to vote in legislative and consular elections for officials who represent the French abroad. However, this voting option is not available for other elections (presidential, European, referendums).[220]

It was a bid to increase voter turnout[221], facilitate access to polling and modernize public services that led to the introduction of Internet voting.[222]

3.3.1 Context and objectives

Due to their great distance from the nearest polling station, no more than 50% of French expatriates have voted in various polls since 2000.[223] The electorate outside France is highly dispersed and mobile. There are no community groupings in urban areas and expatriates are spread out over large areas outside cities, which presents a challenge with regard to maintaining lists of electors and offering traditional paper ballots.[224]

French nationals abroad are allowed to vote in a variety of polls. Digital voting by mail is officially only available for the election of members of the Assemblée nationale and of consular advisors. Following the 2008 constitutional reform,[225] French nationals abroad obtained the right to be represented in the Assemblée nationale by 11 deputies elected in a two-round, first- past-the-post majority poll.

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220. France Diplomatie, *Vote par Internet*, [Online]. [https://www.diplomatie.gouv.fr/fr/services-aux-francais/voter-a-l-etranger/modalites-de-vote/vote-par-internet/].

221. Alain Anziani and Antoine Lefèvre, *Rapport d'information fait au nom de la commission des lois constitutionnelles, de législation, du suffrage universel, du Règlement et d'administration générale (1) sur le vote électronique*, Senate, 2013-2014 regular sitting, No. 445, [Online]. [https://www.senat.fr/rap/r13-445/r13-4451.pdf].

222. French Republic, *Déclaration de M. Édouard Courtial, secrétaire d'État aux Français de l'étranger, sur les modalités de vote à distance des Français de l'étranger, à Paris le 10 février 2012*, [Online]. [https://www.vie-publique.fr/discours/184359-declaration-de-m-edouard-courtial-secretaire-detat-aux-francais-de-l].

223. During the second round of the 2002 presidential elections, 44% of electors outside France cast their votes, compared to 42% in 2007. In 2005, 33% voted in the referendum on the Treaty establishing a Constitution for Europe. Cédric Pellen, "À la conquête de l'Amérique. La campagne des élections législatives dans la 1re circonscription des Français de l'étranger", *Revue française de science politique*, vol. 63, No. 6, 2013.

224. *Ibid.*

225. This new representation was established by Article 9 of the *Constitutional Act* of July 23, 2008, which stipulated that [*translation*] "French nationals living outside France are represented in the Assemblée nationale and the Senate." Unlike the Assemblée nationale, representation of French expatriates in the Senate is indirect. Constitutional Council, *Loi constitutionnelle nº 2008-724 du 23 juillet 2008 de modernisation des institutions de la Vᵉ République*, [Online]. [https://www.conseil-constitutionnel.fr/les-revisions-constitutionnelles/loi-constitutionnelle-n-2008-724-du-23-juillet-2008].

The *Electoral Code* states that electors [*translation*] "may also [...] vote by mail using sealed envelopes or electronically using hardware and software to ensure the secrecy of the vote and the sincerity of the vote."[226] Online voting for consular elections was introduced into law following a reform of consular representation in 2013.[227] During this election, approximately 450 consular advisors[228] are elected for a six-year term.[229]

3.3.2 How online voting works

Electors can vote online using a computer, tablet or smartphone. Internet voting is an advance poll which is available for six consecutive days between noon (Paris time) on the second Wednesday before the election and noon on the Tuesday after this date. This timeline allows election administrators to update the lists of electors before they are used on polling day (Sunday), thus eliminating the possibility of electors voting both online and using paper ballots.[230]

Before a poll, electors receive a password by email. They also receive an identifier in the postal mail. When they log on to the voting platform, they receive a second password by text. Once they cast their vote on the platform, the vote is recorded in the virtual ballot box. The elector receives a receipt confirming that they cast their vote. This procedure requires a list of electors that includes the elector's email address and cellphone number.[231] A website allows electors to check whether their devices are compatible with the voting platform.

Electors also have access to a telephone help line. During the 2014 consular elections, 6% of Internet voters (approximately 4,630 individuals) contacted the technical assistance unit because they were unable to connect to the platform.[232]

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226. Following this reform, Ordinances No. 2009-935 and No. 2009-936 of July 29, 2009 specify the number of electoral divisions, their boundaries and the specific provisions for the election of deputies by French nationals living outside France under the *Electoral Code*.

227. Legifrance, *Loi n° 2013-659 du 22 juillet 2013 relative à la représentation des Français établis hors de France (1)*, article 22, [Online]. [https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000027734839#LEGISCTA000027736443].

228. The number of consular advisors to be elected varies from one consular election to another within the parameters established by the Act. The voting system used may also vary depending on the number of seats to be filled in an electoral division. Legifrance, *op. cit.*, articles 25 and 26, [Online]. [https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000027734839#LEGISCTA000027736443].

229. These elected officials participate in the selection of members of the Assembly of French Nationals Abroad and senators representing French nationals living abroad, in addition to representing their electors on the consular council chaired by the ambassador. France Diplomatie, *Des conseillers consulaires, pour quoi faire?*, [Online].[https://www.diplomatie.gouv.fr/fr/services-aux-citoyens/publications/article/des-conseillers-consulaires-pour-quoi-faire-infographie].

230. Alain Anziani and Antoine Lefèvre, *op. cit.*

231. Jacky Deromedi and Yves Détraigne, *Rapport d'information au nom de la commission des lois constitutionnelles, de la législation, du suffrage universel, du Règlement et d'administration générale (1) sur le vote électronique*, Senate, 2018-2019 regular sitting, No. 73 [Online]. [http://www.senat.fr/rap/r18-073/r18-0731.pdf].

232. Jacky Deromedi and Yves Détraigne, *op. cit.*

3.3.3 The voting process and results

Among the phenomena observed since the introduction of Internet voting is a drop in the number of paper-based postal votes in favour of digital voting (a displacement effect). During the 2014 consular elections, about 900,000 of the approximately 1,100,000 voters sent their email addresses to election administrators when they registered to vote.[233]

The French experience reveals geographical variations with regard to the proportion of online votes cast compared to the total number of votes cast. During the first round of the 2012 legislative elections, 57.39% of French nationals abroad who voted did so online. However, this proportion varies between 78.71% in Northern Europe and 33.93% in the Near East and Africa.[234]

The proportion of votes cast online differs from one geographical region to another, which shows that a wide variety of factors influence the use of this voting option. These factors include the distance to the nearest polling station, availability and quality of Internet access, the number of polling stations in the country, postage rates, etc.

Internet voting has no effect on voter participation among electors living outside France. For the most part, this rate depends on socio-political factors (election issues, political offer, etc.). Internet voting has primarily a displacement effect. Where it is available, large numbers of French nationals living outside France make use of it, because it is often more accessible than voting using a ballot box and more convenient than paper-based voting.[235]

3.3.4 Technical considerations

The French authorities relied on a partnership with private companies to introduce their online voting system.[236] Among the factors that influence online voting are the technical challenges faced by both the electoral administration (Ministry for Europe and Foreign Affairs) and the electors. For example, during the 2012 legislative elections, the online voting platform was found to be incompatible with certain user devices.

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233. By using the number of 900,000 electors instead of the number of registered voters in 2014, voter turnout exceeds the 20% threshold, bringing it closer to other elections. Christophe-André Frassa and Jean-Yves Leconte, *Rapport d'information fait au nom de la commission des lois constitutionnelles, de législation, du suffrage universel, du Règlement et d'administration générale (1) sur le bilan de l'application de la loi nᵒ 2013-659 du 22 juillet 2013 relative à la représentation des Français établis hors de France*, Senate, 2014-2015 regular sitting, No. 481, [Online]. [http://www.senat.fr/rap/r14-481/r14-4811.pdf].

234. Jacky Deromedi and Yves Détraigne, *op. cit.*

235. *Ibid.*

236. French Republic, *Déclaration de M. Édouard Courtial, secrétaire d'État aux Français de l'étranger, sur les modalités de vote à distance des Français de l'étranger, à Paris le 10 février 2012*, [Online]. [https://www.vie-publique.fr/discours/184359-declaration-de-m-edouard-courtial-secretaire-detat-aux-francais-de-l].

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The system is built on a Java application that launches automatically on the elector's computer when they visit the online voting website. This application issues an electronic signature, encrypts the ballot, and sends it to the company's data centre.[237] However, this process was disrupted by an upgrade from Java 1.6 to Java 1.7 a few days before the first round. Electors using this new version, which had not been tested in advance, were unable to vote online. They saw an error message prompting them to use another device.[238] It is estimated that, of the 244,623 electors who voted in both rounds, 12,893 tried to log on, but were unable to cast their vote, which corresponds to just over 5%.[239]

The 2014 consular elections do not appear to have been spared technical difficulties either. The challenges were caused by the capacity and calibration of servers, which could not handle the volume of electors. As a result, access to Internet voting was unavailable for two hours before the end of the period when it was permitted. The specific repercussions of this event are as yet unknown.[240]

3.3.5 Digital security governance

Measures have been put in place to ensure the security of polling. An Internet voting office was set up in order to monitor the electoral process. It was made up of eight members including representatives of the French abroad, the Ministry of Foreign Affairs and the National Cybersecurity Agency of France (ANSSI). Candidate representatives may also participate in meetings of the Internet voting office on a consultation basis.

The office must record all observations in its minutes. It may temporarily stop electronic voting operations in the event of an attempted security breach. It may consult the ANSSI on the security measures in place and, if the secrecy and accuracy of the vote is threatened, the Ministry of Foreign Affairs can put an end to Internet voting.[241]

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237. The fact that the company that supplied the online voting platform was located outside France was denounced as failing to comply with a CNIL recommendation. Émilie Massemin, "Législatives : les boulettes du vote par Internet" *Libération*, [Online], May 25, 2012, *Libération*, [Online], May 25, 2012. [https://www.liberation.fr/ecrans/2012/05/25/legislatives-les-boulettes-du-vote-par-internet_955695].

238. *Ibid.*

239. Alain Anziani and Antoine Lefèvre, *op. cit.*

240. Christophe-André Frassa and Jean-Yves Leconte, *op. cit.*

241. Jacky Deromedi and Yves Détraigne, *op. cit.*

3.3.6 Legal challenges

There have been many legal challenges as a result of the 2012 and 2014 Internet voting experiences. These challenges addressed the integrity of the electoral process, elector identification, the secrecy and reliability of the vote, and the security of online voting.

Several requests were brought before the French Constitutional Council in 2012. The applicants established the existence of obstacles to voting, but their arguments were rejected. According to the Court, the fact that an elector or group of electors had difficulty does not mean that a significant number of electors in the same electoral division experienced the same issues. A "significant" number would be at least equal to the difference between the votes cast for the two candidates with the most votes.[242]

When it came to the overall shortcomings of the system (particularly in relation to the recommendations of the Commission nationale de l'informatique et des libertés [national commission on IT and data privacy]), the arguments did not, according to the Court, demonstrate that the ballot was less accurate.[243] In both cases, it would have been necessary to demonstrate that the circumstances had affected the outcome of the vote, resulting in questions about whether the poll truly reflected the will of the electors.

Following, for the most part, the same reasoning, an administrative judge did not find it necessary to intervene and annul a ballot when irregularities during the 2014 consular election were noted. Neither an error on the part of the electoral administration allowing an elector to vote both online and at the ballot box, nor the sending of an email to 18 electors inviting them to send their polling codes to a candidate constituted a breach of the accuracy of the poll.[244] In the second case, nobody was able to establish that the electronic votes of the email recipients were cast using a false identity.[245]

Many individuals feel that the Court rejects all hypothetical arguments. Since it is technically impossible to observe whether any form of interference reduces the accuracy of online voting, the production of admissible evidence remains challenging. In cases of alleged fraud, an applicant must provide evidence since suspicion alone is not considered and the case is dismissed.[246]

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242. Chantal Enguehard and Tatiana Shulga-Morskaya, "De l'annulation d'élections par Internet par le moyen des insuffisances du système de vote", *Les convergences du droit et du numérique*, Bordeaux, France, [Online], 2017. [https://www.archives-ouvertes.fr/hal-01730380v1].

243. Decision No. 2012-4597/4626 AN rendered on February 15, 2013, provides additional information on the context of the challenges and the content of the Court's ruling. Constitutional Council, "Élections législatives de juin 2012. Bilan du contentieux devant le Conseil constitutionnel", *Les Nouveaux Cahiers du Conseil constitutionnel*, 41(4), 2013. [https://www.cairn.info/revue-les-nouveaux-cahiers-du-conseil-constitutionnel-2013-4-page-99.htm].

244. Chantal Enguehard and Tatiana Shulga-Morskaya, *op. cit.*

245. Christophe-André Frassa and Jean-Yves Leconte, *op. cit.*

246. Alain Anziani and Antoine Lefèvre, *op. cit.*

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3.3.7 The cost of Internet voting[247]

At the end of 2015, the Ministry of Foreign Affairs launched a public tender to design and operate a new Internet voting platform.

In May 2016, the contract was awarded to a private company for a four-year period for a total of €3.73 million ($5.8 million). An additional sum of €2.99 million ($4.65 million) was set aside for ancillary services provided by other companies.

Implementation of this platform was a major project, with a total cost[248] of €6.72 million ($10.45 million) over four years. In addition to the Internet voting module, the platform includes several peripheral services that make it possible to digitize the entire electoral process for French nationals living outside France (management of candidacy nomination papers, centralization of results [including physical polling stations], voter information portal, etc.).

The need for security seems to have been underestimated and the government had to tighten its requirements between awarding the public contract in 2016 and preparations for the legislative elections in 2017. The subsequent system security matrix contained 73 pages and 419 recommendations or requirements.

Two extensive tests carried out in December 2016 and February 2017 were unsatisfactory from both an ergonomic and digital security standpoint. The Internet voting platform was found to be structurally flawed.[249]

3.3.8 The 2017 legislative elections

Internet voting was cancelled for the June 2017 legislative elections. The government only allowed French nationals living outside France to vote at the ballot box or by mailing paper ballots. Internet voting was not made available for the 2017 legislative elections as a precautionary approach was taken. This was not due to a specific threat or a precisely targeted risk, but rather the result of a global geopolitical context.

In a report presented to the Senate, the attacks on French media sites and the German Bundestag were cited, as well as possible interference in the U.S. elections (dissemination of emails from the Democratic candidate and foreign propaganda). The cumulative effects of these events prompted the decision-makers to take a cautious approach.[250]

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247. Jacky Deromedi and Yves Détraigne, *op. cit.*

248. Cour des comptes [Audit Instituon], *Le coût et l'organisation des élections à l'étranger et de la représentation des Français de l'étranger. Exercices 2010-2015. Observations définitives*, 2016.

249. Jacky Deromedi and Yves Détraigne, *op. cit.*

250. *Ibid.*

In addition to these geopolitical challenges, the digital voting platform had structural imperfections that explain, in part, why Internet voting was abandoned for the 2017 legislative elections. Other deciding factors included an overly tight schedule, changing security requirements and extensive testing that proved inconclusive.

Based on past experience, Internet voting for legislative and consular elections is now considered indispensable to guarantee an effective right to vote for French nationals living outside France.

In October 2017, the President of the French Republic, Emmanuel Macron, declared his commitment to offering Internet voting before the Assembly of French Nationals Abroad: "If we are not in a position to make progress by the next election to offer an [Internet] voting system that cannot be attacked, then we can no longer call our country France! [...] We will create the means required to do so because this is primarily a democratic interest, but it is also a question of credibility and French sovereignty."[251]

As a logical follow-up to this presidential commitment, the new Internet voting platform for the election of French overseas advisors and consular delegates was extensively tested in both July and November 2019 among approximately 1% of the world French electorate. These tests made it possible to verify the platform's ergonomics, robustness in the face of various forms of digital threats and compliance with the main electoral principles: electors' accessibility to voting, secrecy of the vote and the integrity of the ballot.

In January 2020, the Internet voting platform was approved for the next elections, which are scheduled for later this year.[252]

3.4 Norway

In 2008, the Norwegian government authorized a trial of Internet voting during the country's 2011 municipal and regional elections. The purpose of this project was to trial Internet voting on a small scale to test the merits of implementing the voting option across the country. Norway uses proportional representation for local and national elections, so ballot papers are relatively complex.

Between 2004 and 2006, a committee of experts mandated by the Norwegian government studied and documented the challenges involved in introducing Internet voting. Their recommendations, including the adoption of a cautious and gradual introduction of Internet voting, guided the Norwegian trials.[253]

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251. Speech by the President of the French Republic during the 27th plenary session of the Assembly of French Nationals Abroad (AFE), October 2017.

252. Ministry for Europe and Foreign Affairs, *Vote par Internet*, [Online]. [https://www.diplomatie.gouv.fr/fr/services-aux-francais/voter-a-l-etranger/modalites-de-vote/vote-par-internet/].

253. Ministry of Local Government and Regional Development, *Electronic Voting - Challenges and Opportunities*, 2006.

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In 2011, 10 municipalities participated in the pilot project. Internet voting was made available to all electors in these municipalities, which represented approximately 168,000 people.[254] Parliamentarians voted, by a slim majority, in favour of continuing to test Internet voting during the 2013 parliamentary election.[255] During this election, Internet voting was made available in the same ten municipalities as in 2011 and in two more. As a result, 250,000 electors could choose to vote online.[256] In 2014, following these tests, the government chose to abandon the use of Internet voting for future elections. The reasons behind this decision are presented below.

Internet voting is conducted in an uncontrolled environment. Issues related to coercion and secrecy of the vote, as well as potential vote buying, were central to the discussions surrounding the Norwegian Internet voting trials. Voting by mail, which is also conducted in an uncontrolled environment, was relatively uncommon in Norway and limited to a small number of electors (those living outside the country). Electors who wished to vote in advance polls could do so in person at polling places.

3.4.1 Objectives and approach

The government's objective with these pilot projects was to improve access to voting for electors who encountered obstacles when voting, such as persons with disabilities and citizens living abroad, and to increase voter turnout by offering a new generation of electors an electronic voting solution.[257] The government also hoped to achieve more accurate election results more quickly, and, in the long term, to reduce the cost of elections. It also wanted to eventually provide a low-cost direct democracy platform for referendums, for example.[258]

For the Norwegian government, the trials represented an opportunity to open up a broad public debate on a number of issues related to Internet voting, including the security, transparency and verifiability of the vote, as well as issues related to vote buying and the secrecy of the vote.[259] It is with this in mind that the pilot project was developed in close collaboration with stakeholders including advisory committees of specialists, municipal stakeholders, national political parties and electors.[260]

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254. Approximately 3.8 million electors were eligible to vote in this poll. "Count for Norway Municipal Council Election 2011," *Valgdirektoratet*, [Online]. [https://www.valgresultat.no/?type=ko&year=2011]; Seegard et al., *The Norwegian Trial with Internet Voting: Results and Challenges*, 2013.

255. OSCE, *Norway Parliamentary Elections 9 September 2013. OSCE/ODIHR Election Assessment Mission*, p. 7.

256. At that time, Norway had approximately 3.6 million electors. "Count for Norway Parliamentary Election 2013", *Valgdirektoratet*, [Online]. [https://www.valgresultat.no/?type=st&year=2013].

257. Norwegian Ministry of Local Government and Regional Development, *Project Mandate for E-vote 2011 Project*, p. 5; Seegard et al., *op. cit.*

258. In 2010, Internet voting was trialled during certain municipal referendums. Norwegian Ministry of Local Government and Regional Development, *op. cit.*, p. 5; Henrik Nore, *Can We Trust Internet Voting? Internet Voting in Norway*, 2013, p. 6.

259. Norwegian Ministry of Local Government and Regional Development, *op. cit.*, p. 6.

260. *Ibid.*, pp. 11-12.

So as to ensure that the trials were conducted in a similar way and to reduce costs, they were planned and carried out under the responsibility of the ministry for municipal affairs, in co-operation with the participating municipalities, which administered the election in their respective jurisdictions.[261]

3.4.2 How the Internet voting process was conducted

In both 2011 and 2013, as per the recommendations of the advisory committee, Internet voting was only offered during advance polls for a period of approximately one month. It was an option that was provided in addition to paper ballots.[262] Participating municipalities were selected following a call for applications. They were selected based on their diversity and number of electors.[263]

Internet voting was available to all electors in these municipalities. Prior to the voting period, electors were mailed an information card containing instructions on how to vote online and unique codes associated with each political party. These codes allowed electors to confirm that their vote had been recorded and to verify its accuracy.[264] Electors were required to log in to the Internet voting portal with a username and password used for other government services. They then received a special password via text message which enabled them to cast their vote online.[265]

Since the Norwegian authorities wanted to provide electors with a mechanism that allowed them to cast a vote without constraints, electors could cancel their online vote and vote again as many times as they wished, in which case only their last vote was counted. They could also vote on paper at a polling place in addition to Internet voting, in which case only the paper vote was counted, regardless of the order in which the votes were cast.[266]

During the 2011 municipal and regional elections, more than a quarter of electors in the ten participating municipalities chose to vote online (26.4%), which represented approximately 45,000 people or 70% of all advance poll electors in those municipalities.[267] By 2013, 36% of electors in all participating municipalities (approximately 90,000 people) used Internet voting.[268]

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261. *Ibid.*, p. 5.

262. *Ibid.*, p. 6.

263. Seegard et al., *op. cit.*

264. OSCE, *Norway Internet Voting Pilot Project. Local Government Elections 12 September 2011. OSCE/ODIHR Election Expert Team Report*, 2012, pp. 4, 7 and 8.

265. *Ibid.*, p. 5.

266. Seegard et al., *op. cit.*; OSCE, *op. cit.*, p. 7.

267. Seegard et al., *op. cit.*

268. OSCE, *Norway Parliamentary Elections 9 September 2013. OSCE/ODIHR Election Assessment Mission*, 2013, p. 13.

3.4.3 The Internet voting system

Starting in 2011, Norway developed a fully public Internet voting system for all components (ownership, management and operation). The government issued a public call for tenders for the required components. The source code of the Internet voting system was also made public.[269] However, there appeared to be no system in place to allow a third party to verify the entire source code before the elections.[270]

The development of online voting in Norway was based on the standards recommended by the Council of Europe for electronic voting, designed to ensure democratic, secure and accessible elections.[271] Electors could verify their vote using the unique code associated with their chosen party, which was sent to them by text message after their vote was registered. This unique code, coupled with the information card, allowed them to confirm that their vote had indeed been registered for the party of their choice.[272] The platform had to be compatible with technologies that facilitate voting for persons with disabilities.

An evaluation of the 2011 and 2013 Internet voting experiences indicated positive results overall.[273] Nevertheless, certain observers criticized the government for a lack of transparency in the documentation that was made public.[274] There were also a few incidents. During the 2011 municipal and regional elections, some people noticed errors in the codes sent to electors on their information cards. These electors were unable to verify their vote after it was registered.[275] Between 2011 and 2013, this issue was corrected by simplifying the printing of information cards and providing an additional verification method.[276] The software, encryption mechanism and verification process were also upgraded.[277] Lastly, in order to increase transparency, the

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269. Norwegian Ministry of Local Government and Regional Development, *Project Mandate for E-vote 2011 Project*, p. 5; Seegard et al., *op. cit.*

270. OSCE, *Norway Internet Voting Pilot Project. Local Government Elections 12 September 2011. OSCE/ODIHR Election Expert Team Report*, 2012, p. 2; OSCE, *Norway Parliamentary Elections 9 September 2013. OSCE/ODIHR Election Assessment Mission*, 2013, p. 15.

271. Seegard et al., *op. cit.*; OSCE, *Norway Parliamentary Elections 9 September 2013. OSCE/ODIHR Election Assessment Mission*, p. 2.

272. Seegard et al., *op. cit.*

273. OSCE, *Norway Internet Voting Pilot Project. Local Government Elections 12 September 2011. OSCE/ODIHR Election Expert Team Report*, 2012, p. 5; OSCE, *Norway Parliamentary Elections 9 September 2013. OSCE/ODIHR Election Assessment Mission*, 2013, pp. 2, 6 and 8.

274. OSCE, *Norway Internet Voting Pilot Project. Local Government Elections 12 September 2011. OSCE/ODIHR Election Expert Team Report*, 2012, pp. 2 and 4; OSCE, *Norway Parliamentary Elections 9 September 2013. OSCE/ODIHR Election Assessment Mission*, 2013, pp. 14-15.

275. Bull et al., *The Imperfect Storm*, 2016, p. 117; OSCE, *Norway Internet Voting Pilot Project. Local Government Elections 12 September 2011. OSCE/ODIHR Election Expert Team Report*, 2012, p. 5.

276. Bull et al., *op. cit.*, p. 118.

277. OSCE, *Norway Parliamentary Elections 9 September 2013. OSCE/ODIHR Election Assessment Mission*, 2013, p. 2; Bull et al., *op. cit.*, pp. 117-118.

government formed a committee, the Internet Election Committee, to oversee the entire process. This committee, which has limited resources, contracted an auditor to evaluate certain IT components of the system.[278]

Despite these improvements, a flaw was identified in the cryptographic processes of the online voting system before the 2013 parliamentary election. These processes allowed for the storage of password-protected data.[279] At a later stage, when online voting had already been underway for several weeks and thousands of votes had been registered, a programming error affecting the encryption of votes was discovered. This error was immediately corrected and does not appear to have affected the rest of the poll.[280] These incidents were attributed to the late decision on the part of the authorities to extend the pilot project for the 2013 legislative elections, which limited the preparation and improvement of the systems.

3.4.4 Review of the experience and end of the trials

The government that was formed following the 2013 legislative elections announced in 2014 that Internet voting in Norway would be abandoned. Certain partners in the governing coalition had made this an election campaign promise. It must be said that, from the outset, some political parties and elected officials opposed its introduction.[281] The main objections expressed by elected officials were related to the difficulty of ensuring that Internet votes are freely cast and that the secrecy of the vote is respected, given that Internet voting is carried out in an uncontrolled environment, unlike paper-based, in-person voting.[282] A review of the 2011 and 2013 experiences showed that electors were unfamiliar with the mechanisms available to ensure that nobody would vote under duress.[283] The system flaws identified in 2013 also led to concerns among voters and elected officials.[284] This review did not conclude that Internet voting had a positive impact on voter turnout, particularly among young electors. Indeed, the results showed no significant difference in the demographic characteristics of electors using traditional options and those who voted online.[285]

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278. OSCE, *op. cit.*, p. 8.

279. Bjørstad, *Technical Report. Source Code Audit of Norwegian Electronic Voting System*, 2013, pp. 2 and 5.

280. OSCE, *op. cit.*, pp. 6-8; Bull et al. *op. cit.*, pp. 118-119.

281. Norwegian Ministry of Local Government and Regional Development, *Project Mandate for E-vote 2011 Project*, p. 4; OSCE, *Norway Internet Voting Pilot Project. Local Government Elections 12 September 2011. OSCE/ODIHR Election Expert Team Report*, p. 3.

282. Norwegian Ministry of Local Government and Modernization, *Internet Voting Pilot to Be Discontinued*, 2014, [Online]; Bull et al., *op. cit.*, p. 119.

283. Segaard et al, *Internettvalg. Hva gjør og mener velgerne?*, English Summary, Institutt for Samfunnsforskning, 2014, p. 139.

284. BBC News, *E-voting Experiments End in Norway Amid Security Fears*, [Online], 2014. [https://www.bbc.com/news/technology-28055678].

285. Segaard et al., *op. cit.*, p. 135.

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However, the experience shows that electors appreciated being able to vote online in 2011 and 2013 and that they found the process user-friendly and convenient.[286] Nevertheless, certain voters with a disability, who required special applications on their devices to use the platform, experienced difficulties.[287] Almost all respondents indicated that they had a good understanding of the registration process, which required a password and unique code, and they found this process user-friendly.[288] Furthermore, the research team found that among electors in the municipalities that participated in both trials, those who voted online in 2011 did so again in 2013.[289]

Although voter turnout did not increase as a result of Internet voting, there was a significant shift from election day voting to advance polls, primarily online voting.[290] Research teams also noted that Internet voting positively influenced voter participation among electors living outside of the country, with 9% more electors voting in 2013 in municipalities where Internet voting was available.[291]

Those who decided to vote on paper in the participating municipalities did not show any particular reluctance with regard to online voting. In explaining their choice, most of these electors cited a simple preference for paper voting, the symbolism of voting on election day, or the fact that a polling place was close to their home.[292]

The research teams also observed a relatively high level of tolerance among the population for the fact that remote Internet voting no longer guarantees the secrecy of the vote, as long as it does not lead to criminal acts such as vote buying. In fact, about a third of Internet voters reported that they were not alone when they cast their ballot online.[293] Among those reporting undue pressure or knowledge of vote buying, the research teams did not note a difference between the number of electors who voted on paper and those who voted online.[294]

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286. *Ibid.*, p. 136.

287. Seegard et al., "The Norwegian Trial with Internet Voting: Results and Challenges", *Revista General de Derecho Público Comparado*, vol. 13, 2013.

288. *Ibid.*

289. Segaard et al., *Internettvalg. Hva gjør og mener velgerne?*, English Summary, Institutt for Samfunnsforskning, 2014, pp. 135-136.

290. Seegard et al., "The Norwegian Trial with Internet Voting: Results and Challenges", *Revista General de Derecho Público Comparado*, vol. 13, 2013

291. Segaard et al., *Internettvalg. Hva gjør og mener velgerne?*, English Summary, Institutt for Samfunnsforskning, 2014, p. 137.

292. Seegard et al., "The Norwegian Trial with Internet Voting: Results and Challenges", *Revista General de Derecho Público Comparado*, vol. 13, 2013

293. Segaard et al., *Internettvalg. Hva gjør og mener velgerne?*, English Summary, Institutt for Samfunnsforskning, 2014, p. 138.

294. *Ibid.*, pp. 138-139

Overall, the Norwegian electorate demonstrated a considerable level of confidence in the online voting system, even when presented with considerations regarding a lack of safeguards guaranteeing the secrecy of the vote or IT security.[295] The report noted that electors in the municipalities that participated in the pilot projects were more supportive of its widespread implementation than the electorate in general. In 2013, 90% of voters who participated in the pilot projects supported the proposal to expand Internet voting nationwide, compared to 70% of the Norwegian electorate.[296]

3.5 Switzerland

Switzerland has a long history of implementing Internet voting. The country began trialling this voting option in a gradual and decentralized manner in 2004. This measured approach reflects Switzerland's political culture and its federal system.

Swiss electors are frequently called to the polls for elections and referendums. Citizens can have the opportunity to vote four to six times a year. The country has taken steps to make voting more accessible in order to encourage voter turnout.

3.5.1 The context

In the early 1990s, most Swiss cantons offered unconditional voting by mail.[297] Every citizen can use voting by mail. This is the most popular voting option. It is offered in addition to traditional paper-based voting.

Following an initial trial of remote voting by mail, there was a desire to implement an Internet voting system. This implementation was intended to reduce the time required to transmit paper ballots and the risk of ballots being rejected due to postal delays.

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295. *Ibid.*, p. 137.

296. *Ibid.*

297. Switzerland is a confederation made up of 26 federated states known as cantons. Each canton has its own constitution, parliament (the Grand Council) and government (the Council of State). Each canton establishes the options for voting to constitute its parliament. The cantons are also responsible for organizing federal and communal polls. At the federal level, parliament (the Federal Assembly) is made up of two chambers: the National Council and the Council of States. The Federal Assembly appoints the members of the Federal Council, the executive body of the Confederation. The Federal Chancellery is the central body of the Federal Council and coordinates its work. The Federal Chancellery is responsible for federal political rights, including the coordination of federal polls, even where they are organized by the cantonal authorities. When it comes to Internet voting, more specifically the Federal Chancellery supports the cantons in the introduction of this voting option and collaborates with the Federal Council as the licensing authority (https://www.bk.admin.ch/dam/bk/fr/dokumente/komm-ue/Buku2008/die_schweizer_demokratie.pdf.download.pdf/la_democratie_suisse.pdf).

The deployment of Internet voting was part of a national strategy proposed by the Swiss government in the early 2000s. At that time, an eGovernment Strategy included several forms of online political participation, including Internet voting.

Since the cantons have electoral responsibilities, they managed the development of the Internet voting infrastructure in close collaboration with the Swiss government, which defined certain benchmarks and funded most of the project. The short-term objective was to offer this voting option to Swiss electors abroad, as well as to target groups with special needs, visually impaired people in particular. Ultimately, Internet voting was to become a permanent voting option accessible to the entire population.

Since the Internet voting trial phase began in 2004, 15 cantons have allowed a portion of their electorate to vote online during more than 300 polls. The categories of voters who can use this voting option vary from canton to canton.[298]

3.5.2 The legal implementation

Over the years, the Federal Chancellery determined detailed requirements to ensure that elector quality is monitored and that the votes are secret and counted in full.[299] These requirements are outlined in the Ordinance on Political Rights and the Federal Chancellery Ordinance on Electronic Voting. A steering committee, a monitoring group and a working group monitor the progress of the project. These groups are made up of representatives of the Confederation, the cantons and the Chancellery.

In the early 2000s, the Swiss Parliament commissioned the Federal Council to conduct a feasibility study on Internet voting and to prepare for its introduction in Switzerland. The legal basis for Internet voting trials was established in June 2002 in an amendment to the *Federal Act on Political Rights*.

The Federal Chancellery is responsible for Internet voting. The cantonal authorities oversee the implementation of the voting processes by organizing and conducting polls, including federal elections. Therefore, each canton can decide whether or not to offer Internet voting and choose which system to use.

Each canton involved must enter into an agreement with the federal government to conduct Internet voting pilot projects. These agreements outline the terms of the trials and the responsibilities of each player, while providing for certain safety rules. Internet voting must respect the core democratic voting principles, including the integrity of the electoral process, freedom, uniqueness and secrecy of voting.

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298. Certain cantons offer or have offered Internet voting only to electors living abroad, while others also offer or have offered it to specific groups of electors living in the canton (citizens in certain communes and persons with disabilities, for example).

299. Federal requirements do not apply to cantonal polls.

3.5.3 The trial phase

The Internet voting trial phase began in 2004. Internet voting was limited to a proportion of the electorate to ensure that the digital voting platform was reliable. This proportion was determined by the Federal Council when it authorized the trial phase.

Pilot tests

The first tests took place in the canton of Geneva in 2003.[300] Further trials followed in Neuchâtel and Zurich in 2005. Each of these three cantons developed its own Internet voting system. They also passed legislative changes to allow for the implementation of Internet voting.

During the first pilot tests in 2004-2005, just over 22% of those eligible to vote online did so. Turnout was much higher in the canton of Neuchâtel, where 61.5% of those who were eligible voted online, which was probably due to the interest among those using the canton's government services portal.[301]

Expansion of the test phase

Following the success of the pilot tests, the Federal Parliament adopted legislative amendments in March 2007 which marked the beginning of an extended trial phase. This decision aligned with the national eGovernment Strategy adopted by the Federal Council in 2007, which stipulated that online voting was a priority project. These changes allowed for the gradual expansion of Internet voting and allowed additional cantons to conduct trials.

The pilot tests in the cantons of Geneva, Neuchâtel and Zurich were reserved for electors residing in Switzerland. As of 2008, the Swiss government established that Swiss electors abroad and visually impaired electors should be priority target groups for Internet voting due to their particular needs.

In 2009, the number of cantons offering Internet voting increased from three to thirteen, which represented half of all cantons. All these cantons adopted one of the three digital voting systems developed by the cantons that originally introduced Internet voting.

Under these legislative and regulatory changes, a canton that had successfully conducted five consecutive trials could apply to the Federal Council to extend its authorization. The maximum proportion of the electorate that could use Internet voting was now 10% of all Swiss electors and 20% of the electorate in each canton.

As of June 2012, following requests on the part of the cantons of Neuchâtel and Geneva, the Federal Council set stricter requirements in order to raise the percentage of the cantonal electorate eligible for Internet voting to 30%.

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300. Before conducting the first pilot project during a federal referendum, the canton of Geneva tested its system in four communal polls.

301. Data for polls held on September 26, 2004 (Geneva), on November 28, 2004 (Geneva), on September 25, 2005 (Neuchâtel), on November 27, 2005 (Zurich) and on November 27, 2005 (Neuchâtel).

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New security requirements and expansion of the authorized electorate

Due to the positive evaluation of the extended trial phase, the Federal Council reviewed the provisions governing Internet voting trials and adopted new requirements at the end of 2013[302] with a view to gradually expanding access to this voting option.

The main requirements govern the implementation of verifiability and system certification by an accredited independent body. They also raise the maximum threshold of the cantonal electorate eligible for Internet voting to 50%. Compliance with the new requirements must be in place before applying to the Federal Council to increase the proportion of electors who can use this voting option.

In its report on Internet voting, the Federal Council also proposes extending online voting to all electors in a canton under certain conditions: the canton must use an open-source-code platform, ensure universal verifiability of digital voting operations and carry out conclusive intrusion tests.

Internet voting as a third voting option

After several years of trial phases, the Federal Council recognized that Internet voting is beneficial, particularly for Swiss citizens abroad and electors with a disability who can vote independently.[303] As early as 2017, it began work on revising federal law so that electronic voting could become the third regular channel for voting, in addition to voting at a polling station and voting by mail.

The stages of the review project

In April 2017, a panel of experts[304] was established specifically to develop the legal framework governing the transition from the trial phase to standardized Internet voting as a third voting option. In April 2018, this group tabled a report[305] containing several recommendations. The main recommendation proposed that Internet voting be recognized as a third voting option as long as the source code of the digital platform is open and allows for complete operational

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302. *Rapport du Conseil fédéral sur le vote électronique: Évaluation de la mise en place du vote électronique (2006-2012) et bases de développement*, [Online], June 2013. [https://www.bk.admin.ch/dam/bk-intra/fr/dokumente/pore/bericht_des_bundesrateszuvoteelectronique-auswertungdereinfuehru.pdf.download.pdf/rapport_du_conseilfederalsurlevoteelectronique-evaluationdelamis.pdf].

303. "Modification de la loi fédérale sur les droits politiques (passage de la phase d'essai à la mise en exploitation du vote électronique) – Rapport sur les résultats de la consultation", [Amendment to the Federal Act on Political Rights (from trial phase to commissioning of electronic voting – Report on the consultation reports], *Swiss Confederation*, [Online], June 18, 2019. [https://www.newsd.admin.ch/newsd/message/attachments/57569.pdf].

304. This interdisciplinary group consisted of thirteen members including specialists (in law, security, political science), representatives of the federal services (Federal Office of Justice, the federal office for the equality of disabled people, the Federal IT Steering Unit) and representatives of the cantons.

305. *Rapport final du groupe d'experts Vote électronique (GE VE)*, [Online], 2018. [https://www.bk.admin.ch/dam/bk/fr/dokumente/pore/Schlussbericht%20EXVE.pdf.download.pdf/Schlussbericht_EXVE_FR.pdf].

verifiability. The group also recommended that the drafting of security requirements should remain a federal responsibility. Lastly, it stated that strict requirements are justified because of the consequences of manipulating Internet voting.

In spring 2017, with a view to accelerating and pursuing the expansion of online voting, the cantons and the Swiss government signed a joint declaration of intent to confirm their desire to end the trial phase of Internet voting.[306]

In June 2018, the Federal Council mandated the Federal Chancellery to draft legislative amendments[307] to make Internet voting a third regular voting channel. The proposed revision seeks to enshrine Internet voting in the law, since provisions relating to the terms of the trial phase are essentially outlined in regulations.

This draft revision provided for the removal of limitations on the number of electors eligible for Internet voting in the cantons using digital voting platforms that meet the highest security requirements and ensure full verifiability.

> During its meeting on June 26, 2019, the Federal Council decided to dispense with the commissioning of electronic voting for the time being. During the consultation on the draft amendment to the Federal Act on Political Rights, while the majority of participants were in favour of electronic voting, most parties in particular felt that commissioning it would be premature. The Federal Council instructed the Federal Chancellery to adapt the general conditions governing the trial phase by the end of 2020. [...] The objective was to establish a stable test phase based on state-of-the-art systems. These include extending independent monitoring, increasing transparency and trust in the system, greater involvement of the scientific community and a review of existing requirements and procedures.[308]

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306. *Déclaration d'intention pour l'introduction du vote électronique*, April 21, 2017.

307. Confédération suisse, *Modification de la loi fédérale sur les droits politiques (Passage de la phase d'essais à la mise en exploitation du vote électronique)*, [Amendment to the Federal Act on Political Rights (from trial phase to electronic voting], [Online], 2018. [newsd.admin.ch/newsd/message/attachments/55217.pdf].

308. Conseil fédéral, *Vote électronique: le Conseil fédéral restructure la phase d'essai et renonce pour l'instant à en faire un canal de vote ordinaire*, [Online], June 27, 2019. [https://www.admin.ch/gov/fr/accueil/documentation/communiques.msg-id-75615.html]; and Confédération suisse, *Modification de la loi fédérale sur les droits politiques (passage de la phase d'essai à la mise en exploitation du vote électronique) – Rapport sur les résultats de la consultation*, [Amendment to the Federal Act on Political Rights (from trial phase to electronic voting) – Report on the consultation results], [Online], June 18, 2019. [https://www.newsd.admin.ch/newsd/message/attachments/57569.pdf].

3.5.4 Popular support, usage statistics and voter turnout

An extensive[309] online[310] consultation process on this draft revision ran from December 19, 2018, to April 30, 2019. The public appeared very enthusiastic about Internet voting. The results showed that almost 70% of respondents felt that Internet voting should be made available to all electors, 47% said they would vote more often if they could do so online, and only 8% supported a ban on Internet voting.[311] The Organisation of the Swiss Abroad (OSA)[312] expressed strong and enthusiastic support for Internet voting.

During the May 2019 federal elections, 47.6% of electors who voted and had the option of using Internet voting chose this voting option over ballot box or voting by mail.[313]

According to a 2017 study conducted in the cantons of Geneva and Zurich, Internet voting makes it easier to exercise the right to vote but does not significantly increase voter turnout.[314]

These findings align with those of a 2013 study[315] carried out by the Commission externe d'évaluation des politiques publiques [external commission for the evaluation of public policies] in the canton of Geneva, which stated that Internet voting had not increased participation in this canton. This type of voting also had no effect on the participation of specific segments of the electorate (young people, people who vote very rarely or occasionally). According to this study, [*translation*] "the gains in participation generated by simplifying the voting act have already been achieved through voting by mail."[316]

309. *Ibid.*

310. The complete questionnaire can be found on the following webpage: https://www.newsd.admin.ch/newsd/message/attachments/55227.pdf.

311. Swiss Confederation, *Étude nationale sur la cyberadministration 2019. La cyberadministration en Suisse selon le point de vue de la population, des entreprises et des administrations*, [Online], 2019. [https://www.egovernment.ch/fr/dokumentation/etude-nationale-2019/].

312. Organisation of the Swiss Abroad, *Pétition: Le vote électronique pour tous les Suisses de l'étranger*, [Online]. [https://www.aso.ch/fr/politique/petition-en-ligne-evoting/informations-sur-la-petition].

313. Federal Chancellery, *Essais de vote électronique*, [Online], 2019. [https://www.bk.admin.ch/dam/bk/fr/dokumente/pore/Vote_%C3%A9lectronique_Resultate_FR_19._Mai_2019.pdf.download.pdf/Vote_%C3%A9lectronique_Resultate_FR_19._Mai_2019.pdf].

314. This study is based on data regarding participation in federal referendums in the canton of Geneva between 2001 and 2014 and in the canton of Zurich between 2001 and 2011. In both cantons, Internet voting was only offered in certain communes in order to comply with the maximum percentage of electors allowed under federal legislation. This allowed the research team to compare voter turnout rates in municipalities where Internet voting was available to the entire electorate to turnout rates in municipalities where it was unavailable. Micha Germann and Uwe Serdült, "Internet voting and turnout: Evidence from Switzerland," *Electoral Studies*, No. 47, 2017.

315. Pascal Sciarini, Fabio Cappelletti, Andreas Goldberg, Alessandro Nai and Amal Tawfik, *Étude du vote par Internet dans le canton de Genève. Rapport final à l'intention de la Commission externe d'évaluation des politiques publiques*, University of Geneva, February 8, 2013, p. 4.

316. *Ibid.*, p. 5.

In its evaluation of the introduction of Internet voting, which was published in 2013, the Federal Council remains cautious about the effects of this voting option even though it sees Internet voting as a future project that is likely to gain in popularity, as was the case with voting by mail. The Federal Council believes that, in the long term, Internet voting could prevent a decline in voter turnout.[317]

Internet voting appears to be more popular among certain elector profiles. The 2013 study conducted in the canton of Geneva indicates that more men than women use this voting option. Online voting usage also declines with age. The highest proportion of Internet voting users is in the 25-34 age group and the lowest is in the 65+ age group. However, the difference between the age groups is less pronounced now than during the initial trials. Internet voting is more popular among electors who rarely or occasionally vote than among those who always or regularly vote. Electors who vote online do so later than those who vote by mail. Electors with higher levels of education, income or political knowledge are also more likely to choose Internet voting. Lastly, the use of this type of voting is strongly linked to computer use, which includes Internet use, the level of digital literacy and trust in online communications and transactions.[318]

Internet voting is also much more popular among electors living abroad than among those living in Switzerland.[319] However, the available data does not allow us to determine whether this popularity translates into an increase in the participation of non-resident voters or whether it is displacement of the vote.[320]

Swiss electors who choose Internet voting during one election will not necessarily do so regularly. According to a study[321] carried out in the Canton of Geneva between 2012 and 2014, only a third of voters used Internet voting again in subsequent elections. The remaining two thirds of electors either abandoned this voting option or used it in alternation with voting by mail or in-person voting. This study also shows that young people are the most likely to stop using Internet voting.

On a cantonal level, elector interest in Internet voting is not uniform.[322] Certain elected officials oppose the Internet voting project, citing that it is expensive yet not sufficiently reliable or secure, that polling and vote counting operations require specialists rather than elected officials, and that this voting option does not significantly increase voter turnout.

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317. Swiss Federal Council, *Rapport du Conseil fédéral sur le vote électronique. Évaluation de la mise en place du vote électronique (2006-2012) et bases de développement*, June 14, 2013, pp. 4581-4582.

318. When computer factors are controlled for in public opinion surveys, differences in age, gender, education and political knowledge disappear, which suggests that this is the most important factor. Pascal Sciarini et al., *op. cit.*, pp. 4-5.

319. Micha Germann and Uwe Serdült, *op. cit.*, p. 4.

320. *Ibid.*, p. 9. The study notes that there is also insufficient data to measure the effect of Internet voting on the participation of electors with a disability.

321. Fernando Mendez and Uwe Serdült, "What Drives Fidelity to Internet Voting? Evidence from the Rollout of Internet Voting in Switzerland", *Government Information Quarterly*, No. 34, 2017, p. 518.

322. See, for example, the popular federal initiative "Pour une démocratie sûre et fiable (moratoire sur le vote électronique) " [https://moratoire-e-vote.ch/texte-dinitiative/].

3.5.5 Internet voting systems

Under the legislative provisions in effect in Switzerland, cantons must acquire and implement the Internet voting systems that they choose. They are responsible for covering the operating costs of the systems. They may only use approved systems that meet security requirements and must obtain permission from the Federal Council for each use of Internet voting.

The three cantons that carried out Internet voting pilot projects (Zurich, Geneva and Neuchâtel) used different digital Internet voting platforms. These platforms were subsequently used by other cantons when the test phase was extended.

Moving away from digital voting platforms

Over time and for various reasons, the use of two systems stopped: the Zurich system in 2015 and the Geneva system in 2018. Since February 2020, the digital voting platform used by Neuchâtel is the only one used in Switzerland. The country will now have to contend with a limited number of private companies offering digital voting platforms, contrary to the expectations of the Confederation and the cantons, which hoped for a variety of Internet voting systems.[323]

The system developed by Zurich and the consortium of cantons

The first system that was abandoned was originally developed by the canton of Zurich and then by the consortium of cantons.[324] It was based on technology supplied by a private company. This system no longer met the security requirements that came into effect in 2014. This finding was based on the results of an internal audit required by the Federal Council ordinance. The digital platform had a flaw related to the protection of the secrecy of the vote. The system, which was used for almost 10 years, was abandoned by the consortium because the costs required to meet the Federal Council's security requirements were too high.

The system developed by Geneva

The Geneva system, also known as CHVote, was developed internally by cantonal authorities starting in 2001. This platform was launched in 2003 and enabled more than 150 polls. Both the first online referendum in Europe and the first online election in Switzerland were held in the canton of Geneva. The Geneva system was the only system in Switzerland, and probably in the world, that was designed, hosted and operated by the public administration. As of 2016, citizens who submitted a request could access the system's source code. During the 2017 elections, almost 60% of the Geneva electorate who were authorized to use Internet voting employed this voting option.

In November 2018, after some fifteen years of use, the canton of Geneva announced its decision to halt the development of its CHVote platform and to cease offering it by February 2020

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323. The declaration refers to a "multi-product strategy." See the Conference of State Chancellors and the Chancellor of the Confederation, "Déclaration d'intention pour l'introduction du vote électronique", [Online], April 21, 2017. [https://www.bk.admin.ch/dam/bk-intra/fr/dokumente/Allgemein/neues_planungsinstrument-absichtserklaerung.pdf.download.pdf/nouvel_instrumentdeplanification-declarationdintention.pdf].

324. The cantons of Zurich, Glarus, Fribourg, Solothurn, Schaffhausen, St. Gallen, Graubünden, Aargau and Thurgau.

at the latest. The canton decided to cease using this system for financial reasons.[325] The costs associated with upgrades required to meet federal requirements were too high for the canton, as was the case for the consortium of cantons.

Geneva had launched in 2014 a project to develop its platform to comply with new Federal Chancellery requirements, including the implementation of individual and universal verifiability. The cost of the work required was estimated at an additional 4.74 million Swiss francs ($6.92 million). The budget was adopted by the Grand Council of the Canton of Geneva in September 2016 and was added to the administration's budget. However, [*translation*] "a reassessment of the planning required to complete the platform developments"[326] suggested that a project extension was necessary. This extended timeline, which was estimated at 17 months, would entail additional capital expenditure of approximately 2.6 million francs ($3.8 million) in addition to the sums already set aside.[327]

Since 2001, the costs related to the technical development of the platform - over 14 million Swiss francs ($20.5 million) which was already set aside - were covered by Geneva without the support of the partner cantons or the Confederation. In a press briefing in fall 2018, the Council of State stated that it had decided to put an end to the operation of the system [*translation*] "given that it is not the role of a canton to develop, operate and finance an IT system of such complexity and scale by itself."[328]

Elected officials and citizens alike have raised concerns about the possible use of a system run by a private and foreign company. Several have made repeated calls for a public online voting system. In December 2018, a bill was submitted to the Grand Council proposing that the law explicitly state that the Internet voting system must be entirely managed by public authorities. The explanatory note for the bill states that:

> [*translation*] Unlike the Geneva open-source-code system, the Swiss Post e-voting system is opaque and managed by the companies that develop it. However, its functionality is not accessible and cannot be verified by a citizen with the necessary expertise. While this is often problematic with most computer programs, it is simply unacceptable when it comes to the process that underpins our democracy. The companies that developed this system are for profit companies and so they, by definition, must protect their inventions from competitors and therefore cannot be entirely transparent. The very nature of these companies contradicts one of the major requirements for choosing an electronic voting system. Managing an electronic voting system must be considered a sovereign task to be performed by the public authorities given the fundamental constitutional right to democracy.[329]

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325. The decision to cease offering the system is not linked to the hacking test carried out in fall 2018, during which ethical hackers hired to check the security of the system managed to redirect potential electors to a fraudulent site. Many were of the opinion that this flaw was commonplace and could have been corrected, but the Geneva canton decided to cease investing in its platform.

326. Conseil d'État press briefing, [Online], November 28, 2018.
[https://www.ge.ch/document/point-presse-du-conseil-etat-du-28-novembre-2018].

327. *Ibid.*

328. *Ibid.*

329. Projet de loi modifiant la Loi sur l'exercice des droits politiques (LEDP) [Act to Amend the Act on Political Rights] (A 5 05), December 12, 2018 [http://ge.ch/grandconseil/data/texte/PL12415.pdf].

The Neuchâtel system

The third system, the only one that is still in use, was developed in the canton of Neuchâtel, based on technology provided by a private company. The canton did not own its own system, but rather acquired a limited right to use it.

In August 2015, the canton of Neuchâtel announced that it had entered into a partnership with La Poste, a postal service company owned by the Swiss government, to test, for the first time, its new Internet voting platform which was also developed by the private company. La Poste was already the cantons' primary partner for voting by mail, "with 19 million letters sent out each year for polls and elections."[330]

Since 2014, La Poste has been in discussions with this company regarding the purchase and development of an online voting platform that meets federal requirements that came into effect in 2014. The system was developed during 2015. This partnership between Neuchâtel and La Poste was also designed to provide La Poste with the support of the canton and the Internet voting expertise that the latter had acquired over the previous decade.

In return, the canton of Neuchâtel could offer a more innovative solution to its electorate. La Poste had in fact planned to move ahead as quickly as possible with the development of a system that offered universal verifiability, which the Neuchâtel system did not offer. Due to Neuchâtel sharing its know-how in organizing online voting with La Poste, the canton was able to operate the solution free of charge in 2017 and at half price in 2018 under the terms of the contract.

La Poste's Internet voting system has effectively been operational since 2016. Four cantons are already using this system (Neuchâtel, Fribourg, Basel-Stadt and Thurgau) and this number is expected to increase. Indeed, the six cantons using the Geneva system will have to decide whether they will continue to offer this voting option and, if so, whether they will use the La Poste platform.

In August 2017, the La Poste system was certified for use by 50% of the electorate in accordance with federal requirements. It is the first and only system to receive this certification.

La Poste's Internet voting system

A private company developed the core of the voting system. La Poste's solution can be integrated into the digital devices that cantons use for voting, particularly those for authentication. It can be used at all elected levels (federal, cantonal and communal) in the four national languages of Switzerland (German, French, Italian and Romansh). The list of electors remains in the cantons at all times and La Poste does not have access to the personal data on this list. The cantons are responsible for preparing the polls and for vote counting.

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330. Samuel Jaberg, "Swiss Post's ambitions," Swissinfo, October 22, 2015.

Each authorized elector receives voting materials in the mail, which allow them to vote. This material includes four cryptographic codes and the URL link to the portal for polls in their canton. The fact that these codes are sent by postal mail rather than electronically is an additional security measure. The first code that the elector must use is a start-up code, which is identified using a triangle.[331] The start-up code is a series of 20 numbers and letters that electors must enter when logging on to the portal.

Certain cantons also require that an additional authentication feature such as the elector's year of birth is entered when logging in. Once the elector has verified their identity, they may cast their vote. The system generates verification codes for each vote or each choice.[332] Voting materials also include verification codes, which are indicated by a diamond. These codes consist of a series of four digits and they are used for individual verifiability. Each elector receives a set of unique verification codes. The elector must compare the verification codes displayed on their screen with those in their voting materials. If the codes match, their vote has been registered correctly.

The elector must then enter their confirmation code, indicated by a pentagon, which allows the vote to be sent to the virtual ballot box. Lastly, the system generates a completion code. The elector must compare this code with the code in their voting materials, indicated by a star, to ensure that their vote has indeed been transmitted to the ballot box and that the procedure has been completed.

Votes transmitted to the virtual ballot box are encrypted and cannot be linked to specific electors. The virtual ballot box is hosted on La Poste's system. La Poste delivers the encrypted contents of the ballot box to the electoral commission, which is responsible for decrypting the data and counting the votes. The keys required for data decryption are distributed among members of the electoral commission. Each member has a smart card that contains part of the encryption key and a password, which protects their segment of the encryption key. All of the members must be together for the decryption process to occur. Once the data has been decrypted, the results are extracted into a signed XML file and displayed in a PDF report. When the process is complete, it is audited.

Intrusion test and 100% certification

La Poste sought certification of its Internet voting system for 100% of the electorate. In winter 2019, the company subjected this new Internet voting system to a public intrusion test. On February 7, it released the system's source code "including the documentation required to verify all security aspects of the system."[333] The source code will remain public for an indefinite period, in accordance with federal obligations. Individuals who wish to access the source code must register.

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331. Each code is marked with a different geometric shape to help electors identify which code to use at what time.

332. During Swiss polls, several elections or referendums often take place simultaneously. Electors can therefore cast several votes during a poll.

333. La Poste, *Test de piratage public du système de vote électronique de la Poste*, [Online], February 7, 2019. [https://www.evoting-blog.ch/fr/pages/2019/test-de-piratage-public-du-systeme-de-vote-electronique-de-la-poste].

CHAPTER 3 : Internet Voting in Canada and Around the World

The intrusion test, which simulated a federal election, ran between February 25 and March 24, 2019. The purpose of the test was to allow individuals outside of La Poste to deliberately attack its Internet voting system, "so as to verify its reliability."[334] The test results would then be integrated into the system development process. The mock poll was held on March 24 and Internet voting began, as in a real election, four weeks before election day, which was February 25 in this case. Hackers and other specialists were eligible to participate in this test. They could download their voter card onto a test platform.[335] This card contained the codes required to cast their vote, just like in a real poll. Participants could apply for multiple voter cards in order to launch multiple attacks on the system.

An independent company was contracted to conduct the test which included managing the platform and carrying out an initial evaluation of the results. Participants who found a potential flaw were to submit their findings on the test platform. The independent company did an initial sort and only forwarded plausible findings to La Poste. Financial compensation[336] was paid to participants who reported an authenticated flaw if they were the first to report it. The attacks allowed during the test were related to consulting or manipulating votes, attacks on the central voting system and its security mechanisms, and attacks on specific and universal verifiability. Other systems which are not directly related to the voting process were excluded from the test. Similarly, known attacks and those against which La Poste had already taken security measures were excluded from the scope of the test, since they would not generate any useful feedback.

A total of 3,187 people registered to participate in the intrusion test. They proposed 16 improvements to the voting system, which were all non-critical findings. The ballot box was not hacked, which means that no participant was able to break into the system, crash it or manipulate the results. In addition, 25 optimization proposals and three errors qualified as significant by La Poste were detected in the source code by cryptographic and security specialists. La Poste has committed to correcting the source code and having it verified once more by independent specialists. Since one of the three flaws concerned the individual verifiability system, which is used in the cantons of Thurgau, Neuchâtel, Fribourg and Basel-Stadt, La Poste announced that its Internet voting system would not be available in 2019 until it is upgraded and audited.

The flaws detected in the source code attracted media attention. One of these flaws "could be exploited to manipulate votes, without this being proven at a later date. However, the individual flaw [could not allow] an intrusion into the electronic voting system. "[337] Nevertheless, there were

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334. *Ibid.*

335. The link to the test platform was https://www.onlinevote-pit.ch/.

336. A total of 150,000 Swiss francs ($230,100) was earmarked for the financial compensation. This sum was distributed according to the types of flaws detected and their degree of severity. A sum of 50,000 francs ($77,700) was set aside for the most serious intrusion: managing to manipulate votes in an undetectable manner. Critics of the test claimed that the rewards were not substantial enough to interest hackers and that [*translation*] "criminals and strategic organizations earn much larger amounts than those offered by Switzerland to develop attacks." Swissinfo.ch, *Piratez le système de vote électronique suisse!*, [Online], February 14, 2019. [https://www.swissinfo.ch/fre/crash-test_piratez-le-syst%C3%A8me-de-vote-%C3%A9lectronique-suisse-/44756194].

337. La Poste, *Une erreur dans le code source a été décelée et éliminée*, [Online]. [https://www.post.ch/fr/notre-profil/entreprise/medias/communiques-de-presse/2019/une-erreur-dans-le-code-source-a-ete-decelee-et-eliminee].

repercussions, particularly in Bern, where national advisors raised concerns with the Federal Council during question period. The Swiss Chancellor, the head of the Federal Council Administration, acknowledged that the flaw is significant.[338] In a press release, La Poste also acknowledged this was an issue.[339]

3.5.6 Overall observations

After some fifteen years of trials, Switzerland is continuing to implement Internet voting, but progress is quite slow. Since 2004, online voting has been offered in more than 300 polls in 15 different cantons. Switzerland imposed restrictions on the number of eligible voters from the very first tests and it was only after successful experiments that the restrictions were gradually lifted. The Federal Chancellery justifies this cautious approach by the federal structure of the country, with the need to adapt legal framework to the various levels of government and the many security and technical challenges created by the introduction of an Internet voting system. According to several observers, this vigilance is a factor that made the Swiss experience successful.

A cautious approach combined with the fact that 10 out of 26 cantons offer this voting option means that barely 2% of electors are currently authorized to vote online in Switzerland, a proportion that rises to 4% when electors living abroad are included.

The Swiss population is in favour of Internet voting. In that country, the electorate accepts that votes can be cast outside a polling station and remain under the control of the authorities.[340]

Following the La Poste intrusion test result, Internet voting was not legislated as a third regular voting channel in 2019. As of spring 2020, the Internet voting trial phase is ongoing.

3.6 New South Wales

New South Wales is one of the six states that make up the Australian federation. It is also the most populous Australian state. It has approximately 5.2 million electors and a population of 8 million, the majority of whom reside in and around Sydney, its capital.[341] In New South Wales and throughout Australia, voting is compulsory. In light of this, a range of different voting options make it as easy as possible for electors to fulfil their civic obligation. This range of procedures is

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338. Bernard Wuthrich, "La 'faille considérable' du vote électronique", *Le Temps*, March 18, 2019.

339. La Poste, *op. cit.*

340. Swiss Federal Council, *Fiche d'information – Vote électronique*, [Online]. [https://www.bk.admin.ch/dam/bk/fr/dokumente/pore/Faktenblatt_FR.pdf.download.pdf/Faktenblatt_FR.pdf]. See also: Organization for Security and Co-operation in Europe, *Rapport annuel 2012*, [Online]. [https://www.osce.org/fr/secretariat/100309].

341. NSW Government, *Population*, [Online]. [https://www.nsw.gov.au/about-new-south-wales/population/]; NSW Electoral Commission, *NSW State Election Results 2019*, [Online]. [https://pastvtr.elections.nsw.gov.au/SG1901/LA/State/turnout].

particularly aimed at individuals who may have difficulty voting in a polling place on election day. For example, voting by mail and voting at advance polling stations have been available to certain categories of electors for several years. Since 2011, New South Wales has also allowed certain groups of electors to vote online or by telephone during state elections.

3.6.1 The introduction of Internet voting

The introduction of Internet voting in New South Wales is linked to the 2008 ruling of the NSW Administrative Decisions Tribunal in the *Fittler v. New South Wales Electoral Commission* case.[342] In this case, the Tribunal held that the New South Wales Electoral Commission acted in a discriminatory manner by depriving a blind person of the opportunity to cast their vote independently and secretly in municipal elections, without having to seek assistance, like the majority of the electorate. To remedy the situation, the State introduced Braille ballot papers that were available on request for the 2008 municipal elections.[343]

In 2010, following a request on the part of Parliament, the New South Wales Electoral Commission investigated the possibility of offering Internet voting to blind and visually impaired people and people with other disabilities so that they could exercise their right to vote while maintaining confidentiality. Following analysis and consultations, the Electoral Commission confirmed the possibility of implementing Internet voting as an additional voting option for these electors during the next State general election in 2011.[344] It also recommended offering Internet and telephone voting to other categories of electors who may have difficulty voting, such as those living in remote regions and locations where postal services are not adequate. The Electoral Commission estimated that 400,000 electors in these categories (persons with disabilities and those living in remote regions) could benefit from access to this voting option.

At the end of 2010, Parliament passed legislation allowing the introduction of Internet and telephone voting in State elections for the categories of electors recommended by the Electoral Commission, as well as for electors who are outside of their State or outside the country on election day.[345]

Internet voting was offered for the very first time during the 2011 general election in New South Wales. It has been available during a total of three general elections: in 2011, 2015 and 2019. This voting option has also been offered in by-elections (some fifteen to date) that have taken place since its introduction.

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342. *Fittler v. New South Wales Electoral Commission and anor* (No. 2), 2008, NSWADT 116.

343. NSW Electoral Commission, *Report on the Feasibility of Providing "iVote" Remote Electronic Voting System,* 2010, p. 1.

344. *Ibid.*

345. NSW Electoral Commission, *Report on the Conduct of the NSW State Election 2011,* p. 89.

3.6.2 Eligible electors

Since its introduction in 2011, Internet and telephone voting has been limited to certain categories of electors. The State of New South Wales currently offers it to electors who:[346]

- Experience difficulty voting in person or are unable to vote without assistance due to a disability;

- Are illiterate and cannot vote without assistance;

- Live more than 20 kilometres from a polling place;

- Will be outside the State or country on election day;

- Are *silent electors.*[347]

During the next general election, scheduled for 2023, the availability of Internet and telephone voting will be expanded. Electors in the following situations will be added to the list of electors who are eligible for Internet and telephone voting:[348]

- Electors who are unable to travel due to a serious illness or disability;

- Those who are unable to travel to a polling station because they are caring for someone who is seriously ill or disabled;

- Those who cannot sign their name (disability certified by a recognized health professional);

- Those who are unable to travel to their polling place for religious reasons.

3.6.3 Using Internet and telephone voting

In 2011, some 46,800 electors used Internet or telephone voting, which represented 1% of those who voted. This number far exceeded the expectations of the Electoral Commission.[349] It more than quintupled during the next general election in 2015 to 283,669 electors (6.2% of those who voted). In 2019, the number of electors who voted online or by telephone decreased slightly to 234,401 (approximately 5% of those who voted).[350] With respect to this slight decline in the use of Internet and telephone voting, the electoral administration notes that it is too early to estimate how many electors will regularly use the digital voting platform in the future.[351]

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346. *Electoral Act*, 2017, No. 66 [NSW], s. 152; NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, p. 161.

347. Internet and telephone voting have been available for this category of electors since 2019. Electors may be granted this status if the publication of their address on the list of electors could jeopardize their safety or that of their family. Their address then remains on the list of electors, but it is confidential. The list of electors is available for consultation and is shared with certain electoral stakeholders.

348. NSW Electoral Commission, *iVote® Refresh Project for the 2019 NSW State Election*, pp. 6-7; *Electoral Act*, 2017, No. 66 [NSW], s. 37.

349. NSW Electoral Commission, *Report on the Conduct of the NSW State Election 2011*, pp. 89-90.

350. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, p. 19.

351. *Ibid.*, p. 76.

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The Electoral Commission notes that Internet voting is used primarily by electors who are outside their State or outside the country. Persons with disabilities are making less use of Internet and telephone voting than the Electoral Commission anticipated.[352] In 2011, half of the visually impaired people who registered to vote online or by telephone chose to vote by telephone. However, this proportion shifted in favour of Internet voting during subsequent elections.

By 2011, the vast majority of electors who registered prior to voting either online or by telephone cast their ballots online (95%). This trend continued in subsequent polls. In 2015 and 2019, this proportion was 99%.

At the same time, the Electoral Commission has noted a steady decline in voting by mail during the last three general elections. From 245,411 postal votes in 2011 (representing 5.7% of electors who cast ballots), the number of postal votes decreased to 136,572 in 2019 (2.9%).[353] The Electoral Commission noted that there is most likely a shift from voting by mail to Internet voting among certain electors.[354]

3.6.4 The Internet and telephone voting system

iVote® is an online and telephone remote-voting system used by the New South Wales Electoral Commission.[355] Electors can access the system either by telephone or the Internet using a computer, tablet or smartphone. The system is compatible with various web browsers. The iVote system consists of three sub-systems: a registration and ID management system, a central voting system and a vote verification system.

The registration and ID management system, which includes the voter register, is developed and managed by the Electoral Commission. The software behind the central voting system, which allows electors to verify their vote, was provided by a private company following a call for tenders. The Electoral Commission signed a four-year contract with the winning company. The three components of iVote are hosted and managed by different entities, for increased security.[356]

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352. NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, p. 17; NSW Electoral Commission, *Report on the Conduct of the NSW State Election 2011*, p. 90.

353. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, pp. 19 and 59.

354. NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, p. 17.

355. iVote® is a registered trademark of the New South Wales Electoral Commission. However, we will not use the trademark symbol throughout this document.

356. NSW Electoral Commission, *Post-Election Report - Specified Procedures in Relation to the Online and Telephone Voting System ("iVote") for 2019 NSW State Elections*, pp. 10-11.

3.6.5 Costs

According to the Electoral Commission, the cost of developing and implementing the iVote platform for the 2011 general election amounted to AUD 3.5 million[357] (C$3.2 million). The Electoral Commission is of the opinion that the development costs compare very favourably to those of other voting options for the visually impaired, such as Braille ballots.

Operating costs, on the other hand, vary according to the number of electors who use the platform during an election. In 2011, operating costs totalled approximately AUD 370,000[358] (C$337,000). In 2015, a significant increase in the number of users resulted in higher costs of AUD 2.6 million (C$2.5 million). The Electoral Commission also reports spending of AUD 670,000[359] (C$633,000) on system development between 2011 and 2015.

In 2019, the number of people who used Internet or telephone voting was comparable to 2015. Operating costs totalled AUD 2.5 million[360] (C$2.4 million), which is similar to 2015. Internet and telephone voting, per vote cast, are less expensive than voting by mail.[361] The Electoral Commission also invested approximately AUD 5.5 million (C$5.2 million) in 2019 for system improvements, including the iVote Refresh Project, which is discussed below.

3.6.6 How Internet and telephone voting are conducted

Internet and telephone voting are offered over a 13-day period, which covers the entire advance polling period and election day.[362] Eligible electors who wish to vote online must first register on the platform's website (ivote.nsw.gov.au) or by telephone. The registration period begins approximately one month before online and telephone voting become available, even before the order instituting an election is issued.[363] Eligible voters can register up until election day, a few hours before polls close.[364]

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357. NSW Electoral Commission, *Report on the Conduct of the NSW State Election 2011*, p. 94.

358. *Ibid.*, p. 76.

359. NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, p. 54.

360. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, pp. 38-39.

361. In 2019, the operating costs per vote were approximately $11 for Internet voting and $13 for absentee voting. NSW Electoral Commission, *op. cit.*, pp. 38-39.

362. In 2011, Internet voting was initially offered as an advance polling option for eligible electors. Since 2015, eligible electors have been able to vote online or by telephone on election day.

363. State elections are scheduled on a fixed date in New South Wales.

364. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, p. 79.

When registering, electors must provide their date of birth, address and certain information shown on a recognized identity document (passport, driver's licence or health insurance card). They choose whether they will vote online or by telephone and create a password (for Internet voting) or a personal identification number (for telephone voting). Electors must complete a declaration confirming that they are the individual who is submitting the request.[365]

Once the online and telephone voting period has begun, electors receive an eight-digit iVote ID by text message, email, telephone or mail, depending on their selection. In order to vote online, registered electors must visit the iVote website and log in using their iVote ID and the password they created when they registered. They must declare that they have not already voted in the election. They can then access voting instructions and electronic ballot papers. Voters can review and correct their ballots before submitting them. The iVote system notifies users who try to submit an incomplete ballot. They can then fill in their ballot or submit a blank ballot.

After submitting their vote, the elector receives a QR code and a unique confirmation number. The confirmation number allows the elector to check that their vote has indeed been recorded, thanks to a verification tool accessible on the homepage of the iVote website. The voter can carry out this procedure once they have submitted the vote and for a week after the election.

Since the 2019 election, voters can also verify the content of their vote within one hour by scanning the QR code into a multilingual application (the iVote Verification App). For security reasons, they must perform this verification using a different electronic device than the one they used to cast their vote. Once they have scanned the QR code into the application, electors enter their iVote ID and password. They can then view their ballot paper as recorded by the system. If this ballot does not match the vote submitted, the elector must contact a call centre to cancel their vote and cast their vote again. Almost 50% of iVote users verified their vote in this way in 2019[366].

3.6.7 Security and verification of the voting system

Since the iVote system was introduced, several security mechanisms have been implemented to ensure its security, such as encryption, data reproduction and white hacking.[367] Legislation also requires that an independent auditor evaluate the iVote system before and after the election.[368] One of the purposes of this evaluation is to ensure that the system appropriately reflects the votes submitted and that the process is secure. The audit reports are made public.[369] The independent auditor may make recommendations to the Electoral Commission to reduce or eliminate risks affecting the security, reliability or secrecy of the vote. Party representatives and candidates may observe every stage of the polling process from the pre-election voting tests to the final decryption process.[370]

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365. NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, p. 4.

366. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, p. 80.

367. NSW Electoral Commission, *Report on the Conduct of the NSW State Election* 2011, p. 123.

368. NSW Electoral Commission, *op. cit.*, pp. 90-91; *Electoral Act*, 2017, No. 66 [NSW], a. 156.

369. NSW Electoral Commission, *op. cit.*, 2011, p. 95.

370. NSW Electoral Commission, *iVote® Refresh Project for the 2019 NSW State Election*, p. 11.

Several improvements have been made to the security of the iVote system since its implementation to correct certain issues and to respond to criticisms made by the media, elected officials and experts. In 2011, for example, the Electoral Commission acknowledged that the rapid implementation of the iVote system precipitated the conduct of analyses and audits and that certain risks identified during the pre-election audit could not be eliminated in time. In 2015, when Internet voting was first introduced, two independent researchers identified a security flaw that would have allowed an individual with malicious intent to access an elector's vote, alter it and bypass the verification mechanism without triggering the system's security warnings.[371] This discovery was highly publicized. The Electoral Commission immediately corrected the flaw, but was reassuring about the risks involved, estimating that there was a very low risk that the 66,000 or so votes that had already been submitted in iVote had been altered.[372]

Nevertheless, this incident and other criticisms led the New South Wales Parliament to recommend a series of actions to ensure the security of the system.[373] A committee of experts was tasked with assessing the security of the iVote system and determining whether it should be used during the 2019 election.[374] The committee report concluded that the iVote system was secure and could be used. However, the authors of the report made a series of recommendations aimed at improving its functioning, security and transparency.[375] It is with this in mind that the State launched a major project to improve and upgrade the platform for the 2019 election, taking advantage of all the recommendations made and the guidelines for Internet voting and electronic voting set out by the Electoral Council of Australia and New Zealand and the Council of Europe, respectively.[376]

The iVote Refresh Project thus made it possible to make significant changes to the voting and vote verification modules based on the input of external specialists. The main objective of this project was to improve the system's security, transparency, monitoring and evaluation mechanisms. In order to improve transparency and public confidence in the security of the iVote system, the State published critical sections of the source code for verification and comment, as recommended by elected officials and experts.[377] The Electoral Commission had previously called on experts to analyze and evaluate the code, but other specialists could now participate in this exercise. However, they were required to register and sign a confidentiality agreement.[378] The project also included improvements to benefit users, including translating content into languages other than English.[379]

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371. Joint Standing Committee on Electoral Matters, *Administration of the 2015 NSW Election and Related Matters*, p. 10.

372. NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, pp. 77-78.

373. Joint Standing Committee on Electoral Matters, *op. cit.*

374. *Ibid.*, p. 12.

375. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, p. 96; Roger Wilkins AO, *Report on the Security of the iVote System*, 2018.

376. NSW Electoral Commission, *iVote® Refresh Project for the 2019 NSW State Election*, p. 5.

377. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, pp. 80-81; Roger Wilkins, *op. cit.*; Joint Standing Committee on Electoral Matters, *op. cit.*

378. NSW Electoral Commission, *iVote® Refresh Project for the 2019 NSW State Election*, pp. 18-19.

379. *Ibid.*, p. 5.

No major security incidents were reported in 2019. However, during the election period, some individuals raised concerns about the security of the iVote system following intrusion tests conducted at the same time in Switzerland on the La Poste online voting system. These intrusion tests revealed a flaw related to a component also present in the iVote system, which comes into play when electronic votes are counted. The Electoral Commission reports that it made the necessary corrections before votes were counted.[380] It also reports that the iVote system experienced several instances of service interruption or slowdown during the voting period. This affected the experience of tens of thousands of users, but the Electoral Commission assures that the security of the vote was not compromised at any stage.[381]

Since 2011 and between each election, the Electoral Commission has had to continue developing the iVote platform in order to guarantee and improve security, since technology is constantly evolving. To achieve this, it has called on external expertise, in particular to develop security mechanisms and prevent risks.[382] The Commission appointed a panel of independent experts to monitor, advise and report on the use of iVote during each general election.[383] It introduced additional transparency mechanisms, including sharing sections of the source code and the possibility for voters to verify their votes first by telephone (in 2015) and then using a mobile application (in 2019).

3.6.8 The Electoral Commission's review

The New South Wales Electoral Commission's review of Internet voting is very positive. The number of voters using the service exceeded initial expectations. Although the system was originally designed to allow visually impaired electors to vote independently, it was electors who were outside their State and overseas on election day who made up the majority of its users, about 90%, from one election to the next.

The Electoral Commission believes that this voting option is effective in ensuring the secrecy of the vote for visually impaired voters and has a positive impact on voter turnout. In 2011, the Commission estimated that approximately 30,000 electors who were outside their State or overseas would not have voted without the iVote system.[384] The Commission notes that, in 2015, 10% of respondents to the post-election survey said they would not have voted if iVote had not been available.[385] However, the effect on the voter turnout rate remains difficult to assess. Voter turnout is high and relatively stable in New South Wales, since voting is compulsory. The voter turnout rate was approximately 92% in 2007 and 2011. It was approximately 90% during the 2015 and 2019 elections. Nevertheless, the Electoral Commission concludes that Internet and telephone voting are helping to increase, or at least maintain, voter turnout.[386]

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380. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, pp. 80-81.

381. *Ibid.*, pp. 77-79.

382. NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, pp. 76-77.

383. NSW Electoral Commission, *iVote® Refresh Project for the 2019 NSW State Election*, p. 16.

384. NSW Electoral Commission, *Report on the Conduct of the NSW State Election 2011*, p. 96.

385. NSW Electoral Commission, *iVote® Refresh Project for the 2019 NSW State Election*, p. 9; NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, p. 82.

386. NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, p. 3.

The Commission also notes that Internet and telephone voting are more reliable than voting by mail. Indeed, the Electoral Commission notes that the actual voting rate is much higher, in relation to the number of registrations, for Internet voting than for voting by mail. In 2015, only 1.8% of electors registered for Internet voting did not vote, compared to 11.4% of those registered to vote by mail. In 2019, almost one in four ballots sent by mail were rejected by the Electoral Commission because they arrived late or were not properly sealed in envelopes.[387] This may explain the decrease in registrations for voting by mail and the increase in registrations for the iVote system.

The Commission also notes a very high satisfaction rate among iVote users. It conducts a survey following each general election. These studies confirm that satisfaction is maintained from one election to the next. In 2011, 96% of electors having voted using the iVote system reported that they were satisfied or very satisfied. This rate was 97% in 2015.[388] In 2019, 74% of users reported being satisfied with the system and found it easy to use, fast and convenient.[389] Intermittent interruptions and slowdowns affecting the iVote service in 2019 largely explain this lower satisfaction rate.[390]

User trust in the system is also high: 90% in 2015 and 72% in 2019. In 2015, the Commission pointed out that this rate was higher among iVote users than among the electorate as a whole (30% of all voters trust the system, while 27% reported that they neither trusted nor distrusted it).[391] These surveys show that the vast majority of electors would like to use this voting option again and would recommend it.[392]

In light of these positive findings on the experience of electors and the rate of use of the iVote system (particularly in the context of declining postal services, especially in remote regions, which affects the reliability of postal voting), the Electoral Commission recommended, as early as 2011, extending eligibility to Internet and telephone voting. For example, the Commission proposed offering Internet and telephone voting during municipal elections.[393] In 2015, the Electoral Commission recommended expanding access to the iVote system to voters who are eligible for other advance polling procedures (in-person and voting by mail). It believed that this would, among other things, make the iVote system cost-effective. It also wanted to be able to offer access to the iVote system to up to 15% of the electorate, a proportion that it felt represented a balance of risk and benefit.[394]

387. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, p. 59.

388. NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, p. 79.

389. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, p. 81.

390. NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, p. 81; Colmar Brunton, *2019 NSW State Election Research Report*, pp. 95-97.

391. NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, p. 79.

392. *Ibid.*, p. 75; Colmar Brunton, *op. cit.*, pp. 97-98.

393. NSW Electoral Commission, *Report on the Conduct of the NSW State Election 2011*, p. 196.

394. NSW Electoral Commission, *Report on the Conduct of the 2015 State General Election*, pp. 17 and 53.

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Despite satisfaction among voters and the positive review by the Electoral Commission, elected officials were reluctant to expand access to Internet and telephone voting. In an assessment report on the conduct of the 2015 general election, elected officials expressed concerns about the impact that a significant breach of iVote security could have on the legitimacy of election results if Internet voting were made available to a larger segment of the electorate.[395]

It should be noted that legislative changes to the Election Act in 2017 will allow new categories of electors to avail of Internet voting during the next general election in New South Wales.

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395. *Ibid.*, p. 12; NSW Electoral Commission, *Report on the Conduct of the 2019 NSW State Election*, pp. 95-96.

Technical Considerations

This chapter explores the principal technical aspects of Internet voting. It highlights the most common sensitivities, difficulties and pitfalls in using online voting at various elected levels of government in Canada and worldwide. It also examines proven technical measures to address risks and threats to ensure the availability, integrity and confidentiality of the Internet voting process. These technical considerations are of a general nature and are not analyzed in a Québec context.

4.1 Some general considerations

4.1.1 Voting in a digital world

The appropriation of digital innovations by citizens and their use in daily life have an impact on their opportunities to contribute to political and democratic life. Some people want to vote by Internet, but others have reservations about this voting option.

Since the early 2000s, Internet voting has always been the subject of polarized debate in all countries that have sought to introduce it. Technical considerations are the main reason for this debate in public, political and academic circles.

In a democratic society, Internet voting must respect the fundamental principles for the exercise of the right to vote: accessibility, free exercise of the right to vote, secrecy of the vote, transparency of the electoral process, integrity of the process and results.

Internet voting poses certain technological challenges and must meet a set of requirements. What technical aspects must be taken into account to ensure the accuracy of the results? How can exercising the right to vote be facilitated? How can the voter be convinced that his or her vote has been counted when it is anonymous and secret? What events could compromise the smooth operation of online vote proceedings? What measures should be implemented to minimize and control risks? How can digital security help reassure the electorate?

4.1.2 Risk control with proven security measures

The different Internet voting trials studied confirm that Internet voting is feasible under certain optimal conditions.

Like any type of voting, Internet voting involves different phases: identification, voting and counting. With their digital device, voters connect to the Internet voting platform, establish their identity and express their choice.

As a general rule, the digital ballot is then anonymized and encrypted with a public key. During the count, most of the time, the election officials each have a fragment of a private key. They have to pool these fragments to decipher votes during the count.[396]

In traditional elections, the digital systems used to support certain operations (including access to the list of electors, online marking of advance polls and transmission of results) are secured using technical procedures and tools.

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396. Interview with Véronique Cortier by Philippe Nessmann, "Le vote électronique, pour quelles élections", *CNRS le journal*, [Online], December 4, 2015. [https://lejournal.cnrs.fr/articles/le-vote-electronique-pour-quelles-elections].

For Internet voting, all digital devices must comply with strict security criteria based on level of risk. Security issues must be well contained and documented. Most of the time, the proven means of protection and detection available on the market manage to counter the risks. Nevertheless, the knowledge and methods of hackers are constantly evolving, therefore, the possibility of a digital attack or an unexpected technical failure is always present[397].

Citizens must exercise caution and counter digital threats by using recommended methods. An electoral administration making Internet voting available should develop a technical risk management policy, consider security requirements and deploy proven safeguards to gain and maintain voters' confidence in the Internet voting process.

Secure Internet voting requires an appropriate and rigorous operational, legal and technical framework. Despite this, the utmost vigilance is required to deal with ever-changing digital risks and threats.

4.1.3 Step-by-step approach

Given the diversity and complexity of the technological challenges to overcome, the implementation of Internet voting requires an informed and balanced approach, ideally in phases.

First, in light of most of the trials compiled, it seems appropriate to offer Internet voting to certain categories of voters on a voluntary basis. The other voting options must remain available during this phase.

This strategy allows risks to be reduced and online voting to be perfected without compromising the smooth operation of elections. Ultimately, the objective is to facilitate the exercise of the right to vote for all citizens and to maintain their confidence in the electoral process.

When experimenting with Internet voting, a careful and comprehensive threat analysis must be conducted based on the context, guidelines and characteristics of the particular type of deployment selected. Appropriate risk reduction measures must also be adopted.

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397. François Pellegrini, *Chains of trust and certification perimeters: the case of "electronic voting" systems*, research report, INRIA, [Online], 27 June 2014. [https://hal.inria.fr/hal-01010950v3/document].

4.1.4 Technological challenges according to the type of digital environment

The evolution, sophistication and opportunism of digital threats raise relevant and legitimate questions when it comes to the introduction of Internet voting.[398].

We will consider various vulnerabilities and threats related to Internet voting that affect devices, communication channels, software and human behaviour. We will then talk about some measures to prevent and counter them. Then, we will discuss the division of responsibilities between the electoral administration and voters in order to meet the challenges of protecting online voting.

Internet voting, from the moment the voter connects to the digital platform to the counting of encrypted votes, takes place in three types of tightly interwoven digital environments. Each of these environments is characterized by specific risks.

The first two environments, the technical environment specific to the voter and the networked communication environment, concern all digital uses and services, including Internet voting. Only the application environment of the Internet voting platform specifically relates to the online voting process.

In each of these three environments, various sensitive points and protection measures have an impact on digital security. We will examine them carefully in the following order:

Technical environment specific to the voter

- Malware or spyware
- Human factor
- Internet connection limitations

Networked communication environment

- Saturated and overloaded digital access
- Non-secure connection
- Protection of personal information

Application environment of the Internet voting platform

- Digital identity of voters
- Vote confidentiality and secrecy
- Absence of material evidence
- Open source code
- Accessibility and user-friendliness

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398. The National Academies of Sciences, Engineering, and Medicine, *Securing the Vote: Protecting American Democracy*, [Online], The National Academies Press, Washington, DC, 2018. [https://download.nap.edu/cart/download.cgi?record_id=25120].

4.2 Technical environment specific to the voter

When voting over the Internet, voters use a digital device (a computer, smartphone or tablet) that they often use in many other contexts. Inevitably, this device is already exposed to risks. Malicious people can infect and weaken this device using techniques that are difficult to detect.

These devices are configured in different ways: they do not all have the same operating system or Web browser. Thus, the voter is the only person responsible for the safety of his or her device. He or she must be alert and use up-to-date applications, a high-performance antivirus and any other required fail-safe utility. These tools counter known threats, but they cannot eliminate all risks.

Because electors' digital devices cannot be verified, their security and reliability cannot be guaranteed during Internet voting, even though the voting platform is designed to withstand a variety of threats. In this context, each person must comply with good practices on his or her device.

4.2.1 Malware or spyware

Despite the use of the best software, most advanced technologies and latest encryption algorithms, a digital device remains vulnerable. Voters must be vigilant and respond appropriately to the various threats in the digital world.

Malware or spyware can be inserted into a voter's device and change or monitor their vote without their knowledge.[399] Under certain circumstances, citizens may wonder whether they are voting on the official server or not. Malicious people can indeed create fake voting platforms on servers that are not linked to those of the electoral administration. This technique, known as phishing, involves fooling voters by redirecting them to a deceptive site. As a result, not only will the vote not make it to the official system, but the malicious person can appropriate the voter's digital identity and password in order to vote in his or her place in the official system. This ploy is a serious digital threat in various online banking and commercial services.

Viruses, spyware or Trojan horses (stand-alone programs with a hidden malicious function that perform unauthorized operations) can also manipulate the voting process. In this case, cryptographic processes are no help. Such programs may be embedded in the operating system of a digital device, develop within it, spread to other devices, allow third parties to access personal data or record passwords. If a voter does not have protective software on his or her digital device, these viruses and Trojan horses pose a significant risk to the voter.

Regardless of the security level of an Internet voting platform, the electoral administration cannot secure the digital device that the elector uses to cast his or her vote. A harmful maneuver from this device would be very difficult to detect.[400]

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399. Eric Geller, "Online Voting is a Cybersecurity Nightmare," *The Daily Dot*, [Online], 10 June 2016. [https://www.dailydot.com/layer8/online-voting-cybersecurity-election-fraud-hacking/].

400. Brian Lack, *Simple Vote*, brief on Internet voting submitted as part of the public consultation conducted by Élections Québec, Montréal, October 7, 2019.

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The electoral administration can enhance the security of vote transmission to protect against manipulation by viruses or Trojan horses. For example, when an individual has cast his or her vote, he or she may receive an automated message asking him or her to perform one last action to authenticate his or her vote. This verification step can be done using a pictogram[401] that viruses and Trojan horses are unlikely to recognize.[402]

This type of attack has no direct impact on the integrity of the digital voting platform. Malicious acts affect only one elector at a time, at the same time as he or she votes on the Internet. In most cases, these harmful actions remain limited to a few voters and fail to produce the scale effect required to truly manipulate the results.

Electors who opt for Internet voting are required to monitor the security of their digital device when casting their vote.

4.2.2 Human factor

Some people use their digital device without worrying about technical details and vulnerabilities in their operating system or programs. However, updating software and applications is an essential security measure. The use of obsolete digital devices and old program versions increases the risks.[403] This type of behaviour is a major source of vulnerability.

The use of a simple password that is often reused, the failure to lock a digital device and the downloading of applications without reading the conditions of use are sources of failure that are due to the human factor.

Hackers exploit human behaviour, not just technical shortcomings. Hackers cover their tracks with the intention of taking control of a device. Tracking them is difficult, if not impossible.

The best security technologies are useless if they are not used properly. Habit and lack of knowledge of security technologies encourage people to rely on protection measures and underestimate the importance of warnings, errors or caveats. Some people fail to notice the absence of the padlock icon (which certifies that the connection is secure) in the browser address bar or, out of habit, click on the browser's security notices without taking them into account.[404] The human factor is a common weakness regardless of digital security measures.

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401. Unfortunately, specialized devices for persons with disabilities cannot read a pictogram. This control measure is safer, but it is a barrier to accessibility for persons with visual impairments.

402. Swiss Federal Chancellery, *Rapport final du groupe d'experts Vote électronique*, [Online], April 2018. [https://www.egovernment.ch/index.php/download_file/1406/3469/].

403. Olivier Arteau, *Mémoire sur le vote par Internet*, public consultation held by Élections Québec, November 3, 2019.

404. Aleksander Essex, *Le vote par Internet au Canada: optique de cybersécurité*, [Online]. [https://www.noscommunes.ca/Content/Committee/421/ERRE/Brief/BR8610535/br-external/EssexAleksander9462888-f.pdf].

The most effective way for voters to counter these risks is to adopt accepted digital security behaviours. During implementation of Internet voting, the electoral administration could propose a digital code of conduct, communicate best practices to electors and make them aware of the various risks. This would help voters to protect themselves from threats related to the use of their own device to vote online.

This type of action could instill a digital culture in voters, influence their behaviour in order to promote vigilance and encourage them to develop a sense of precaution and digital security.

4.2.3 Internet connection limitations

The quality and speed of the elector's Internet connection (wire-based or wireless) can also cause slowdowns, frequent interruptions or difficulties in accessing the voting platform. This problem is greater in remote or isolated areas.

Internet service providers could fall victim to an attack designed to overload or slow down their networks or disrupt them altogether. In that case, the elector would not be able to vote over the Internet, even if the digital voting platform were available and functional for the majority of citizens.

In order to address the access difficulties of some electors, public places may be provided to allow them to vote online. For example, agreements may be made with educational institutions or public libraries. This type of measure is particularly important when Internet voting becomes the sole voting option, as was the case in some Ontario municipalities in 2018.

4.3 Networked communication environment

A robust networked communication environment (fast, available and secure) is essential to the proper functioning and efficiency of the Internet voting platform.

The second area of vulnerability for Internet voting is the networked communication environment. The digital world offers many opportunities for targeted operations and massive and indiscriminate intervention for malicious purposes. These activities represent an insidious but real and significant threat.

Ideally, the elector should have a reliable Internet connection with an end-to-end protected access, from the digital device to the online voting platform. The act of properly securing, partitioning and filtering the perimeter of electoral infrastructures is a first safeguard to protect the confidentiality, integrity and availability of data, applications and the digital voting platform.

Particular attention should be paid to network communication, in particular with regard to procedures for limiting, authorizing, authenticating and logging digital access. The same applies to any person who could, intentionally or unintentionally, make the network vulnerable by his or her actions. Digital security is not only a matter of technological tools—in an electoral context, the human factor must be the subject of great vigilance.

The network architecture and governance of digital infrastructures must be scalable, responsive, efficient and controlled. A secure networked communication environment must protect all its components. Overall security is always measured by that of the most vulnerable element of a network or situation.

As soon as vulnerabilities exist, an unforeseen event may give rise to adverse consequences. To responsibly use the Internet for Internet voting, a digital network management policy should be developed. Also, several security measures and various action levers should be instituted to control risks and protect data integrity during digital exchanges.

4.3.1 Saturated and overloaded digital access

The Internet voting platform may slow down or become inaccessible for a period of time. It could be targeted in an attack designed to overload network bandwidth or to overload the servers via massive artificial traffic resulting in their no longer being able to respond to requests received (known as a distributed denial-of-service attack). In that case, access to the voting platform no longer meets the demand: electors cannot use it within an acceptable response time.[405]

Such attacks are frequent, in particular because they are easy to carry out and because they are effective against an unprepared target. However, they have no impact on the security or confidentiality of data stored one the server. These malicious acts may still disrupt voting and could undermine the efficiency and credibility of the electoral process.

The deployment of Internet voting requires the use of state-of-the-art technologies to ensure continuous access to the online voting platform. To avoid the risks of system-wide failures and slowdowns, recovery tests, load tests and security audits must be carried out. The measures put in place must improve the capacity to absorb a denial-of-service attack intended to make the infrastructure unavailable. 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.

The risk of temporary unavailability or slowdown of the voting platform can be reduced by scheduling a period of Internet voting before the traditional election day. If a massive digital attack paralyzed the Internet voting system, citizens could, for example, go to the polling station on polling day.

4.3.2 Non-secure connection

An unsecured network connection transfers unencrypted and unprotected data. In this context, a hacker can ambush a voter's Internet connection to the voting platform without anyone suspecting that the communication channel is compromised. As a result, the hacker spies on digital communications in both directions and can access the ballot papers to modify them before they are transmitted to the virtual ballot box. This is known as a man-in-the-middle attack.

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405. Véronique Cortier, "La sécurité sur Internet", conference in the framework of the event "*Les mardis de l'espace des sciences de Rennes*", [Online], 22 October 2019. [https://www.youtube.com/watch?v=9li07QFwVQ0].

A router and a firewall protect against this risk by partitioning networks, implementing rules to filter traffic in both directions and prohibiting the use of non-secure communication protocols. The communication environment becomes secure as a result: the information flow between two networks is selective, which makes it possible to neutralize most external intrusion attempts.

Using TLS and HTTPS protocols, which establish a secure, encrypted Internet connection between an elector's digital device and the voting platform server, is an effective solution. These protocols add a padlock icon and the HTTPS prefix on the address bar of Web browsers. By clicking on the padlock, voters can view the TLS certificate details; this certifies the authentication of the official Internet voting platform.

Using this type of protocol, or any other more advanced one, is essential for any communication between the electorate and the Internet voting platform. This makes it possible to transmit votes in a secure and uncorrupted manner. This way, digital communications and encrypted data transmitted cannot be read or amended. They remain safe from prying eyes and many malicious acts.

This protection measure is simple, intuitive and transparent for citizens not used to digital security.

4.3.3 Protection of personal information

Voter confidence is critical to the success of Internet voting. A fragile and vulnerable communication environment can lead to technical failures and result in malicious acts, such as the collection of personal data.

To comply with secure obligations and boost voter confidence, we must be extremely vigilant, develop a policy statement and use appropriate procedures for the governance of each elector's personal information.

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 (the name, address, gender and date of birth of citizens).[406]

Concise and intelligible information, in simple, clear and accessible language, must be communicated to explain the treatment of personal information on the Internet voting platform. This allows voters to give informed consent.

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406. Élections Québec, *Partis politiques et protection des renseignements personnels: exposé de la situation québécoise, perspectives comparées et recommandations*, [Online], Quebec City, February 2019. [https://www.pes.electionsquebec.qc.ca/services/set0005.extranet.formulaire.gestion/ouvrir_fichier.php?d=2002].

4.4 Application environment of the Internet voting platform

To gain citizens' trust, an online voting platform must be free of any known flaws, vulnerabilities or deficiencies. This is essential to protect reliability, maintain its continuity of use, ensure the accuracy of its operations and demonstrate that it complies with the principles of a democratic election.

The application environment of the Internet voting platform must include a voter identification and authentication mechanism, anonymization procedures, encrypted ballot papers to preserve secrecy, a virtual ballot box and a vote-counting process using a recognized method such as shared decryption keys which are combined only to obtain results.

This voting platform should take into account the digital environment of electoral operations. It would be protected by the digital security system designed to block attempts at malicious acts and to guard against dangers targeting technological infrastructures.

The rapid evolution of technology represents an ambitious and demanding challenge for digital security. New threat possibilities are constantly emerging. A lucid and constantly updated strategic vision must be adopted to address risks, continuously monitor the processing of operations and ensure the consistency of the measures deployed to counter threats.

4.4.1 Digital identity of electors

When the elector is connected, the Internet voting platform must authenticate his or her identity. The platform must then check his or her registration on the list of electors and perform a digital marking once the vote is officially authenticated. The platform must also ensure that each person exercises his or her right to vote only once. Finally, it must clearly separate the nominative data of the person voting from the vote cast, in order to establish and uphold the secrecy principle of the vote at all times, including after the count.

One of the main challenges of Internet voting is verifying the identity of electors authorized to exercise their right to vote.[407] Online authentication may be carried out using a secure digital identification card (e.g., in Estonia) or by means of digital ID processes used to access other government services. This can also be done through information shared by the elector and the electoral administration. It is possible, for example, to transmit a unique access code to electors, by mail or otherwise, and ask them to use that code to access the Internet voting platform. Voters could also provide information about themselves that is known to the electoral administration (date of birth, the answer to a secret question, etc.). Electors can also register in advance to vote online. This would allow for an initial verification of information about the voter.

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407. Laurence Favier, "L'anonymat en contexte dématérialisé: l'originalité du vote électronique", *Terminal*, [Online], No. 105, 2010. [https://journals.openedition.org/terminal/1855].

While relevant, legitimate and frequent, these options do not provide the same degree of assurance regarding an elector's identity as in-person verification does. A voter can sell an access code or have it stolen. Other people may know or get their hands on his or her personal information. With this information, a malicious person could vote over the Internet in the place of another person. However, according to the integrity principle of the electoral process, the result of the vote must reflect the genuine and sincere expression of the electorate's will.

In Québec, controlling citizens' digital identity is a major concern of the government, especially in relations citizens have with the public administration. The Secrétariat du Conseil du Trésor is carefully considering a security approach that would allow for absolute authentication of citizens' digital identities. The Government of Québec wishes to implement a digital identity mechanism as soon as possible.[408]

Where a government has established a strong, proven and authenticated digital identity measure for its citizens (such as Estonia with its digital identification card), the electoral administration tends to use this mechanism to authenticate voters. This helps instill voter confidence in Internet voting.

4.4.2 Vote confidentiality and secrecy

During an election, all useful measures to ensure complete respect of the secrecy of voting must be taken. This principle guarantees the free expression of political opinions by preserving the anonymity of electors and by prohibiting their vote from being known in order to protect them from any external influence or constraint. No individual should be able to show proof of the expression of their vote to anyone.[409]

In a polling station, the polling booth ensures the free exercise of the vote and confidentiality within a supervised area. When the elector places his or her ballot paper in the ballot box, his or her choice is no longer linked to his or her identity. There is no way to subsequently link this ballot to the person who voted. By mail, the confidentiality of the vote is preserved by means of a double envelope system.

On the Internet, the secrecy of the vote principle means that the electoral administration must comply with a requirement that other institutions providing digital services do not have to manage: the identity of the elector must be completely dissociated from the vote. The secure

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408. Mylène Crète, "Québec entend blinder ses registres d'identité numérique," *Le Devoir*, [Online], December 12, 2019. [https://www.ledevoir.com/politique/quebec/568908/la-technologie-des-bitcoins-pour-proteger-l-identite-numerique-des-quebecois]; The Treasury Board Secretariat issued a Request for Interest on Digital Identity on November 4, 2019 (https://seao.ca/OpportunityPublication/ConsulterAvis/Categorie?ItemId=b4e43b5a-2885-4ffe-8c31-78a24b4d5af9&SubCategoryCode=G8&callingPage=4&searchId=79a2782c-5bfd-4527-99bb-7889f225e709).

409. OSCE Office for Democratic Institutions and Human Rights, *Handbook for the Observation of New Voting Technologies*, [Online], 2013. [https://www.osce.org/odihr/elections/104939?download=true].

digital platform must protect the secrecy of the vote, at all stages of the process, as well as the confidentiality of interactions with the system. This is somewhat paradoxical, since increasing the security of the process weakens the secrecy of the vote.[410]

The Internet voting platform must, however, make it possible to verify certain information, including confirming that votes have been recorded and counted, which may pose additional risks with respect to the secrecy of the vote. Secrecy and verifiability are indeed difficult to reconcile: one is based on the anonymization of votes and the other on their traceability.[411]

In addition, because electors can vote where they wish, in an uncontrolled environment, another person can see their Internet ballot paper or coerce them when casting their vote. Responsibility for this aspect of the secrecy of the vote lies, in part, with the elector.[412]

Technical requirements must be established so that the Internet voting system uses reliable communication mechanisms, secure servers and advanced cryptographic processes that will ensure the secrecy of votes. After the end of the official period for contesting the result of an election, all encrypted votes should ideally be irreversibly destroyed, including all back-up copies, to avoid any possibility of breaking the secrecy of the vote in the future.

Blockchain and Internet voting

The blockchain[413] is a means of storing data in a shared, synchronized and unchangeable manner. This technological process is intended to build confidence and ensure traceability of operations in a digital system.[414]

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410. Matthew Bernhard, Josh Benaloh, J. Alex Halderman, Ronald L. Rivest, Peter Y. A. Ryan, Philip B. Stark, Vanessa Teague, Poorvi L. Vora and Dan S. Wallach, "Public Evidence from Secret Ballots", [Proceedings of] *Second International Joint Conference, E-Vote-ID 2017*, [Online], October 2017. [https://arxiv.org/pdf/1707.08619.pdf].

411. Swiss Federal Council, *Rapport sur les projets pilotes en matière de vote électronique*, [Online], 31 May 2006. [https://www.admin.ch/opc/fr/federal-gazette/2006/5205.pdf].

412. Pierre-Étienne Vandamme, "Les électeurs sont-ils si vertueux," *La vie des idées*, [Online], November 28, 2016. [https://laviedesidees.fr/Les-electeurs-sont-ils-si-vertueux.html].

413. [*translation*] "It is a secure, non-editable database, secured and distributed over a network of computers. [...] All transactions are added one after the other. It is literally a chain of blocks since each line is a block of information. And these blocks of information are interconnected by a series of cryptographic issues. The main innovation of this technology is how it is linked, i.e., each entry contains a cryptographic identifier from the previous block. Everything has been put in place to prevent anyone from ever editing this database." Remarks by Florian Martin-Bariteau reported by Benoît Sabourin, "La chaîne de blocs expliquée", *Le Droit*, [Online], October 4, 2018. [https://www.ledroit.com/magazine-affaires/octobre-2018/la-chaine-de-blocs-expliquee-c0c2cf50e78bfc48955cba78ec579026].

414. David F. Blair, Brian Lipson, Alexandre Saulnier-Marceau and Élisabeth Sohier-Poirier, *Blockchain: Just Because It's a Buzzword Doesn't Mean It's Not the Future of the Supply Chain*, [Online], June 26, 2019. [https://www.mccarthy.ca/fr/references/blogues/mccarthy-tetrault-en-mouvement/chaine-de-blocs-lexpression-nest-pas-seulement-la-mode-cest-lavenir-de-la-chaine-dapprovisionnement].

Since blockchains are based on decentralization, incorruptibility, transparency, verifiability and traceability, can they meet some of the challenges of Internet voting?

The possibility of combining Internet voting with a blockchain is often raised. For some specialists, the design of an Internet voting platform based on this technology is promising[415] to protect against manipulation[416] and other external[417] interference. On the other hand, the majority of specialists have many reservations about integrating a blockchain into an online voting system.

Confidence in election results depends on direct transparency, i.e., the ability of voters to observe, without specialized skills, any possible infringement on the authenticity of the elections. Internet voting is characterized by the dematerialization of the expression of the vote and the inability of citizens to verify the integrity of the electoral process.

The use of a blockchain within a digital voting system would not solve the problem of opacity of electoral process, even if this technology were at the heart of the digital identity mechanism. In addition, each voter could recognize his or her vote among those already registered.

The use of a blockchain to store the votes received would not add any benefit in relation to the transparency of the digital electoral process.[418] Admittedly, the electors' identity would remain concealed by an encrypted identifier and would remain unknown to other electors, but not necessarily to the electoral administration. The promise of individual verifiability could have the effect of undermining the absolute respect for secrecy and anonymity, i.e., the severing of any link between the expression of a vote and the identity of an elector.[419]

415. Institut de la gouvernance du Québec, *Livre blanc: registres distribués, l'évolution de la chaîne de blocs*, [Online], 2019. [https://ign.quebec/livreblanc].

416. Alexandre David, "Vote électronique, vers la fin des réticences grâce à la blockchain?", *Maddyness*, [Online], June 20, 2017. [https://www.maddyness.com/2017/06/20/tribune-vote-electronique-block chain/].

417. Danny Palmer, "How the blockchain could save suffrage ... and democracy", ZDNet, [Online], February 5, 2020. [https://www.zdnet. fr/actualites/comment-la-block chain-pourrait-sauver-le-suffrage-et-la-democratie-39898573.htm].

418. Michael A. Specter, James Koppel and Daniel Weitzner, *The Ballot is Busted Before the Blockchain: A Security Analysis of Voatz, the First Internet Voting Application Used in U.S. Federal Elections*, Massachusetts Institute of Technology, [Online], February 2020. [https://internetpolicy.mit.edu/wp-content/uploads/2020/02/SecurityAnalysisOfVoatz_Public.pdf].

419. Chantal Enguehard, "Blockchain and Electronic Voting", *Terminal*, [Online], No. 124, 2019. [https://journals.openedition.org/terminal/4190].

4.4.3 Absence of material evidence

Paper voting is a simple process that is easy to understand for all voters and stakeholders. The legitimacy of elections depends on the active involvement of voters at every stage of the voting process in order to verify its integrity. The review and verification of voting operations procedure help foster voter confidence.

An elector may not be present during the entire voting process. He or she may form his or her own opinion on the basis of information from others, in particular election officials and representatives of candidates. His or her opinion may then depend on the degree of trust he or she places in these people. Because of the reciprocal control they exercise over each other, none of these people can promote the interests of any particular candidate. This creates a democratic balance that contributes to the smooth functioning of the polling station.[420]

Electors who have voted for a candidate who was not elected must have confidence in the voting system to comply with the election result and accept the defeat at the time of the counting of the votes, which is carried out under the supervision of the polling station members. If someone casts doubt on the legitimacy and authenticity of the result, the paper trail remains verifiable and the ballots can be recounted. Confidence is based on observation of the polling count and results from the active and vigilant involvement of voters in the voting process.[421]

Internet voting leads to a loss of transparency[422] in the electoral process. It makes the expression of the vote completely immaterial, since it keeps no observable and verifiable physical trace of it. An individual, even if he or she is an expert in digital technologies, cannot verify the proper execution and integrity of the poll: he or she loses all traces of the vote once it is recorded.[423] The dematerialization of the electoral process, when voting online, breaks the entire chain of trust.

In the case of Internet voting, trust is not just about technological security. It is an individual perception related to the idea that one can trust someone or something. Trust is delegated to individuals, organizations, common practices and digital devices. Trust is about accepting risk in order to meet expectations. Trust is earned and does not preclude verification. On the contrary: active, continuous and effective verification builds trust. However, even if vigilance is still required, no one can exercise direct and effective control over everything.[424]

420. François Pellegrini, *Chaînes de confiance et périmètres de certification: le cas des systèmes de « vote électronique »,*, Research Report, [Online], June 27, 2014. [https://hal.inria.fr/hal-01010950v3/document].

421. Chantal Enguehard, "Blockchain and Electronic Voting," *Terminal*, [Online], No. 124, 2019. [https://journals. openedition.org/terminal/4190#tocto1n3].

422. Laurence Favier, "L'industrialisation du processus électoral", *Le Genre humain*, No. 51, 2011/2, Paris, Le Seuil, 2011. [https://www.cairn.info/revue-le-genre-humain-2011-2-page-147.htm].

423. Andrew W. Appel, *Ceci n'est pas une urne : à propos du vote par Internet pour l'Assemblée des Français de l'étranger*, [Online], June 14, 2006. [https://www.cs.princeton.edu/~appel/papers/urne-en.pdf].

424. Explanation inspired by Michela Marzano, "What is trust", *Studies*, 2010/1 (Vol. 412), pages 53–63. [https://www.cairn.info/revue-etudes-2010-1-page-53.htm].

When it comes to elections, perceived security, i.e., the feeling of being safe from risk or danger, is just as important as actual security. Any doubts about a possible intrusion or failure of the Internet voting platform can undermine voter confidence in results and call into question the legitimacy of their elected officials.

Some solutions allow voters to verify parts of the voting process without jeopardizing the secrecy of the vote. Some Internet voting systems allow for individual verifiability, while others allow universal verifiability.

Individual[425] verifiability allows voters to see that the digital platform has taken their vote into account, to ensure that the vote corresponds to their choice and that it has been registered in the system without having been amended. This verifiability is also the responsibility of independent technical specialists mandated to certify the reliability of the platform and the processing of the vote without amendment. This expertise must be tested and verified by voters; specialists must earn the trust of voters.

Universal[426] verifiability, on the other hand, allows technically competent observers to ensure that all votes registered in the system are from legitimate voters, have not been tampered with and have been correctly counted to obtain election results. This verifiability ensures that malfunctions due to software errors, human errors or attempts at tampering the voting or electoral process can be detected independently. The specialists responsible for universal auditing could also demonstrate, with supporting evidence, that the results are correct and fair. They would evaluate the evidence in an observable technical process.

With a view to protect the secrecy of the vote, votes are never displayed in unencrypted form. Therefore, they cannot be deciphered between the time of the vote and the deciphering of the mixed votes by means of an asymmetric cryptographic process.[427] Specifically chosen cryptographic processes can be used to meet the requirements of digital voting.[428] These complex cryptographic protocols can only be understood by specialists in the field. It is for this reason, among others, that the electoral administrations that deployed Internet voting (with the exception of the Canton of Geneva in Switzerland, and Norway) used private companies.[429]

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425. Swiss Federal Chancellery, *Rapport final du groupe d'experts Vote électronique*, [Online], April 2018. [https://www.bk.admin.ch/dam/bk/fr/dokumente/pore/Schlussbericht%20EXVE.pdf.download.pdf/Schlussbericht_EXVE_FR.pdf].

426. Chantal Enguehard, "Les dispositifs de vote électronique dits vérifiables", *Le vote électronique*, Paris, Lextenso éditions, 2015.

427. Véronique Cortier, *La sécurité sur Internet*, lecture given at the event *Les mardis de l'espace des sciences de Rennes*, [Online], 22 October 2019. [https://www.youtube.com/watch?v=9li07QFwVQ0].

428. Ordonnance de la Chancellerie fédérale suisse sur le vote électronique du 13 décembre 2013 (status as of 1 July 2018). [https://www.admin.ch/opc/fr/classified-compilation/20132343/201807010000/161.116.pdf].

429. The Canton of Geneva, Switzerland, has developed its own online voting system. Recently, however, the canton announced the end of its system because of the investments it would have had to make to meet the Federal Council's requirements. For more information on this subject, see the section of this document on Switzerland.

CHAPTER 4 : Technical Considerations

It is difficult for voters, candidates, organizations and political parties to completely understand the digital processes at work in Internet voting.[430] They must delegate their trust to verification by specialists. Technical control based on specialized expertise makes the transparency of the Internet voting process more difficult. Technical expertise is replacing citizen control;[431] the public must put this expertise to the test in order to build their own confidence in Internet voting.[432]

A system that is end-to-end verifiable, individually as well as universally, still helps increase the electorate's confidence in Internet voting. Despite everything, Internet voting does not allow for recounts due to the absence of material evidence. In the event of a contested election, if elements disputed are deemed valid, the solution is to conduct the voting all over again in order to maintain voter confidence.

4.4.4 Open source code

An international consensus, particularly among the 47 Member States of the Council of Europe, is in favour of publishing the source code of the Internet voting platform and leaving it freely accessible in order to respect the principle of transparency of operations. This way, associations, university research teams and independent specialists can examine and test all the programming elements required for the platform to function before an election is held.

Monitoring of the source code allows for extensive verification, before use in real conditions, of the execution of the voting platform. This monitoring does not guarantee that the vote is free from subtle manipulation during the voting process. Only an electoral administration is able to verify and certify that the source code of the voting platform is the same as the one made available to specialists for examination.

Scrutiny by experts allows for identification of flaws, uncovering of vulnerabilities, pinpointing of shortcomings, highlighting sensitive elements and making the Internet voting process more reliable. But it does not necessarily make it more understandable to voters.

If the Internet voting platform is designed by a private company, transparency is even more delicate. The source code generally remains inaccessible with a view to maintain trade secrets, which provides a commercial advantage in relation to a competitor and increases competitiveness within

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430. Electors' confidence in the voting process depends on its transparency. In this regard, in 2009, the German Federal Constitutional Court rendered a judgment which stipulated that the electoral process should be transparent and comprehensible to the public, even to those who do not have specialized knowledge on the subject. Based on this principle, the judgment declared unconstitutional the electronic voting being tested in Germany at that time. On this subject, see Sebastian Seedorf, *Germany: The Public Nature of Elections and its Consequence for E-Voting*, Routledge, 2016.

431. Milad Doueihi, "Préface," *Le Genre humain*, No. 51, 2011/2, Paris, Le Seuil, 2011. [https://www.cairn.info/revue-le-genre-humain-2011-2-page-9.htm].

432. Benjamin Morel, "Les enseignements des expériences européennes du vote électronique," *Revue française de droit constitutionnel*, [Online], No. 114, 2018/2, pages 371-394. [https://www.cairn.info/article.php?ID_ARTICLE=RFDC_114_0371].

the private sector. Third-party verification is therefore restricted or even impracticable. As a result, the electorate cannot be sure that the proclaimed result is true and exact. Such a voting platform, opaque in nature, tends to break the chain of trust in the electoral process.

In general, electoral administrations favour the use of an open-source-code digital voting platform to ensure transparency of the process, to benefit from the collective intelligence of specialists and to defend the integrity of the Internet voting process. To build voter confidence, they can establish rigorous frameworks for independent audits and external evaluations at all stages of the Internet voting process.

In addition, penetration tests and measurement of malicious activity exposure risk (for example, deliberate attempts to disrupt the system, violate the secrecy of the vote and modify votes) can expose flaws and hidden functions of the voting platform and demonstrate vulnerabilities of external and internal network infrastructures. The results of these penetration tests can prompt an electoral administration to make the required corrections and increase the digital security of all components of the Internet voting system.

4.4.5 Accessibility and user-friendliness

The principle of accessibility means that each elector should be able to exercise his or her right to vote under the best conditions according to his or her particular context and personal situation. In some circumstances, Internet voting is undeniably useful to promote expression of the vote or to simplify the act of voting.

The Internet voting platform must be easy to use. It should not require specific technical skills or specialized digital knowledge. Its interface must comply with[433] recognized digital accessibility standards and be adapted to the specific needs of persons with disabilities.

Internet voting provides greater autonomy for people who are visually impaired or have difficulty moving around. They can vote independently and maintain the secrecy of their electoral choice[434] in an environment they control. Improving access to voting for persons with disabilities is often cited as one of the reasons for introducing Internet voting in Canada and worldwide.[435]

People who are considering using an Internet voting platform expect clear and easily understandable explanations. In general, the more secure the system, the more difficult it is to use. The challenge is to find the right balance between user-friendliness, ergonomics and robustness.

Before being made available to voters, the Internet voting platform must be tested and corrected, if necessary. This ensures that the voting system respects accessibility and the secrecy and integrity of the vote. The voting platform must be sufficiently secure to counter various forms of digital threats.

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433. WCAG 2.0 standards (including three levels of compliance) to make digital content more accessible to all.

434. *Avis du Regroupement des aveugles et amblyopes du Québec (RAAQ)*, document tabled during the public consultation on Internet voting by Elections Québec, September 16 to November 3, 2019.

435. Elections Ontario published a report on the subject in 2013. For this reason, the state of New South Wales, Australia, has been making Internet voting available to some electors since 2011.

CHAPTER 4 : Technical Considerations

France's two full-scale trials conducted in 2019 with its citizens living abroad[436] show that an electoral administration benefits from conducting an extensive simulation of Internet voting for selected target groups. A major experiment, in the presence of representatives of electors, political parties and various independent fields of expertise, tests the operation of all online voting operations in a configuration that takes into account the requirements of an election.

Before implementing an Internet voting platform, it would be advisable to bring together a variety of electors and specialists in focus groups to evaluate the simplicity of the platform's operation, measure its user-friendliness, improve its ergonomics and test its accessibility for persons with disabilities.

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436. France Diplomatie, *Vote par Internet*, [Online], January 2020.
    [https://www.diplomatie.gouv.fr/fr/services-aux-francais/elections/modalites-de-vote/article/vote-par-internet].

Results of Consultation on Internet Voting in Québec

As part of this study, Élections Québec deemed it essential to consult the population to learn about its expectations and concerns with respect to Internet voting and to evaluate the social acceptability of this voting option in Québec.

To this end, the institution developed a consultation strategy that combined three principal methods: a telephone survey, an online consultation and a citizen panel. The consultation provided an overall picture of citizens' views on Internet voting; provided an opportunity for those interested to express their views on the issue; and gathered informed opinions from electors who had received information on the subject.

Élections Québec also held particular consultations with members of two advisory committees that it coordinates, the Citizen round table and the Accessibility committee, as well as with representatives of provincial political parties.

5.1 General public consultation

5.1.1 Telephone survey

The telephone survey made it possible to assess the social acceptability of Internet voting among Quebecers in general, without people having received prior information on the subject. The telephone interviews were conducted by the SOM research firm with 1,002 citizens aged 18 or older between September 10 and 30, 2019.

The survey contained 37 questions and was conducted in English or French. The average response time was just over 10 minutes. Approximately 50% of the interviews were conducted on a cellular telephone line in order to reach the population that is primarily accessible this way, especially younger people. The response rate at the end of data collection was 23.9%.

The research firm weighted the data to ensure a good representation of the population according to age, sex, mother tongue, highest diploma obtained and number of people in the household. The maximum margin of error for all respondents is 3.9% (at a 95% confidence level). However, it increases for subgroups in the sample.

Prerequisites for Internet voting

The data collected indicate that the majority of the electorate would be able to use Internet voting if it were available. Ninety percent of respondents said they had easy access to the necessary tools (an Internet connection and a connected device).[437] In addition, 76% of voters surveyed felt comfortable about using an online service.[438] However, some groups may find it more difficult to take advantage of such an option. This is the case for people aged 65 or older, those with a family income of less than $35,000, those who do not easily carry out tasks that require fine motor skills,[439] and those who have only completed secondary or elementary school. In proportional frequency, a greater number of these individuals indicated not having the tools to use an online service or feeling less qualified to do so.

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437. These results are consistent with those of the CEFRIO, which provides a yearly digital portrait of Québec households. These data were presented in Chapter 2.

438. The question specified that in order to vote over the Internet, people must, among other things, be able to access a Web address, log into an account using credentials and choose from a list.

439. Respondents for whom it is "somewhat easy," "somewhat difficult" or "very difficult" to perform such tasks (8% of answers) had to be grouped together in order to complete subsequent statistical analyses.

Acceptance of Internet Voting

Quebecers are divided on the issue of Internet voting. In fact, 62% of people surveyed chose answers at either end of the scale when asked about the introduction of this voting option, which indicates a certain polarization of opinions on the subject. However, a narrow majority appears to favour Internet voting, as 57% of respondents agreed that it should be available in Québec (see Chart 5.1). This support is greater among young voters and declines with age (see Chart 5.2).

CHART 5.1 **Acceptance of Internet voting**

[...] Generally speaking, to what extent would you [agree/disagree] with Internet voting being offered in Québec?

Strongly disagree	29%
Somewhat disagree	14%
Somewhat agree	24%
Strongly agree	33%

n = 991
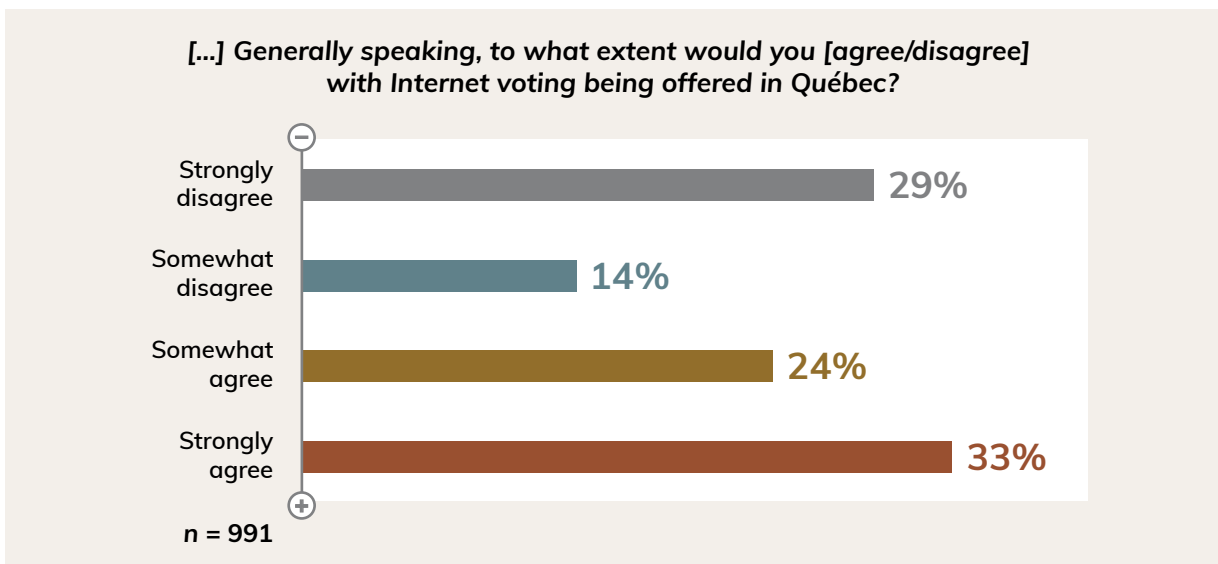
CHART 5.2 **Proportion of acceptance based on age**

Proportion of people who "strongly" or "somewhat" agree by age group

18-24 years old (n = 65)	25-34 years old (n = 141)	35-44 years old (n = 223)	45-54 years old (n = 167)	55-64 years old (n = 189)	65 years old and over (n = 203)
76%	76%	58%	63%	49%	34%
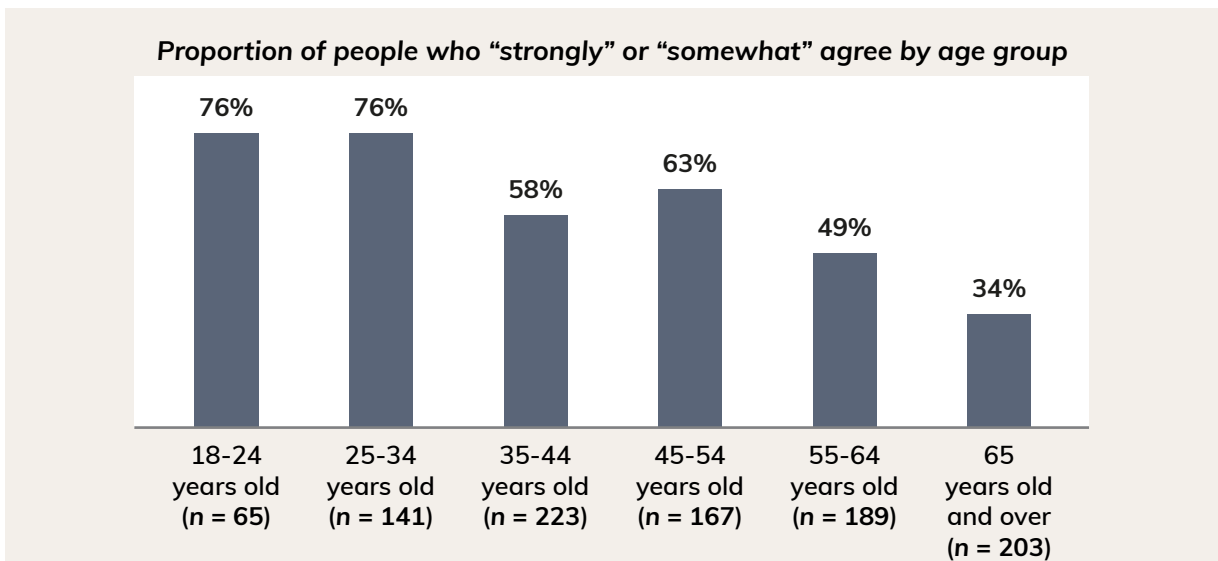
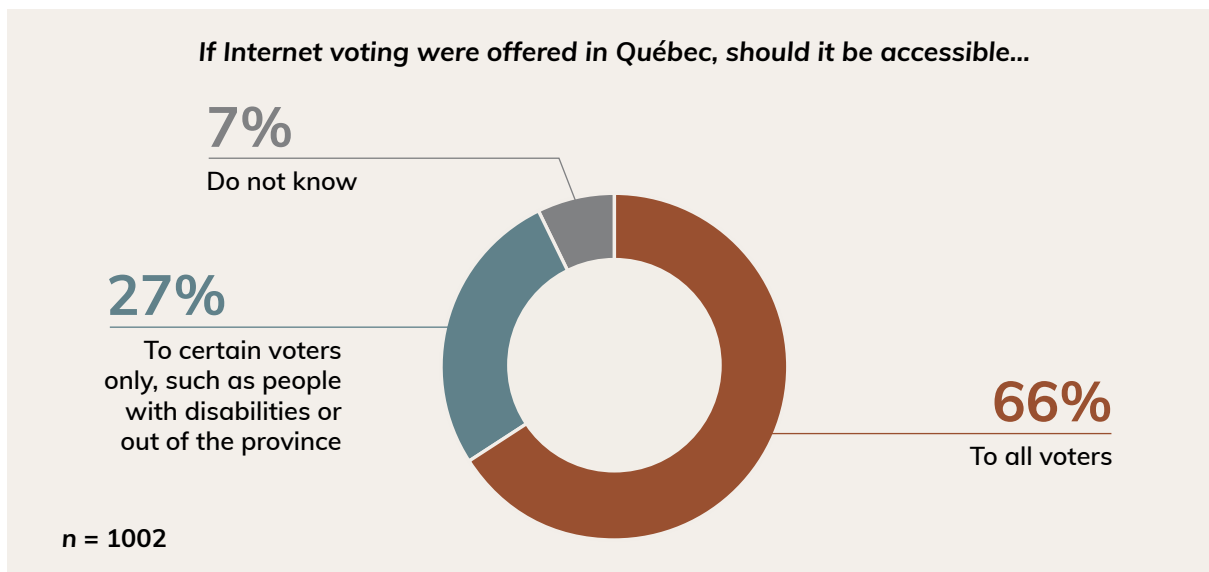**CHAPTER 5 :** Results of Consultation on Internet Voting in Québec

Many other groups of people have greater reservations about Internet voting: those who do not easily have access to an Internet connection or appropriate device; those who feel they do not have the skills required to use an online service; those who live outside the Québec City and Montréal regions; those who have only completed secondary school or elementary school; and those who voted in the latest provincial general election.[440] In proportional frequency, a greater number of these people disagreed. Incidentally, these socio-demographic groups often have different opinions than other groups in one question or another.

The majority of respondents who supported Internet voting justified their position with accessibility-related reasons[441]: reduced travel, ease of voting and reduced waiting lines. And, to a lesser extent, they also mentioned voter turnout. Conversely, respondents opposed to this voting option invoked security- and voter-identification-related reasons. Thus, it seems that public opinion polarization stems from the dilemma between the accessibility and security of the electoral process.

In addition, certain factors could influence the acceptability of Internet voting. This is the case, for example, with the intended electorate. Most respondents believe that if this voting option were offered, it should be available for the entire electorate (see Chart 5.3). However, respondents not in favour of its introduction would be more inclined to reserve this measure for certain voters only. Therefore, such an approach could foster greater social acceptability.

CHART 5.3 **Electors for whom the introduction of Internet voting is intended**

If Internet voting were offered in Québec, should it be accessible...

7%
Do not know

27%
To certain voters only, such as people with disabilities or out of the province

66%
To all voters

n = 1002

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440. This result should be interpreted with caution, as the turnout rate for the 2018 provincial general election reported by respondents in the survey (82%) is much higher than the actual rate (66%). This discrepancy can be explained by two main factors: social desirability bias and memory bias.

441. Respondents were able to provide up to three reasons.

The cost associated with Internet voting could also have an impact on acceptance by electors who theoretically agree with its introduction. If the cost of elections increased, 64% of respondents in favour of this option would maintain their support, but 36% would withdraw theirs. Therefore, the narrow majority in favour of Internet voting could swing on this question.

Using Internet voting

Noteworthy parallels exist between the distribution of answers regarding acceptance of Internet voting and that of answers related to the likelihood of using this voting option. First, a slim 54% majority of respondents said they would use this option if it were available (see Chart 5.4). In addition, young voters would be more likely to use it (see Chart 5.5).

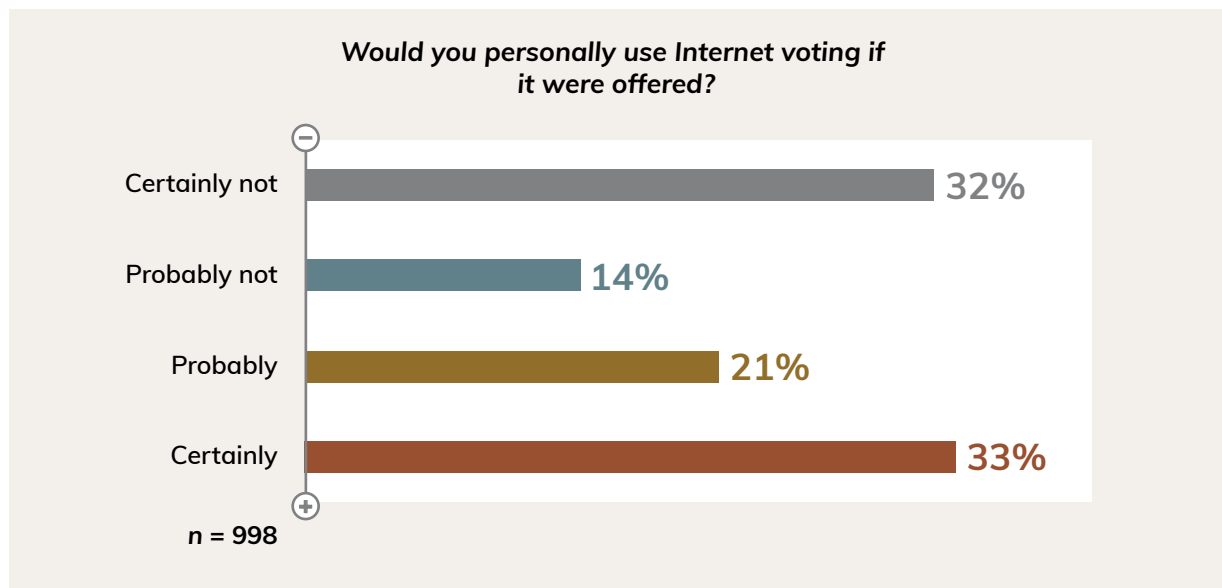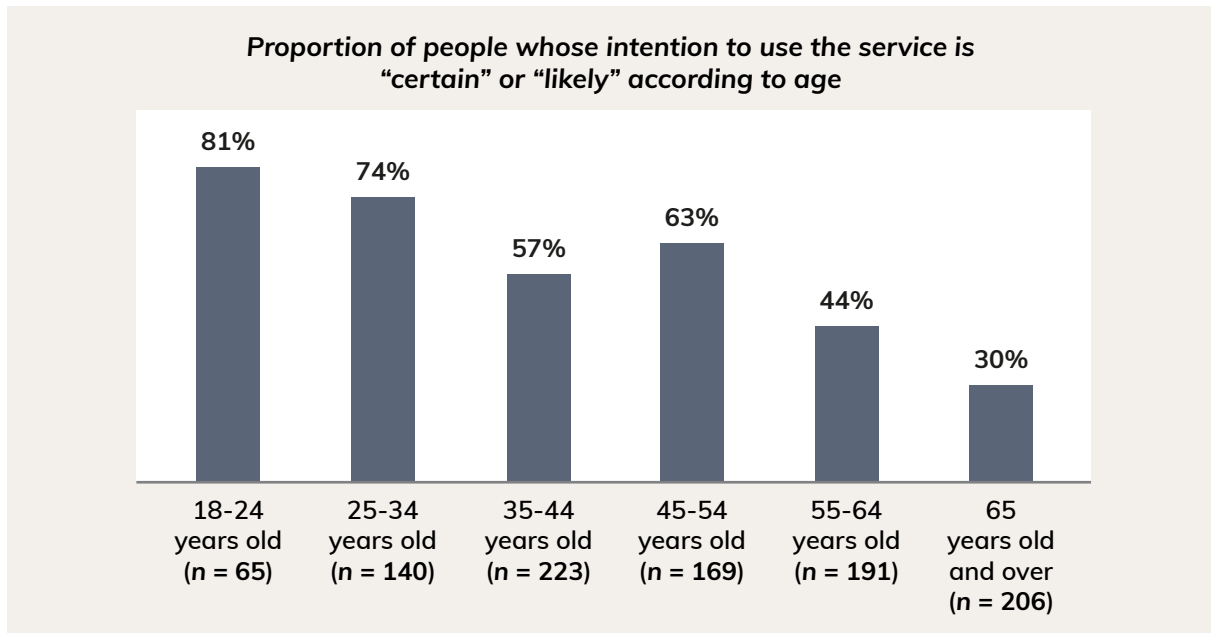**CHART 5.4** **Probability of using Internet voting**

Would you personally use Internet voting if it were offered?

Response	Percentage
Certainly not	32%
Probably not	14%
Probably	21%
Certainly	33%

n = 998

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CHART 5.5 Proportion of use based on age

Proportion of people whose intention to use the service is
"certain" or "likely" according to age

Age group	Proportion
18-24 years old (n = 65)	81%
25-34 years old (n = 140)	74%
35-44 years old (n = 223)	57%
45-54 years old (n = 169)	63%
55-64 years old (n = 191)	44%
65 years old and over (n = 206)	30%

The individual answers of Quebecers surveyed are consistent in this regard. Of the 57% of respondents in favour of Internet voting, 89% said they would choose this voting option if it were available. Furthermore, electors who did not vote in the last provincial general election would be both more supportive of this option and more likely to use it than those who voted.[442] Socio-demographic groups that are generally more opposed to Internet voting would also be less likely to use it, as would those with income of less than $35,000.
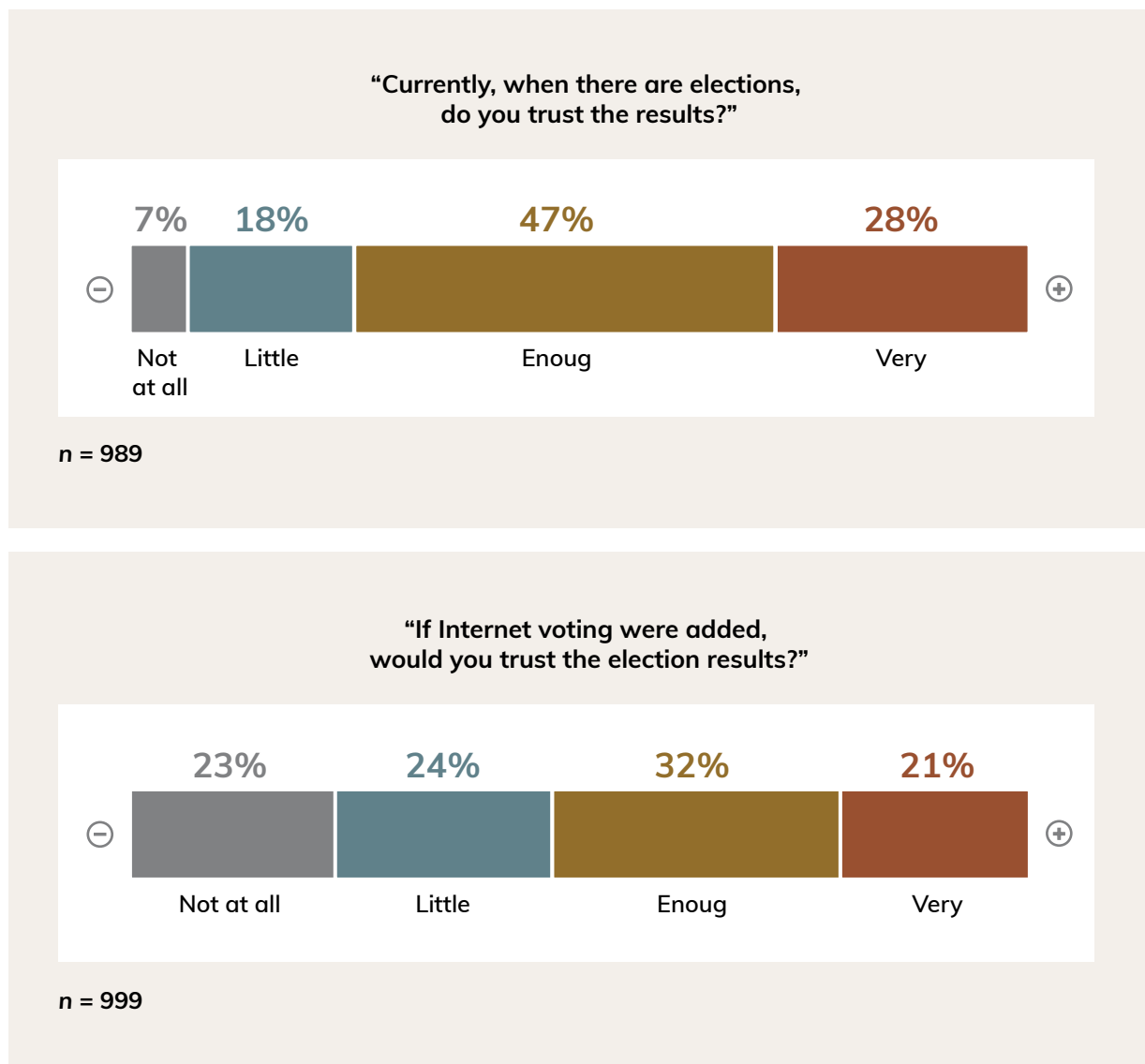
Regardless of the potential interest in remote voting, 71% of the voters surveyed consider voting in person at a polling location to be important. Among those opposed to Internet voting, the rate climbs to 98%, while it is 50% among those in favour. It appears that the importance of voting in person varies based on age: 50% of respondents of 18-24 years old believe that it is important, which is fewer than those aged 65 and over (84%).

---

442. This result should be interpreted with caution due to the facts set out in Note 440.

Confidence in election results

Internet voting could have an effect on voter confidence in the election results. Each voter is free to choose the option that suits him or her, but trust is based on a collective assessment of the integrity of the electoral process. However, in the current context, implementation of Internet voting would likely lead to a reduction in the confidence in the results. This decrease would be 22% among respondents (see Chart 5.6). The confidence rate appears to be particularly low among respondents not in favour of this voting option: only 13% would be confident in the results if Internet voting were possible. However, 83% of those in favour of this voting option would have confidence in the results.

CHART 5.6 **Confidence in election results**

**"Currently, when there are elections,
do you trust the results?"**

7%	18%	47%	28%
Not at all	Little	Enoug	Very

n = 989

**"If Internet voting were added,
would you trust the election results?"**

23%	24%	32%	21%
Not at all	Little	Enoug	Very

n = 999

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The individual variation in confidence allows for a more in-depth analysis (see Chart 5.7). In general, implementation of Internet voting generates a slight drop in confidence among respondents (on average -0.4 out of 4). Among the 43% of respondents whose confidence would decline, the mean reduction is -1.6 out of 4. In contrast, the confidence of 19% of the voters surveyed would increase. It would remain stable for 38% of them. Once again, those segments of the electorate least favourable to Internet voting would be the most likely to see their confidence in election results decline if this option were offered.

CHART 5.7 **Individual variation in confidence in election results**[443]

Individual variation in confidence in election results

For **38%** of Quebecers, Internet voting has no impact on their confidence in election results.

43% of Quebecers surveyed would have less confidence in the election results if Internet voting were introduced.

On the contrary, **19%** of Quebecers would have greater confidence in the election results if Internet voting were introduced.

Variation in confidence						
-3	-2	-1	0	1	2	3
5%	15%	23%	38%	14%	4%	1%

_____

443. Variation in confidence was measured by subtracting the result of the answer to the question on current confidence (1 to 4) from the result of the answer to the question on confidence if Internet voting were introduced (1 to 4). A score of zero means that the answers were the same; a negative score indicates a decrease in confidence by the same number of points on the answer scale; and a positive score indicates an equivalent increase.

Perceived advantages and risks to voters

The advantages and risks that respondents associate with Internet voting are primarily related to accessibility, in the first case, and to security, in the second case. On the one hand, a strong majority of respondents judge that Internet voting could increase the autonomy of persons with disabilities, promote access to voting for electors outside Québec and facilitate the exercise of the right to vote for all. Many also believe that this option could increase voter turnout. On the other hand, the voters surveyed are particularly concerned about the risk of fraud designed to alter election results or usurp their vote.

TABLE 5.1 **Perceived advantages and risks of Internet Voting**

Perceived advantages		Perceived risks	
In your opinion, if Internet voting were offered, would it...? *[A lot, somewhat, a little or not at all.]*		*For each of the following risks, please indicate whether you would be [very, somewhat, a little or not at all] concerned [...]*	
% of "a lot" and "somewhat" answers		**% of "very" and "somewhat" answers**	
Increase the autonomy of persons with disabilities	88%	That the election results could be altered by a malicious act	70%
Promote access to voting for electors outside Québec	85%	That someone could vote in your place, without you knowing about it	68%
Make it easier to exercise the right to vote	78%	That the online voting system could be designed and operated by a private company	59%
Increase voter turnout	78%	That votes were transmitted and counted electronically rather than in person	47%
Decrease the environmental impact of the elections	63%	That someone could reveal who you voted for	42%
Improve the accuracy of election results	51%	That someone might push you to vote for a candidate you didn't choose	35%

Younger electors surveyed were generally more positive about the effects of Internet voting. A greater number of those with more education or higher income were also more likely to anticipate advantages in terms of accessibility and participation. Electors who did not vote in the last provincial general election also stood out with regard to certain advantages. In terms of risk, a greater number of respondents not in favour of Internet voting, those 55 years of age or older as

well as those whose first language is not French were proportionally more likely to express concerns about Internet voting. Moreover, those who do not easily carry out tasks that require fine motor skills and those with low income seem more concerned than others about being induced to vote for a candidate they did not choose.

5.1.2   Online consultation

The online consultation was conducted from September 16 to November 3, 2019. The purpose of the online consultation was to allow interested parties to express their views on the implementation of Internet voting in Québec.

The consultation included a 16-question questionnaire, prepared in collaboration with the SOM research firm. Both an online and a hard copy of the questionnaire were available (Élections Québec mailed it out upon request). Additional information documents could be sent to Élections Québec by individuals or organizations if they so desired.

The survey Web page provided some information on Internet voting. It provided participants with a common definition of this voting option as well as a summary of the advantages and disadvantages generally identified in the literature on the subject.

Élections Québec used several means of communication to publicize this consultative effort: it conducted an advertising campaign on the Web, social media and on the radio in all Québec regions from September 16 to September 29, 2019. It also sent newsletters to organizations and associations working with certain clienteles, including people with functional limitations. All communications were distributed in both French and English. Numerous media and daily newspapers covered the launch of the consultation.

Web questionnaire

Methodological limitations

For various reasons, unlike the telephone survey, the online consultation results cannot be generalized to the entire Québec population. First, because no sampling or weighting techniques were used to ensure that respondents were representative of the population. Second, access to the Web questionnaire did not require registration or a password. This was intended to facilitate the participation of as many people as possible, regardless of their Internet abilities. However, this may have resulted in someone completing the questionnaire more than once. This must be taken into account when interpreting and using the results of the Web questionnaire.

Portrait of participants

A total of 21,668 questionnaires were completed during the consultation period. The vast majority of questionnaires were done online and in French. Just over 5% of the questionnaires were completed in English (1,159), and 152 were returned by mail. As expected, there are gaps between the profile of participants and the Québec population.

First, more men than women completed the questionnaire (see Chart 5.8). In addition, people aged 25 to 54 participated more than other age groups (see Table 5.2). Similarly, some regions, such as the Capitale-Nationale, are over-represented in the responses collected, while others are under-represented, such as the Montréal region (see Chart 5.9).

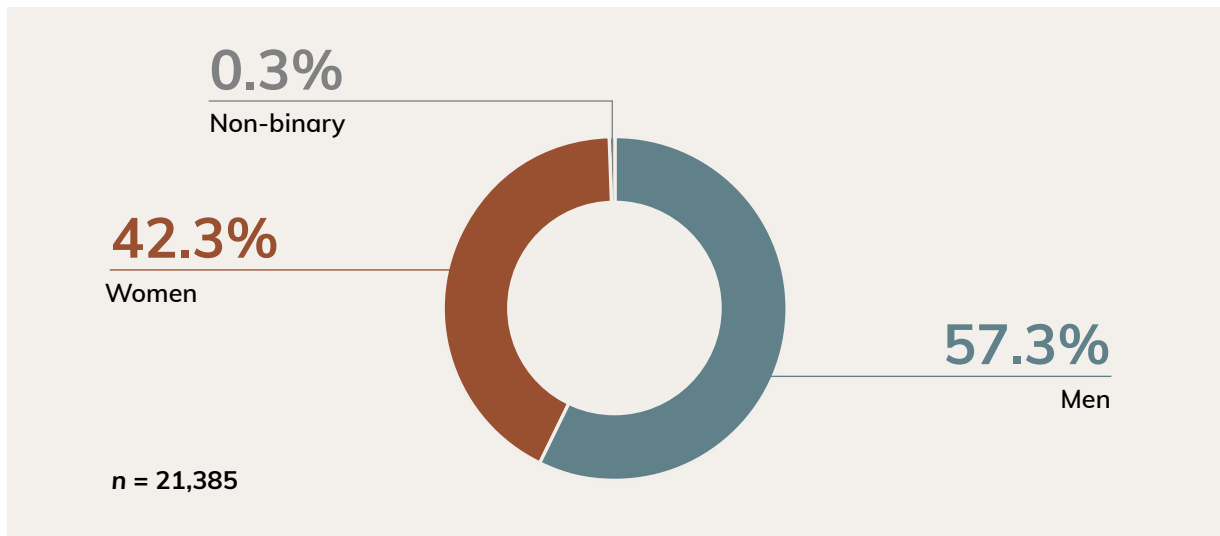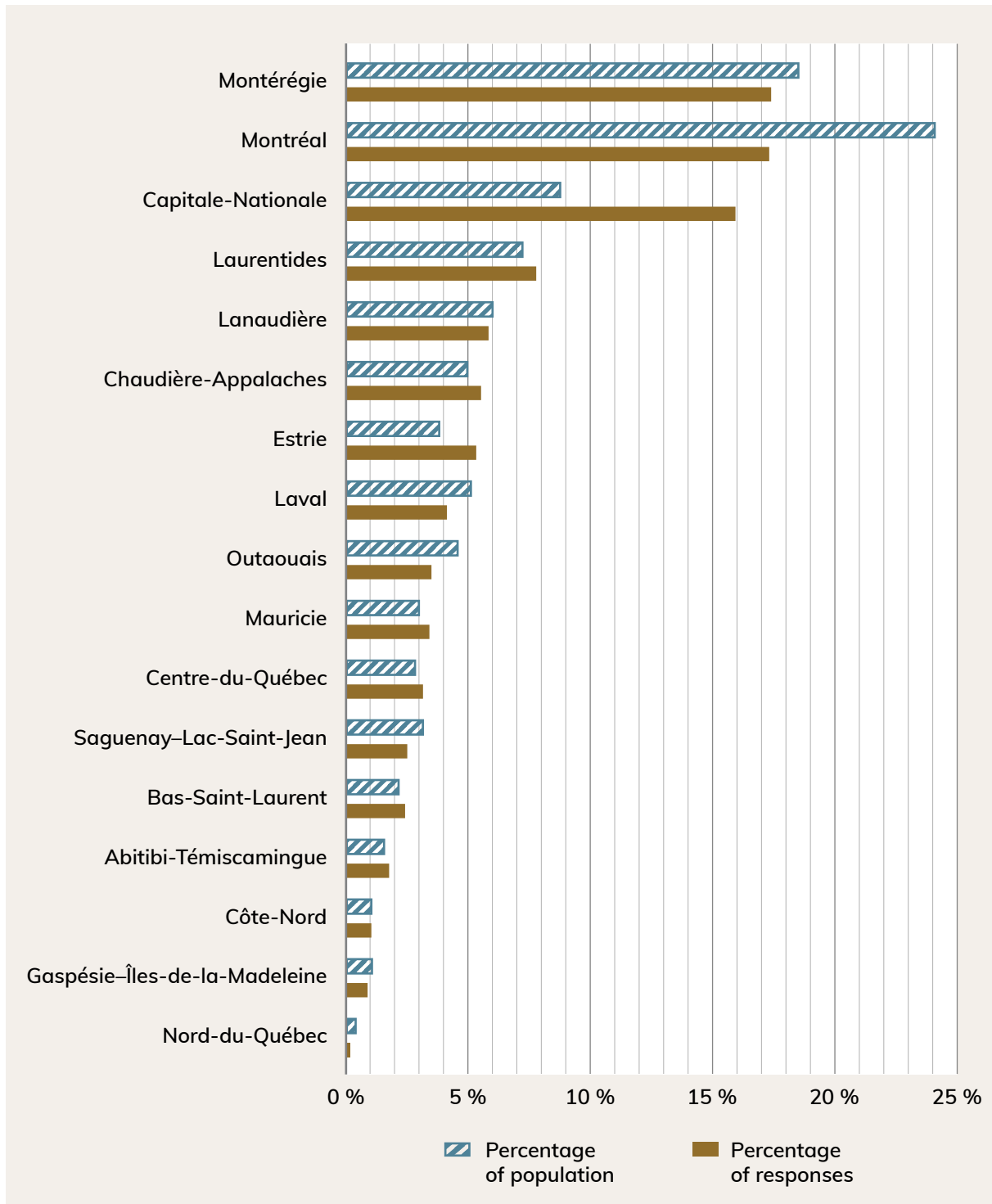**CHART 5.8** **Distribution of answers by gender**

0.3%
Non-binary

42.3%
Women

57.3%
Men

n = 21,385

TABLE 5.2 **Distribution of answers by age**[444]

Age	% in the population	% of answers
15 to 24 years old	13.0%	10.4%
25 to 34 years old	15.4%	21.5%
35 to 44 years old	16.0%	22.1%
45 to 54 years old	15.2%	16.8%
55 to 64 years old	17.5%	17.4%
65 years old and over	22.9%	11.8%
Total (N)	100.0% (7,146,304)	100.0% (21,543)

444. Percentages for the Québec population were calculated using the September 2019 demographic estimates for population aged 15 and over. (Institut de la statistique du Québec, *Population par groupe d'âge, Canada et régions, 1er juillet 2019*, [Online], 2019. [https://www.stat.gouv.qc.ca/statistiques/population-demographie/structure/104.htm].)

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CHART 5.9 **Distribution of answers by region**[445]

445. Percentages for the Québec population were calculated for the entire population. (Institut de la Statistique du Québec, "La population des régions administratives, des MRC et des municipalités du Québec en 2019," *Coup d'œil sociodémographique*, [Online], 2020. [https://www.stat.gouv.qc.ca/statistiques/population-demographie/bulletins/coupdoeil-no71.pdf].)

Results

In general, those who participated in the online consultation were more supportive of Internet voting: 76% of the answers indicate agreement with this voting option and 78% indicate intent on using it if it is introduced in Québec (see Charts 5.10 and 5.11). Slightly more than 20% of the answers indicate objection to the introduction or use of online voting.

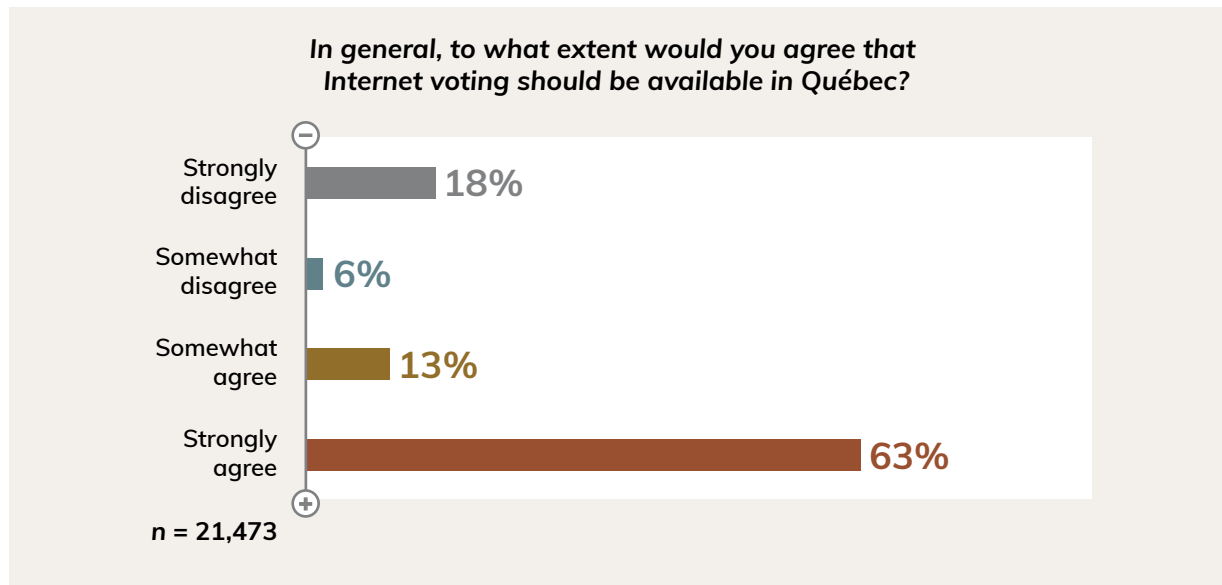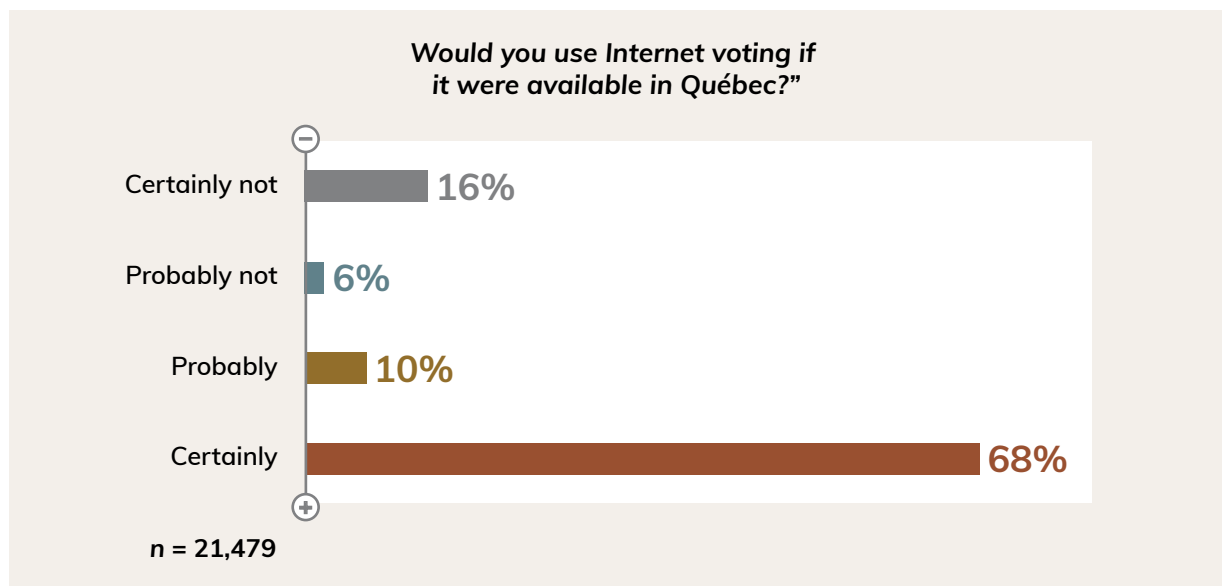**CHART 5.10** **Acceptance of Internet voting**

In general, to what extent would you agree that
Internet voting should be available in Québec?

Strongly disagree	18%
Somewhat disagree	6%
Somewhat agree	13%
Strongly agree	63%

n = 21,473

CHART 5.11 **Probability of using Internet voting**

Would you use Internet voting if
it were available in Québec?"

Certainly not	16%
Probably not	6%
Probably	10%
Certainly	68%

n = 21,479

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The reasons given in the questionnaires to justify positive or negative[446] opinions are similar to those collected through telephone surveys and are also related to accessibility and security. The most frequent reasons for supporting the implementation of Internet voting are no waiting lines, greater accessibility to voting, ease and simplicity, and reduced travel. The main reasons for disagreeing with this voting option are lack of security, less supervision of voters, identification problems, doubts about the validity of the results, and lack of confidence in the Internet.

One of the questions in the consultation was about confidence in the results of an election in which some votes were cast online. Approximately three out of four questionnaires reflect respondent confidence, a ratio similar to the one related to acceptance and probability of use. However, the confidence-related answers are more nuanced: 30% of the questionnaires indicated that respondents would be "fairly confident", and 44% would be "very confident."

The final questions in the online consultation were designed to assess the perceived advantages and risks often attributed to Internet voting. Greater consensus was reached on two advantages: the possibility that Internet voting would increase voter turnout and the possibility that it would facilitate the exercise of the right to vote (over 85% of answers in both cases). Opinions were more divided on whether the option could improve the accuracy of election results (63%). In addition, half of the online consultation participants said they were worried that the results could be altered by malicious acts. However, they showed little concern about being pressured at the time they voted or having their vote disclosed (83% and 80% of answers, respectively).

The questionnaire included a space for comments and suggestions.[447] Many participants in favour of online voting stressed the importance of modernizing processes, while pointing out that particular attention should be paid to security and the risks of fraud. Participants who were opposed to Internet voting mainly referred to security issues and stated that they did not think it was a good idea or that the option would not solve anything. Other people also stated that they feared voting would be trivialized.

Information documents received

Also, in the context of the online consultation, 43 individuals or organizations filed an information document with Élections Québec presenting and explaining their position on certain aspects of Internet voting.[448] With one exception, all documents were transmitted electronically. The documents were in various formats; the most common were emails and briefs (37 out of 43 documents received). Email was mainly used by citizens. The other documents came from

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446. A random sample of 1,600 answers, including the reasons given in 800 questionnaires in favour of Internet voting ("somewhat agree" and "strongly agree") and 800 against ("somewhat disagree" and "strongly agree") was analyzed. Respondents could provide up to three reasons to justify their position. As a result, the percentages provided represent the proportion of questionnaires mentioning one of the reasons associated with a particular theme. They cannot be added together.

447. A random subsample of 400 answers was analyzed. A maximum of three items were considered for each answer and then addressed in a thematic analysis.

448. Defamatory or irrelevant statements, including a service proposal, were not taken into account in the analysis.

organizations, companies, students, researchers and specialists working, for the most part, in fields related to the security of information systems. A political party and a regional county municipality also participated in the consultation.

Most documents received showed opposition to the implementation of Internet voting in Québec (60%), 26% of them supported it while 14% were neutral. Individuals and organizations considered as neutral did not take a position. Instead, they highlighted the need to meet a set of considerations or requirements before introducing this voting option.

Presentation of arguments in favour of Internet voting

A majority of arguments made in favour of online voting in these documents were accessibility related. An organization defending the rights of persons with disabilities emphasized the simplicity of this option for these voters. While many of them need to use paratransit to get to the polling location, Internet voting would allow these individuals to vote in an adapted environment without requiring the assistance of election officials. However, the organization stresses that the platform should be totally accessible, including the voter identification process. Implementation of Internet voting should also provide for a telephone help line. However, this new voting option should not lead to a reduction in the means deployed to physically adapt polling locations.

Other participants in the consultations addressed the question of accessibility in general, pointing out that Internet voting would be a practical solution, adapted to different lifestyles.

Some documents list the advantages of this option in municipal elections: it would make it easier for voters who are not domiciled in the municipality to vote. It could also reduce the cost of these elections.

Companies and consultants also suggested that the implementation of Internet voting could reduce the cost of holding elections, particularly if it gradually replaced other voting options.

Consultants, citizens as well as companies in favour of Internet voting discussed the security issue. They argue that vendors use bullet-proof practices against the most common hacking techniques. They believe that measures such as universal verifiability or application of the "last vote counts" principle[449] would increase transparency and eliminate the risk of an elector being forced to vote for a candidate against his or her will. In addition, some believe that risks to the integrity and confidentiality of the electoral process could be reduced to an acceptable level by offering online voting for school or municipal elections only. These elections would attract less attention from malicious people, who could attempt to exploit vulnerabilities unknown to the designers of the Internet voting system[450].

One company also argued that blockchain technology could reduce the risks associated with online voting, as it would allow for auditing and ensuring the confidentiality and security of votes. However, there is no consensus on this opinion, including among consultation participants, as discussed below.

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449. This principle allows an elector to change his or her vote online as many times as he or she wishes, to limit the risk of being pressured or coerced by others while exercising his or her right. For further explanations on how this principle is applied in Estonia, see page 57.

450. Zero-day attacks.

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Presentation of arguments against Internet voting

The arguments opposing the implementation of Internet voting presented in the materials received mainly relate to limitations of currently available technology. Experts stated that the accuracy of the results obtained online cannot be guaranteed while maintaining the secrecy of the vote. The traditional voting process ensures the confidentiality of votes, transparency of the process, identification of voters and the possibility of a recount, but Internet voting might not provide the same guarantees.

In terms of security, participants pointed out the fact that it would be impossible to detect all system intrusions, the possibility of results being manipulated remotely, vulnerabilities on voters' machines, and identification problems. Citizens, specialists and academics noted that Internet connection subjects the democratic process to a number of threats. Not only would it be possible to commit a remote malicious act, it could also affect a very large number of votes. Many potential targets would be available to malicious people, for example: flaws in the digital voting platform, the company developing or hosting the platform and its dependencies on other modules or digital applications (a back-door attack). According to some, the full range of security threats to online voting cannot be known at this time.

Audit and certification processes would also have their limitations. One of the documents received emphasized that audits rely on guides and checklists that take a long time to prepare; therefore, they are not often updated. As a result, using the latest version of an audit protocol would not guarantee that its content was complete at the time of the audit. In addition, results may vary from one audit to another. As for certification, auditors in charge of the process are apparently often obliged to base their analysis on documents provided by the company itself.

Contrary to what was argued in another briefing paper received, academics reported that blockchain technology does not meet the requirements of an election. In particular, this technology would introduce a defect in terms of the confidentiality of votes. Since data is sequential, electors' votes could be traced.

Electors' devices and Web browsers could also affect the accessibility, security and confidentiality of the voting process. Academics and experts indicated that many low-income citizens are using devices that do not allow them to perform the required updates. This would oblige designers to create an Internet voting platform that is compatible with many operating system versions. In addition, malicious software (such as stalkerware) could enable a third party to spy on a voter's device. Other participants suggested that some people might want to vote from their workplace, which could compromise the secrecy of their vote. Many employers equip their computer network with SSL interception tools, capable of detecting requests made on the Web from workstations. These tools would make votes accessible.

In addition, certain citizens expressed distrust of what they felt was too much control by Internet voting service providers over the electoral process and results. In their opinion, this would lead to a loss of transparency and make verification difficult. Finally, several participants felt that the anticipated gains in voter turnout, access to voting and efficiency would not be sufficient to offset the risks associated with online voting. For them, the paper ballot is enough to ensure transparency of the electoral process and public confidence.

Suggested considerations (neutral)

Some participants, while neither clearly in favour of nor against Internet voting, raised certain important points.

An academic researcher stressed the need for specific framework for online voting, both in terms of legal and technical standards. Otherwise, implementation of Internet voting could create ambiguities with respect to the principles set out in existing legislation. This framework should in particular define the division of responsibilities between the service provider and the public authorities.

In addition, provisions should be developed in case the results of an election were contested. Some documents indicate that online voting systems do not provide defeated candidates with as tangible evidence of their defeat as paper-based voting does, which allows for judicial recounts. A political party also stressed the confidence that the current electoral process enjoys among the electorate.

Some participants also recommended more specific actions. For example, one academic researcher suggested not using the date of birth to verify the identity of voters, particularly in the context of municipal elections. In his view, by combining the date of birth and municipality of residence, certain voters could be identified, which could compromise the secrecy of their vote. One expert also stressed the need to protect the personal information of electors who vote over the Internet, recommending that the highest standards of security be used.

Finally, a political party recommended caution and pilot projects if Internet voting is introduced. A regional county municipality recalled the importance of considering regional realities, in a context where the rate of Internet connection is not the same as in urban areas.

5.1.3 Citizen Panel

Led by the Institut du Nouveau Monde (INM)[451], the citizen panel allowed us to obtain the informed opinion of 14 Québec citizens. They had the opportunity to read about Internet voting, discuss the subject with experts and deliberate among themselves with a view to developing consensus or preferences regarding the implementation of Internet voting in Québec.

Panellist selection process

The panellist selection process began with a call for nominations sent out on August 19, 2019, to 6,000 people residing in Québec, drawn from a random sample of residential addresses provided by Canada Post. The sample included an equal number of men and women, as well as people from all Québec electoral divisions.

Subsequently, 16 people were selected from the 125 applications received. This random selection had to comply with the principles of gender balance and regional, generational and linguistic diversity. The selection also had to include at least one person from an Aboriginal community and one from an immigration background. The selection met all these criteria.

Of the 16 people selected, 14 were present when the opinion of the citizen panel was developed.

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451. Mandated by Élections Québec, the INM handled all contacts with the panellists to prevent any appearance of influence in the process. Élections Québec staff were in contact with the panellists only to provide logistical information, and always in the presence of members of the INM team.

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Schedule of the panel's activities

Several stages marked the panel's activities. The panellists were first invited to read an information document outlining the advantages, disadvantages and other considerations related to Internet voting, as well as a snapshot of the situation in Canada and worldwide. Élections Québec developed this document based on available documentation on Internet voting.

Subsequently, the panellists met for the first time on November 1, 2 and 3, 2019 to hear from experts from a variety of backgrounds. These specialists were chosen for their expertise related to Internet voting or one of the key aspects of this voting option. Those responsible for the selection ensured that the specialists had no commercial interest in participating and that they represented a diversity of views. Whenever possible, those in charge favoured Québec specialists.

Specialists who participated in the citizen panel on Internet voting

Accessibility	**Anne Pelletier** Executive Director of DéPhy Montréal and self-employed worker specializing in digital accessibility Member of the Board of Directors of the Office des personnes handicapées du Québec and of the Accessibility Committee of Élections Québec
Information systems	**Jeremy Clark** Associate Professor at the Concordia Institute for Information Systems Engineering (CIISE) in Montréal **Louis Salvail** Professor in the Department of Computer Science and Operations Research at the Université de Montréal
Elections	**Jean-Thomas Bilodeau-Fortin** Strategic advisor and assistant to the director of electoral operations for Élections Québec **Valérie Vulliez Boget** Deputy-Secretary General of the State Council (Chancellery) of Geneva, Switzerland **Olivier Leclère** Information System Advisor of the State Council (Chancellery) of Geneva, Switzerland
Voter turnout	**Nicole Goodman** Director of the Centre for E-Democracy and Associate Professor at Brock University, St. Catharines, Ontario

Finally, the panellists met a second time over the weekend of November 23 and 24, 2019, to deliberate among themselves and answer the following question: "With respect to the principles of a democratic election, should remote Internet voting be introduced in Québec?

The following democratic principles guided them:

- Voting is secret;

- Voting is exercised freely, without outside influence, compensation, judgment or punishment;

- Voting is accessible to all voters, who must have an equal opportunity to exercise their vote;

- The process has integrity: it is reliable, efficient and ensures that each person votes only once and that the votes cast are properly counted;

- The process is transparent: it must be easy for voters to understand and be subject to verifications at its different stages.

Results

After a day of deliberation, all panellists were of the opinion that Internet voting could not be implemented immediately and that further research on the subject should be conducted. They did not reach consensus on the above question, however. Nine of them were in favour of introducing Internet voting, subject to certain conditions, and five of them were against it, but approved the continuation of some work. The final opinion of the citizen panel thus includes a majority and a minority opinion, as presented below.

> ***Majority opinion expressed by nine panellists [translation]***
>
> We support the gradual implementation of remote Internet voting. We believe that adding this new way of voting would democratize access to voting by increasing its accessibility for segments of the population for whom it is more difficult to vote under current conditions, in particular persons with disabilities and people living in remote regions. We also believe that Québec must be proactive and show leadership in research on remote Internet voting and take action to implement it. We believe that it is better to choose than to endure. In this era where digital technologies are developing rapidly, we feel that a reflection on implementing Internet voting is inevitable. In addition, the following advantages justify our choice:
>
> - *the possibility to vote anywhere, without having to move about;*
>
> - *the opportunity to vote at any time during the period allotted to voting;*
>
> - *increased autonomy for electors with a disability;*
>
> - *elimination of delays and postage costs for electors in remote regions or outside Québec;*

- *elimination of certain risks of error for electors when marking their choice on the ballot, provided that validation steps are suggested;*

- *the possible improvement of the efficiency of the process, mainly in the compilation of results;*

- *the reduced need for human resources during elections;*

- *the possibility of using the system to survey the population on other topics.*

However, we believe that certain conditions must be met before remote Internet voting can be implemented.

Further research

First, a research environment should be created in Québec to understand the ins and outs of implementing remote Internet voting. For example, a research chair focusing on remote Internet voting could be established to assess the advantages, disadvantages and risks, including cybersecurity, and other considerations related to this new technology. Working with international experts, particularly from countries that have experimented with remote Internet voting, would also be essential. Specialists working on the issue should be independent to avoid a political decision.

Gradual deployment

The deployment of remote Internet voting should also be done in phases. Pilot projects could be deployed in smaller elections. The school and municipal levels, for cities with a population of up to 25,000, should be targeted initially to limit the level of risk. If the pilot projects were conclusive with respect to the conditions mentioned in this opinion, a gradual implementation at the provincial level could be considered.

State ownership of infrastructure

The Québec State should also own the IT infrastructure that would allow remote Internet voting, rather than a private company. This would, in particular, avoid the risk of foreign interference and protect our national sovereignty.

Cost lower than or equal to current cost

Particular attention should also be paid to the costs associated with the implementation and operation of the IT infrastructure for remote Internet voting. As for implementation costs, they should be assessed by independent experts before proceeding, so that an informed decision can be made. In terms of operating costs, the expenses associated with remote Internet voting should be similar or lower than they currently are.

Registering for the electoral register

To prevent vulnerable people from being unduly influenced when exercising their vote, electors should be required to register in advance to be eligible for remote Internet voting. Registration could, for example, be periodic and renewable annually. To encourage voter turnout among young people, registration could be available to individuals as early as their 17th birthday.

Information and education

An information and education mechanism should also be put in place to ensure that people unfamiliar with the Internet and various digital media are comfortable with remote Internet voting. Similarly, civic education programs should be implemented to inform young voters about remote Internet voting and, more broadly, to stimulate their interest in voting in elections.

Replacement of currently accessible voting modes

Finally, remote Internet voting should not replace the voting modes currently available. The choice to eliminate currently accessible voting modes is a political decision and involves many considerations (including freedom of choice), that were not addressed in the citizen panel on Internet voting.

Conclusion

If all these conditions are met, we are in favour of implementing remote Internet voting. However, we urge Élections Québec and the Government of Québec to be cautious in implementing remote Internet voting, where applicable.

Minority opinion expressed by five panellists [translation]

We are opposed to the implementation of remote Internet voting. We do not believe that it can comply with the principles of a democratic election according to the knowledge currently available on the subject. Our thinking revolves around the risks associated with security, public confidence and costs, while the benefits of remote Internet voting are not guaranteed.

Security risks

First of all, the impacts of security risks are colossal. A security breach could be led by malicious people at any stage of the process. Moreover, the possibility of falsifying the results without anyone realizing is high. It is currently impossible to know whether the results of an Internet election are reliable and there is no way to conduct a recount to find out. In the event of flaws in the security system or suspicions of manipulation of the electoral process, citizens' confidence in democracy and the reliability of the election system would be undermined and difficult to restore.

Unforeseeable costs

The voting system currently in place meets the principles of a democratic election and works well. Costs are foreseeable and controlled, whereas the implementation of remote Internet voting would involve greater financial risks. Setting up an IT infrastructure to enable remote Internet voting would likely require major initial investments, not to mention the recurring expenses that will be incurred for the research required to be on the cutting edge of technology and, as a result, be up to date and prevent attacks. Access to expert resources in the area of information security would also be difficult because of the scarcity of this specialized workforce, which would have to be paid accordingly.

Potential benefits to be proven

According to current studies, there are no guarantees regarding the benefits of remote Internet voting:

- *voter turnout would not necessarily increase;*

- *accessibility would not be assured;*

- *the complexity of the voting platform could curtail the exercise of the vote by some people;*

- *the need to preserve the voting modes currently available in parallel with remote Internet voting would not improve the eco-responsibility of the process, nor reduce its costs.*

The international experience speaks for itself and justifies our comments. Very few States have tested remote Internet voting; those that have, have all encountered significant security problems. Switzerland, among others, imposed a moratorium on the issue of remote Internet voting, in particular because of the high costs and security risks, without having seen a significant increase in voter turnout.

Conclusion

In conclusion, we do not believe that remote Internet voting is possible right now. It could, however, be an option in the medium to long term, provided that further research continues on a potential, completely secure, remote Internet voting process. Until then, attendance at conventions and conferences with specialists and monitoring what is being done elsewhere should continue, in countries that have implemented remote Internet voting, but also in countries that may have begun to reflect on the subject. In light of the results of this research, the decision to implement remote Internet voting could be reviewed periodically. Revision of this decision should be based on the discovery of a reliable cybersecurity solution. At the same time, we believe that current technologies should be used primarily to encourage people to exercise their right to vote and to better understand the issues and the importance of a healthy democracy.

5.2 Particular consultations

5.2.1 Citizen round table

The Citizen round table is a consultative committee made up of twelve Québec citizens. Established in 2017, its mission is to give advice to Élections Québec and contribute to its reflections in an impartial and non-partisan manner with the interest of the Québec population in mind. The members of the Citizen round table provide advice, suggestions and opinions on matters relating to the administration of elections, the application of electoral legislation and issues affecting Québec's election system. An equal number of women and men are members of the Citizen round table and, as much as possible, it reflects Québec's diversity and all age groups. Members meet at least twice a year. The work is coordinated by Élections Québec. Meeting minutes are posted on the institution's website.

The members of the Citizen round table discussed the issues of Internet voting and its introduction in the Québec context during a meeting held on June 8, 2018. Prior to this meeting, they were invited to read an information document presenting the advantages and disadvantages of this voting option, the lessons learned from Internet voting experiences, as well as an overview of the debate in Canada and Québec. Élections Québec developed this document based on available documentation on Internet voting.

Members were very sensitive to the risks of this voting option and the fact that Internet voting would not significantly increase voter turnout. In light of the risks involved, several members advised against the implementation of Internet voting, while others, conscious of its practicality for voters, were prepared to consider its gradual and cautious implementation over the medium term.

At the end of their deliberations, the Table members recommended that Élections Québec not implement Internet voting in the short term, but rather study the opportunities and risks associated with this voting option. If Internet voting were to be implemented or piloted, which most members felt was likely, members recommended to:

- Retain the paper voting method;
- Proceed gradually, with caution, in:
  - conducting pilot projects with a limited number of voters;
  - surveying voters on their satisfaction, after the fact.
- Conduct an extensive information campaign to inform voters of the risks associated with Internet voting and the mechanisms in place;
- Be highly transparent in the whole process, in particular by publishing the results of the pilot projects carried out.

In October 2019, as part of their end-of-mandate review, the members of the Citizen round table unanimously reiterated their disagreement with the short-term introduction of Internet voting.

5.2.2 Accessibility Committee

The Accessibility Committee is a working group of a consultative nature made up of nine Québec voters. Established in 2018, its mission is to give advice to Élections Québec in an impartial and non-partisan manner on accessibility-related questions. Members have personal or professional expertise on issues affecting persons with disabilities and the exercise of voting rights. Members meet at least twice a year. Their work is coordinated by Élections Québec. Meeting minutes are posted on the institution's website.

The members of the Accessibility Committee discussed the implementation of Internet voting at their meeting on June 14, 2019. Beforehand, they were given a short presentation on the advantages and disadvantages associated with this voting option. They were in favour of its introduction if it is offered in addition to paper voting.

While members are aware of the potential for computer or technical problems, they nevertheless consider the advantages of Internet voting to outweigh its disadvantages. In their view, this voting option has many advantages: increased flexibility, fewer constraints, reduced waiting lines and paper use. All members of the Accessibility Committee would be willing to use this voting option if it were available.

However, their views on how to introduce Internet voting in Québec differ. Some members believe it should be available to all voters. Some would prefer that this option be available to a limited segment of the population, upon registration. Other members suggested selecting a representative sample of the population according to region, age, disability and economic status.

5.2.3 Meeting of authorized political parties

Since 2018, Élections Québec has been organizing an annual meeting with representatives of all authorized provincial political parties in Québec. The purpose of this meeting is to identify improvements that could be made to the electoral framework or practices of Élections Québec and to promote exchanges between political parties and an understanding of each other's realities. This annual meeting also allows Élections Québec to inform political parties of the improvements made to the electoral process.

Representatives of fifteen political parties who were present at the meeting of authorized political parties held on December 6, 2019, discussed the introduction of Internet voting. Prior to this meeting, they were invited to read an information document presenting the advantages, disadvantages and other considerations related to Internet voting, as well as a snapshot of the situation in Canada and worldwide.

Representatives recognized that Internet voting includes benefits for some electors and could encourage a greater voter turnout. However, a majority of them were of the opinion that the risks outweigh the benefits. They discussed recent events in Québec and international news related to the security of computer systems and the protection of citizens' personal information. Since the risk of fraud is likely to undermine the integrity of the election, paper voting remains, in the eyes of political party representatives, the safest voting option.

Several participants raised concerns about the difficulty in verifying the identity of voters, the lack of transparency of Internet voting and the absence of an easily verifiable paper trail. Some people mentioned the risk of coercive voting and the impact that Internet voting could have on electors' perception of what it means to vote. They are also concerned about the possibility that voters may vote with a few clicks after being exposed to partisan advertising, particularly on social networks, when such advertising is banned at the polling place. Finally, they also mentioned the significant costs of this voting option.

Some parties, however, stated that they were in favour of Internet voting, while specifying that solutions must be developed to meet the challenges of voter identification and protect the system from intrusion or malicious acts. Beyond the risks, they consider that this voting option is an interesting solution to facilitate voter participation of the entire electorate, especially for those with reduced mobility. They also raised the possibility of reducing the environmental footprint of elections.

Participants also mentioned that Internet voting could be part of the development of a broader digital culture in Québec and would allow the reduction of monitoring provided for in the electoral process. For example, this voting option could allow for the transfer of information on electors who voted electronically rather than in person by poll runners. They also stressed the importance of maintaining the transmission of this information to candidates if there was an online voting system.

5.3 Consultation findings

The consultations met their objectives, i.e., assess the social acceptability of this voting option and provide clarity on the expectations and concerns of Québec voters with respect to it.

The telephone survey, the online consultation and the citizen panel succeeded in reaching voters from across Québec. In light of all the consultations carried out, Élections Québec notes that opinion on Internet voting is divided. On the one hand, those in favour want to maximize accessibility to the electoral process; on the other hand, those against it want to ensure the security and integrity of the elections. This division transcends the different opinions expressed, regardless of the means of consultation.

5.3.1 Acceptance of the introduction of Internet voting

The implementation of Internet voting is supported by 57% of Quebecers surveyed by telephone.[452] The results of the citizen panel are similar: a majority of panellists wish for this way of voting to be introduced in Québec. The results of the online consultation also reflect support from a majority.

However, a significant proportion of the population (43%) is against the implementation of Internet voting. Moreover, 43% of Quebecers surveyed would have less confidence in the election results if this voting option were introduced, this loss of confidence being felt most strongly by those who are against it. Disagreement with this voting option is also present in the majority of the information documents filed during the online consultation.

The results of particular consultations conducted with committees coordinated by Élections Québec also reflect the lack of consensus on the issue. On the one hand, members of the Accessibility Committee are in favour of the introduction of Internet voting. On the other hand, members of the Citizen round table and the majority of those who participated in the meeting of authorized political parties are of the opinion that this technology must not be used at this time.

This portrait shows that there is no public consensus on the issue. Nevertheless, citizens appear to share several expectations.

5.3.2 Expectations

Improving access to voting

The desire to facilitate the right to vote of certain groups seems to be unanimous. The population perceives the increased autonomy of persons with disabilities (88%) and better access to voting for electors in remote regions or outside Québec (85%) as the main advantages of Internet voting. Panellists in favour of the option also identified these two advantages and specified that it would eliminate delays and postage costs for electors in remote regions and outside Québec. In addition, some briefs and documents submitted during the online consultation highlighted the difficulties encountered by persons with disabilities who must use paratransit services and those encountered by non-domiciled voters during municipal elections.

All consultation activities also included comments stating that Internet voting would make it easier for the entire electorate to exercise their right to vote, for example, by avoiding people to move about and reducing waiting lines at polling places or by extending the periods allowed for voting. These are also the advantages sought by members of the Accessibility Committee, who propose that Internet voting be introduced not only for persons with disabilities, but in a more inclusive manner, for a segment or the entire electorate.

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452. Note that only the results of the telephone survey can be generalized, since the sample of its respondents was statistically representative. While the composition of the citizen panel is nonetheless somewhat representative of Québec society, the respondents to the Web questionnaire for the online consultation are not representative.

Ensuring the integrity of the election system

A large number of voters, whether they were for or against the addition of this voting option, also expressed their expectations regarding the security of the online voting process so as not to compromise the integrity of the elections. They expressed particular concern about the risk of election results being modified (70%) and the risk of someone voting in their place without their knowledge (68%). These concerns are also reflected in the two opinions issued by the citizen panel. The majority of respondents to the online consultation who disagreed with Internet voting also mentioned the lack of security. Several of the information documents submitted for this consultation stress, in particular, that the integrity of online results cannot be guaranteed while ensuring the anonymity of the vote. Some also pointed out that it is not possible to detect all intrusions, computer vulnerabilities in the devices used to vote and issues related to voter identification.

Controlling costs

Controlling the costs associated with the implementation of Internet voting is also a common expectation. More than a third (36%) of those in favour of Internet voting voiced reservations about its implementation if it increases election costs. However, the public does not spontaneously mention the increase in costs to justify their position on the introduction of Internet voting.

Both opinions issued by members of the citizen panel mention cost-related considerations. Panellists in favour of Internet voting argue that the online voting system costs (excluding development costs) should be similar to or lower than current costs. Panellists opposed to Internet voting mentioned the unpredictability of costs, noting that the implementation of this technology would require major upfront investments, not to mention recurring research expenses required to ensure the technology remains cutting edge.

Maintaining current voting options

Several comments collected during the online consultation mentioned the importance of maintaining current voting options in order not to limit access to voting for people with no Internet connection or who lack the skills to vote online, for example. Members of the Citizen round table and panellists also share this concern. However, panellists opposing Internet voting pointed out that the need to maintain current voting options does not improve the eco-responsibility of the electoral process or reduce costs.

Moreover, 71% of Quebecers surveyed indicated that voting in person is important to them. Almost all (98%) of those opposed to the implementation felt that in-person voting is important, as did half (50%) of those in favour of Internet voting. This result supports maintaining a diversity of voting options.

Continuing and furthering research

Continuing and furthering research on Internet voting seems important to many people. Both opinions issued by the citizen panel mentioned that Internet voting could not be implemented immediately and that further research on the subject should be conducted. Panellists in favour of introducing Internet voting propose to first create a research environment to understand the ins and outs of introducing this voting option. Moreover, the members of the Citizen round table also highlighted the importance of conducting prior research, particularly on system security. Panellists who opposed Internet voting also shared this view noting that, while Internet voting should not be implemented in the short term, its implementation could be conditional on finding a reliable cybersecurity solution. From this perspective, it would be relevant to determine what conditions should be met before considering the implementation of this way of voting and to reassess this decision periodically, at a determined frequency, in the light of these conditions.

5.3.3   Internet voting implementation parameters

Despite the concerns raised by voters, a narrow majority (54%) say they would vote online if the service were available. The results of the online consultation, which were more favourable to Internet voting, go even further: more than three quarters of the questionnaires attest that respondents would use this voting option.

The majority (66%) of Quebecers surveyed believe that if Internet voting were available, it should be accessible to all electors, not just certain groups such as persons with disabilities or people outside of Québec. However, among those opposed to online voting, more than half (52%) believe that only a segment of the population should be able to vote online if this service were available.

A number of proposals were received to reduce the risks inherent in Internet voting. Information documents provided during the online consultation suggest that this option should only be available for school or municipal elections. Panellists in favour of Internet voting agree, proposing a gradual deployment, initially in the form of pilot projects within these two elected levels. The members of the Citizen round table also propose to conduct pilot projects with a limited number of voters.

Moreover, panellists in favour of Internet voting stressed that the Québec State should own the IT infrastructure necessary for Internet voting. This is consistent with a concern that emerges from telephone survey results, as more than half of the respondents (58%) expressed concern that the online voting system would be designed and operated by a private company.

5.3.4   Information

Finally, voters expressed their need for information on the objectives of online voting, the associated risks and the means used to ensure system security. If Internet voting is to be implemented, the electoral administration's information and transparency would seem to be an essential component of the social acceptability of this voting option. Information could also be important if Internet voting is not implemented since the interest for the positive impacts of online voting is present. It may therefore be appropriate to inform voters of the reasons for the decision as well as the conditions that must be met before re-evaluating that decision, if applicable.

Analysis of Internet Voting in the Québec Context

When considering the introduction of Internet voting in Québec, various questions arise as to the best way to do so. At what elected level should it be introduced? To whom should it be offered and based on what parameters? What measures should be included to continue to maintain the democratic principles on which our elections and referendums are based? Which legal vehicle should be used? What adjustments should be made to the legislation? What technical and financial elements should be taken into account when selecting an online voting system?

For each of these questions, we explore various scenarios specific to the Québec reality and provide avenues of analysis to guide this important reflection. Recommendations are based on the desire to maximize the benefits of Internet voting while mitigating the risks with which it might be associated. However, they leave the door open to various possible scenarios for introduction.

6.1 The main introduction parameters

To plan for the introduction of Internet voting, we must determine for what kind of election (elected level, general election or by-election) Internet voting would first be introduced, how it would be offered in relation to other existing voting options, and which electors would have access to it. While these various parameters are addressed separately in this section, they are indivisible: the directions taken for each will inevitably influence the options available for the others. These choices also have an impact on stakeholders involved and on the necessary coordination among them. The decisions taken should seek a balance between the desire to extend the flexibility of Internet voting to the greatest possible number of electors and the need to limit the risks, which requires a gradual approach, initially limited to a small portion of the voters.

6.1.1 Elected level and division of responsibilities

Internet voting could be offered in provincial, municipal or school elections.[453] Each elected level involves multiple factors, especially with respect to the division of responsibilities. Organizing these elections is not the responsibility of the same players; they do not have the same level of autonomy, same resources or organizational capacities.

Introduction during provincial elections

In provincial elections, returning officers act under the authority of the Chief Electoral Officer, who is responsible for the administration of the *Election Act*. This control of the process by a centralized and permanent organization is an advantage when trying out a new voting option. Historically, most voting options were first available in provincial elections in Québec.

Internet voting is particularly well suited to centralized management. This voting option is based on a complex computer system and its monitoring requires cutting-edge expertise. Whether the system is owned by the State or a private supplier, the election administrator remains responsible for the integrity of the electoral process. Therefore, the administrator must be sufficiently knowledgeable to exercise strict control over the voting process and the operation of the system. He or she must also be able to provide the required explanations to the various stakeholders. If Internet voting were first offered in provincial elections, Élections Québec could develop and consolidate this expertise. If, thereafter, this voting option were offered in municipal or school elections, the institution could provide more effective support to the returning officers.

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453. Internet voting could also be offered during a public consultation at the provincial or municipal level. However, this hypothesis was ruled out for a first test phase considering that this type of poll is not as frequent.

In addition, the introduction of Internet voting in provincial elections would facilitate the division of responsibilities. Since this voting option does not require to be deployed in the field, Élections Québec could manage it centrally, with the assistance of returning officers, who could take on certain tasks (for example, monitoring the votes cast and the compilation of results). Several tools that ensure effective coordination of operations throughout Québec are already in place. The computer system managing the provincial elections, for example, allows Élections Québec and the electoral divisions to exchange real-time information. This system could be adapted to ensure the monitoring of electors who have voted, making it possible to offer multiple voting options simultaneously. At this time, such an option would not be available in municipal or school elections.

To mitigate risks that could be associated with conducting trials in provincial elections, Internet voting should be limited to certain groups of electors or a limited proportion of electors. This will be discussed further on.

Introducing Internet voting in provincial elections would therefore present interesting advantages for carrying out initial tests, in particular a greater centralization of responsibilities, the availability of tools to better control the testing and the development of expertise within Élections Québec.

Introduction during municipal or school elections

Consideration could also be given to initiating trials of Internet voting at the local level. During consultations, panellists in favour of implementing this voting option recommended targeting school elections or elections in municipalities with fewer than 25,000 people for the first pilot projects to limit the level of risk involved. In that context, it will be necessary to both take into account the autonomy that municipalities and English-language[454] school service centres have in organizing their elections and to seek the best possible conditions to ensure the integrity of the voting process. While the degree of threat for local elections is considered lower[455], the security and reliability requirements for Internet voting should be the same regardless of elected level.

Targeted municipalities and English-language school service centres

Municipalities and English-language school service centres are responsible for organizing their elections. Municipalities must also determine whether they make voting by mail available to voters not domiciled within the jurisdiction. Since they could have a similar responsibility for Internet voting, the introduction of this voting option may depend on the level of interest of local authorities. The participation of municipalities and English-language school service centres in the initial trials could also be on a voluntary basis. However, for this first step, criteria should be established to focus and narrow the trials.

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454. As a result of the adoption of Bill 40, *An Act to amend mainly the Education Act with respect to school organization and governance*, only certain members of English-language school service centres are elected by universal suffrage. Elections are no longer held in what are now French-language school service centres.

455. In 2017, the Communications Security Establishment (CSE) considered that "the threat to the democratic process in relation to Canada's sub-national elections is very likely to remain at its current low levels." This also applied to provincial and territorial elections. The 2019 CSE report does not provide an update on this issue. Communications Security Establishment, *Cyber Threats to Canada's Democratic Process*, [Online], 2017, p. 33. [https://cyber.gc.ca/sites/default/files/publications/cse-cyber-threat-assessment-f.pdf].

CHAPTER 6 : Analysis of Internet Voting in the Québec Context

Managing Internet voting and division of responsibilities

Even if municipalities and English-language school service centres have autonomy in the organization of their elections, a greater centralization of responsibilities would be required to administer Internet voting. In 2005, electronic voting experiments conducted in Québec demonstrated that the absence of a competent authority with a monitoring mandate and verification and control powers might have contributed to the problems encountered. The Chief Electoral Officer of Québec also deplored the fact that these trials did not make it possible to develop expertise within the public services.[456] A similar observation could apply to Ontario municipalities that use Internet voting:

> Despite [Ontario] having one of the largest concentrations of online voters globally, its use is not governed by any federal or provincial standards. This has left many municipalities to make decisions largely in isolation, relying on for-profit vendors to set their own bar for cybersecurity and public accountability.[457]

The majority of the States studied have chosen to design or acquire a single Internet voting system, suitable for any type of voting within their jurisdiction.[458] As this system is managed by the State, local entities can use it in their elections. In Québec, it would also be desirable to promote the development of a single system, for which Élections Québec would be responsible. Given the decentralization of municipal and school elections, certain tasks would be assigned to the returning officers and close co-operation with Élections Québec would be required. Division of responsibilities should be clearly defined beforehand. In the short term, this model would make it possible to ensure better control and systematic monitoring of the trials in addition to providing enhanced support to the returning officers. In the longer term, this model would make it possible to consider the development of an Internet voting system meeting the highest accessibility and security requirements, which could be owned by the State. This was a recommendation of the citizen panel; it would address concerns about a voting system designed and managed by a private company.[459]

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456. Directeur général des élections du Québec, *Élections municipales de novembre 2005. Rapport d'évaluation des nouveaux mécanismes de votation*, 2006, p. 219-220.

457. Anthony Cardillo, Nicholas Akinyokun and Aleksander Essex, *Online Voting in Ontario Municipal Elections: A Conflict of Legal Principles and Technology?*, 2019, p. 1.

458. Estonia and New South Wales use a single Internet voting system for elections at the different levels of government. The Swiss cantons use one system for cantonal and communal elections and votes. Representatives of the Federal Chancellery, whom we met with on October 3, 2019, indicated that they favoured a multi-system approach at the federal level. In Canada, the Ontario and Nova Scotia municipalities that offer Internet voting acquire the rights to use a system from private providers.

459. When asked "Would you be concerned that the online voting system could be designed and operated by a private company?", 59 percent of respondents to the telephone survey on Internet voting said they would be "very" or "somewhat" concerned.

If Internet voting were reserved for municipal or school elections and the returning officers were responsible for it, the experiments conducted would have to be rigorously managed. The Chief Electoral Officer made a number of important recommendations on this subject in the *Rapport d'évaluation des nouveaux mécanismes de votation*, published in 2006.[460] Many of these recommendations remain relevant whether the responsibility for Internet voting is given to Élections Québec or to the returning officers. They would be particularly useful if municipalities or English-language school service centres had to deal with private providers. In particular, it would be essential that the chosen voting systems comply with security and reliability standards as well as with rigorous technical specifications. A central authority could be mandated to pre-qualify the systems that could be used. It would also be essential for Élections Québec to develop specialized expertise in the field of Internet voting, so that its staff can support and advise returning officers. The latter should also acquire specific knowledge, particularly in the field of information security.[461]

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 election, with a view to ensuring better control over the trials.

6.1.2 An additional voting option, not a replacement

Internet voting must be considered as an additional voting option, regardless of the elected level. The introduction of this option should not lead to the elimination of other voting options available to electors today. The fairness and accessibility of the electoral process are at stake. Several considerations argue in favour of this orientation.

First of all, even if digital technologies are widely used in Québec society, part of the public uses them little or not at all. While 90% of Quebecers report having easy access to an Internet connection and a device to vote online, 24% consider themselves to have little or no ability to use an online service. Older people, those with lower education or family income, those lacking fine motor skills and those living outside the Montréal and Québec City regions are proportionally more likely to feel uncomfortable in this context.[462] In a resolution adopted on October 16, 2019, in the context of consultations conducted for this study, one RCM asked the Chief Electoral Officer of Québec [*translation*] "to take into account the situation of rural areas where Internet access is not available to all."[463]

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460. Directeur général des élections du Québec, *op. cit.*, 2006, pp. 225–228.

461. *Ibid.*

462. These data were taken from our telephone survey on Internet voting.

463. MRC de Témiscamingue, *Résolution n° 10-19-356 Consultation du DGEQ sur le vote électronique*, December 16, 2019.

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Thus, while a large majority of electors have the skills and tools to vote online, some would not be able to do so. The State has an obligation to provide mechanisms to enable all electors to exercise their right to vote, regardless of age, origin, health or socio-economic status. The removal of a voting option would be inconsistent with this obligation, particularly if Internet voting became the only option available to some electors, who may be deprived of an effective means of exercising their right to vote.[464]

Moreover, the withdrawal of other voting options is not compatible with one of the objectives of the introduction of Internet voting, that of facilitating the exercise of the right to vote. The more options electors have to vote, the easier it is for them to do so. Furthermore, the public consultation results indicate that almost half of electors (46%) would not use Internet voting if it were available.[465] These electors should not be penalized by the introduction of this voting option.

In the countries surveyed, Internet voting is generally added to other options without replacing them.[466] In Québec, the evolution of electoral legislation has always favoured a diversification of voting options. No option has been withdrawn to date. Many of the citizens heard during the consultations stressed the importance of maintaining the existing options if Internet voting is introduced.[467] One disability rights organization stated in its brief that [*translation*] "Internet voting is an interesting addition to the methods already in place, but should not become a means of disengaging from making polling stations accessible."[468] It also encouraged Élections Québec not to slow down its efforts in this regard. The introduction of Internet voting should therefore not lead to a reduction in services at polling places.

> If Internet voting is introduced in Québec, the Chief Electoral Officer recommends:
>
> - Maintaining existing voting options, regardless of the introduction parameters adopted.

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464. An Ontario study indicates that the elimination of the paper ballot vote in some municipalities could deprive electors less comfortable with technology of their right to vote. This would become apparent after a few elections without a paper ballot. See Nicole Goodman et al., "Another Digital Divide? Evidence That Elimination of Paper Voting Could Lead to Digital Disenfranchisement," *Policy and Internet*, 2018.

465. This data was taken from our telephone survey on Internet voting.

466. Ontario municipalities are an exception as some of them used only Internet voting for elections in 2018. However, as a result of service slowdowns and disruptions, some municipalities, including Sudbury, have decided to reintroduce the paper ballot vote for the 2022 election. See Mary Katherine Keown, "Sudbury to Return to Paper Ballots Next Municipal Election," *Sudbury Star*, April 10, 2019, [Online]. [https://www.thesudburystar.com/news/local-news/sudbury-to-return-to-paper-ballots-next-municipal-election].

467. This was the case for the members of the Citizen round table, consulted on June 8, 2018; the members of the Accessibility Committee of Élections Québec, consulted on June 14, 2019; and the members of the citizen panel held in November 2019.

468. Regroupement des aveugles et amblyopes du Québec, *Avis du Regroupement des aveugles et amblyopes du Québec (RAAQ) sur la consultation sur le vote par Internet*, 2 novembre 2019.

6.1.3 Targeting voters: Balancing accessibility and integrity

For some groups of electors, Internet voting represents a solution to the barriers they face when voting, which are often due to geographic location or a disability. For all electors comfortable with technology, it promises more flexibility in exercising their right to vote by eliminating the need of moving about and extending the voting period. Whatever the objective, the introduction of Internet voting should be measured and down in phases. During a first stage, conducting pilot projects with a few electors would limit the risks and establish the necessary foundation for a broader deployment of this voting option. In these pilot projects, Internet voting could be restricted to certain categories of electors or, alternatively, to a portion of the entire electorate.

Internet voting as a particular option

As with other voting options available in Québec, Internet voting could be introduced to meet the specific needs of certain categories of electors. This approach has been adopted in various jurisdictions, i.e., the Northwest Territories in Canada, the State of New South Wales in Australia, some cantons in Switzerland, and France. Out-of-state electors, those living in remote regions and those with disabilities are often among the target groups.

In Québec, these electors also encounter obstacles likely to compromise the exercise of their right to vote. However, at this stage we have excluded other groups that could benefit from Internet voting but who already have voting options tailored to their needs. In provincial elections, for example, electors who are absent from their constituencies for work, school or other reasons, as well as those in detention, could benefit from Internet voting. However, the current options provide them with access to voting and better guarantee the integrity of the vote.

A solution for voters outside Québec and in remote regions

Internet voting could alleviate some of the difficulties encountered by electors outside Québec in provincial elections. Currently, voting by mail is the only option available to them. For their ballot to be counted, it must be received by the Chief Electoral Officer before the polling stations close. However, postal timelines vary from one place to the other and in some countries this deadline is difficult to meet. Voters must also pay the cost of returning their ballot paper. This cost can be high and can be a deterrent, especially for those who are not sure if they will be able to transmit their ballot paper within the timeframe. In the 2018 provincial general election, 3,105 electors outside Québec registered to vote by mail. Of these, 2,063 were able to exercise their vote. Three hundred ballots arrived after the time prescribed and had to be rejected, which corresponds to 12.5% of the votes from outside Québec.

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There are also difficulties with voting options available in remote regions. In some cases, election officers visit communities or labour camps to allow electors in those communities to cast their votes. The latter may also vote by mail. They may then face similar cost and postal timeline challenges as voters outside Québec.

The addition of Internet voting would make it easier for these electors to access voting if they have a sufficiently efficient Internet connection. Since this voting option would eliminate postage delays and costs, the voting period for these electors would be automatically extended and they would be able to exercise their right at no cost. As such, Internet voting would also contribute to the fairness of the electoral process by giving these electors an equal opportunity to participate.

The introduction of Internet voting for these electors would also have operational advantages. First, these groups are relatively small. Even considering the record number of registrations received for voting outside Québec in 2014 (18,328), these voters represented about 0.3% of all electors.[469] Restricting Internet voting to a limited pool of electors would allow for better monitoring of initial Internet voting trials and limit the risks. In addition, these electors already vote remotely. As a result, some of the risks associated with Internet voting have already been assumed: the difficulty of establishing their identity beyond any doubt as well as the impossibility of guaranteeing them an environment free of constraints and allowing them to maintain the secrecy of their vote. In addition, an online registration mechanism for voting by mail is already available for electors outside Québec. When they register for this voting option, their names are removed from the list of electors used in the polling stations. This prevents them from voting twice in the case of a false statement. A similar mechanism could be used for Internet voting.

A measure promoting the autonomy of voters with a disability

Internet voting could also improve access to voting at all elected levels for electors with a disability. Although various measures are being implemented to enable these electors to vote in the best possible conditions,[470] certain obstacles remain. For example, some voters might have difficulty finding transportation to the polling place. Once on site, it may be difficult for them to locate the accessible entrance and get to their assigned polling station. Other voters might need help reading, marking their choice, folding and placing the ballot paper in the ballot box. The secrecy of the vote of these electors cannot be fully guaranteed because another person might see their ballot paper. For them, exercising the right to vote is more complex and requires more time. These difficulties might be perceived as a loss of autonomy.

No data is available to define the proportion of electors who have difficulty voting for health reasons in Québec. To provide an indication: in the 2018 provincial general election, 13,139 electors voted at home, in a residential facility, a hospital or a rehabilitation centre. In addition, the disability

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469. A citizen who has left Québec for more than two years loses his or her right to vote, unless he or she holds a certain type of job. This may have an impact on the number of electors registered to vote outside Québec.

470. For example, the accessibility of most polling places and, when a location is not accessible, the possibility of voting in another accessible polling place, assistance measures for electors unable to mark their ballot paper alone and voting at electors' homes, in nursing homes, etc. For a more complete description, see the chapter titled "Voting in Québec."

rate among the Québec population aged 15 and over is estimated at 16.1%, which corresponds to 1,053,350 people.[471] Of these, 40% have a severe or very severe disability.[472] Not all disabilities lead to a situation of disability at the time of voting. Nevertheless, the current voting options do not make it possible to alleviate all the difficulties.

Internet voting could be an additional option for these electors in parallel with efforts to improve the accessibility of polling places. Not only would this voting option enable these people to avoid having to move about, it would also guarantee them greater autonomy in the exercise of their vote, and better maintain its secrecy. Indeed, technology can enable electors with visual or mobility impairment to vote independently and ensure that they have indicated their choice correctly. For this to occur, the Internet voting process must be fully accessible at all stages.[473] Electors must have the computer tools required to consult the voting platform. They must also have the skills to vote online. However, the disability rate is higher among people aged 65 and over who are also more likely not to consider themselves qualified to use an online service.[474]

However, the introduction of Internet voting for persons with disabilities presents some additional challenges. In fact, these electors are currently voting in the presence of election officers. Remote voting would introduce new risks related to the verification of identity as well as the freedom and secrecy of the vote. No longer voting in a controlled environment may be a concern for more vulnerable people.[475] In view of these issues, persons with disabilities should be involved in a possible move to introduce Internet voting. Their participation would facilitate the development of a process that engages them, respects their dignity and promotes their autonomy.

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471. This information dates back to 2017. The definition of disability used by Statistics Canada in the Canadian Survey on Disability has been expanded. In addition to disabilities related to a physical or sensory impairment (such as sight and hearing), the concept also includes disabilities related to pain, memory, learning (such as dyslexia or hyperactivity), development (such as Down syndrome and autism) or mental health (such as anxiety or depression). The disability might be caused by a condition or health problem that lasts or could last six months or more. See Office des personnes handicapées du Québec, *L'Enquête canadienne sur l'incapacité de 2012 et 2017 : pourquoi ces enquêtes ne peuvent être comparées*, Drummondville, 2019.

472. Office des personnes handicapées du Québec, « L'Enquête canadienne sur l'incapacité de 2017 », *Passerelle*, volume 11, numéro 1, janvier 2019. [https://www.ophq.gouv.qc.ca/fileadmin/documents/Passerelle/Passerelle_vol11_no1.pdf].

473. The Regroupement des aveugles et amblyopes du Québec stresses that it is imperative that the Internet voting platform comply with Web accessibility standards (SGQRI 008 2.0) of the Québec government. It states that [*translation*] "special attention must be paid to the online identification process, which is often completely inaccessible to people with a visual limitation."

474. The disability rate is 24.7% for those aged 65 and over and 14.0% for other age groups. See Office des personnes handicapées du Québec, *op. cit.* 2019, p. 2. Among those aged 65 and over who answered the telephone survey on Internet voting, 53% consider themselves to be not very, or not at all competent to use an online service.

475. For example, in the survey on Internet voting, respondents lacking fine motor skills were more likely to be very or somewhat concerned that someone would persuade them to vote for a candidate they did not choose (49% compared to 35% of all respondents). Conversely, the Regroupement des aveugles et amblyopes du Québec instead emphasized the advantage, in terms of the secrecy of the vote, of allowing people with visual disabilities to choose an environment that they control.

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A particular option in the context of municipal or school elections

In municipal or school elections, electors who face barriers to voting have fewer options than in provincial elections. Internet voting could therefore improve access to voting for some electors. For example, this voting option could be offered to those who are not domiciled in the municipality. Currently, only a minority of municipalities allow these electors to vote by mail. In 2017, 12% of municipalities did so (132 municipalities out of approximately 1,100). In particular, this situation could be explained by the costs incurred by municipalities for this voting option. An Internet voting system managed by Élections Québec would alleviate these organizational difficulties.

Internet voting could also allow electors who are outside their municipality or of their English-language school service centre to vote. These voters currently have no option to do so. This voting option could correct this inequity. Given the large areas of some municipalities and English-language school service centres, Internet voting could also be made available to electors who are far from polling places.

Nonetheless, it would be preferable to have conducted first conclusive experiments with a portion of the electorate in provincial elections, particularly since these elector groups are very small, which would raise additional issues for the confidentiality of their votes and the scope of the trials.

Internet voting as a general voting option

Internet voting could also be made available to all electors. This was the solution adopted, for example, when the vote was introduced in the offices of returning officers during provincial elections in Québec. Estonia, as well as municipalities in Ontario and Nova Scotia, chose this option when they introduced Internet voting. In the Swiss cantons, this voting option is offered to a maximum threshold of the electorate, with no eligibility criteria.

Internet voting would allow the electorate to vote 24 hours a day during the period allotted to voting. It would also allow voters to cast their ballots from a convenient location without having to move about or wait in line at a polling station. However, before Internet voting is made available to the entire electorate, pilot projects should be conducted with a limited pool of electors whether in provincial, municipal or school elections.

A trial run in provincial by-elections

If Internet voting were to be tested in provincial elections, it would be advisable to first test it in by-elections. The fact that these elections are held only in certain electoral divisions would allow for more staff to be assigned to help with the smooth operation of the trials. It would also be simpler to limit the trials in this context. A threshold limiting the proportion of electors eligible for this voting option in an electoral district would limit the risks. Initially, this threshold could represent 10% of the electorate, which corresponds to just under 5,000 voters.[476] Electors wishing to vote by

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476. For purposes of limiting the risks and obtain greater assurance of the reliability of election results in a context of testing a new voting option, the suggested threshold is 10%. This threshold may seem low, but it takes into account the voter turnout, which is often lower in by-elections, as well as the margin of victory, which is often less than 10%. This threshold could be increased after initial conclusive tests.

Internet would be invited to register until the threshold is reached. In addition to this 10% of the general electorate, electors outside Québec, living in remote regions or who have disabilities could use this voting option.

In addition to the benefits already mentioned for these latter groups of electors, in a by-election, Internet voting would provide a voting option for those who are absent from their constituency, such as students and people working in another region. Currently, these electors must return to their electoral division to vote in a by-election.[477]

This approach, which would limit the initial trials to a fraction of the electorate, would allow this voting option to be deployed gradually. Pilot projects should take place in different electoral divisions to test the system in a variety of contexts and to assess how it works. Following a conclusive evaluation of the experiments conducted, Internet voting could be made available in general elections, maintaining a maximum threshold of electors in each electoral division. Like Switzerland, Québec could set gradual thresholds based on the voting system's security level.[478] Thus, the more sophisticated and proven the system is, the wider the access to this voting option could be. This approach would also allow for a diversity of specific cases since different profiles of voters could use the option. Under these conditions, it would be possible to gather more complete data on the profile of users, their level of satisfaction and the difficulties they encounter.

This expansion of Internet voting to a proportion of the electorate would, however, introduce new risks for electors who currently vote in monitored polling places. It is harder to establish with certainty the identity of electors who vote remotely. In addition, they become responsible for the environment in which they exercise their right. During provincial elections, it was decided to limit voting by mail to certain electors in order to ensure the integrity of the electoral process by establishing the identity of electors.[479]

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477. In a general election, these electors can vote at the office of the returning officer for the electoral district in which they are located. Students can also vote in their educational institutions. These two options are not available during by-elections as they would require the opening of polling stations throughout Québec.

478. Chancellerie fédérale suisse, *Ordonnance de la Chancellerie fédérale sur le vote électronique*, [Online], 2018. [https://www.admin.ch/opc/fr/classified-compilation/20132343/index.html].

479. Assemblée nationale du Québec, *Journal des débats*, 37th Leg. 2nd Sess. 39, No. 38, 6 June 2006, p. 2187 (L. Thériault).

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A trial run during a general election in one or more municipalities
or in English-language school service centres

Pilot projects could also take place during general elections in one or more municipalities or in English-language school service centres.[480] Given that there are some 1,100 municipalities in Québec, trials in municipal elections should be limited both in terms of the number of municipalities and the scale of the electorate that can use Internet voting in each municipality. During school elections, the trials could take place in all nine English-language school service centres or only in those covering a large territory.

As mentioned earlier, voting options are limited in municipal and school elections. In this context, the introduction of Internet voting could result in more substantial gains in access to voting for all electors. The flexibility of this option can make voting easier, particularly for certain groups, such as electors with a disability, those who are outside of the territory of their municipality or school service centre at the time of the election, and those who live far from polling places.

However, trials conducted with the electorate of a municipality or an English-language school service centre would increase certain risks. It would no longer be possible to verify in person the identity of electors using this voting option. Moreover, secrecy and freedom of the vote could no longer be guaranteed by a voting environment free from outside influence. In addition, testing in the context of municipal or school elections could pose certain organizational challenges, given the decentralization of responsibilities at these levels and the management tools that would have to be developed to facilitate the exchange of information between field teams and headquarters.

A question of purpose and social acceptability

The introduction of Internet voting can serve a variety of purposes. On the one hand, it could improve the accessibility and fairness of the electoral process for certain electors who encounter significant barriers when exercising their right to vote. On the other hand, it could facilitate voting for all electors, regardless of their situation, by allowing them to vote when and where it suits them during the allotted period. However, this latter objective must be considered long-term, since the option must first be tested and refined with a limited proportion of electors before it can be expanded to a more substantial pool. Internet voting represents a significant paradigm shift from current voting options. It would create new risks related to digitalization of the votes, the environment in which voting takes place and the verification of the identity of electors. In that respect, an introduction to those who are already entitled to vote by mail would be simpler. However, the question of the cost effectiveness of the Internet voting system could become more acute if this voting option were to be permanently restricted to a fraction of the electorate.

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480. A general election is held to fill all seats on the municipal council or all elective seats on the board of directors of an English-language school service centre. Trials could also be held in a by-election (which allows only one or a few seats to be filled) if the target electorate is large enough.

Two thirds of Quebecers surveyed in our consultations would like to see Internet voting made available to all electors. However, the introduction of this voting option among certain target groups could encourage greater support among the public. Half of the electors opposed to Internet voting would prefer that it be made available only to certain electors, such as those with disabilities or located outside of Québec. In fact, the perceived benefits for these groups are the ones on which there is the broadest consensus, both in terms of autonomy for persons with disabilities and access to voting for those outside the province. Furthermore, this approach is in line with what the Citizen round table would prefer if Internet voting were to be implemented.[481] Panellists in favour of this voting option suggested instead that pilot projects be held during smaller-scale school and municipal elections with a view to a gradual deployment of the option.

A study published by the federal government on Internet voting recommends a minimum of two pilot projects before adopting online voting on a permanent basis. According to the authors, a pilot test "should be conducted with a restricted group of general electors that would include persons with disabilities and another with a special group of electors such as citizens or military abroad."[482] However, they cautioned that while Internet voting should be considered for persons with disabilities, several experts recommend that trials should not begin with this group as these people might not have the required technology and that it may prove to be difficult to determine who is eligible for this voting option.[483]

The definition of the electors targeted for the introduction of Internet voting should seek the best possible balance between accessibility and the integrity of the electoral process, while taking into account the social acceptability of the project, considering associated risks.

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

- 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 system's reliability and security;

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

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481. At the June 8, 2018 meeting, the members of the Citizen round table recommended against implementing this voting option. The members recommended that great care and a very gradual approach be taken should implementation had to occur. In situation simulations, two out of three teams targeted categories of electors encountering obstacles when exercising their right to vote. See Élections Québec, *Compte rendu de la rencontre du 8 juin 2018 de la Table citoyenne*, [Online], 2018, pp. 13-18. [https://www.electionsquebec.qc.ca/documents/pdf/table_citoyenne/compte_rendu_TC_2018-06-08.pdf].

482. Government of Canada, *Online voting: A Path Forward for Federal Elections*, [Online], 2017, p. 49 [https://www.canada.ca/en/democratic-institutions/services/reports/online-voting-path-forward-federal-elections.html#toc29].

483. *Ibid.*

6.2 Conducting elections with Internet voting

Once the parameters for introducing Internet voting have been determined, the electoral process should be adjusted. The changes made should, as much as possible, promote the accessibility of the vote as well as preserve the confidence of the Québec public and the transparency of the process. Voter information is an essential component of this process. The process that electors should follow to vote by Internet should ensure the integrity of the vote while keeping it simple so as to promote accessibility. Conducting the vote and the counting of the votes should both be subject to high standards of transparency and should be open to monitoring by political parties, candidates and independent observers.

6.2.1 Information for voters

If Internet voting were introduced in Québec, one of Élections Québec's priorities would be to appropriately inform electors about this change. Its purpose would be twofold: first, to inform the general public about this new voting option for purposes of transparency and civic education and second, to inform the electors covered by this option so that they have all the information they need to use it.

Informing the public: transparency as a driver of trust

Internet voting represents a major change from the current voting options, in particular due to the digitalization of the votes that it entails. This dematerialization entails risks, particularly in terms of the security and integrity of the votes. It is also associated with a loss of transparency, since neither the voters, the candidates nor their representatives can physically observe the voting process. On the contrary, they must rely on information provided by the voting system or by the people supervising its operation.[484] Moreover, the possibility of voting anytime, anywhere could have the effect of trivializing the exercise of the right to vote in the eyes of some people

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484. According to Chantal Enguehard, direct transparency is essential for democratic elections. Transparency is direct when, [*translation*] "events on election day, from the opening of polling stations to the establishment of the results on the notices, takes place before the eyes of the voters [...]. Transparency becomes indirect when it takes place via a human or software medium depriving the elector of his or her control ability, in this case, the voter must place his or her trust in this medium, which is susceptible to error, deception or malice, without being able to verify for himself or herself the effectiveness of the measures taken or the reality of the information transmitted to him or her." For this researcher, with regard to computer-based voting systems, it would no longer be a question of transparency, but rather of opacity. See Chantal Enguehard, *Transparence, élections et vote électronique*, 2009, pp. 2 and 4.

and diminishing its collective scope.[485] Québec voters are also divided on the issue of Internet voting. IT security is at the heart of the reasons given for disagreeing with its introduction. The addition of this voting option could lead to a significant drop in confidence in the election results, particularly among voters who are against it.[486]

Therefore, the introduction of Internet voting must be accompanied by an information campaign aimed at all electors, not just those entitled to use it. The objective of this campaign would be to provide neutral, clear and comprehensive information on this voting option so as to respond to electors' main questions and concerns. It would focus on the objectives sought through the addition of Internet voting, the benefits it offers and the security measures implemented to limit the risks and preserve the integrity of the electoral process. General audience documents or video capsules could also be made available to explain how this option works. Regular communications at different stages of the election period would be provided for in order to ensure the greatest possible transparency. Élections Québec would also educate electors about the risks inherent in Internet voting, which would contribute to an informed acceptance of these risks.[487] Since Internet voting cannot provide direct transparency, openness in communications would contribute to voter confidence, regardless of their opinion of this voting option.

As in any major information campaign, Élections Québec should take into account the heterogeneity of the Québec electorate. Indeed, there are significant intergenerational differences in the media interests and consumption habits of Quebecers. A multi-platform campaign would help to get the information out to all voters. In the specific case of Internet voting, the disparities in digital literacy and use of technology across age groups should also be considered. Therefore, the messages relayed should be adapted for these various groups, so that messages are understood by both those who are familiar and those who are less familiar with these technologies. Élections Québec could also adapt its school-based democracy education programs to make future electors aware of the meaning of voting, the principles associated with it and the responsibilities of the elector in an Internet voting context.

Élections Québec would also be constantly vigilant in responding to any event that could undermine electors' trust in Internet voting. Should a problem arise during the voting process, the institution would openly provide clear explanations on the nature of, and solutions to, these problems. When it comes to elections, a doubt about the integrity of the process can have significant repercussions on voters' trust in the results and, consequently, in their elected officials' legitimacy. Élections Québec should pay particular attention to the news conveyed in the media and on social networks to correct inaccurate information and maintain voters' trust.

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485. This observation applies not only to Internet voting, but also to other voting options that reduce the scope of election day, such as voting by mail and the various advance poll options. See Graeme Orr, "Convenience Voting: The End of Election Day?", *Alternative Law Journal*, 2014, pp. 154-155.

486. See the results of the telephone survey conducted in the context of the consultations presented in Chapter 5.

487. Representatives of the Geneva State Council (Chancellery), whom we met on September 30, 2019, emphasized that communications on electronic voting are crucial, particularly to ensure transparency and to maintain the trust of voters and other stakeholders. Communication must be simple at all stages of the voting process. They also stressed the importance of the notion of risk associated with electronic voting.

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Strong governance would be necessary at Élections Québec as well as among its partners in the municipal and school sectors, to ensure the transparency and communications required for this voting option. If responsibility for Internet voting were given to municipalities or English-language school service centres, Élections Québec could support them in communications aimed at their entire electorate. The scale of communication methods used would vary depending on the elected level and the voters involved.

Inform affected voters to promote access

Élections Québec, as well as responsible returning officers, according to elected level, would also have to inform the electors who can use this voting option. The election laws already provide that the Chief Electoral Officer and returning officers inform electors of the holding of an election and the procedures involved by means of public notices or information documents sent to each address. These documents would need to be adapted to include information on Internet voting, in particular the period during which electors can use this voting option and the conditions they must meet to use it, where applicable. This information would benefit from being relayed quickly during, or even before, the election period. Specific information measures could also be provided for certain groups of voters.

Information tools specifically designed for electors voting online would be added to the usual means of communication. The first objective of sending this documentation would be to explain how this voting option works and the steps to follow. If voters were required to authenticate themselves using access codes, as is the case in some countries, these codes could be included in the documentation along with vote verification codes. In this specific case, communications should be addressed to each voter rather than to each address for security reasons. Voters should also be made aware of the risks associated with remote voting and informed of their responsibilities, particularly with respect to the freedom and secrecy of their vote and the security of their electronic devices. The documentation provided could contain a reminder of the personal and confidential nature of the vote and related offences. It could also inform voters of best practices to adopt in terms of digital security, personal information protection and voting environment. They would then be better prepared to cast their votes online under optimal conditions.

Since the level of computer knowledge and skills varies among the population, and Internet voting can be complex to understand, particular attention should be paid to the vulgarization of the information conveyed and the ergonomics of the voting materials.[488] As with all its communications, Élections Québec would ensure that this material complies with universal accessibility standards in order to meet the needs of all people, regardless of their condition. Voting materials could be delivered digitally rather than by mail if a secure online service platform were available. This would maximize the benefits of this voting option, particularly

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488. According to representatives of the Geneva State Council (Chancellery), whom we met on September 30, 2019, it is necessary to ensure not only the ergonomics of the electronic voting system, but also the ergonomics of the voting material, which is very important.

for persons with disabilities and for travellers who do not have a mailing address. However, the decision to do so must be based on a rigorous assessment of the implications of a complete digitization of the voting process, in particular in terms of security and integrity.[489]

Finally, Élections Québec or the returning officers, depending on the elected level, should provide technical support to electors throughout the voting period. This service would be essential to ensure accessibility of the Internet voting option. This means it may be necessary to extend the days and hours of operation of the Élections Québec information centre. In addition, staff should be available to remotely accompany electors through all stages in the online voting process, to assist them in case of technical difficulties and to answer their questions more generally.

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 voting option.

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489. In Switzerland, the expert group on e-voting examined the complete digitalization of the electronic voting process. Several cantons were interested in this measure, with a view to eliminate the costs associated with mailing voting material and ensuring the cost effectiveness of the option. The group concluded that no device on the market has all the qualities required to enable electronic voting without paper support. In their opinion, electronic identification and authentication of electors are essential for the complete digitalization of electronic voting. See Panel on Electronic Voting, *Final Report*, April 2018, pp. 24–28.

6.2.2 Registering and voting

In the initial trials of Internet voting, a two-stage process, including a registration period and a voting period, would be preferable. Registration would make it possible to monitor accepted electors and ensure better control of their identity and the votes cast. As for the voting period, it should be defined in relation to the scheduled voting days for the other voting options and the available mechanisms for registering electors and monitoring votes (see text box). The objective would be to limit the risk that an elector could vote more than once.

Registration period

As is the case with other voting options limited to certain electors in Québec (such as mobile polling and voting by mail), electors would have to register for Internet voting before being able to use it. This would ensure that the maximum number of electors allowed to vote online would be respected and that, if applicable, the established eligibility criteria are met. It would then allow an initial verification of the identity of voters using the required identification documents. Internet voting materials could be sent directly to registered electors, based on the information provided by them, without the need for a mass mailing to the entire electorate.

Such registration would also allow for better monitoring of votes cast online, in a context where the monitoring of electors who have voted is still mainly done in a decentralized manner, on printed lists of voters. A first option would be to provide a separate list of electors for those who register for Internet voting, removing their names from the lists used at the polling stations. This is the procedure in effect for electors outside Québec who use voting by mail. This would prevent, with as much certainty as possible, an elector from voting both online and in person. However, this method would deny access to alternative voting options to these electors, which could be perceived as an unjustified constraint. Consequently, there should be a process to allow electors registered to vote online who have not yet exercised their right to vote to change their registration to vote in person.

A second option would be to keep the names of these voters on the lists of electors, but with a note stating that they are registered to vote online. If one of these electors were to show up at a polling station, election officers should ensure that he or she has not already voted. If officers had access to the computerized list of electors (as is the case when voting in the office of returning

> **Recording of electors who have voted**
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> In Québec, two principal ways are used to track electors who have voted. At advance polls and on polling day, whether in provincial, municipal or school elections, this monitoring is done in a decentralized manner, in each polling station, on printed lists of electors. Each polling station has only the extract of the list of electors corresponding to the electors who can vote there. Once electors have voted, a mark is placed beside their name indicating that they have already voted.
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> As soon as voters can vote at the same time in more than one way, this type of marking is no longer appropriate. That is why, for voting in the offices of returning officers and in educational institutions, marking is done on a computerized list of electors, which is updated in real time. This system makes it possible to centrally track electors who have voted anywhere in Québec. This system should be adapted to Internet voting.

officers and in educational institutions), they could easily perform this verification. If there is no access (as is the case, for example, on the two advance polling days and on polling day), the elector would have to take an oath, a practice already provided for in the electoral laws.[490]

The registration process should be simple to prevent this step from becoming an obstacle to the use of this voting option. Nevertheless, this simplicity should not detract from the objectives of verifying the identity of electors and facilitating the monitoring of votes, in order to ensure the integrity of the electoral process. Voters could make a registration request online, as they can already do for voting outside Québec.[491] The registration period should be as long as possible. It could begin as soon as the electorate is notified of the opportunity to vote by Internet and end before the voting period begins, to ensure that the lists of electors are updated. If Internet voting materials were mailed, the registration period would have to be shorter to accommodate postal timelines. During provincial elections, Élections Québec could manage the registrations. In municipal and school elections, it could be done in close co-operation with returning officers.

Voting period

One of the objectives of introducing Internet voting is to provide electors with more flexibility, particularly with respect to when they vote. Therefore, the period during which this voting option is offered is a determining factor. Internet voting has the advantage of being accessible 24 hours a day. The following should be taken into account when setting polling days: the time required by voters to follow and become informed on the election campaign; management of registration on the list of electors and the revision period; the days scheduled for other voting options; and the mechanism for tracking which electors have voted.

In provincial elections, the voting period begins on the tenth day before the election. In municipal and school elections, it begins on the eighth day before the election. The Internet voting period should begin at approximately the same time. The candidate nomination period must first have ended. Next, electors, regardless of the voting option used, should have a comparable period of time to learn about candidates, political parties and their platforms and to follow the election campaign before exercising their right to vote. This information and reflection period is necessary for an informed decision.

In municipal or school elections, this would also prevent Internet voting from taking place at the same time as the revision period for the list of electors. This is particularly important, especially if Internet voting were administered by Élections Québec, while applications for revision to the list would be handled locally. Thus, the returning officers could send a final list to Élections Québec at the end of the board of revisors' work.

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490. *Election Act*, s. 339; *Act respecting elections and referendums in municipalities*, s. 218; and *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 125.

491. This registration option has not yet been formally incorporated into the *Election Act*. However, it is available to voters outside Québec under an agreement signed by the leaders of the authorized political parties represented in the Assemblée nationale.

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In provincial elections, the voting period and the special revision period, which ends on the fourth day before the election, would overlap. Given that electors would have to register for Internet voting, they could be allowed to modify their registration on the list of electors only until the end of the regular revision period. Electors who register on the list of electors or who change their registration before a special board of revisors would no longer be eligible for Internet voting, just as they are not eligible to vote at the advance poll under the current legislation.[492]

Internet voting could not be available on advance polling days or on polling day unless electors registered for Internet voting did not have access to the latter two options. In order to offer simultaneous in-person and online voting to the same electorate, electors who have voted must be monitored centrally, in real time, to prevent an elector from voting more than once. This type of monitoring is currently impossible in these polling stations. However, Internet voting could be offered in conjunction with voting at the office of returning officers and educational institutions in provincial elections. To ensure that electors registered for Internet voting can easily access these options, their name should not be removed from the list of electors.

It would be desirable for electors registered for Internet voting to have at least one other way to exercise their right, regardless of the elected level, for accessibility and security reasons. Therefore, polling day should be excluded from the online voting period, so that it remains open to all. That way, if the system failed or if an elector finally wanted to vote in person, he or she could still do so. In provincial elections, if Internet voting were restricted to electors outside Québec, the voting period could exceptionally include election day.

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

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492. The revision of registration on the list raises other issues. Electors should be able to apply for revision online at the same time as they register for Internet voting. Information to be covered by this application (name, address, etc.) would need to be determined. Applications for revision could be dealt with in the electoral district, by ordinary board of revisors, if the names of electors registered for Internet voting were kept on the list of electors; or by a board of revisors established by the Chief Electoral Officer, if their names were removed from that list, as is the case for electors outside Québec (*Election Act*, ss. 229 to 233.6).

6.2.3 Observation and counting

From the beginning of the voting period to the publication of results, political parties, candidates and their representatives play an important role in monitoring the electoral process. Likewise, their assistance is essential for the full participation of electors, within the limits required in respect of the freedom and secrecy of the vote. Therefore, these roles should be aligned within the context of Internet voting. We must also make sure that these actors have the means and information required to carry out their various functions.

Observation of voting operations

Electoral laws ensure that candidates in an election may observe all operations related to the vote or appoint a person to represent them in that capacity.[493] At the start of the day, they can attend the formalities prior to the opening of polling stations and see that the ballot boxes are empty. They may remain on the premises throughout the voting proceedings and, at the end of the day, observe the closing of the stations and the counting of the ballots. As a result, political parties, candidates and their representatives can be assured that the operations were carried out in full compliance with the law, which helps to build confidence in the integrity of the process and the results.

With Internet voting, as with voting by mail, vote proceedings can no longer be observed live. Nevertheless, transparency measures for these stakeholders should be provided. Representatives could be invited to attend different stages of the work, such as the preparation of the virtual ballot boxes. They could also be given trial votes to test the platform's functionality and ensure that their vote has not been corrupted. Still in their presence, the ballot boxes would then be sealed until they were put into service. These measures would be in addition to other monitoring and verification mechanisms. An independent audit would be carried out on the system at the various stages of the online voting process. In addition, agreements could be concluded with other independent stakeholders, such as academic research teams, to review the process and attest to its reliability.

On polling day, electoral laws allow candidates to appoint a poll runner, who periodically collects the list of electors who have voted.[494] This allows them to monitor participation in the election and mobilize those who have not yet exercised their right to vote. Since the Internet voting period would end before polling day, it would be possible at the end of the Internet voting period to transmit to political parties and candidates a complete list of electors who had voted, as is the case for other advance polling options. Internet voting would automate and simplify this monitoring compared to voting options that use printed lists of electors.

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493. *Election Act*, s. 316; *Act respecting elections and referendums in municipalities*, ss. 92–95; and *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, ss. 31–33.

494. *Election Act*, s. 318; *Act respecting elections and referendums in municipalities*, s. 96; and *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 34.

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The introduction of Internet voting would also require adjustments with respect to raising awareness of political stakeholders, as well as to violations of electoral laws. Indeed, being able to vote remotely, from any electronic device, could lead to situations that are worrying for the freedom and secrecy of the vote, situations that are impossible under the current conditions. For example, it would be unacceptable for a party or candidate to use one of its electronic devices or its premises to have electors vote over the Internet. Nor could he or she invite them to vote in his or her presence, at a political fundraising event or door-to-door, for example. Thus, information tools and training for political parties should be reviewed to take these new issues into account. Provisions could also be made for new criminal offences. Voter education on these issues would also be crucial.

Counting of the votes and publication of the results

The counting of the votes is one of the critical steps in any electoral process. Consequently, particular attention should be paid to the procedures that would govern the counting of the votes cast online. The process should promote transparency and enable the various stakeholders to obtain the guarantees required to ensure their confidence in the accuracy of the results. The counting of Internet votes would take place after the polling stations on polling day are closed, as with other advance polling options. At the end of the online voting period, the encrypted votes would be extracted from the system and stored securely by Élections Québec or, if applicable, by the returning officer. This would be done in the presence of independent observers. Representatives of political parties or candidates could also attend if they wish. Thus, the results would remain secret until election night.

In order to count the results of the online vote, the presence of several people would be required. The key to allow for decryption of the votes should be fragmented and distributed among different process stakeholders.[495] In provincial elections, the key could, for example, be shared among the Chief Electoral Officer, returning officers and representatives of political parties. Similarly, in municipal or school elections, it could be shared between the Chief Electoral Officer, the returning officer of the municipality or English-language school service centre and representatives of political parties or candidates. The combination of all these key fragments would be necessary to decipher and count the votes. This way, none of the stakeholders would have access to the results individually. The counting could be carried out remotely, to take into account the geographical remoteness of the participating people. However, at least two people should be present at each location to monitor operations. Independent observers as well as political parties and candidates not directly involved in the count could attend.

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495. It would be undesirable to entrust the decryption key to any single authority, no matter which one, since it would then have access to all votes. Fragmentation of the key and entrusting fragments to independent stakeholders allows for a better protection of vote confidentiality and ensures better control over the count. The authorities, each holding part of the key, can also monitor each other and attest to the successful completion of this crucial step. See Véronique Cortier and Steve Kremer, "Voting by Internet," *Interstices*, [Online], 2017, p. 5. [https://interstices.info/vote-par-internet/].

When the results are counted, the returning officer for the electoral district, the municipality or the English-language school service centre could print a statement of votes and keep it. This statement would make it possible to add the votes. Depending on the number of votes cast online and to preserve their confidentiality, the results could be merged with the results of another voting option.[496] The data related to Internet voting should be kept for a period determined in accordance with legal obligations, but also taking into account the risks to the confidentiality of votes.

> If Internet voting is introduced in Québec, the Chief Electoral Officer recommends:
>
> - Giving political parties, candidates and their representatives a monitoring role at the various steps of 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.

6.3 Internet Voting Legal Framework

Legally, Internet voting could be introduced in different ways: in election laws, by regulation or agreement. The framework should establish a basis for ensuring compliance with democratic voting principles. It could define standards and technical specifications as well as how roles and responsibilities are to be shared between the different stakeholders. It should also provide for adjustments to certain processes and provisions of the laws, particularly to ensure the integrity of the electoral process.

6.3.1 Ways to amend electoral laws

Various legislative vehicles would allow for the introduction of Internet voting for one or more Québec elected levels. Previous electoral reforms that have led to the addition of new voting options reflect this diversity of means. The choice is a matter for the legislator and depends on the approach chosen to introduce this voting option. Depending on the desired level of supervision, it would be possible to proceed by adopting a bill, to amend election laws; by regulation, to extend such laws; or by agreement, to test the option before formalizing its use.

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496. The results of certain voting options are already merged with others when few votes are cast. This measure is designed to protect the secrecy of the vote of electors who have voted this way.

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Legislative process

All of the voting options available to Québec electors are set out in the various election acts. They have been introduced through bills adopted by the Assemblée nationale. Internet voting could be added to the election system by the same means. To this end, a bill or bills to amend the electoral legislation should be submitted to parliamentarians for consideration.

The legislative process involves several steps: drafting of the bill, its introduction, adoption of the principle, comprehensive study in committee, assessment of the committee's report and adoption.[497] The bill is then assented to by the Lieutenant Governor and comes into force on the date specified in the bill. Given these different steps, the legislative process can take several months. On the other hand, the debate and deliberation it generates among parliamentarians contribute to the democratic legitimacy of the provisions adopted.[498]

The degree of precision of the characteristics and procedures applicable to the new voting option may vary in the law. On the one hand, the bill providing for the introduction of Internet voting could set out all the provisions for online voting. This is the path chosen for the vast majority of voting options in force in Québec: the procedures are set out in the Acts. On the other hand, the bill could allow the use of Internet voting, but only include more general requirements. A regulation or directive could specify the technical aspects. Québec's election laws provide a single example of this approach[499]: voting by mail for electors not domiciled in a municipality, the procedures for which are set out in a regulation.

Regulation

Regulations are rarely used for voting options in Québec, but one could provide for the introduction of Internet voting and establish a framework for it. The regulatory power is a delegation of the authority to legislate. This delegation is made through legislative provisions, which specify the matters to be prescribed by regulation.[500] When a regulation comes into force, it has the force of law. The power to create a regulation is, for the most part, delegated to the government, but it can also be delegated to various bodies.[501] Different factors may lead the legislator to delegate its authority: the technical nature of the legislation, its rapid evolution, the need for flexibility in the application of laws or the need for experimentation in new

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497. Luc Gagné, *Le processus législatif et règlementaire au Québec*, 1997, pp. 33-34.

498. Bryan Schwartz and Dan Grice, *Establishing a Legal Framework for E-Voting in Canada*, Elections Canada, 2013, p. 31.

499. This provision has never been applied, but *An Act to defer the next general school election and to allow the Government to provide for the use of a remote voting method* also provides for the introduction of a voting option by regulation: "The Government may, by regulation, after consulting the Chief Electoral Officer, allow the use of a remote voting method for the general school election of 1 November 2020 and determine the applicable conditions and procedure." (SQ 2018, c. 15, s. 5).

500. Luc Gagné, *op. cit.*, p. 226.

501. *Ibid.*, p. 227.

legislative fields.[502] The time required to adopt a regulation is generally shorter than that of a bill and its amendment requires less formalism, which makes it easier to keep up with technological advances and adapt to various situations.[503]

Québec's electoral legislation requires the development of regulations related to various aspects of the electoral process. Thus, the provincial *Election Act* gives the Chief Electoral Officer regulatory power over matters that must be prescribed by regulation under this Act.[504] For example, the *Voting Regulation*[505] provides for the various voter oaths and the form authorizing an elector to vote. The regulations are to be submitted to the Committee on the Assemblée nationale or to any other committee designated by the Assemblée nationale, which may approve them with or without amendment. They come into force no earlier than 15 days after their publication in the *Official Gazette* or at a later date indicated therein. The *Act respecting elections and referendums in municipalities* (AERM) and *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres* also specify various matters on which the government or the minister responsible for the administration of these acts make regulations. Voting by mail for electors not domiciled in a municipality is the only voting option whose procedures are defined by regulation in Québec. The AERM specifies that this regulation must be subject to consultation with the Chief Electoral Officer.[506]

Elsewhere in Canada, other voting options have been introduced by regulation, including Internet voting. In Ontario, the *Municipal Elections Act, 1996* provides that the council of a municipality may adopt a by-law authorizing an "alternative voting method...that does not require electors to attend at a voting place in order to vote."[507] The clerk of the municipality establishes the applicable procedures.[508]

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502. *Ibid.*, p. 228.

503. *Ibid.*

504. *Election Act*, s. 550.

505. CQRL, c. E-3.3, r. 17.

506. *Act respecting elections and referendums in municipalities*, s. 582.1

507. SO 1996, c. 32, Sch. s. 42(1)(b).

508. *Ibid.*, s. 42(3). The lack of federal or provincial standards governing Internet voting has been criticized in Ontario. See Anthony Cardillo, Nicholas Akinyokun and Aleksander Essex, *op. cit.*, p. 1. The province's Chief Electoral Officer has recommended the institution of common evaluation standards and a certification process for voting technologies. See Elections Ontario, *Modernizing Ontario's Electoral Process. Report on the 42nd Ontario General Election*, [Online], 2018, p. 53. [https://www.elections.on.ca/content/dam/NGW/sitecontent/2019_fr/%C3%89lection%20g%C3%A9n%C3%A9rale%20de%202018%20-%20rapport%20d%27%C3%A9valuation.pdf].

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In Nova Scotia, the *Municipal Elections Act* provides that a municipal by-law may authorize electors to vote by mail, electronically or by another voting method.[509] Unlike the Ontario law, the Nova Scotia Act specifies the various aspects that must be provided for in the by-law. In particular, the by-law must address the notices to electors, the format of ballot papers, how to count the votes and criteria for rejecting ballots. It may also specify the days and hours of voting under this voting option and how to proceed for a recount and provide for the establishment of offences and the imposition of fines.[510]

In the Northwest Territories, the *Elections and Plebiscites Act* allows the Chief Electoral Officer to establish a procedure to allow an absentee elector to use an electronic ballot.[511] On the recommendation of the Chief Electoral Officer, the Commissioner of the Northwest Territories may administer this type of vote through regulations, including specifying the provisions of the law regarding absentee ballots that will also apply to the electronic absentee ballot.[512]

Agreements to test new methods of voting

In an initial testing phase, Internet voting could be introduced by agreement, under the provisions already provided for in the electoral legislation.[513] This approach has often been used to test new voting options in Québec, such as voting at the office of the returning officer in provincial elections as well as voting by mail and electronically in municipal elections. The agreements allow a voting option to be tested in a more flexible framework before it is formally adopted. They also make it possible to establish and test the guidelines for possible legislative provisions, to evaluate them and adapt or supplement them before a formal introduction into electoral legislation.

While temporary, agreements to test new methods of voting have the effect of law during the elections in question. Agreements related to provincial elections are made on the recommendation of the Chief Electoral Officer and must be approved by the leaders of the authorized political parties represented in the Assemblée nationale. Agreements for municipal elections are made between the municipality, the Minister of the Ministère des Affaires municipales and the Chief Electoral Officer. Those for school elections are signed by the Chief Electoral Officer and the English-language school service centre. The agreements must describe the voting mechanisms used and specify any amendments to the existing Act.

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509. RSNS 1989, c. 300, s. 146A.

510. *Ibid.*

511. NWT-O 2006, c. 15, s. 132.1.

512. NWT-O 2006, c. 15, s. 360(f).

513. *Election Act*, s. 489; *Act respecting elections and referendums in municipalities*, s. 659.2; *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 282.2.

To be effective, the agreements must be complete and provide for all procedures related to the conducting of the poll. The agreements signed to test electronic voting in municipal elections in the early 2000s provide avenues for improvement. In particular, the Chief Electoral Officer pointed out that the legislation should be better defined and that the roles and responsibilities of the various stakeholders should be clearly established.[514] To this end, the agreements should better reflect the processes in place and appropriately regulate the use of technological tools. Judges have drawn similar conclusions following judicial recounts: the regulation of the new methods of voting should be sufficiently precise to govern all voting procedures, to set out the roles and responsibilities of each party and to determine the specific criteria giving rise to recounts. If the legislator chose to introduce Internet voting by agreement, the specific characteristics of this new voting option would have to be taken into account so that the proposed regulation matches the related procedures.

Pilot projects involving the use of Internet voting could be carried out through such agreements. Following the initial trials, if the legislator chooses to continue offering this voting option, it would be desirable to formalize the legal framework in order to promote the transparency of the process and the confidence of electors and other stakeholders. This formalization could take the form of detailed legislative provisions, or a regulation. A balance should be sought between the democratic legitimacy conferred by the legislative process and the flexibility required by technological developments so that the legal framework established remains relevant.[515]

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.

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514. Directeur général des élections du Québec, *Élections municipales de novembre 2005. Rapport d'évaluation des nouveaux mécanismes de votation*, 2006, p. 225.

515. The authors of a study conducted for Elections Canada on the design of a legal framework for electronic voting concluded that "[a]chieving a balance between legislation and delegated regulations is important. The more detailed legislation in place, the greater legitimacy the legal framework will probably have. [...] Detailed legislation is not necessarily needed to test an electronic voting system in a by-election or comparably limited context, but using it in a general election without amendments to the Canada Elections Act may raise public concerns about whether there has been sufficient democratic debate and support for the system, and whether sufficient measures have been in place to reduce risk, identify malfunctions or tampering and provide for remedial measures." See Bryan Schwartz and Dan Grice, *Establishing a Legal Framework for E-Voting in Canada*, Elections Canada, 2013, p. 34.

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6.3.2 Legal framework basics

The legal framework to be established for the introduction of Internet voting would have to be based on the core democratic voting principles and preserve a balance between them. To this end, standards, technical specifications and procedures would first have to be defined in order to detail how these principles would be implemented. The legal framework should also define the roles and responsibilities of the various stakeholders and provide for verification and corrective measures to ensure compliance with the requirements. Finally, it should specify the mechanisms and conditions under which the results of an election can be contested and contain penal provisions adapted to the specificity of Internet voting.

Compliance with core democratic voting principles

At the beginning of this study, we outlined the core democratic voting principles: accessibility, free exercise of the right to vote, secrecy of the vote, integrity of the process and results, and transparency. These principles stem from international conventions and reflect the rights and values intrinsic to the right to vote that is protected by the Canadian and Québec charters of rights and freedoms.

Québec's electoral legislation does not set out all of these principles. Nevertheless, the spirit of these laws, as well as the electoral procedures defined therein, are intended to ensure compliance with them. For example, different voting options and elector assistance measures help to make voting more accessible and fairer. All three election acts specify that the vote is secret. To preserve the freedom and secrecy of the vote, electors cast their ballots in a polling booth in a place supervised by election officers. The laws also prohibit the disclosure of one's vote or intention to vote on the premises of a polling station, and no one can be compelled to declare for whom he or she voted.[516] The integrity of the electoral process and results is maintained through procedures such as verifying the identity of electors and ensuring that they only vote once. It is also maintained by security measures, such as the application of seals on the ballot box. Finally, transparency is manifested through various provisions that provide for means to inform the public, as well as the possibility for electors, candidates and their representatives to observe the various steps of the process.

Many of the electoral procedures set out in existing laws will become inadequate once voting is digitalized and can be done remotely, which is what Internet voting entails. The legal framework for the introduction of this voting option should therefore provide for new electoral procedures adapted to Internet voting and require the adoption of standards and technical specifications prior to its use. It should not, however, restrict technological choices or favour one technology over

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516. *Election Act*, ss. 355–359; *Act respecting elections and referendums in municipalities*, ss. 279–283; and *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 165–168.

another, in order to respect the principle of technological neutrality.[517] Following the trials on electronic voting during the 2005 municipal elections, the Chief Electoral Officer recommended [*translation*] "that the legislation governing the use of the new voting mechanisms be reviewed and better defined."[518] The Chief Electoral Officer also recommended [*translation*] "that, as a prerequisite for any future use of a new voting mechanism, rigorous technical specifications, safety and reliability norms and standards should be adopted and reviewed on a regular basis."[519]

The aim of these standards, technical specifications and electoral procedures should be objectives equivalent to those fulfil by the current provisions. This approach derives from the application of the principle of functional equivalence[520] which "requires that regulations affecting technology should allow it to be as good as or better than the current system, while ensuring that proposed laws reflect the purposes and functions of the traditional law (United Nations, 1999)."[521] As a result, a comprehensive review of the procedures in effect would allow a determination of the measures to adopt to ensure compliance with core democratic voting principles in the Internet voting context.[522]

The standards and technical specifications should be based on reference documents developed internationally, while being adapted to the Québec electoral context. The standards for e-voting adopted by the Venice Commission[523] are a prime reference source that should be taken into account. In terms of information security, the ISO 27000[524] family of standards, as well as other

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517. [*translation*] "Characteristic of a law that sets out the rights and obligations of people in a generic manner, regardless of the technological means by which the activities in question are carried out. The Act is neutral with regard to the specific technological framework to put in place. The Act does not specify the technology that must be installed to achieve and maintain the integrity of documents and to establish a link to a document. Moreover, it does not promote the use of one technology at the expense of another." See Pierre Trudel et al., *La loi en ligne : La Loi concernant le cadre juridique des technologies de l'information*, 2001, cited in Vincent Gautrais, "Neutralité technologique," *LFIT.ca*, [Online], September 2019. [https://www.lccjti.ca/definitions/neutralite-technologique/].

518. Directeur général des élections du Québec, *op. cit.*, 2006, p. 225.

519. *Ibid.*

520. [*translation*] "An approach whereby requirements found in some legislation, such as writing, signature or original, can also be applied to a technological medium to the extent that these requirements perform the same functions as the paper equivalent." See Vincent Gautrais, *Pour y voir clair: guide relatif à la gestion des documents technologiques* (Montréal: Fondation du Barreau du Québec, 2005), p. 8. In Québec, this principle of functional equivalence is found in *An Act to establish a legal framework for information technology*, whose aim is to ensure the functional equivalence of documents and their legal value, regardless of their medium. See CQLR, c. C-1.1, s. 1 (3).

521. Bryan Schwartz and Dan Grice, *op. cit.*, p. 24.

522. *Ibid*, p. 28.

523. Council of Europe, *Recommendation CM/Rec(2017)5[1], Committee of Ministers to member States on standards for e-voting*, [Online], 2017. [https://search.coe.int/cm/Pages/result_details.aspx?ObjectId=0900001680726f6f]; *Explanatory memorandum* [https://search.coe.int/cm/Pages/result_details.aspx?ObjectId=090000168071bc84]; *Guidelines* [https://search.coe.int/cm/Pages/result_details.aspx?ObjectId=0900001680726c0b].

524. International Organization for Standardization, *ISO/IEC 27000:2018(en) Information technology - Security techniques - Information security management systems - Overview and vocabulary*, [Online], 2018. [https://www.iso.org/obp/ui#iso:std:iso-iec:27000:ed-5:v1:en].

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information security standards, should be respected. In addition, documentation developed by countries using different electronic voting options could be used. Switzerland[525], France[526] and the United States[527] offer particularly interesting resources in this area.

Also, following the electronic voting experiments conducted in 2005, the Chief Electoral Officer recommended that a group of experts be established to develop standards and technical specifications for these voting options. He also recommended that these requirements be subject to verification and monitoring by an independent authority.[528] In addition, the development effort could include a consultation process; Estonia, Norway and Switzerland, among others, have done so.[529] An inclusive approach would promote transparency and could also lead to consensus on the requirements for allowing the use of Internet voting.

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525. In Switzerland, the criteria for conducting electronic voting trials are defined in the *Federal Act on Political Rights*, the *Ordinance on Political Rights* and the *Federal Chancellery Ordinance on Electronic Voting* VEIeS. The latter ordinance, updated in 2018, sets out the conditions that must be met for electronic voting trials to be permitted. In particular, it establishes separate requirements based on the percentage of the electorate that is allowed to vote electronically. The *Ordinance* also includes an appendix setting out technical and administrative requirements for electronic voting. The Federal Chancellery has catalogues of criteria for the implementation of these legal bases. See Federal Chancellery, *Electronic Voting - Federal Legislation*, [Online]. [https://www.bk.admin.ch/bk/en/home/politische-rechte/e-voting/versuchsbedingungen.html].

526. In 2019, the Commission nationale de l'informatique et des libertés adopted a recommendation on the security of systems designed for voting by electronic correspondence, including Internet voting. Unlike other documents of the same type, this recommendation does not apply to other forms of electronic voting, such as telephone voting and voting terminals. In particular, it sets risk levels and safety objectives to be achieved in relation to those levels. It is accompanied by a practical sheet, which includes an analysis checklist to determine the level of security that the voting system must achieve, as well as examples of the means to be implemented to reach the various security objectives. See Commission nationale de l'informatique et des libertés, *Sécurité des systèmes de vote par internet : la CNIL actualise sa recommandation de 2010*, 2019, [Online]. [https://www.cnil.fr/fr/securite-des-systemes-de-vote-par-internet-la-cnil-actualise-sa-recommandation-de-2010].

527. The U.S. Election Assistance Commission is responsible for developing and maintaining specifications and requirements for voting systems used in that country. This directive is applied on a voluntary basis. In particular, it enables assessment of basic functionalities, accessibility and the security of voting systems. The latest version of this directive was updated in 2015 and a new version is in the process of being approved. See United States Election Assistance Commission, *Voluntary Voting System Guidelines*, [Online]. [https://www.eac.gov/voting-equipment/voluntary-voting-system-guidelines].

528. Directeur général des élections du Québec, *op. cit.*, 2006, p. 225.

529. Bryan Schwartz and Dan Grice, *op. cit.* p. 56. The representatives of the Swiss Federal Chancellery whom we met on October 3, 2019, indicated that the *Federal Chancellery Ordinance on Electronic Voting* was drawn up in collaboration with the University of Bern and other Swiss schools of applied sciences. The cantons, system providers and the scientific community working in the field of electronic voting were also consulted. A consultation process had also been carried out when the electronic voting provisions of the *Ordinance on Political Rights* were adapted in 2013. See Federal Chancellery, *Report on the Results of the Hearing Procedure on the Revision of the Ordinance on Political Rights (Electronic Voting)*, [Online], 2013, p. 3. [https://www.bk.admin.ch/bk/fr/home/droits-politiques/groupe-experts-vote-electronique/criteres-pour-les-essais.html].

Roles and responsibilities

The legal framework that would accompany the introduction of Internet voting should clarify the roles and responsibilities of the different stakeholders in the electoral process. The Chief Electoral Officer noted discrepancies at this level during electronic voting experiments conducted in 2005; therefore, he recommended that [*translation*] "the roles and responsibilities of the Ministère des Affaires municipales et des Régions, the Chief Electoral Officer and municipalities with regard to the use of the new methods of voting be clearly defined."[530] This clear division of responsibilities would be all the more important in the case of Internet voting. Indeed, introduction of this voting option could lead to changes in the current roles of stakeholders,[531] particularly if it is managed by Élections Québec.

Internet voting may also require private sector participation. The latter could support the electoral administration in terms of expertise or equipment. In this regard, once again, the electronic voting experiments conducted during municipal elections in Québec are revealing. Among the factors that may have contributed to the difficulties encountered, the Chief Electoral Officer noted the delegation of too much responsibility from the municipal returning officer to the service provider, as well as, at times, imprecise contractual requirements and incomplete specifications.[532] In the context of Internet voting when an external service provider is used, it would be essential to establish specific contractual requirements for the services required so that the responsibilities of the company are clearly established. The electoral administration would remain responsible for ensuring the integrity of the electoral process and, to that end, for developing the expertise needed to play that role effectively. In his recommendations, the Chief Electoral Officer targeted certain obligations that should be imposed on suppliers: provide access to all information concerning voting systems (source code, software, characteristics, features, IT infrastructure, parameters and data stored on devices and memory cards); have all personnel assigned to the project sworn in; destroy, after the poll, data saved on the electronic voting systems; and ensure the protection of personal information to which the suppliers and their staff might have access.[533] The contract should also ensure that the service provider allocates the required resources for the smooth operation of the poll and that it provides full technical support for any event that may affect Internet voting proceedings.

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530. Directeur général des élections du Québec, *op. cit.*, 2006, p. 225.

531. Currently, the Chief Electoral Officer is responsible for the administration of the *Election Act*. Returning officers are responsible for organizing elections in their electoral districts. The Ministère des Affaires municipales and the Ministère de l'Éducation are responsible for the laws related to municipal and school elections, respectively. Municipal and school returning officers organize elections in their territory; the Chief Electoral Officer assists them in the exercise of their duties.

532. Directeur général des élections du Québec, *op. cit.*, 2006, p. 221.

533. Directeur général des élections du Québec, *op. cit.*, 2006, p. 228.

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The introduction of Internet voting could lead to the creation of a new independent entity, whose main mandate would be to monitor the process. Such an entity would be useful, since Internet voting requires centralized operations, particularly for vote counting, and technical expertise that complicates the monitoring traditionally carried out by candidates and their representatives. Such an entity could contribute not only to the integrity of the process, but also to the confidence of voters and other stakeholders. The authors of a study on electronic voting conducted for Elections Canada noted a trend toward specialized monitoring in countries where Internet voting has been introduced.[534] They specifically recommended the establishment of "a board or committee with the authority to make recommendations to the electoral authority or arrive at certain determinations regarding e-voting oversight."[535] This committee could have independent powers or act within the electoral administration.[536] Its members should be chosen based on their expertise and ensure the independence of the committee.[537] The roles and responsibilities of this committee would have to be defined, but could include vote counting operations, as is the case in France for the vote of out-of-country electors.[538]

Control and corrective measures

To ensure the reliability and integrity of Internet voting, the legal framework providing for its introduction should require that control and monitoring measures be put in place at each step of the process. These measures would make it possible to prevent certain failures and to detect or even correct those that might occur. The legal framework should also establish transparency obligations to maintain the confidence of voters and various stakeholders in the electoral process.

Internet voting legal framework should require penetration, vulnerability and security tests to assess the voting platform prior to its use.[539] It should also include full-scale trials with control groups in addition to the publication of the results of these various tests. Moreover, the legal

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534. The authors cite Estonia and France as examples; see Bryan Schwartz and Dan Grice, *op. cit.*, p. 65-66. The representative of the Neuchâtel State Council (Chancellery), whom we met on September 30, 2019, indicated that an electoral commission had been established in 2005 at the time of the introduction of electronic voting. This commission is composed of representatives of political parties and the administration. It follows all steps of the work. The committee has helped to build confidence in electronic voting in the canton.

535. Bryan Schwartz and Dan Grice, *op. cit.*, p. 66.

536. *Ibid.*

537. Without making specific recommendations on this subject, the authors of the study for Elections Canada give a few examples: federal court judges or other people in positions of independence; tenured academics specializing in engineering, computer science or law; privacy or information commissioners; and others recommended by various political parties. See Bryan Schwartz and Dan Grice, *op. cit.*, p. 66.

538. Electronic voting operations in France are supervised by an electronic voting office composed of six members representing, in particular, the Council of State, French citizens abroad and the Agence nationale de la sécurité des sytèmes d'information. See *Electoral Code*, s. R176-3-1. The electronic voting office ensures smooth running of the electoral process and verifies the effectiveness of the security devices provided to ensure the secrecy of the vote, the sincerity of the vote and the accessibility of the suffrage (s. R176-3-3). Each member of the office is assigned a separate key for counting the votes, and at least four of these keys must be used to open the ballot box (s. R176-3-8 and R177-5).

539. The Chief Electoral Officer's assessment report on electronic voting mechanisms used in 2005 recommended that similar measures be put in place. See Directeur général des élections du Québec, *op. cit.*, 2006, p. 228.

framework could require that the source code of the voting platform be made public. This transparency measure was adopted by the Swiss Federal Chancellery.[540] In addition, the legal framework should provide for obligations relating to the certification of the platform by a competent authority, as well as an external audit to attest to the smooth running of the process and the reliability of the platform.

Particular attention should be paid to protecting the privacy of electors' personal information used for Internet voting. A review of the obligations prescribed by election laws and international best practices in this field would be relevant.[541] Provisions should also require that data used for polling purposes be destroyed, taking into account the retention periods already provided for in election laws.[542]

The framework for Internet voting should require contingency and continuity plans.[543] It should include corrective measures to remedy any failure of the voting platform or any event that could slow down, interrupt or jeopardize the holding of the poll. The electoral legislation already provides that, subsequent to an error, an emergency or an exceptional circumstance, the Chief Electoral Officer may adapt a provision according to the requirements of the situation to achieve its objective.[544] In the event of a major disaster or a serious and unforeseeable situation, he or she can also postpone a provincial election to the following Monday. This power conferred on the Chief Electoral Officer is broad enough to cover a range of situations. Nevertheless, the laws could provide "some guidance on how to resolve issues that could affect the results of an election."[545] They could set out the conditions for extending the Internet voting period or removing the ability to vote using this option. The laws could allow for the election to be cancelled or held again as a last resort.

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540. This requirement was included in the latest revision of the [Swiss] *Federal Chancellery Ordinance on Electronic Voting*. The Chancellery stated that this [*translation*] "publication is intended to strengthen public confidence in electronic voting systems. Furthermore, it will give the specialist community the opportunity to convince itself of the safety and quality of the systems at all times. As for the authorities, they will be able to make the necessary improvements in time in case external experts find shortcomings." See Federal Chancellery, *Requirements of Federal Law*, [Online]. [https://www.bk.admin.ch/bk/fr/home/droits-politiques/groupe-experts-vote-electronique/criteres-pour-les-essais.html].

541. Since 2013, the Chief Electoral Officer has been recommending a review of the provisions of the *Election Act* regarding the protection of electors' personal information. For more information on these recommendations, see Directeur général des élections du Québec, *Partis politiques et protection des renseignements personnels. Exposé de la situation québécoise, perspectives comparées et recommandations*, 2019.

542. In the assessment report on the electronic voting mechanisms used in 2005, the Chief Electoral Officer recommended that a similar measure be put in place. See Directeur général des élections du Québec, *op. cit.*, 2006, p. 228.

543. *Ibid.*, p. 227.

544. *Election Act*, s. 490; *Act respecting elections and referendums in municipalities*, s. 90.5; *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 30.8.

545. This recommendation was made by the authors of the study on electronic voting conducted for Elections Canada. An independent commission or committee, responsible for monitoring the process, could also support the electoral administration in dealing with emergencies or serious problems. See Bryan Schwartz and Dan Grice, *op. cit.*, pp. 35, 65-66.

Recount and contestation of elections

The electoral legislation provides for two judicial remedies to challenge the results of an election: judicial recount and contestation of election. A person may request a judicial recount if he or she has reasonable grounds to believe that ballot papers have been counted or rejected illegally or that a statement of votes is incorrect.[546] A contestation of election, on the other hand, makes it possible to apply to the court to void an election because it was irregular or because a corrupt electoral practice was used.[547] A court determines whether the election should be cancelled, whether the candidate was duly elected or whether another person was elected.[548]

The introduction of Internet voting should be accompanied by a review of these provisions. Indeed, this voting option leads to a digitalization of the votes and of the counting of the results, which makes it difficult to apply the current methods of remedy. First, in the absence of physical ballot papers, judicial recounts, as defined in current electoral legislation, are no longer possible. In fact, during the electronic voting trials held in the early 2000s, the agreements for the use of voting terminals repealed the articles relating to the rejection of votes. However, they provided for the possibility of requesting a new compilation of the results if there were reasonable grounds to believe that a statement or report of results had been inaccurately prepared.[549] Similarly, the regulation authorizing the use of Internet voting in the Halifax Regional Municipality provides for the possibility of recompiling the votes cast online. If the results do not match, a third count is conducted in the presence of the returning officer. The result of this third compilation is considered final. However, the regulation specifies that no judicial recounts may be conducted for votes cast over the Internet.[550] Consequently, the various aspects of the judicial recount should be evaluated in light of the characteristics of Internet voting in order to develop a method for recompiling the results. In particular, provisions should specifically set out the conditions giving rise to such an exercise, the applicable procedures and the consequences of such an exercise.

The criteria in the current electoral legislation for challenging an election are rather generic. Specific criteria could be established for Internet voting. In particular, the criteria for cancelling and holding an election again should be clearly defined (e.g., system failures and manipulation of ballot boxes or votes could be among the circumstances included by the legislator). Consideration should also be given to the difficulty for candidates, their representatives or even the public to observe and document the presence of irregularities in the conduct of an online vote. Finally, if the Internet

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546. *Election Act*, s. 382; *Act respecting elections and referendums in municipalities*, s. 262; *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 145.

547. *Election Act*, s. 458; *Act respecting elections and referendums in municipalities*, s. 286; *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 173.

548. *Election Act*, s. 467; *Act respecting elections and referendums in municipalities*, s. 292; *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 182.

549. The new compilation of the results was to be performed by a judge. Depending on the type of voting terminal, he or she would print the results compiled on the memory card or would examine the paper trail of the votes cast. Where paper trails were available, they were obtained using a sealed printer that printed out the votes cast on the device in real time. After correcting, if necessary, the report of the results, the judge would conduct a new addition of the votes and certify the results.

550. *Halifax Regional Municipality By-law Number A - 400 Respecting Alternative Voting*, s. 16 to 19.

voting results were found to be invalid, the question of whether the election should be held again would have to be determined, taking into account, among other things, the number of votes cast online and the margin of victory of the elected candidate.

Penal provisions

The introduction of Internet voting should be accompanied by a revision of the penal provisions already contained in the electoral legislation. Indeed, this voting option could promote the emergence of new forms of malicious acts aimed at disrupting elections or influencing the vote of electors. Moreover, the effect of such acts could be multiplied tenfold due to the centralization of votes in one system. Large-scale attacks could affect several electoral divisions at the same time. In the face of these new threats, criminal offences can be an important deterrent, in addition to the various security measures deployed to ensure the availability, integrity and confidentiality of the Internet voting system.[551]

Election laws provide for various criminal offences to punish behaviour that could undermine electors' right to vote and the integrity of the electoral process. For example, any person who attempts to violate the secrecy of the vote, inhibit the freedom to vote, prevent a voting procedure or alter the results of the election is liable to a fine.[552] Other sections prohibit the promise or granting of an advantage to an elector in order to influence his or her vote.[553] The *Election Act* also punishes unauthorized access to voters' personal information. It provides that it is an offence for a person to access or attempt to access, without authorization, by electronic or telematic means, the register of electors or the register of territories of the permanent list of electors.[554] These various offences are punishable by a minimum fine of $5,000. They also constitute corrupt electoral practice; consequently, the person convicted of these offences loses his or her electoral rights for a five-year period.[555]

Election laws could be amended to include penal provisions creating offences specific to Internet voting. For example, unauthorized access or attempted access to the Internet voting system or the data it contains should be subject to sanctions. Similarly, a study on electronic voting conducted for Elections Canada recommends punishments for attempts to alter election results, such as disrupting servers or electronic voting equipment and the manufacturing of vote-altering software.[556] They

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551. Bryan Schwartz and Dan Grice, *op. cit.*, p. 53.

552. *Election Act*, s. 557; *Act respecting elections and referendums in municipalities* s. 589 and 641.1; *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 217 and 221.1.1.

553. *Election Act*, s. 558; *Act respecting elections and referendums in municipalities*, s. 591 and 641.1; *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 219 and 221.1.1.

554. *Election Act*, s. 551.3.

555. In particular, the person loses the right to vote, to be a candidate and to engage in work of a partisan nature. See *Election Act*, s. 567 and 568; *Act respecting elections and referendums in municipalities*, s. 645 and 645.1; and *An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 223.1 and 223.2.

556. Bryan Schwartz and Dan Grice, *op. cit.*, p. 56.

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also recommend banning, "wilful creation, promotion and linking to spoof election sites."[557] They further suggest that employers and other organizations that use technology to monitor computers should be required to "take reasonable steps to ensure the secrecy of the vote, including alerting employees ."[558] They also indicate that fines and sentences should be set taking into account the potential for large-scale fraud in Internet voting.[559]

The by-law authorizing the use of Internet voting in the Halifax Regional Municipality includes other offences that could be added to the electoral legislation. For example, it prohibits anyone from using the personal identification number of another elector or interfering with an elector who is in the process of voting.[560] It also provides that a candidate or an agent acting on behalf or in support of a candidate may not provide a personal electronic device to an elector to vote by Internet.[561] Any person who contravenes these provisions is guilty of an offence and is liable to a minimum fine of $5,000.[562]

The addition of criminal offences must necessarily be done by legislation. If offences were to be created by regulation, provision should be made specifically for this purpose in electoral legislation.

> If Internet voting is introduced in Québec, the Chief Electoral Officer recommends:
>
> - 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 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 the various stakeholders in the electoral process 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 recount 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.

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557. *Ibid.*

558. *Ibid.*, p. 55.

559. *Ibid.*

560. *Halifax Regional Municipality By-law Number A - 400 Respecting Alternative Voting*, s. 24 to 26.

561. *Ibid.*, s. 26A.

562. *Ibid.*, s. 27.

6.4 Considerations related to the choice and cost of an Internet voting system

The main challenge of Internet voting is to apply and respect the core democratic voting principles, while taking into account its digitalization and the fact that it is carried out remotely. International standards are a valuable source of reference for translating these principles into requirements to facilitate choosing an Internet voting system.

In light of these standards and international experiences with Internet voting, we can identify certain characteristics of a platform that promotes accessibility, the free exercise and secrecy of the vote, transparency and integrity of the process and results.

The remote voting system selected should use the most advanced technologies and demonstrate its ability to operate under the expected electoral conditions, regardless of the extent of online voting deployment and the elected level involved. The Québec electorate's confidence in Internet voting and the social acceptability of this option are at stake. The introduction of Internet voting into Québec electoral process should comply with a financial framework, but should not be subject to any democratic, operational, technical or security compromises.

The introduction of an Internet voting option is not merely a technological issue, but also raises many democratic and social considerations. It would be appropriate for Élections Québec to draw on the diversity of its expertise. It should accompany the selection and deployment of a digital voting platform with actions for communication, consultation, co-operation, training, evaluation and testing with electors, political parties and election officers.

6.4.1 Choosing a voting platform

Internet voting experiences in Canada, Estonia, France, Norway, Switzerland and New South Wales reflect the magnitude of the challenges involved in implementing the core democratic voting principles in a digital environment.

The secrecy of the vote and the integrity of the electoral process require the development of a risk governance policy, the consideration of evolving requirements to ensure digital security, the use of proven leading-edge technologies and the deployment of effective means of protection. The measures adopted must, in particular, ensure the uninterrupted encryption of digital votes and ensure both data confidentiality and personal information protection.

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Within the specialized bodies that develop standards[563] and define requirements[564] for the management of Internet voting, there is an international consensus to use an open-source-code voting platform that is free of known flaws, vulnerabilities and deficiencies and that is verifiable across the board, individually and universally, to ensure the transparency of the electoral process.

In order to make Internet voting accessible, equitable and available for all electors, in light of different international experiences, it is necessary to provide a voting platform that is easy for the voter to use, does not require specific technical skills, has an interface that meets recognized standards for digital accessibility and is adapted to the specific needs of persons with disabilities.

A review of experiences in Canada and around the world shows that there are three approaches to providing a digital Internet voting platform. Each of these approaches has distinct characteristics, and the advantages and disadvantages of each are outlined below.

1. Acquisition of a limited right to use an existing voting platform designed and operated by an external partner

2. Design of a voting platform that meets the specific requirements of an electoral administration

3. Acquisition of an existing voting platform designed by an external partner with a view to its adaptation and operation by an electoral administration

These three approaches highlight certain financial aspects that are instructive, even if the costs stated are indicative, partial and difficult to compare. In some cases, these costs represent only the acquisition of rights (a licence), the original design or the acquisition and adaptation of a voting platform. In other cases, they include all actions related to the Internet voting option.

1. Acquisition of a limited right to use an existing voting platform designed and operated by an external partner

This first approach has the advantage of being turnkey, which facilitates its deployment. It allows for the acquisition of a one-time right of use (a licence) of a voting platform that has already been tested. This right is limited in time and space: in general, its use is restricted to a single election with a defined number of voters. This digital platform (online voting operations, decrypting, counting, digital security) is designed and operated in the private sector in collaboration with the electoral

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563. For example, the Venice Commission adopted internationally agreed-upon standards for electronic voting. This commission comprises 62 member states: the 47 member States of the Council of Europe as well as 15 other countries, including Canada and the United States. See Council of Europe (2017), *Recommendation CM/Rec(2017)5[1], Committee of Ministers to member States on standards for e-voting*, [Online]. https://search.coe.int/cm/Pages/result_details.aspx?ObjectId=0900001680726f6a]; *Explanatory memorandum* [https://search.coe.int/cm/Pages/result_details.aspx?ObjectId=090000168071bc81]; *Guidelines* [https://search.coe.int/cm/Pages/result_details.aspx?ObjectId=0900001680726c0a].

564. For example, *Ordinance of the Swiss Federal Chancellery on Electronic Voting of 13 December 2013 (status as of 1 July 2018)*, [Online]. [https://www.admin.ch/opc/fr/classified-compilation/20132343/201807010000/161.116.pdf].

administration. This approach is well suited to a territory with a limited electorate. The budget associated with organizing an election with an Internet voting option is easier to control, since the cost for this usage right depends on the size of the electorate. This approach leaves it up to the external partner to make changes to the platform to take into account new technological requirements, particularly with regard to digital security.

This approach has certain disadvantages. The cost of acquisition of a right of use is recurrent from one election to the next and increases based on the growth in size of the electorate able to use it. This option can therefore become expensive over time. The characteristics of this type of platform, whose functionalities are limited, raise questions as to the respect and implementation of core democratic voting principles: transparency (the source code is normally closed due to industrial secrecy) and the integrity of operations (verifiability is limited or not provided for). Moreover, the electoral administration is not in a position to fully assume its mandate to organize, secure and control the integrity of the electoral process.

As an indication, we present, subject to limitations, a few examples of the costs of acquiring a right to use and operate a voting platform for a single election. These costs do not include various actions related to communications, consultation, co-operation, training, evaluation and testing with electors, political parties and election officers.

- In the 2018 municipal and school elections in Markham, Ontario, the acquisition of a right of use cost $372,645.[565]

- In the 2016 municipal and school elections in Halifax, Nova Scotia, the acquisition of a right of use cost $495,402.[566]

- The canton of Basel-Stadt (Switzerland) has signed an agreement with the postal service for the use and operation of its voting platform for elections and popular consultations over a ten-year period from 2017 to 2027. This agreement cost the canton 5 million Swiss francs (7.3 million Canadian dollars).[567]

- In a report on voting technologies, Elections Ontario estimated in 2013 that the cost of acquisition of a right of use of a digital platform for an election involving 100,000 potential electors would be $837,000.[568]

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565. Markham, *2018 Municipal Election - Award of Proposal # 179-R-17 for Optical Scan Vote Tabulation (Part 1) and Online Voting System (Part 2)*, [Online], February 2018 [meeting minutes]. [https://pub-markham.escribemeetings.com/filestream.ashx?documentid=5134].

566. Halifax Regional Council, *Award - RFP # P15-327, Integrated Internet and Telephone Voting*, [Online], November 2015. [http://legacycontent.halifax.ca/council/agendasc/documents/151110ca1112.pdf].

567. The sum of 7.3 million Canadian dollars is equivalent to 5 million Swiss francs. This cost is mentioned in Tiago Pires, "Basel-Stadt chooses Swiss Post's electronic voting system," *ICT Journal*, [Online], 6 February 2017. [https://www.ictjournal.ch/news/2017-02-06/bale-ville-choisit-le-systeme-de-vote-electronique-de-la-poste].

568. Estimated costs to acquire limited rights to a private provider's solution. See Elections Ontario, *Alternative voting technologies report. Appendix 5: Network Voting Business Case*, [Online], 2013. [https://www.elections.on.ca/content/dam/NGW/sitecontent/2014_fr/rapports/2012%20Rapport%20sur%20les%20technologies%20permettant%20de%20voter%20d%27autres%20fa%C3%A7ons%20-%20Annexe.pdf].

2. Design of a voting platform that meets the specific requirements of an electoral administration

The purpose of this second approach would be to design, from A to Z, a new and original voting platform to meet the expectations and requirements of an electoral administration. The voting platform would be designed by the electoral administration, with the collaboration of specialists, or by a private company responsible for the design of all its functionalities. The operation and security of this voting platform would be entirely the responsibility of the electoral administration, which could call on the occasional expertise of specialists. This type of platform often has features that allow for its use in multiple elections at various levels. The electoral administration can add functionalities in a modular way, in order to extend its use to another elected level, for example. Its mode of operation can respect and implement core democratic voting principles, in particular the principle of transparency, through publication of the source code and individual and universal verifiability.

On the other hand, this approach is expensive and risky, due to the functioning of the voting platform (which is untested), the risks of vulnerability and the implementation schedule that is difficult to control. The combination of democratic, social, security and technical requirements can lead to a variety of malfunctions that are difficult to solve in a quick and cost-effective manner. Due to the accelerated evolution of digital devices, digital security issues and the rapid obsolescence of all electronic equipment, the electoral administration must plan for annual recurring costs for the maintenance, upgrade and evolution of the platform to meet the requirements and core democratic voting principles in addition to the challenge of having specialized and fully trained resources available.

For information purposes, we present, subject to limitations, two examples of an original design of a voting platform that can be used in several elections or popular consultations at different elected levels, depending on the specific requirements of the electoral administration. The costs of these platforms are limited to technical aspects and do not include various actions related to communications, consultation, co-operation, training, evaluation and testing with electors, political parties and election officers.

- From 2003 to 2018, the canton of Geneva (Switzerland) designed its own digital voting platform for elections and referendums, at a cost of more than 14 million Swiss francs (20.5 million Canadian dollars).[569]

- From 2008 to 2012, Norway outsourced the design of its digital voting platform to an external partner at a cost of 143.3 million Norwegian kroner (19.7 million Canadian dollars).[570]

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569. This cost only relates to the technical development of two generations of the Internet voting platform. See Chapter 3 for explanations and references relating to these costs.

570. A Norwegian government representative estimates the total cost of the Internet voting experiment in Norway to be 30 million U.S. dollars (303.1 million Norwegian kroner or 42.1 million Canadian dollars). Subject to limitations, as an indication, we can deduct from this amount, presented in a document at a United Nations Development Programme training session, the development cost of the voting platform, updating it to take account of technological developments and overall annual maintenance at 14 million U.S. dollars (143.3 million Norwegian kroner, i.e., 19.7 million Canadian dollars) from 2008 to 2012. See Henrik Nore, *Norwegian Experiences with Internet Voting*, Mombasa, [Online], 3 August 2012. [https://www.ec-undp-electoralassistance.org/wp-content/uploads/2018/08/ec-undp-jtf-31-our-trainings-2012-monbasa-day-4-case-study-3-norway.pdf].

3. Acquisition of an existing voting platform designed by an external partner with a view to its adaptation and operation by an electoral administration

This third approach aims to acquire a relatively well-proven digital platform that can be adapted to meet the expectations and requirements of an electoral administration as detailed in a set of requirement specifications. As a general rule, the computer engineering work required for the adaptation is carried out externally, mainly by the private company that designed the acquired voting platform and, if necessary, by specialists for specific elements. The operation and security of this voting platform would be entirely the responsibility of the electoral administration, which could call on the occasional expertise of specialists. The voting platform may have features that allow for its use in multiple elections and at various elected levels. The electoral administration can add functionalities in a modular way in order to extend its use. Its mode of operation can respect and implement core democratic voting principles, in particular the principle of transparency, through publication of the source code and individual and universal verifiability. The budget is generally predictable, since the voting platform and its adaptation work were the subject of a call for tenders.

Since adapting this platform requires specialized computer engineering work, technical difficulties may arise and the costs to resolve them may be unforeseeable and high. Because of the accelerated evolution of digital devices, digital security issues and the rapid obsolescence of electronic equipment, the electoral administration must plan for annual recurring costs for the maintenance, upgrade and evolution of the voting platform to meet the requirements and core democratic voting principles, not to mention the challenge of having specialized and constantly trained resources available.

As an indication, we present, subject to limitations, a few examples of costs related to the acquisition of an existing voting platform designed by an external partner for adaptation and operation by the electoral administration. Such a platform can be used in several elections or popular consultations at different elected levels, depending on the specific requirements of the electoral administration. These costs include some actions related to communications, consultation, co-operation, training, evaluation and testing with electors, political parties and election officers.

- In 2015, New South Wales (Australia) acquired, adapted and operated a digital platform at a cost of 6.8 million Australian dollars (6.3 million Canadian dollars).[571]

- In 2019, New South Wales (Australia) adapted, upgraded and operated a digital platform at a cost of 8 million Australian dollars (7.6 million Canadian dollars).[572]

- In preparation for the 2017 legislative elections, France entered into a four-year agreement (2016-2020) to acquire, adapt, integrate, test and operate a digital platform to enable French citizens abroad to vote over the Internet at a cost of 6.72 million euros (10.44 million Canadian dollars).[573]

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571. See Chapter 3 for explanations and references relating to these costs.

572. See Chapter 3 for explanations and references relating to these costs.

573. See Chapter 3 for explanations and references relating to these costs.

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These experiments give a general idea of the financial resources to budget for the introduction of an Internet voting option, depending on the chosen approach.

When choosing an Internet voting platform, Élections Québec would proceed by way of a call for tenders based on a requirement specifications document detailing its technical requirements for respecting and implementing core democratic voting principles. The third approach, that of acquiring an existing voting platform designed by an external partner for adaptation and operation, seems more conducive to meeting its needs.

In order to maintain the electorate's confidence and promote the social acceptability of Internet voting, Élections Québec could thus maintain full control over the way the digital platform operates, the verification of its integrity and its use in the interest of transparency.

In Québec, the estimated cost of introducing Internet voting would be documented in a next step. The choice selected for the acquisition of a digital voting platform would have significant impacts on the supervision, planning, budgeting, implementation, security and evaluation of the project.

This cost would not be limited to the acquisition and adaptation of a digital voting platform. Élections Québec would take into account the costs provided for the electoral process for the various actions related to communications, consultation, training, co-operation, evaluation and testing. It would also take into consideration the annual recurring costs for the maintenance, update and technological evolution of the voting platform. In addition, Élections Québec would set aside a budget to conduct regular independent vulnerability tests and external security audits to maintain the confidence of voters, political parties and election officers.

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 and 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.

Conclusion and Recommendations

The introduction of Internet voting in Québec could improve access to voting. In particular, this option could make voting easier for electors outside Québec or their municipality at the time of the election, for those living in remote regions and for electors with disabilities. It could also enable certain voters with visual limitations or who have difficulty moving about to be autonomous in exercising their right, and better protect the secrecy of their vote. This voting option would also provide more flexibility to all voters as to where and when they vote, and the method used.

However, Internet voting raises some issues with respect to other core democratic voting principles. First, the fact that voting would take place remotely poses a risk to the freedom and secrecy of the vote. It also makes it more difficult to verify the identity of voters. In addition, the digitalization and centralization of votes represent challenges to the integrity of the electoral process and results. Internet voting also leads to a loss of transparency: other voting options can be observed and understood more easily. However, proven solutions exist in terms of technology and electoral organization, which can help alleviate these difficulties. Nevertheless, some risks remain and must be understood and accepted by politicians and the electorate so that the introduction of Internet voting can be considered and implemented.

The consultations conducted as part of this study reveal that opinions on the issue of Internet voting are divided among Quebecers. A narrow majority of Quebecers would be in favour of introducing this voting option. However, Internet voting could lead to a decline in confidence in the election results. In this context, providing information to voters and the transparency of the electoral administration would be essential components of the introduction of Internet voting. Adopting an approach that minimizes risks to the integrity of the electoral process and maximizes gains in accessibility could also help to ensure acceptance by the greatest number of voters.

A measured, coordinated, concerted and gradual approach

If there were the political will to offer Internet voting in Québec, introduction of this voting option should be done gradually, in a measured, concerted and coordinated approach, at all elected levels.

A measured approach

Regardless of the type of election, or the number of voters involved, the online voting platform should comply with the highest requirements in terms of accessibility, security and reliability in order to respect the core democratic voting principles in the best possible way. The introduction of Internet voting into Québec electoral process should comply with a financial framework, but should not be subject to any democratic, operational, technical or security compromises. The project would inevitably require significant investments in human, technical and financial resources. Furthermore, sufficient time should be given to the project: regardless of the circumstances, implementation of Internet voting should not be rushed.

A coordinated approach

To comply with these various requirements, coordinating the process of introducing Internet voting in provincial, municipal and school elections would be required. The Chief Electoral Officer of Québec should be responsible for this process as he or she has the required electoral expertise. Municipalities and school service centres often have more limited means, as the organization of elections is not part of their main mandate. Similarly, it would be desirable to concentrate efforts and investments on the development of a single Internet voting system, which could be adapted for all elected levels. To do so, Élections Québec could acquire an existing platform designed by an external partner. Thus, this platform would already be proven, but could be adapted to the requirements to be established for Québec.

A concerted approach based on expertise and transparency

As it would be responsible for the process of introducing Internet voting, Élections Québec should surround itself with a network of partners in order to have access to specialized expertise. The academic research community (in computer engineering, information security, law, political science, etc.) should participate in the introduction of this voting option. In parallel with such collaborations, Élections Québec should develop its own expertise in the field. It should also draw on Canadian and international experiences and share Québec experiments. It could work with Canadian electoral administrations, electoral administrations in other countries where Internet voting is used as well as with international bodies dealing with electoral, and more broadly, democracy issues. In addition, Élections Québec should ensure the participation of the various stakeholders in the electoral process (political parties, candidates, electors, returning officers, etc.) at each step of the procedures to introduce Internet voting. It should plan for consultation and accountability mechanisms to ensure that the process is inclusive and transparent.

A gradual approach

Introduction of Internet voting should be gradual, starting with pilot projects. It would be advantageous to hold the first trials during a provincial election because of the greater centralization of responsibilities at that level, the means available to Élections Québec and the control it could exercise. Pilot projects could also take place during municipal or school elections. Regardless of the elections concerned, the first trials should target a limited number of voters. Based on the objectives defined for the introduction of Internet voting, pilot projects could be restricted to electors who encounter particular obstacles in exercising their voting right or be open to a proportion of the general electorate. Furthermore, the introduction of Internet voting should not lead to a reduction in services at the polling place or the disappearance of other voting options.

Proposed approach

The introduction of Internet voting could occur in three main steps: defining the trial phase, conducting the trials and formal adoption. Each of these steps should conclude with the publication of a report to collect the opinion of the various stakeholders. These consultations would be essential to continue the work from one step to another, given the nature of the changes required by Internet voting and the need to maintain trust in the electoral process. Élections Québec should also plan communication activities, at various times, to inform electors and other stakeholders of the progress of the work and the results obtained.

1 Definition of the trial phase

If the Assemblée nationale were to give a new mandate to the Chief Electoral Officer under section 485 of the *Election Act*, Élections Québec could begin work to define the main parameters and objectives of the Internet voting trial phase. In particular, this step would clarify the form that potential pilot projects would take, the legal, operational, technical, security and accessibility requirements to be met, the preliminary budget and the completion schedule.

Independent specialists could support Élections Québec, allowing it to have access to the leading-edge expertise required to carry out this work. At the end of this step, Élections Québec would publish a report including:

- The objectives of the pilot projects;
- The elections selected as well as the voters concerned;
- The risk assessment of the pilot projects;
- The standards and technical specifications, as well as the electoral procedures that would oversee the trials;

Conclusion and Recommendations

- A set of requirement specifications for the selection of an Internet voting platform, which would include the definition of the technological solutions needed for: digital identification and authentication, voting, recording of voters who have voted, archiving of votes, compilation and verification;

- The definition of the roles and responsibilities of each of the stakeholders (for example, Élections Québec, the municipality or English-language school service centre, service providers, etc.) and definition of the mandate of the independent Internet voting oversight committee, where applicable;

- The definition of certain elements that should be part of the Internet voting legal framework and which should be included in an agreement authorizing its testing;

- The indicators to measure the success of the pilot projects as well as monitoring and evaluation mechanisms;

- A preliminary budget;

- A completion schedule.

2   Carrying out the tests

If the proposal made in the previous step were supported by stakeholders, the second step would consist of developing an agreement under the provisions of electoral laws to authorize testing of this new voting option.[574] Depending on the elections selected, the Chief Electoral Officer would sign this agreement with the leaders of the political parties represented in the Assemblée nationale, or with the municipalities concerned and the Ministère des Affaires municipales et de l'Habitation; or with the English-language school service centres concerned.

This step would once again be the responsibility of Élections Québec. However, an external evaluation committee should monitor the progress of the work and report to the Chief Electoral Officer, in particular on the reliability and security of the platform.

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574. "The Chief Electoral Officer may recommend to the leaders of the authorized parties represented in the National Assembly the use of alternative voting procedures, [...] in a by-election or a general election, in the latter case, for all or only some of the electoral divisions." (*Election Act*, s. 489.) "Any municipality may, in accordance with an agreement with the Minister of Municipal Affairs, Regions and Land Occupancy and the Chief Electoral Officer, test new methods of voting during a poll." (*Act respecting elections and referendums in municipalities*, s. 659.2.) "An English-language school service centre may, in accordance with an agreement made with the chief electoral officer, test new methods of voting during a poll..." (*An Act respecting school elections to elect certain members of the boards of directors of English-language school service centres*, s. 282.2.)

Selection of an Internet voting platform

Élections Québec should first select an Internet voting platform based on the requirement specifications established in the previous step. This platform should meet all technical, security and accessibility requirements. It could be adapted to better meet the requirements of Québec's electoral process, particularly in terms of legal, operational and technical aspects.

Testing of the Internet voting platform

Élections Québec would then publish the source code of the voting platform and conduct various tests to verify its security, robustness, ergonomics and user-friendliness. The following tests could be performed:

- Public review of source code for vulnerabilities and flaws to be fixed before use;
- Penetration, vulnerability and digital security testing;
- User tests with focus groups;
- Full-scale testing with the targeted electorate for the pilot projects;
- External audit and certification.

Following each of these tests, corrections and improvements would be made to the Internet voting platform.

Implementation of pilot projects

Pilot projects would allow for the implementation of Internet voting in a regular electoral context and gather feedback from various stakeholders. Political parties and candidates could observe Internet voting proceedings during these trials. Among other things, the pilot projects would have the following objectives:

- Verify that the voting platform is working as intended;
- Evaluate the experience of eligible electors: measure their use of Internet voting, describe the gains in terms of accessibility, identify any difficulties they encounter and verify their overall satisfaction;
- Assess the risks in the context of the election and the effectiveness of the planned mitigation measures;
- Estimate the technical capacity needed for larger-scale deployment;
- Allow the various stakeholders to become familiar with the voting option, understand how it works and monitor its progress;
- Collect feedback from stakeholders in the electoral process: political actors, returning officers, associations representing the groups of voters targeted by the voting option, etc.;
- Evaluate established standards and technical specifications and improve them as required.

Conclusion and Recommendations

Each pilot project would be the subject of a report setting out the results obtained in relation to the objectives mentioned. This report would be made public and the report of the external evaluation committee would be included with it.

Once Internet voting trials are completed, Élections Québec could conduct consultations to re-evaluate the social acceptability of this voting option with a view to formalizing its use.

3 Adoption of Internet voting

If, at the end of the various tests and pilot projects planned, both electors and elected officials felt that Internet voting should become an official voting option in Québec, a bill to amend one or more electoral laws would have to be drafted and then enacted by the Assemblée nationale. At this stage, the Chief Electoral Officer would play an advisory role to elected officials.

The detailed provisions allowing for the conduct of an online election could be included in the bill or could be specified by regulation. In particular, the Internet voting framework should describe:

- The voters eligible for this voting option;

- The corresponding electoral procedures (partly defined in Chapter 6);

- The standards and technical specifications, which should be capable of being regularly updated to take into account the quick evolution of technologies and to allow for necessary improvements to the voting platform;

- The roles and responsibilities of the various stakeholders;

- The creation of an independent Internet voting oversight committee, its composition and mandates, where applicable;

- The control and corrective measures for each step of the voting process;

- The provisions applicable in the event of a challenge to the results of the election;

- The criminal offences related to Internet voting;

- The evaluation and accountability mechanisms for this voting option.

Even after Internet voting is officially adopted in Québec, this voting option should continue to be subject to specific evaluation and accountability. The requirements specific to this voting option require regular monitoring, to ensure that the voting system evolves in line with the development of technologies and the emergence of new threats.

Technological improvements critical to the introduction of Internet voting

At the conclusion of this study, two technological developments emerged as important foundations that could greatly facilitate the introduction of Internet voting. These computer applications could contribute both to the integrity of the voting process and to its flexibility.

A *government authentication system to verify the identity of voters*

It would be particularly important to be able to count on a secure digital authentication system to remotely verify the identity of voters. While other identity authentication mechanisms could be considered for Internet voting, this is the most reliable option. Some people even make it an essential condition for the introduction of this voting option. The Government of Québec wants to implement a digital identity mechanism in the coming years.[575] This authentication platform would provide access to various government services. It could be used to verify the identity of electors registered for Internet voting.

A *system for recording in real time the votes as they are cast*

Second, a system to digitally track in real time the electors who have voted would provide more flexibility for those who would be registered for Internet voting. The proposals made in this study take into account the limitations imposed by the manual tracking of votes currently used in municipal and school elections and, in provincial elections, for advance polls and polling day. A digital tracking system is already in use for votes cast in the office of returning officers and educational establishments. Its broader deployment (in advance polling stations, for example) would make it possible to extend the period of online voting and ensure that electors registered for this voting option can maintain their access to the advance poll. This would make it much easier to reconcile flexibility for the electorate with the integrity of the electoral process.

In other words, the introduction of Internet voting is more than a technical issue: it raises many democratic and societal considerations. Therefore, the addition of this voting option in Québec, whether in provincial, municipal or school elections, should not be done hastily, at the expense of the requirements and steps essential to the security and integrity of the voting process. Any introduction should be designed to respect the principles underlying a democratic vote. Implementing such an approach requires significant time and resources. For this reason, we believe it is necessary to obtain a new mandate from the Assemblée nationale before proceeding.

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575. In order to implement a digital identity, the Secrétariat du Conseil du trésor launched a notice for expression of interest or request for information in the fall of 2019. See Mylène Crète, "Québec entend blinder ses registres d'identité numérique," *Le Devoir*, [Online], December 12, 2019. [https://www.ledevoir.com/politique/québec/568908/la-technologie-des-bitcoins-pour-proteger-l-identite-numerique-des-québecois]; and SEAO, *Identité numérique*, November 4, 2019, [Online]. [https://seao.ca/OpportunityPublication/ConsulterAvis/Categorie?ItemId=b4e43b5a-2885-4ffe-8c31-78a24b4d5af9&SubCategoryCode=G8&callingPage=4&searchId=79a2782c-5bfd-4527-99bb-7889f225e709].

Recommendations

Compilation of the recommendations regarding the introduction of Internet voting in Québec, its operationalization, its supervision and the choice 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 persons with disabilities during the development of a process to introduce Internet voting for them.

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 the various steps of 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 legal 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 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 the various stakeholders in the electoral process 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 and 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.

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