1-1-2015

Transitioning The Canadian Democratic System Into The Era of Digital Governance: A Longitudinal Study of First Time Online Voting and Voter Turnout in Ontario Municipalities

Chris Bantock
Western University

Transitioning The Canadian Democratic System Into The Era of Digital Governance: A Longitudinal Study of First Time Online Voting and Voter Turnout in Ontario Municipalities

Masters of Public Administration Research Paper
Western University
2014-2015

Chris Bantock
Full Time Student

Table of Contents

Introduction

The following research paper aims to examine the relationship between online voting and voter turnout rates in Ontario municipalities. The study commences with a theoretical review that recognizes the technological shift leading up to the increased use of online voting in the Province of Ontario. This first section also discusses important voting theories as to why people choose to vote or not, in addition to some of the frequently used variables that are often utilized to study voter turnout. Following this, a methodological approach outlines the structure of the research design, along with specific variables and measurements that will be implemented so as to effectively test the hypothesis. Continuing with these variables and tests, measurements will be undertaken so that operational and quantitative analysis is possible moving forward through the study. In doing so, this will allow for us to properly analyze the data that comes as a result of our tests upon the variables themselves, as well as the relationship between online voting and voter turnout. This study will then conclude by looking at some of the theoretical and practical implications that will ultimately impact the overall research that surrounds the field of online voting at the municipal level.

Theoretical Review

Digital-Era Governance

For many years in the public sector, drivers of organizational change in North America have come from the theory of New Public Management (NPM). NPM was first established in the late 1980's after a managerial shift began to take place as a means of creating more efficient and quality public service delivery[1]. When taken down to its core,

[1] Christopher Hood, *Public Management, New.*

NPM is most often cited for having a focus on concepts such as disaggregation, competition, and incentivisation. Dunleavy argues that these three root concepts mentioned above used to be influential but are no longer effective in the modern world[2]. Essentially, NPM no longer has anything to offer for the future of public administration because "NPM solutions ceased to fit well with the macro-trends in business and the wider society towards digital era processes[3]". As a result, many advanced industrial states over the past decade have moved away from NPM and have begun to shift towards what is being called "digital-era governance". This new paradigm focuses on key concepts such as reintegration, needs based holism, and digitalization[4]. This then allows for the assimilation of technological drivers throughout government structures, from the way the organization is developed internally, to how citizens and society as a whole can interact with and receive public services. Jocelyne Bourgon describes a similar shift throughout the public sector in her book, *A New Synthesis of Public Administration: Serving in the 21st Century,* when she states that "Technology is not simply an enabler or a driver of change: it is part and parcel of the way we live in the 21st century. Governments are undergoing an unprecedented transformation from a 'government-to-you' to a 'government-with-you'[5]". As a result of this, an increase in information technology in the public sector can be argued to have a strong influence over the way in which society behaves and the type of policies that are enacted at different levels of government (see figure 1.0 in appendix). The end result of this system then seems to show an increase in

---

[2] Patrick Dunleavy, Helen Margetts, Simon Bastow and Jane Tinkler, *New Public Management is Dead – Long Live Digital-Era Governance.*
[3] Patrick Dunleavy and Helen Margetts, *The Second Wave of Digital Era Governance.*
[4] Ibid.
[5] Jocelyne Bourgon, *A New Synthesis of Public Administration: Serving in the 21st Century* (Kingston/Montreal: McGill-Queen's University Press, 2011), 27.

productivity and efficiency from an internal and external perspective. Overall, it is this type of cultural change that has become labeled by many academics as e-governance and has initiated the development and use of e-democratic practices as the modern day public sector begins to open up.

E-Democracy

The way people have come to utilize technology since the 1990's have resulted in the world as a whole becoming more technologically driven[6]. In adopting such technological approaches in the public sector, e-government has resulted in a transition into the realization of e-democracy at the municipal level in Canada. What most have come to know as democracy in Canada can be defined as "a government in which the supreme power is vested in the people and exercised by them directly or indirectly through a system of representation[7]". E-democracy maintains this same definition while introducing a way to "positively redefine democratic processes and reinvigorate the relationship between citizens and their elected representatives[8]". One tool that is becoming more popular at the municipal level that promotes this redefined democratic process is known as e-voting or online voting. Simply put, this procedure involves a method of voting that allows eligible voters to securely cast their ballot over the Internet from anywhere in the world. As a result, it is firmly believed that such practices will become commonplace in the emerging era of digital governance and play a critical role in the success of e-democracy systems. Going forward, it will be the purpose of this

---

[6] Charmaine Fraser, *E-Government: The Canadian Experience.*
[7] Stephen Coleman and Donald F. Norris, *A new agenda for e-democracy.*
[8] Ibid.

research paper to solely study the use of online voting and the effects it has on voter turnout in a democratic system at the local government level.

Online Voting

Historically, the dominant way of voting in municipal elections has been through the method of paper ballots. Some municipalities have recently incorporated the use of scanning technologies to read paper ballots at the polling stations as a means of increasing efficiency[9]. However, the real technological shift at the local government level in recent elections has been through the implementation of online voting. When considering the practice of online voting there are generally three different levels recognized as a degree of online voting. The first is known as polling place Internet voting. This level maintains the use of polling stations and has eligible voters cast their vote using technological devices as opposed to on a paper ballot. As a result, this level still offers a high degree of control and security like traditional methods but with very little accessibility for voters[10]. The second level is remote kiosk Internet voting. This option eliminates polling stations and instead places voting kiosks in accessible community buildings such as malls or libraries. This second level maintains a high degree of security but only has a moderate degree of control and a slight increase in voter accessibility from the previous level[11]. The final type is remote Internet voting. Through this type there are arguably lower levels of control and security, however, it offers the highest amount of accessibility for voters because there is no travel involved in the voting

[9] Bradford West Gwillimbury, *Procedures for the Use of Vote Tabulators.*
[10] Elections Canada, *Comparative Assessment of Electronic Voting.*
[11] Ibid.

process[12]. For the purposes of this research paper, when online voting is mentioned it will be in reference to this third level of remote Internet voting.

The Ontario Context

When considering the use of online voting in Canadian municipalities, the Province of Ontario has had the most activity and experience in the field since 2003. Thus, it is crucial for Ontario to be at the center of any online voting investigations within Canada. Beginning in 2003, twelve municipalities in Ontario chose to implement online voting after the option was offered for Ontario municipalities to do so[13]. Of those twelve municipalities, Markham was the largest in terms of population and eligible voters. Since then, Markham has used online voting in each of their municipal elections and has remained the largest municipality in Ontario to use online voting to date[14]. In studying the results out of Markham, Nicole Goodman, the project director for the Internet Voting Project, has stated, "Although the success of any model is context dependent, this case shows that Internet voting can work in a diverse community and can have positive effects for election stakeholders[15]". She goes on to propose that based on recent public feedback surveys and turnout rates, the Markham case "also produces evidence that suggests the extension of Internet voting has the potential to positively affect voting turnout, particularly by encouraging previous nonvoters to participate[16]". Ultimately, while one should not be too quick to define recent Internet voting programs in Ontario

[12] Elections Canada, *Comparative Assessment of Electronic Voting.*
[13] Nicole Goodman, *The experiences of Canadian municipalities with Internet voting.*
[14] Ibid.
[15] Ibid.
[16] Ibid.

municipalities as a success, the results are continuing to be increasingly positive throughout participating jurisdictions.

In Ontario as a whole, the number of municipalities that choose to offer online voting as a voting alternative to their residents has increased each election year. Specifically, the 2010 municipal elections saw forty-four municipalities make the switch to online voting[17]. This number more than doubled in Ontario's most recent municipal elections when ninety-seven different municipalities chose to incorporate the method of online voting as an alternative for their residents[18]. Furthermore, while some municipalities have chosen to offer online voting as an additional option to eligible voters, it has also been offered as the only option in municipalities such as Leamington[19] and Ajax[20].

Even though a majority of the ninety-seven cases of online voting in Ontario incorporated it as an option rather than the only method, fairly significant increases in voter turnout rates have still been experienced. Almost all municipalities are facing the democratic issue of low voter turnout rates during election time. As a result, it has become rare to see over fifty percent or more of the eligible voting population cast a ballot in their municipal election. However, of the Ontario municipalities that incorporated online voting for the first time in 2014, whether as an option or the only method, voter turnout rates increased as high as 19.28% along with a total average percentage change of 9.76%. These turnout rates are perhaps a clear indication of why 2014 municipal elections in Ontario saw an additional fifty-four municipalities introduce

---

[17] Unknown Author, *Online voting only for Leamington, Ont., municipal election.*
[18] Nicole Goodman, *Will e-voting boost turnout in Ontario's municipal elections?*.
[19] Unknown Author, *Online voting only for Leamington, Ont., municipal election.*
[20] Noor Javed, *Ajax ditches paper ballots for online municipal election.*

online voting. So far, the use of online voting in municipal elections presents the greatest potential for increased accessibility due to the capacity to remotely vote from anywhere with an internet connection. Based off of this growth, it would be reasonable to assume that both the use of online voting and voter turnout rates will increase once again in the next municipal election period in Ontario.

Accessibility and Security

The most commonly recognized reason for the increase in voter turnout rates from online voting at the municipal level is due to an increase in accessibility. This involves being able to remotely vote in your municipal election from the computer in your house or anywhere else in the world with a device that has connection to the Internet. Essentially, this means that not only will it solve issues such as voting being an inconvenience or residents being too busy to vote, but it will also meet the accessibility needs of those who have a disability, are on vacation, away for school, or perhaps overseas. However, this also creates a significant dependence on technology for eligible voters. Over the past decade there has been a major shift towards the digitization of society and government and in order for online voting to be successful it must be ensured that all eligible voters have Internet access. As of 2009, eighty-one percent of people living in the Province of Ontario have access to the Internet from some kind of location[21]. While this is a significant number, it must be ensured that everyone has some kind of Internet access on Election Day in order to truly say that all eligible voters have the opportunity to cast their vote. As a result, computer stations have sometimes been set up in municipalities so that this remaining percentage of the population can have equal

[21] Statistics Canada, *Internet use by individuals, by location of access, by province (Ontario).*

access to vote online or can have assistance in using the new technology. In some cases, devices with an Internet connection have been brought to the homes of those who did not have Internet and could not access the computer stations provided[22]. By doing so, any negative impacts that a "digital divide" might have will be effectively managed through a continued equal opportunity to vote, along with the increase in accessibility.

When considering whether or not to incorporate an online voting system, the first concern is often the safety and security of votes being sent over the Internet[23]. Ultimately, the use of online voting in municipal elections presents the greatest potential for increased accessibility but also results in an increased risk of security breaches. Some municipalities also feel this sense of a decrease in security since online voting presents lower degrees of monitoring and controlling of the voting process. This may lead some people to believe that a switch to online voting from current traditions would undermine the integrity of the Canadian voting system. However, partnerships with online voting companies that specialize in providing online voting services have helped to reassure many to go forward with online voting in their municipality with security systems that are just as safe and secure as those used in online banking.

Within online Ontario municipal elections there have been five different service providers that have been hired to carry out the online voting process: Simply Voting, Intellivote, Scytl, Dominion Voting Systems, and Everyone Counts. Of the 97 municipalities that used online voting in 2014, four used Simply Voting, forty-eight used Intellivote, twenty-one used Scytl, twenty-three used the services of Dominion Voting Systems, and one municipality used Everyone Counts (see figure 1.1). Interestingly

---

[22] Helen Henderson, *Accessible elections need online voting.*
[23] Elections Canada, *Comparative Assessment of Electronic Voting.*

enough, and perhaps due to the successful integration of the above security systems, the issue of security seems to be decreasing in municipalities that have utilized online voting. Security issues have also been refuted in a recent voter survey conducted by Nicole Goodman. This survey was conducted in forty-seven participating municipalities using online voting and reported that 66% of respondents thought telephone voting was less safe than Internet voting and 54% thought mail-in voting was less safe than Internet voting[24]. In addition to this, survey respondents in these participating municipalities also reported a 95% satisfaction rate with the online voting process[25]. Overall, security fears that surround voting online seem to be an illusion that emanates from municipalities that have yet to experience online voting themselves. This then raises the question of what effect the introduction of online voting in an Ontario municipal election truly has on voter turnout rates. However, it is important here to first address some of the leading theories behind the reasons that citizens decide to vote or not to vote in an election.

Rational Choice Theory

Many experts in the field of electoral studies believe that the decision to vote is a rational one. This is more accurately referred to as the rational choice theory. This model then follows that "a citizen makes up her mind to vote or not through a simple calculus[26]". More specifically, this choice is made on the balance of benefits and costs for an individual to vote; if the benefit to vote is greater than the cost then an individual will decide to vote. Conversely, if the costs are perceived to be greater than the benefits then an individual will decide not to vote. It is important though to distinguish that the

---

[24] Nicole Wellsbury, *2014 Municipal Election in Ajax.*
[25] Ibid.
[26] Andre Blais, *To Vote or Not to Vote* (Pittsburgh, PA: University of Pittsburgh Press, 2000), 1.

determined benefit is not the potential outcome but rather, what is expected as a result of the action[27]. In his book, *To Vote or Not to Vote,* Andre Blais uses the example of a plurality election to establish rational choice in which eligible voters have a choice between two candidates. As a result of this situation, Blais believes that a rational individual would then determine how likely it is that their vote would sway the election one-way or the other[28]. Overall, it then comes down to how decisive an individual's vote will be for their preferred candidate. Looking at this calculation a little closer, the rational choice to vote would then equal the benefit gained from having your preferred candidate win instead of lose, multiplied by the probability of casting the decisive vote[29]. From this, Blais arrives at the conclusion that a rational voter in a large election would decide not to vote because even though the costs may be small, the benefit is generally even smaller[30]. However, because many citizens continue to vote during election periods, regardless of the marginally perceived benefits through the original rational choice model above, there have been seven amendments made to the theory to help address this "paradox of voting[31]": (1) to maintain democracy; (2) out of a sense of duty; (3) because they are risk-averse and wish to avoid the regret of having not voted and seeing their preferred candidate lose by one vote; (4) because they reason that other citizens will not vote and that their own vote could become decisive; (5) because group leaders and politicians make it easy for them to vote; (6) because the cost of voting is practically nil; and (7) because they find it rational not to calculate benefits and costs when both are very

---

[27] Andre Blais, *To Vote or Not to Vote* (Pittsburgh, PA: University of Pittsburgh Press, 2000).
[28] Ibid.
[29] Ibid.
[30] Ibid.
[31] Ibid.

small[32]. Overall, while many different factors can play into the level of turnout in an election, it seems impossible to use the rational choice theory to accurately predict the exact amount of turnout for a given election. Rather, the purpose of the rational choice theory should be to predict an increase or decrease in turnout based on an increase in probability of decisiveness or voting benefits, or a decrease in the cost to vote[33]. As a result, it could be argued that one of the contributing factors for an increase or decrease in voter turnout rates is if the rational reason to vote or not to vote influences a large number of eligible voters.

Opportunity Cost

When using the rational choice theory to decide whether or not to vote, it is perhaps appropriate to represent the expected costs as an individual's opportunity cost. By definition, opportunity cost is the cost of any activity measured in terms of the value of the next best alternative forgone[34]. Alternatively, opportunity cost can also be thought of as the loss of a benefit by making one choice over another. As a result, the greater the lost benefit is, the higher the opportunity cost. However, this cost should not be thought of as the sum of possible alternate actions, it is simply the value of the next best use[35]. Thus, we could say that opportunity cost is equal to the cost of X, relative to Y, in addition to the benefit of X relative to Y. For eligible voters, Andres Blais has stated that their opportunity cost represents "the time it takes to get registered, go to the poll, and

---

[32] Andre Blais, *To Vote or Not to Vote* (Pittsburgh, PA: University of Pittsburgh Press, 2000).
[33] Ibid.
[34] Library of Economics and Liberty, *Opportunity Cost.*
[35] Ibid.

mark the ballot, but also the time required to obtain and digest information about the candidates in order to determine which candidate the individual prefers[36]".

In considering this theory of opportunity cost, other researchers have suggested that an individual's wage rate is the most efficient way of valuing time. This means that your time spent doing one activity over the next best alternative is worth the wage rate you would receive if you were working instead. As a result, we would be able to determine what the most cost effective activity is[37]. However, by using wage rates, the opportunity cost may vary from person to person because not every individual receives the same wages. This variance is seen most often between working time and leisure time because an individual with high marginal utility per dollar might not receive the same value per hour of leisure activities as an individual that has a low marginal utility per dollar[38]. Essentially then, while an individual may have a lower opportunity cost due to a low wage rate, it does not always mean that the same individual will have a low value of time. For example, a student in university may be unemployed and, as a result, not have a wage rate, but the student does not necessarily have either a low opportunity cost or a low value of time because of this.

Having classified the value of time for different individuals based on the presumption that not everyone has the same "observable market wage[39]", we must also briefly discuss the value of travel time savings. Ultimately though, there will always be variation in savings that depend on the individual travelling, the trip itself, and the

---

[36] Andre Blais, *To Vote or Not to Vote* (Pittsburgh, PA: University of Pittsburgh Press, 2000), 2.
[37] Emily Oster, *Time is Money.*
[38] Douglas W Shaw, *Searching for the Opportunity Cost of an Individual's Time.*
[39] Ibid.

method of transportation. In addition to this, there are five recognized variables of travel time in which the value of time savings during travel can be further determined. These variables are trip purpose, personal characteristics, hourly income, mode and distance, and comfort. Combining these variables, travel time can be reduced and higher levels of value travel time savings can be produced. Overall, if these conditions are improved then the value of travel time savings will likely vary while the travel time remains the same[40].

In considering the above, the time to vote during an election can be calculated to measure the opportunity cost of not voting compared to the cost of voting. On a case-by-case basis, each individual in a municipality would ultimately have a higher or lower opportunity cost depending on the value of the work or leisure time being spent to vote, in addition to each individual's method of transportation to the polling station. This then requires us to look at whether or not the trip was during business or personal time, the cost of the mode of transportation, and the distance to the polling station. Following all of this, we would then be able to put a value on the time required to vote, as opposed to choosing not to vote. Working with an example of the above criteria, let's say an individual decides to take an afternoon break from work to drive to the nearest polling station and vote. The value of their time to do so would equal the hourly rate at which they are being paid at work, the cost to operate their vehicle to and from the polling station, and the overall distance required to travel to and from the polling station. After determining the cost to vote, we would then compare it to the time that would have been otherwise spent at work to see whether or not the cost of voting outweighed the activities that might have been performed at work during that time. This would then provide us

[40] U.S Department of Transportation, *The Value of Saving Travel Time.*

with a low opportunity cost if working is the lesser benefit or a high opportunity cost if work would have been a greater benefit. Overall, research suggests that the cost of voting, as measured in the distance to polling stations, has a strong correlation with eligible voters deciding whether or not to vote[41]. Furthermore, results within this relationship show that if costs of travel and distance can be reduced then residents are more likely to participate in the voting process[42].

In providing evidence to suggest that a majority of residents have high opportunity costs in choosing to vote, it should be recognized that by implementing online voting, at least at the municipal level, the opportunity costs of eligible voters would decrease as a result of the time savings. In doing so, any of the travel costs associated with the valuation of time could be eliminated within opportunity cost measurements. Perhaps even more significant, online voting addresses all five variables of the value of travel time savings by eliminating trip purpose and mode and distance, reducing the overall time spent within personal characteristics and hourly income measures, and arguably increasing comfort to its highest potential. Overall, time is a highly valued good by many individuals and only reducing or eliminating the amount of time and distance that is required to vote will lower the opportunity cost of doing so for eligible voters.

Turnout Variables

Finally, having looked at the theory behind why individuals vote, it is important here to address some of the major variables that impact the overall turnout for a given

---

[41] Joshua J. Dyck and James G. Gimpel, *Distance, Turnout, and the Convenience of Voting.*
[42] Ibid.

election. The first is population size. This variable is important in measuring voter turnout in any analysis because the population size or the number of eligible voters within a population is needed to calculate the turnout percentage for any election. When it comes to the relationship between population size and voter turnout, we can return to the discussion of the rational choice theory of voting. Following this theory, the rational voter would be more likely to vote in a smaller municipality as opposed to a larger one because their vote would arguably be more likely to be decisive in electing a preferred candidate. Geys suggests in his article, *Explaining voter turnout: A review of aggregate-level research*, that from observing tests of population size and voter turnout, there is a relationship between the two variables[43]. This relationship holds to the extent that "larger population is associated with lower electoral turn-out[44]". Geys goes on to show that the effect of this relationship is statistically significant and that voter turnout can decrease simply by increasing the population size by one standard deviation[45].

The second variable is closeness of the election, or at the municipal level, the closeness of the mayoral race. When conducting experiments with voter turnout rates, closeness is one of the most frequently measured variables throughout political literature. When analyzing this variable, the measurement often used to determine closeness is the gap between the elected candidate and the candidate with the second most votes[46]. In doing so, it is argued that the smaller the gap between the top two candidates, the more likely that higher voter turnout rates are to be expected. As was seen in the population size variable, Geys has also reported a statistically significant relationship between

---

[43] Benny Geys, *Explaining voter turnout: A review of aggregate-level research.*
[44] Ibid.
[45] Ibid.
[46] Ibid.

closeness and voter turnout. This relationship is supported by a confidence level over 95% and will cause voter turnout to rise by increasing the closeness of the mayoral race by one standard deviation[47]. It is also important here to distinguish between ex ante data and ex post data. Ex post data refers to the collection of data after the event, while ex ante data means the estimation of data prior to the event[48]. This is significant because the election data used to identify closeness will be more accurate after the official election results have been posted, as opposed to attempting to estimate the results before the election has taken place. Both methods for data collection have their merits, however, ex post data is the more commonly used option. Lastly, rational choice theory also plays a role in the significance of this variable because a rational individual would be more likely to vote in a close election. This is due to the likelihood that an individual's vote would be decisive in electing the preferred candidate. More specifically, having a closer race "increases the expected utility of voting and thereby voter turnout[49]".

The third variable that can also be related to the rational choice theory is the election system that is utilized. This is because individuals may be more likely to vote through an at-large system as opposed to in wards since it would arguably make the rational individual feel that their vote has a higher probability of being decisive in electing the preferred candidate. Studies have shown at the municipal level that at-large systems are more likely to foster increased turnout because they are more likely to create higher levels of competition and, as a result, an increase in voter interest[50]. On the other hand, voting by wards may also increase turnout because residents of each ward often

---

[47] Benny Geys, *Explaining voter turnout: A review of aggregate-level research.*
[48] Ibid.
[49] Ibid.
[50] Curtis Wood, *Voter Turnout In City Elections*.

feel like they have a greater share in the results of elected candidates[51]. Additionally, these candidates elected by wards may also have a stronger connection to the community and the interests of that community, unlike a candidate elected at-large. Thus, it becomes important to distinguish between the two systems when analyzing voter turnout rates because if one system has a stronger relationship with turnout than another, then it should be accounted for in the results of the study.

The next variable is population concentration or rural and urban municipalities. Some studies focusing on voter turnout make use of this variable through the theory that "urbanization leads to 'a weakening of interpersonal bonds, primary social structures and consensus on norms'[52]". As a result, it is sometimes argued that voter turnout is likely to be lower in cities that are more densely populated because there is less pressure and a sense of duty to be involved. On the other hand, low-density areas may be more likely to contain these personable elements and as a result, may be more likely to experience higher turnout[53]. While this sounds like an appropriate variable to measure and analyze voter turnout rates in municipalities, the definition of rural and urban areas is not as black and white as the above theory suggests. Since 1971, Statistics Canada has defined an urban area as "having a population of at least 1,000 and a density of 400 or more people per square kilometre[54]". As a result, areas that do not meet these criteria are classified as being rural. This then causes areas thought to be rural, such as the Village of Casselman for example, to be labeled as urban and areas thought to be urban, such as the City of Kingston, to be labeled as rural. In 2011, Statistics Canada attempted to address this issue

---

[51] Curtis Wood, *Voter Turnout In City Elections*.
[52] Benny Geys, *Explaining voter turnout: A review of aggregate-level research.*
[53] Ibid.
[54] Statistics Canada, *From urban areas to population centres.*

by replacing the term urban area with population centre, and then dividing the areas labeled as population centres into categories of small, medium, and large[55]. However, this still leaves a number of areas to be identified as rural that most likely should not be. As a result, distinguishing between rural and urban areas should be considered as an inappropriate tool for studying voter turnout rates.

The final variable is media coverage during an election. The media plays a significant role in the political process at all levels of government from keeping voters informed to creating competition between candidates. In fact, some studies have suggested that the reason for low voter turnout rates at the municipal level is due to a lack of media coverage of the election in that municipality[56]. This leads one to believe that an increase in media coverage should mean an increase in voter awareness and, therefore, an increase in voter turnout rates. Additionally, it has also been argued that media coverage is a stronger asset in larger municipalities and helps to offset the arguments for higher levels of voter turnout being associated with smaller municipalities[57]. However, because the degree of media coverage during an election period can be difficult to measure, it is not often accurately or significantly analyzed in academic literature surrounding increases and decreases in voter turnout. Overall, having addressed these turnout variables, we can now address the question of what effect the introduction of online voting in an Ontario municipal election has on voter turnout rates.

---

[55] Statistics Canada, *From urban areas to population centres.*
[56] Norman Gludovatz, *Getting the Majority to Vote: Practical solutions to re-engage citizens in local elections.*
[57] Ibid.

Hypothesis

The purpose of this research paper is to conduct exploration into the effect that introducing online voting has on voter turnout rates in Ontario municipal elections. The hypothesis drawn from the theory of online voting and the research question above is that if online voting is implemented in Ontario municipal elections then voter turnout rates will increase. More specifically, the purpose here is not to say that the turnout rate of an online municipality will be higher than a municipality that is not online but that the municipality which switches to online voting will experience an increase in voter turnout. Following the trend of voting alternatives since Ontario municipalities first began introducing online voting, there have been many positive cases of continued use and increased use of online voting each year. Voting behavior has also followed this positive trend with turnout increases in a majority of cases and very little turmoil in terms of system issues and turnout decreases. Additionally, while security will always be a concern of the public when democracy is put into the hands of technology, there have been no reported breaches on either advanced polling or election days in Ontario municipal elections. Ultimately, with the positive results over the past decade, it is reasonable to conclude that municipal participants and turnout will rise again in the next municipal elections held in Ontario and maintain a positive relationship between online voting and increased voter turnout rates.

Methodology

In establishing a research design to study the relationship between online voting in Ontario municipal elections and voter turnout rates, a longitudinal design has been created so as to effectively collect election data from municipalities that used online

voting for the first time in 2014. More importantly, this has allowed for a comparison of election data from the 2010 Ontario municipal elections as we operate over time within the design of the study. This has also made it possible to get closure as opposed to using a cross-sectional approach in which factors are often left out[58]. In determining the relevance of online voting implementation in relation to voter turnout rates, the dependent variable will be voter turnout rates and the independent variables will consist of the implementation of online voting, population size of the municipality, whether the municipality conducts their elections through at-large or ward systems, and the closeness of the mayoral race in the municipality.

Continuing with this design, the factor of online voting as an alternative in municipal elections in Ontario has been introduced to an experimental group of municipalities. This makes these municipalities first time users of online voting. Additionally, a control group of municipalities has been created that does not have this introduced factor of online voting as an alternative method. By introducing these two groups and measuring them at the same time it will ultimately show what would have happened in the absence of online voting. Having done this, an observation can then be made regarding the significance of the data. This will be achieved by implementing a *t*-test to determine whether the difference between the arithmetic averages of the two groups is significant[59]. More specifically, this two sample test will be one-tailed due to the strong expectations that one groups mean will be higher than the other. In doing so

[58] Elizabethann O'Sullivan, Gary R. Rassel, and Maureen Berner, *Research Methods for Public Administrators, 5th ed.*
[59] Ibid.

we are able to state the hypothesis and a null hypothesis that indicates findings in the opposite direction:

H_1: Online voting increases voter turnout rates in Ontario municipalities

H_0: Online voting decreases voter turnout rates in Ontario municipalities

As a result, if the findings in this study support the hypothesis, we will be able to reject the null hypothesis. Following the *t*-test to show if the data is significant, an analysis of variance (ANOVA) will be conducted to look at both the significance and the strength of the relationship between online voting and voter turnout rates. This statistical tool will allow for the examination of the variances within the groups and between the groups and will utilize the *F*-test to determine significance and *eta*, a measure of association, to determine strength.

In addition to these statistical tests, a survey has been created that will be administered to an individual within the Clerks Department of randomly selected municipalities within the experimental group and the control group. In total, thirty municipalities from each group will be selected via random number generation. Those selected will be asked only one question that will differ slightly between the two groups and will be conducted over the phone. The purpose of this survey will be to effectively gauge the percentage of re-users of online voting within the experimental group and the percentage of new users of online voting within the control group for the next municipal elections held in 2018. This will show if first time users of online voting in 2014 had

enough success to deem it re-usable going forward, as well as if non-users in 2014 are interested or know if they plan to pursue online voting in 2018.

As already mentioned, the cases being examined within this research study are contained within two groups; one consisting of municipalities in Ontario that introduced online voting for the first time in 2014 and a second group made up of municipalities that did not use online voting in either the 2010 or 2014 municipal elections. The first group, being the experimental group, contains forty-six municipalities that were selected as a result of their use of online voting for the first time in 2014. While the first time users of online voting in 2014 originally contained fifty-four cases, eight municipalities were removed because they lacked contention for the mayoral candidacy. These eliminated municipalities can be found in Figure 1.1 of the appendix as the cases labeled with an asterisk and the remaining experimental cases are labeled "Y" under the column titled "Experimental Group" in the same chart. The second group, being the control group, also contains forty-six municipalities, however, these municipalities will not have used online voting practices and can also be found in figure 1.1 as the cases labeled "Y" under the column titled "Control Group".

The cases selected for the control group, from the remaining three hundred and seventeen municipalities that run municipal elections in Ontario, were done so through matched sampling. This means that the municipalities in the control group were selected to match the experimental group in relation to the independent variables other than online voting implementation. In order to accomplish this, municipalities were first gathered that had a similar population size to each individual municipality within the experimental group. The next step was to determine if the cases matched by the population size

variable also matched on the second variable of election system. If the selected cases did not match according to ward, at-large, or both, a new municipality was selected until a match was found for both population size and the election system. Lastly, the variable of closeness in the mayoral race was included and was matched using the same method seen in the previous step. The end result was a control group of municipalities that matched the experimental group in terms of population size, election system, and closeness of the mayoral race. By making use of this matched case design, the use of online voting could then be effectively tested because it became the isolated variable in the study. As a result, an accurate comparison of voter turnout rates could then be made between the control group and the experimental group to determine the true effects of online voting in Ontario municipal elections. Overall, the 2014 municipal elections in Ontario have offered a unique opportunity, for perhaps the first time, to ensure that there were a sufficient number of first time online users to apply statistical analysis and avoid sampling error.

In carrying out the above research design to study online voting and voter turnout rates in Ontario municipal elections, data was sought pertaining to the turnout rates for each municipality within the experimental group and the control group. It was important that this data was collected for both the 2010 and the 2014 Ontario municipal elections so that the percentage of voter turnout and the percentage change in turnout could be compared from one election to the next and determine if there was an increase or a decrease in turnout for each individual case. Overall, the data collected on the dependent and independent variables was gathered from existing information. This required research into existing reports and municipal records containing the necessary data that needed to

be applied to each municipality. Having done so, we can now proceed to measure and analyze the cases within this research study.

Measurement

The two variables that make up the hypothesis of this research proposal are the independent variable of online voting use for the first time and the dependent variable of voter turnout rates in Ontario municipal elections. Online voting as an independent variable will be measured in the number of municipalities in Ontario that introduced remote voting over the Internet for the first time in 2014. The use of online voting will be measured by the number of municipalities in Ontario that offered online voting during advanced polling, on Election Day, or both. As long as online voting was provided as an alternative method of voting to some extent for eligible voters then that municipality can be included in the study. This logic is also applied to the exclusivity of voting options utilized in each municipal election. While only a number of municipalities decided to offer online voting only, some chose to package it with telephone voting, paper ballot voting, vote by mail, or a combination of these. By measuring the use of online voting to this degree we are able to label it as a nominal variable because it can only be one or the other. In other words "your municipality introduced online voting or it did not".

On the other side of the hypothesis, voter turnout rates as a dependent variable will be measured as a percentage of an increase or decrease from the municipal elections held in 2010 to the elections in 2014. This percentage will be measured by dividing the total number of votes cast by the total number of eligible voters within any given municipality. The resulting answer will be the voter turnout rate for that municipality, measured as a percentage. These numbers will then be used to calculate the percentage

change in voter turnout from 2010 to 2014 and will ultimately provide the average percentage change in turnout for both the experimental group and the control group. The calculation to achieve this is the 2014 turnout – 2010 turnout / 2010 turnout. This equation differs from the overall turnout rate because it will measure the percentage change found in 2014 that is based off of the turnout from 2010, as opposed to measuring the increase or decrease out of 100% of the overall turnout. In doing so, this raw data will help to display the actual change that can be experienced by a municipality that decides to implement online voting. Lastly, by measuring voter turnout rates as a percentage, this makes it an interval variable because there is a recognizable distance between categories that is equal. However, because we are only concerned with whether an increase or decrease was experienced, voter turnout rates in this study will be considered a nominal variable since our answer for each case will either be an increase or a decrease.

Continuing with the remaining independent variables, population size of the municipality will be measured most simply by the number of residents that live within the boundaries of each given municipality involved in the study. Ultimately, this will allow for equal distance to be established between the cases as the population of each municipality can be listed from highest to lowest as per the number of residents. As a result, the variable of population size can be labeled as an interval variable. In addition to this, population size will also be used to measure the number of eligible voters within each municipality because it is likely that a larger municipality has more eligible voters.

The next independent variable of this study is whether the municipality conducts their elections through at-large or ward systems. This variable is measured according to the electoral system used in each municipality. More specifically, a municipality utilizes

an at-large system if the representative who is elected within the municipality is done so to serve an entire area rather than a subdivision of that area. Subsequently, a municipality has wards if the area of that municipality has been divided into sections for the purposes of an election. However, there are also ten cases, five from each group, that have integrated a combination of at-large and ward systems. Since these categories are not ranked and have no order to them, measuring at-large, ward, or mixed election systems will be done so as a nominal variable.

The final independent variable is the closeness of the mayoral race. This variable refers to the difference in votes between the elected candidate and the runner up. As a result, closeness will be measured for each municipality within the control group and the experimental group based on the number of votes received for each mayoral candidate. Having measured the votes cast, closeness will be determined if the second place candidate was fewer than 1000 votes behind the elected candidate. If the difference in votes is more than 1000 then this study will consider that municipal election as not close. Due to this variation being expressed as one or the other, we can then say that the closeness of the mayoral race will be measured as a nominal variable.

Upon measuring each of the variables above and collecting the required data from each municipal case, two statistical tools will be used to measure the raw data and determine the significance and the strength of the relationship. In determining the significance of the average percentage change for each group, a *t*-test must provide a result that is no lower than 1.96 to ensure that the hypothesis being tested will have at least a ninety-five percent rate of confidence. If the relationship between online voting and increased voter turnout can be shown to be significant, an analysis of variance can

then be used to measure both significance and strength. An *F*-test will measure the first component through the ratio of between-groups variance, divided by the within-groups variance. Statistical significance can then be deemed likely if the resulting value is greater than 1. This will also likely be the case if the means between the groups are large and the variability within them is small[60]. The second measurement, *eta*, utilizes a formula to find the second component of variance analysis. The formula that will be used to acquire this is the square root of the between group sum of squares, divided by the total sum of squares. This measurement of association will then identify the strength of the relationship between the variables based off of a value between 0.00 and 1.00. Ultimately, the closer the resulting value is to 1.00 the stronger the relationship will be[61].

The final tool of measurement to be utilized within this study will be accomplished by surveying thirty randomly selected cases from the experimental and control group (figure 1.2). This survey will attempt to measure the percentage of re-users and new users of online voting in the next municipal elections held in 2018. This will be accomplished by asking each group a variation of one question. The question for the experimental group asks "How probable is it that you will be using online voting again in the next municipal election?". Respondents can then select from five pre-determined answers that will range from being almost certain about re-using online voting (1) to almost certainly not re-using online voting (5). The question for the control group will then ask "How likely is it that you will begin using online voting to some extent in the next municipal election?". Respondents in this group will then have similar pre-

[60] Elizabethann O'Sullivan, Gary R. Rassel, and Maureen Berner, *Research Methods for Public Administrators, 5th ed.*
[61] Ibid.

determined answers as the experimental group, ranging from being almost certain about beginning to use online voting (1) to almost certainly not beginning to use online voting (5). Overall, the analyzed results from these questions should provide an accurate representation of the success that has been had by re-users and the potential benefits that are being realized by future users.

Analysis

The analysis of the data within this study and the information from the measurements section above will be conducted using univariate and bivariate methods in order to provide statistical descriptions. Beginning with the univariate analysis, we can properly express each of the variables found in figures 1.1, 1.3, and 1.3.1. Through the practice of frequency distribution we will then be able to see the number of occurrences that fall into each category of each variable and compare the data between the cases. For the dependent variable of voter turnout rates this shows that 15 of the 46 control cases experienced an increase in voter turnout and 31 of the 46 control cases experienced a decrease in voter turnout. In the experimental group, 32 of the 46 experimental cases experienced an increase in voter turnout, while the remaining 14 experimental cases experienced a decrease in voter turnout. Overall, between the two groups, 47 cases experienced an increase in turnout and 45 cases experienced a decrease. These numbers can then be further expressed as percentages and will show that 33% of the control cases experienced an increase in voter turnout and 70% of the experimental cases saw an increase in turnout. Combined we can then see that 51% of all the cases had an increase in voter turnout in 2014. However, it is important to note that when combining the two

groups, almost 69% of the decreased voter turnout can be attributed to the cases in the control group that did not use online voting practices.

Similar to the dependent variable of voter turnout, each independent variable can also be expressed as seen above. The variable of online voting use shows that 46 of the 92 cases were first time users in 2014. In other words, this makes up 50% of the municipalities being studied. The population size of each case displays the frequency of large and small municipalities within the study. In doing so, a population of 19,999 or less will be considered a small municipality and a population of 20,000 or more can be labeled as a large municipality. These parameters then show that 29 of the 92 cases have a large population and 63 of the 92 cases have a small population. As a percentage, this can be reflected as 32% large and 68% small in terms of population size among the cases. Defining the election system of each case will then show the frequency with which a municipality in this study utilizes ward, at-large, or mixed elections. Of the 92 cases, 50 cases used ward elections, 32 used at-large elections, and 10 used a combination of both ward and at-large. Lastly, the variable of closeness in the mayoral race for each case shows that 48 of the 92 municipalities in this study had fewer than 1,000 votes separating the elected candidate and the second place candidate. This means that the remaining 44 cases elected their mayor over the second place candidate by a margin that was greater than 1,000 votes. In other words, 52% of the cases in this study involved a close mayoral race according to the measurement that was utilized.

Having selected the cases within this study through the use of matched sampling, the next step for analyzing the data within this study involves the use of bivariate methods to look at two variables simultaneously and describe how they might relate to

each other. More specifically, this will show the extent to which the use of online voting might of had an influence over voter turnout rates for the municipalities within this study. Beginning with the *t*-test we will set an alpha level of .05 and assume that variances for the two groups in this study are unequal. As a result, the following equation can be used:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_2^1}{n_1 - 1} + \frac{s_2^2}{n_2 - 1}}}$$

Prior to completing this equation, however, we must first determine the mean for both groups and the standard deviation for both groups. The mean for both groups can be found by adding the percentage change values for each case and dividing that total by the number of cases. The result of this equals a mean of 9.76 for the experimental group, or the first group, and a mean of -4.08 for the control group, or the second group. The standard deviation for each group can then be determined by first subtracting this mean value from each of the cases within that corresponding group. This value will then show how much each case deviates from the mean. These deviation values are then squared, added together, and divided by the total number of cases to receive the variance. As seen in figures 1.3 and 1.3.1, this results in a variance of 407 for the experimental group and 212.5 for the control group. Squaring these two values will then provide a standard deviation of 20.17 and 14.57 respectively. As a result, we now know the average distance of values in the distribution from the mean and can insert these values into the *t*-test equation:

$$t = \frac{9.76 - (-4.08)}{\sqrt{\frac{407}{45} + \frac{212.5}{45}}}$$

$$= \frac{13.84}{\sqrt{9.04 + 4.72}}$$

$$= \frac{13.84}{\sqrt{13.76}}$$

$$= \frac{13.84}{3.71}$$

$$= 3.73$$

After establishing an alpha-level criterion of .05 and degrees of freedom of 90 ($n_1 + n_2 - 2$), a distribution chart of *t*-values shows that the requirement for 95% confidence within a one-tailed test is 1.645. This is much lower than our value for *t* and means that we have statistical evidence to support the research hypothesis and that the relationship between online voting and increased voter turnout is very significant. Furthermore, considering that our value for *t* is much higher than the .05 alpha requirement, we can refer to the next probability for .01 that requires a value of 2.326. Given this, we can actually report 99% confidence that a relationship between online voting and increased voter turnout rates did not occur by chance.

The next step is to complete an analysis of variance to measure the significance and strength of the differences between the means of the experimental and control groups. As mentioned earlier, this statistical tool contains two measurements within it: the *f*-test and *eta*. To determine if the difference of means of our two groups is significant, the *f*-test uses the following equation:

$$\frac{Between\ groups\ variance}{Within\ groups\ variance}$$

To find these two values, the between, within, and total sum of squares must be calculated. Given the values that we already have in figures 1.3 and 1.3.1 we can easily determine the total sum of squares and the between groups sum of squares:

$$Within\ groups\ sum\ of\ squares = 19{,}546$$

$$Between\ groups\ sum\ of\ squares = 8{,}949$$

$$Total\ sum\ of\ squares = 28{,}495$$

Having acquired all the necessary values, along with the degrees of freedom, we can now determine the means squares:

$$Between\ group\ variance = \frac{8{,}949}{2}$$

$$= 4{,}474.5$$

$$Within\ group\ variance = \frac{19{,}546}{92}$$

$$= 212.5$$

These two values can now be divided to give us an *f*-value:

$$\frac{4{,}474.5}{212.5}$$

$$f = 21.1$$

This *f*-value is much greater than 1 and suggests that the difference between the groups means is quite large and the variability within the groups is quite small. Consulting a table of *f*-values will also show that our *f*-value surpasses the 99% confidence value of 4.84 under our degrees of freedom and is therefore statistically significant, as was similarly seen in the *t*-test done earlier. As a result, we can once again reject the null hypothesis and accept the research hypothesis that online voting use increases voter turnout in Ontario municipalities.

The final component of *ANOVA* involves conducting an *eta* test as a measure of association to determine the strength of the relationship between our variables. The formula for *eta* is:

$$E = \sqrt{SS_b / SS_t}$$

The two values then required to complete this equation are the between group sum of squares and the total sum of squares. Dividing the two and then square rooting the result will give us our value for *E*:

$$E = \sqrt{8{,}949/28{,}495}$$

$$= \sqrt{0.314}$$

$$= 0.56^2$$

$$= 0.31$$

When calculating *eta*, the resulting value will range from 0.00 to 1.00 and the closer the value is to 1.00 the stronger the relationship will be. Additionally, the *eta* value received is often squared in order to determine the percentage of variation that is explained by the dependent variable. Looking at the results above, the analysis indicates a moderately strong relationship between the use of online voting and the increase in voter turnout rates in Ontario municipalities. Overall, we can conclude from this statistical analysis that there is a relationship between online voting and voter turnout, the relationship is very significant and moderately strong, the original research hypothesis is supported, and the null hypothesis can be rejected.

Lastly, the data received from the survey question that was administered to the randomly selected cases from the experimental and control group must be discussed here so as to allow for interpretation and comparison between and within the two groups. Of

the total number of randomly selected municipalities, twenty-eight cases from the experimental group and twenty-seven cases from the control group were available for response. Among the experimental cases that were being measured for re-use of online voting in 2018 (figure 1.4), 18 or 64% answered “almost certain” (1), 7 or 25% answered “probable” (2), 3 or 11% answered “not sure” (3), and 0 selected “improbable” (4) and “almost certainly not” (5). Among the control cases that were being measured for new use of online voting in 2018 (figure 1.4.1), 2 or 7% answered “almost certain” (1), 4 or 15% answered “likely” (2), 10 or 37% answered “not sure” (3), 7 or 26% answered “not likely” (4), and 4 or 15% answered “almost certainly not” (5). Going one step further by combining answers (1) and (2) from each survey, it would be accurate to suggest that 89% of the experimental cases will presumably re-use online voting in 2018, while 22% of the control cases will presumably become new users of online voting in 2018. However, it is also important to note that those who selected “not sure” (3) in both surveys did so because there was interest to re-use or become new users of online voting, except approval from coucil was still needed for confirmation. This seems to be an unfortunate result of administering the survey too early prior to an election held in 2018. Regardless, if we were to remove only those that were certain or probable/likely to not re-use or become new users of online voting in 2018, our results suggest much more promising potential for online voting in 2018. More specifically, this would mean that 100% of the experimental group and 59% of the control group at least holds an interest in re-using or becoming new users of online voting respectively in 2018. From the perspective of the experimental group, this simply means that they felt introducing online voting in 2014 was successful and useful enough that the intention is there for re-use in

the next election. Even municipalities that stated they were unhappy with the online voting company they had selected in 2014 answered “not sure” (3) when surveyed because they understand the effectiveness of offering online voting and would recommend that a different service provider be hired for 2018. On the other hand, and likely just as significant, those with a strong interest to become new users of online voting have stated so likely because they have realized the benefits of its use as an alternative voting method and have recognized the success that other municipalities have had with its use.

Implications

The intended purpose of this concluding section is to act as a message directed at municipalities that are using online voting, interested in online voting, or possess insufficient information about online voting. The reasoning for this is due to the exceedingly positive implications that the results of this study could have for those municipalities that simply need more evidence to support their interest and to sway those that may lack an interest. Over the past decade of municipal elections in Ontario the use of online voting has grown with the belief that it has the potential to increase voter turnout rates. The number one reason for this has been cited as the enhancement of accessibility that online voting offers eligible voters. Each year, more and more municipalities in Ontario have made the transition over to online voting as an alternative method for their residents with the largest recorded number of first time users changing from 2010 to 2014. This alone shows a growing understanding of the potential benefits across the province, except now we have statistical evidence to support this benefit of increased voter turnout when utilizing online voting. The statistical analysis shown in the

previous section has provided evidence that not only shows a significant relationship between online voting and increased voter turnout but also one that is moderately strong. More specifically, this means we can accurately report that the use of online voting is the cause of the difference in turnout between the experimental and control groups in this study. This evidence is something that has not been previously published and as a result, poses both theoretical and practical implications for municipal elections in Ontario and perhaps the rest of the democratic world.

Theoretical Implications

To begin, we will start by examining the two major theories that were discussed in the theoretical review section of this paper. The rational choice theory, as discussed by Andres Blais, views voting as an irrational act because the balance between benefits and costs in most municipal elections are often weighted heavily towards the costs. Simply put, regardless of the size of a municipality, there is a very small chance that one individual's vote will be decisive in electing their preferred candidate. Thus, due to a lack of benefits that may be seen by rational individuals, there is arguably a percentage of the population that has political knowledge and a preferred candidate for the election, but remains democratically inactive because it is irrational for them to participate. Although, with the findings of a significant and strong relationship between online voting and increased turnout rates, it would be accurate to suggest that rational voters have recognized the reduced costs that are associated with introducing online voting as an alternative voting method. At first glance this seems to support the theory of rational choice, however, it is the significant increase in turnout from online voting use that actually impairs the concept behind this theory. To explain this, let's assume that all

municipal voters actually decide to vote based off of this rational balancing act of benefits and costs when determining if their vote will be decisive. If online voting is then introduced and it is statistically proven that turnout is likely to increase, does it not reduce the chances for an individual's vote to make a difference in their local election? Additionally, if this reduced the likelihood of decisiveness, the rational thought behind this theory should actually reduce turnout rates. Except we see the opposite in municipalities that introduce online voting, regardless of the number of eligible voters in a given municipality. The reason for this are the marginally associated costs that come with the ease of being able to vote remotely. As a result, the utilization of online voting in Ontario municipalities seems to have eliminated the irrationalism that has been thought to of previously existed within the act of voting.

Unlike the above deductions from rational choice voting, the theory of opportunity cost seems to be mutually supportive with our statistically confirmed relationship between online voting and increased voter turnout rates. In the theoretical review section at the beginning of this paper it was suggested that the introduction of online voting could hypothetically reduce an individual's opportunity cost due to the elimination of travel and an increase in time savings. As a result, by lowering the opportunity cost of voting, voter turnout would then hypothetically increase. Having confirmed a statistically significant and strong relationship between online voting and voter turnout, it would be accurate to report that the introduction of online voting has indeed reduced the overall cost of voting in comparison to the opportunity cost of not voting.

Practical Implications

While being able to show some theoretical implications from our findings are important, it is perhaps even more meaningful that some significant practical implications can be found. Having reported a statistically proven relationship between online voting and increased voter turnout in Ontario municipalities, the most obvious implication from a practical standpoint is generalizability for the rest of the province. The main purpose of this research paper has been to determine the effect that online voting has on turnout rates so that municipalities in Ontario, and perhaps beyond that, have evidence to support an interest or create an interest in online voting. This should allow for the production of strong reports that are needed to influence council buy in where municipalities may be unsure of online voting. These reports would more likely be useful or have implications for those that are looking to become new users of online voting, as opposed to re-users, because they either lack information or need evidence to bring to council. As a result, the findings within this paper should at least provide sufficient grounds for a significant number of new users of online voting in 2018. Ultimately, it is hopeful that municipalities will be able to find comparisons within the cases studied here and feel confident about using online voting as an alternative method in the future.

Continuing with the notion of supportive evidence, the findings in this paper should also serve as an implication against reports that have denounced online voting as having little or no impact on voter turnout. In 2013 a report released by Elections BC downplayed any kind of relationship between online voting and voter turnout[62]. Keith Archer, Elections BC's Chief Electoral Officer, stated at the time that "preliminary

[62] Stephen Smart, *Online voting gets thumbs down from Elections BC*.

findings do not suggest that internet voting would increase voter turnout, a suggestion often put forward by supporters of the move to online[63]". As a result, municipalities in BC have yet to introduce online voting to any extent. However, the statistical findings of a significant and moderately strong relationship between online voting and increased voter turnout indicate quite a bit more than a suggestion. While context remains important here, as this research paper was conducted using Ontario municipalities, the report commissioned by Elections BC would have also studied other elections that utilized online voting because their own municipalities have not. Overall, it would no longer be accurate to suggest that online voting does not increase voter turnout.

One other example of a similar report about online voting came more recently after the 2014 municipal elections held in Ontario. However, rather than reporting that online voting has no effect on voter turnout, it was stated that the impact was small. Stephen O'Brien, Guelph's city clerk, believes that the turnout in 2014 for Guelph was a result of "big local issues and high-profile races[64]". Both of these variables have been linked to increasing voter turnout during elections, however, the results in this paper have found the same to be true for online voting. Additionally, when variables such as closeness of the mayoral race are matched between two groups and online voting is isolated, it was shown here that the difference in turnout between the two groups is in fact the use of online voting. As a result, while it easy to argue that one municipality may have had a higher or lower turnout than another that also used online voting, the biggest difference is noted when comparing those that utilized it and those that did not. Hence, a

---

[63] Stephen Smart, *Online voting gets thumbs down from Elections BC*.
[64] Chris Hannay, *Ontarians like online voting, but turnout boost may be minor, study suggests.*

significant and moderately strong relationship between online voting and increased voter turnout is found.

Finally, it is perhaps important here to briefly discuss some of the issues that have deterred municipalities from showing interest in online voting in the past. Scarcely mentioned here has been the issue of security. As mentioned in the theoretical review, security seems to have been more of an initial worry prior to larger use of online voting in Ontario. The hired online service providers have maintained excellent security measures and voters have reported that they feel safer voting over the Internet than they do voting by phone or by mail. This is also something important to consider for those municipalities that have reported vote by mail as being superior to online voting.

Beyond security, two other more significant issues that have been brought up by non-online municipalities have been their senior and rural populations. Hearing that seniors may be against online voting because of the technology seems to be something that should be measured in each municipality that feels this way. The reasoning for this is because many municipalities that have used online voting have reported that their senior population actually enjoyed the process and found it quite simple. If still not reassured, a minimal amount of paper ballot voting can remain or an online voting station can be set up for those who feel uncomfortable with the system. By doing so, this will easily solve the issue and retain the increased turnout that online voting can provide.

Lastly, the issue of rural populations seems to be the biggest deterrent to introducing online voting. This is an odd deterrent because there are a significant amount of rural municipalities in the experimental group of this study that had success with online voting. However, those that have yet to utilize online voting see it as a barrier. As

a result, it may be accurate to suggest that the issue here is actually a lack of widespread Internet access or a digital divide between Ontario municipalities. Interestingly enough, this was something that was actually brought up by each of the control cases that answered “almost certainly not” (5) in the survey for new users in 2018. Additionally, while such an issue may be difficult to overcome in the short term, it is an issue that does not negatively affect the relationship between online voting and voter turnout. Overall, if rural municipalities with a lack of Internet access were to establish a stronger digital infrastructure, it would not be surprising to see them become similarly interested in online voting.

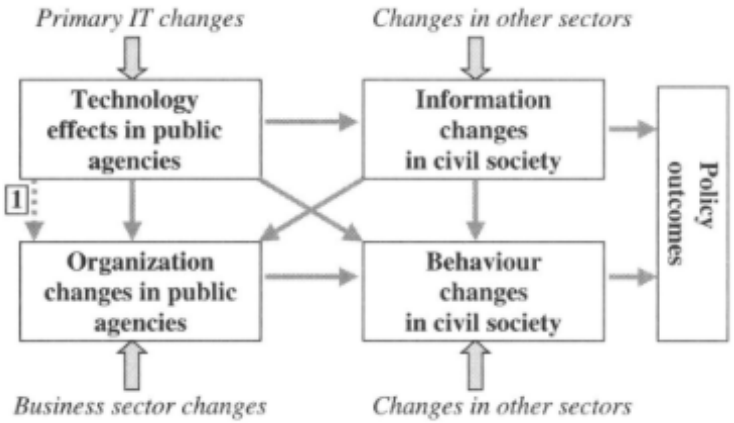
Conclusion

When change is discussed or initiated within an organization or a municipality it is not unusual for those changes to be met with resistance, to some extent. These degrees of resistance are most often associated with the values and attitudes held throughout the municipality and will typically determine the issues that act as barriers to introducing something new. However, the findings in this paper should be able to help effectively reduce resistance to online voting as the value of current operations and the attitudes towards voting over the Internet begin to shift. This study set out to determine the effect that online voting had on turnout rates in Ontario municipalities. Following tests of statistical significance and strength, a relationship has been proven and we can accept the research hypothesis that online voting increases voter turnout in Ontario municipalities. These results, in addition to the surveys for re-use and new use in 2018, indicate that significantly more municipalities in Ontario should be ready to make use of online voting in the next municipal elections. Considering this, along with the proven relationship

between online voting and increased turnout, strong planning is still recommended, especially for those who will be first time users in 2018. Last minute voters have been an issue in past online elections in Ontario, regardless of advanced polling and eight-day voting period options. This has slowed the online system at times but perhaps can be solved by introducing designated voter days. Planning is also necessary for accurate and effective communication of the new process amongst municipal staff and between the municipality and the voters. This is also important when considering the media in order to ensure that the same information is being delivered to the voters so as to not cause confusion. Two other things to consider include back up generators in case of a power outage and trying to ensure that the voters list is accurate. The latter is important for reducing the number of people that need to come in person to either vote or to have the voters list changed so that they can vote remotely. The issue of the voters list is also one that seems to have come up in a few of the surveyed experimental cases and it is likely something that is more easily overcome in smaller municipalities. This is due to the proposition that perhaps voters lists could be maintained independently, rather than by third party systems. Unfortunately, this becomes more difficult as the number of eligible voters increases. Overall, the issues discussed in this paper seem to be largely the result of being new to online voting, rather than the online concept or the system itself. First time users are still gauging system operations and while turnout has increased even with some of these issues present, their recognition will make for a smoother and more successful transition to an online voting system in your next municipal election.

Appendix

Figure 1.0[65]



[65] Patrick Dunleavy, Helen Margetts, Simon Bastow and Jane Tinkler, *New Public Management is Dead – Long Live Digital-Era Governance.*

Figure 1.1

#	POPULATION	FULLNAME	EXPERIMENT GROUP	CONTROL GROUP	ONLINE VOTING	WARD/AT-LARGE	CLOSE MAYORAL RACE
1	84,362	Town of Milton		Y		W	N
2	93,650	City of Brantford	Y		Y	W	N
3	136,063	City of Barrie		Y		W	N
4	98,780	City of Waterloo		Y		W	N
5	126,748	City of Cambridge	Y		Y	W	N
6	103,671	Municipality of Chatham-Kent	Y		Y	W	N
7	121,688	City of Guelph	Y		Y	W	N
8	131,400	City of St. Catharines		Y		W	N
9	123,363	City of Kingston	Y		Y	W	N
10	12,146	Town of Ingersoll		Y		A-L	N
11	12,055	Town of Gravenhurst		Y		W	N
12	11,100	Town of Meaford	Y		Y	A-L	Y
13	12,661	Town of Saugeen Shores		Y		W	N
14	9,111	Town of Penetanguishene	Y		Y	W	N
15	44,876	Haldimand County		Y		W	N
16	50,631	City of Welland		Y		W	N
17	19,600	Town of Essex		Y		W	Y
18	43,086	City of Quinte West	Y		Y	W	N
19	3,856	Township of Howick		Y		A-L	Y
20	108,359	City of Thunder Bay		Y		W	N
21	43,165	City of Timmins	Y		Y	W	N
22	8919*	Municipality of West Perth*	Y*		Y*	W*	N*
23	4,595	Town of Iroquois Falls		Y		A-L	Y
24	18,223	Town of Springwater	Y		Y	W	Y
25	16,572	Town of Midland		Y		W	Y
26	3,028	The Township of Adelaide Metcalfe	Y		Y	A-L	Y
27	109,600	Town of Ajax	Y		Y	W	N
28	2,811	Town of Laurentian Hills		Y		W	Y
29	5,340	Town of Cochrane		Y		A-L	Y
30	15,301	Town of Tillsonburg		Y		A-L	Y
31	10,770	Town of Erin		Y		A-L	N
32	28,077	Town of Bradford West Gwillimbury		Y		W	Y
33	4,556	Central Frontenac Township	Y		Y	W	Y
34	13,734	Township of Clearview	Y		Y	W	Y
35	16,598	Town of Pelham		Y		W	N
36	4,494	Township of Southwold		Y		W	Y
37	9724*	Township of Elizabethtown - Kitley*	Y*		Y*	A-L*	N*
38	1,864	Township of Frontenac Islands	Y		Y	W	Y
39	5,194	Town of Gananoque	Y		Y	A-L	Y
40	15,511	Town of Greater Napanee	Y		Y	W	Y
41	2,719	Township of Horton		Y		A-L	Y
42	10,702	Hamilton Township	Y		Y	A-L	Y
43	32,727	Town of Innisfil	Y		Y	W	Y
44	1,202	Township of Ignace		Y		A-L	Y
45	16,221	Loyalist Township	Y		Y	W	N
46	4,338	Township of Lucan Biddulph	Y		Y	W	Y
47	2,705	Municipality of McDougall	Y		Y	A-L	N
48	1,144	Township of McKellar	Y		Y	A-L	Y
49	2,850	Village of Merrickville - Wolford	Y		Y	W+A-L	Y
50	16487*	Municipality of Middlesex Centre*	Y*		Y*	W*	N*
51	5,655	Township of Minden Hills	Y		Y	W+A-L	Y
52	1,723	Municipality of Huron Shores		Y		W	Y
53	7,044	Municipality of Bluewater		Y		W	Y
54	3391*	Township of Mulmar*	Y*		Y*	A-L*	N*
55	1,842	Township of North Frontenac	Y		Y	W	Y
56	3,963	Township of Amaranth		Y		A-L	Y
57	6,658	The Municipality of North Middlesex	Y		Y	W+A-L	Y
58	6,191	Town of Parry Sound	Y		Y	A-L	Y
59	3,763	Township of Bonnechere Valley		Y		W	N
60	4,284	Town of Prescott	Y		Y	A-L	Y
61	3,988	Township of Seguin	Y		Y	W	N
62	2,737	Township of Shuniah	Y		Y	W	Y
63	5,582	Township of Ashfield-Colborne-Wawanosh		Y		W	Y
64	5,860	The Municipality of Southwest Middlesex	Y		Y	W	Y
65	7,560	Town of Stone Mills	Y		Y	A-L	Y
66	8,058	Township of Zorra		Y		W	Y
67	20,978	Municipality of Strathroy-Caradoc	Y		Y	W+A-L	N
68	11,341	Township of Brock		Y		W	Y
69	13,000	Municipality of Thames Centre	Y		Y	W	Y
70	17,537	Town of Wasaga Beach	Y		Y	A-L	N
71	19,241	Town of Collingwood		Y		A-L	N
72	3,378	Municipality of Powassan		Y		A-L	Y
73	3,626	Village of Casselman	Y		Y	A-L	Y
74	30,586	City of Orillia		Y		W	N
75	15,400	Town of Niagara on the Lake		Y		A-L	Y
76	21,556	Town of Amherstburg		Y		A-L	N
77	25,325	Town of Grimsby	Y		Y	W	Y
78	27,975	Town of Orangeville		Y		A-L	Y
79	15,348	City of Kenora	Y		Y	A-L	N
80	21,362	Town of Kingsville	Y		Y	A-L	N
81	28,403	Municipality of Leamington	Y		Y	A-L	N
82	2,975	Municipality of Wawa		Y		A-L	N
83	182,520	Town of Oakville		Y		W	N
84	11,477	Township of Wellington North		Y		W	N
85	10251*	Township of North Glengarry*	Y*		Y*	W+A-L*	N*
86	4,074	Municipality of Marmora and Lake		Y		A-L	N
87	3,744	Municipality of Northern Bruce Peninsula	Y		Y	A-L	N
88	15247*	Township of Russell*	Y*		Y*	A-L*	N*
89	4,978	Township of Stirling-Rawdon		Y		W	Y
90	2,289	Township of North Kawartha		Y		W+A-L	Y
91	5,037	Municipality of Sioux Lookout		Y		W+A-L	Y
92	160,274	City of Greater Sudbury	Y		Y	W	N
93	23,610	Town of Tecumseh	Y		Y	W+A-L	N
94	8,601	Town of Cavan Monaghan	Y		Y	W	N
95	7591*	Municipality of Central Huron*	Y*		Y*	W*	N*
96	4,193	Town of Deep River	Y		Y	A-L	N
97	9264*	Municipality of Huron East*	Y*		Y*	W*	N*
98	**6,989**	Municipality of Bayham		Y		W+A-L	Y
99	20,623	Township of Uxbridge		Y		W+A-L	N
100	23,145	Township of Woolwich		Y		W+A-L	N
TOTAL		**100 - * = 92 MUNICIPALITIES**	Y = 46	Y = 46	Y = 46	A-L = 32	Y = 48
	L =	29				W = 50	N = 44
	S =	63				W+A-L = 10	

LEGEND	L = LARGE MUNICIPALITY (20,000+)
	S = SMALL MUNICIPALITY (<20,000)
	W = WARD
	A-L = AT-LARGE
	N = NO
	Y = Yes
	* = Eliminated Case

Figure 1.2

SURVEY PARTICIPANTS		
#	EXPERIMENTAL CASES (RE-USE INTEREST)	CONTROL CASES (NEW USE INTEREST)
1	CAVAN MONAGHAN	HORTON
2	CHATAM-KENT	NORTH KAWARTHA
3	PRESCOTT	INGERSOLL
4	STONE MILLS	COLLINGWOOD
5	TIMMINS	PELHAM
6	CLEARVIEW	ERIN
7	TECUMSEH	WELLINGTON NORTH
8	QUINTE WEST	COCHRANE
9	SPRINGWATER	BONNECHERE VALLEY
10	DEEP RIVER	BARRIE
11	MCDOUGALL	BAYHAM
12	LUCAN BIDDULPH	IROQUOIS FALLS
13	NORTHERN BRUCE PENINSULA	BRADFORD WEST GWILLIMBURY
14	FRONTENAC ISLANDS	ORANGEVILLE
15	NORTH MIDDLESEX	NIAGARA ON THE LAKE
16	SHUNIAH	SOUTHWOLD
17	SOUTHWEST MIDDLESEX	WAWA
18	LEAMINGTON	STIRLING-RAWDON
19	PENETANGUISHENE	ORILLIA
20	THAMES CENTRE	POWASSAN
21	MERRICAKVILLE-WOLFORD	WELLAND
22	MINDEN HILLS	MIDLAND
23	CAMBRIDGE	ZORRA
24	KINGSVILLE	MARMORA AND LAKE
25	BRANTFORD	WATERLOO
26	STRATHROY-CARADOC	UXBRIDGE
27	INNISFIL	THUNDER BAY
28	GREATER SUDBURY	LAURENTIAN HILLS*
29	GREATER NAPANEE*	BLUEWATER*
30	KENORA*	SIOUX LOOKOUT*
UNAVAILABLE FOR RESPONSE = *		

Figure 1.3

#	FULLNAME	2010 turnout %	2014 turnout %	% change	Deviation Squared	
Experimental Cases						
1	City of Guelph	33.90%	44.97%	33%	540.1	
2	Township of North Frontenac	63%	66.65%	6%	14.1	
3	City of Kingston	36.70%	39.52%	8%	3.1	
4	The Municipality of North Middlesex	44%	49.34%	12%	5	
5	Town of Parry Sound	54.59%	52.47%	-4%	189.3	
6	Town of Meaford	49%	50.09%	2%	60.2	
7	Town of Prescott	47%	57.61%	23%	175.3	
8	Township of Seguin	53%	41.81%	-21%	946.2	
9	Township of Shuniah	39.70%	51.14%	29%	370.2	
10	Town of Penetanguishene	49.48%	46.50%	-6%	248.4	
11	The Municipality of Southwest Middlesex	32.80%	49.13%	50%	1619.3	
12	Town of Stone Mills	29.80%	46.02%	54%	1957.2	
13	City of Quinte West	29.32%	32.97%	12%	5	
14	Municipality of Strathroy-Caradoc	46.84%	36.10%	-23%	1073.2	
15	City of Timmins	42%	46.54%	11%	1.5	
16	Municipality of Thames Centre	46.87%	50.93%	9%	0.6	
17	Town of Wasaga Beach	27%	46.28%	71%	3750.3	
18	Town of Springwater	38.80%	42.57%	10%	0.06	
19	The Township of Adelaide Metcalfe	31%	45.96%	48%	1462.3	
20	Village of Casselman	63.81%	67.78%	6%	14.1	
21	Town of Ajax	26%	30.42%	17%	52.4	
22	Central Frontenac Township	46%	41.86%	-9%	351.9	
23	Township of Clearview	44.84%	41.80%	-7%	280.9	
24	Town of Grimsby	36.60%	41.89%	14%	18	
25	Township of Frontenac Islands	63%	66.65%	6%	14.1	
26	City of Kenora	58.59%	50.78%	-13%	518	
27	Town of Kingsville	54.95%	47.74%	-13%	518	
28	Municipality of Leamington	49.80%	42.29%	-15%	613.1	
29	Town of Gananoque	46.45%	53.11%	14%	18	
30	Town of Greater Napanee	39.80%	48.69%	22%	149.8	
31	Hamilton Township	28.50%	42.62%	50%	1619.3	
32	Town of Innisfil	46.60%	40.14%	-14%	564.5	
33	Loyalist Township	33.22%	33%	-0.70%	109.4	
34	Municipality of Northern Bruce Peninsula	38%	39.13%	3%	45.7	
35	Township of Lucan Biddulph	39%	48.66%	25%	232.3	
36	City of Greater Sudbury	49.75%	50.71%	2%	60.2	
37	Town of Tecumseh	45.74%	52.65%	15%	27.5	
38	Town of Cavan Monaghan	43.36%	47.21%	9%	0.6	
39	Town of Deep River	57%	64.16%	13%	10.5	
40	City of Brantford	44.02%	37.58%	-15%	613.1	
41	Township of McKellar	48%	50.89%	6%	14.1	
42	Village of Merrickville - Wolford	42%	45.59%	9%	0.6	
43	City of Cambridge	29%	29.89%	3%	45.7	
44	Township of Minden Hills	45%	42.07%	-7%	280.9	
45	Municipality of McDougall	38%	37.81%	-0.50%	105.3	
46	Municipality of Chatham-Kent	39.93%	42.11%	5%	22.7	
TOTAL		1968.76/46	2101.42/46	% Avg. =	Variance =	
		42.80%	45.70%	9.760%	18722	
					/46 = 407	
					SD = 20.17	

Figure 1.3.1

#	FULLNAME	2010 turnout %	2014 turnout %	% change	Deviation Squared	
Control Cases						
1	Township of Woolwich	36%	37.71%	5%	82.4	
2	City of Barrie	40%	31.23	-22%	321.1	
3	City of Waterloo	41.16%	35.93%	-13%	79.6	
4	Township of Uxbridge	51.19%	50.59%	-1%	9.5	
5	Municipality of Bayham	31.60%	30.37%	-4%	0	
6	Municipality of Sioux Lookout	56.86%	55.95%	-2%	4.3	
7	City of St. Catharines	30.60%	34.26%	12%	258.6	
8	Township of North Kawartha	34.19%	46.05%	35%	1527.2	
9	Town of Ingersoll	52%	45.26%	-13%	79.6	
10	Town of Gravenhurst	46.16%	37.08%	-20%	253.4	
11	Township of Stirling-Rawdon	57.39%	58.30%	2%	37	
12	Town of Saugeen Shores	53.38%	57.02%	7%	122.8	
13	Municipality of Marmora and Lake	48.50%	43.42%	-10%	35	
14	Haldimand County	44.20%	36.74%	-17%	166.9	
15	City of Welland	41.10%	35.77%	-13%	79.6	
16	Town of Essex	52.55%	51.28%	-2%	4.3	
17	Township of Wellington North	43%	38.24%	-11%	47.9	
18	Township of Howick	41.90%	36.20%	-14%	98.4	
19	City of Thunder Bay	47.43%	46.05%	-3%	1.2	
20	Town of Oakville	40%	33.34%	-17%	166.9	
21	Municipality of Wawa	61.26%	66.53%	9%	171.1	
22	Town of Iroquois Falls	56%	50.41%	-10%	35	
23	Town of Orangeville	36.66%	39.30%	7%	122.8	
24	Town of Midland	39.50%	41.16%	4%	65.3	
25	Town of Amherstburg	60%	47.27%	-21%	286.3	
26	Town of Niagara on the Lake	48.65%	48.42%	-0.50%	12.8	
27	Town of Laurentian Hills	29.74%	37.69%	27%	966	
28	Town of Cochrane	53%	47.77%	-10%	35	
29	Town of Tillsonburg	39.69%	38.46%	-3%	1.2	
30	Town of Erin	40.90%	46.25%	13%	291.7	
31	Town of Bradford West Gwillimbury	39%	41.11%	5%	82.4	
32	City of Orillia	50.98%	40.13%	-21%	286.3	
33	Municipality of Powassan	54%	52.39%	-3%	1.2	
34	Town of Pelham	45%	44.33%	-1%	9.5	
35	Township of Southwold	49.20%	39.05%	-21%	286.3	
36	Town of Collingwood	50%	51.73%	3%	50.1	
37	Township of Brock	46.30%	43.76%	-5%	0.8	
38	Township of Zorra	37.55%	48.41%	29%	1094.3	
39	Township of Ashfield-Colborne-Wawanosh	43%	50.70%	18%	487.5	
40	Township of Horton	61.11%	55.14%	-10%	35	
41	Township of Bonnechere Valley	62.25%	51.91%	-17%	166.9	
42	Township of Amaranth	35.80%	24.51%	-32%	779.5	
43	Township of Ignace	72%	68.41%	-5%	0.8	
44	Municipality of Bluewater	58%	54.01%	-7%	8.5	
45	Municipality of Huron Shores	39.40%	24.87%	-37%	1083.7	
46	Town of Milton	32.64%	33.35%	2%	37	
TOTAL		2130.84/46	2027.86/46	% Avg. =	Variance =	
		46.32%	44%	-4.080%	9773	
					/46 = 212.5	
					SD = 14.57	

Figure 1.4

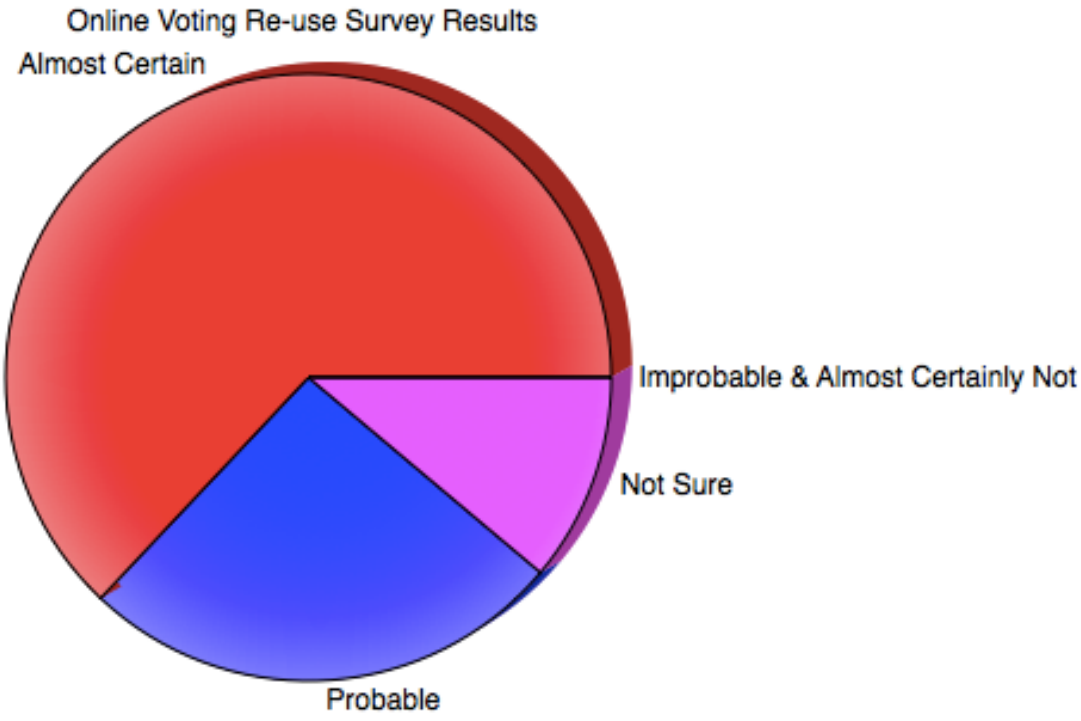
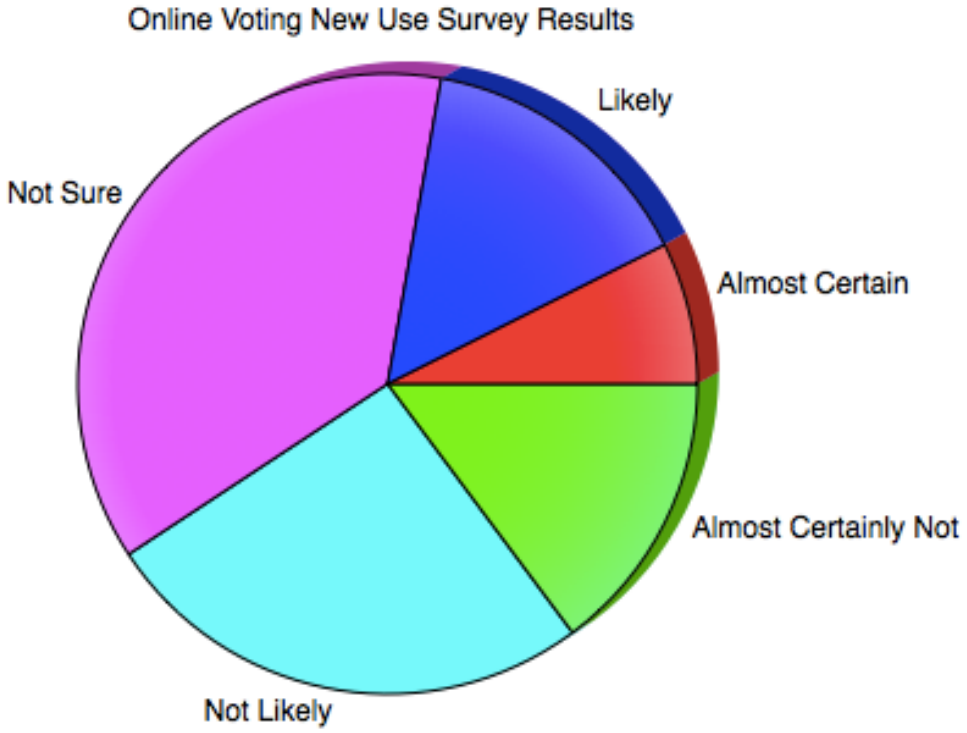


Figure 1.4.1



Bibliography

Blais, Andre. To Vote or Not to Vote. Pittsburgh, PA: University of Pittsburgh Press, 2000.

Bourgon, Jocelyne. A New Synthesis of Public Administration: Serving in the 21st Century. Kingston/Montreal: McGill-Queen's University Press, 2011.

Bradford West Gwillimbury. "Procedures for the Use of Vote Tabulators". June 2014. https://bradfordwestgwillimbury.civicweb.net/document/35094/Procedures%20for%20the%20Use%20of%20Vote%20Tabulators%20-%20June%202.pdf?handle=B541DD1AD4674D81A977D2BAA8778502

Coleman, Stephen and Donald F. Norris. "A new agenda for e-democracy". *Oxford Internet Institute, Forum Discussion Paper No. 4.* January 2005.

Dunleavy, Patrick, Helen Margetts, Simon Bastow and Jane Tinkler. "New Public Management is Dead – Long Live Digital-Era Governance". *Journal of Public Administration Research and Theory, 16(3).* July, 2006. http://www.jstor.org/stable/3840393.

Dunleavy, Patrick and Helen Margetts. "The Second Wave of Digital Era Governance". *APSA 2010 Annual Meeting Paper.* 2010. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1643850

Dyck, Joshua J. and James G. Gimpel. "Distance, Turnout, and the Convenience of Voting". *Social Science Quarterly, 86 (3), pg. 531-548.* September 2005. http://onlinelibrary.wiley.com/doi/10.1111/j.0038-4941.2005.00316.x/abstract

Elections Canada. "Comparative Assessment of Electronic Voting". 2014. http://www.elections.ca/content.aspx?section=res&dir=rec/tech/ivote/comp&document=gen&lang=e

Fraser, Charmaine. "E-Government: The Canadian Experience". *Dalhousie Journal of Interdisciplinary Management, volume 4.* 2009. http://djim.management.dal.ca/issue_pdfs/Vol4/Fraser_The_Canadian_Experience.pdf

Geys, Benny. "Explaining voter turnout: A review of aggregate-level research". *Science Direct Electoral Studies.* 2006. http://www.wzb.eu/sites/default/files/personen/geys.benny.328/electoral_studies_25_4.pdf

Gludovatz, Norman. "Getting the Majority to Vote: Practical solutions to re-engage citizens in local elections". *The Columbia Institute Centre for Civic Governance.* April 2014. http://www.civicgovernance.ca/wordpress/wp-content/uploads/2014/04/Get-Engaged-for-web.pdf

Goodman, Nicole. "The experiences of Canadian municipalities with internet voting". *CEU Political Science Journal.* December, 2010. http://go.galegroup.com.proxy1.lib.uwo.ca/ps/i.do?id=GALE%7CA284754462&v=2.1&u=lond95336&it=r&p=AONE&sw=w&authCount=1

Goodman, Nicole. "Will e-voting boost turnout in Ontario's municipal elections?" *The Globe and Mail.* October, 2014. http://www.theglobeandmail.com/globe-debate/will-e-voting-boost-turnout-in-ontarios-municipal-elections/article21188154/

Hannay, Chris. “Ontarians like online voting, but turnout boost may be minor, study suggests”. *The Globe and Mail.* January 29, 2015. http://www.theglobeandmail.com/news/politics/ontarians-satisfied-with-online-voting-but-turnout-boost-is-minor-study-says/article22696966/

Henderson, Helen. Accessible elections need online voting”. *ProQuest.* April 2011. http://search.proquest.com.proxy1.lib.uwo.ca/docview/864209969?pq-origsite=summon

Hood, Christopher. “Public Management, New”. *Elsevier Science Ltd.* 2001. http://www.christopherhood.net/pdfs/npm_encyclopedia_entry.pdf

Javed, Noor. “Ajax ditches paper ballots for online municipal election”. *The Toronto Star.* October 2014. http://www.thestar.com/news/gta/2014/10/06/ajax_ditches_paper_ballots_for_online_municipal_election.html

Library of Economics and Liberty. “Opportunity Cost”. *Liberty Fund, Inc.* http://www.econlib.org/library/Topics/College/opportunitycost.html

Oster, Emily. “Time is Money”. *Slate.* 2013. http://www.slate.com/articles/double_x/doublex/2013/02/time_is_money_opportunity_cost_can_help_you_figure_out_how_much_your_time.html

O’Sullivan, Elizabethann, Gary R. Rassel, and Maureen Berner, (2008). Research Methods for Public Administrators, 5th ed., New York: Pearson Longman

Shaw, Douglas W. “Searching for the Opportunity Cost of an Individual’s Time”. *Land Economics.* February 1992. http://www.jstor.org.proxy1.lib.uwo.ca/stable/3146747?Search=yes&resultItemClick=true&searchText=%2522Searching%20for%20the%20Opportunity%20Cost%20of%20an%20Individual's%20Time.%2522&searchUri=%252Faction%252FdoBasicSearch%253FQuery%253D%25E2%2580%259CSearching%252Bfor%252Bthe%252BOpportunity%252BCost%252Bof%252Ban%252BIndividual%2527s%252BTime.%25E2%2580%259D%2526amp%253Bacc%253Don%2526amp%253Bwc%253Don%2526amp%253Bfc%253Doff%2526amp%253Bgroup%253Dnone&seq=1#page_scan_tab_contents

Smart, Stephen. “Online voting gets thumbs down from Elections BC”. *CBC News.* October 23, 2013. http://www.cbc.ca/news/canada/british-columbia/online-voting-gets-thumbs-down-from-elections-bc-1.2187349

Smith, Dean. “2014 Summary list of municipalities e-voting”. *Intellivote Systems Inc.* 2014.

Statistics Canada. “From urban areas to population centres”. February, 2011. http://www.statcan.gc.ca/subjects-sujets/standard-norme/sgc-cgt/notice-avis/sgc-cgt-06-eng.htm

Statistics Canada. “Internet use by individuals, by location of access, by province (Ontario)”. 2010. http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/comm36g-eng.htm

Unknown Author. “Online voting only for Leamington, Ont., municipal election”. *CBC News.* April 02, 2014. http://www.cbc.ca/news/canada/windsor/online-voting-only-for-leamington-ont-municipal-election-1.2595300

U.S Department of Transportation. “The Value of Saving Travel Time”. September 2011. http://www.dot.gov/sites/dot.dev/files/docs/vot_guidance_092811c.pdf

Wellsbury, Nicole. “2014 Municipal Election in Ajax”. *AMCTO Municipal Clerks Forum.* April, 2015.

Wood, Curtis. “Voter Turnout In City Elections”. *Urban Affairs Review, 38 (2).* November 2002. http://journals2.scholarsportal.info.proxy1.lib.uwo.ca/pdf/10780874/v38i0002/209_vtice.xml