



# Channel choice and public service delivery in Canada: Comparing e-government to traditional service delivery

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## ABSTRACT

This study examines channel choice and public service delivery in Canada, comparing e-government to traditional service delivery channels such as the phone or visiting a government office. Factors studied include the digital divide, the nature of the citizen interaction with government, public service values, and satisfaction with services received by citizens. These factors are used to determine whether they impacted choice of channel and satisfaction with that channel. This study, through logistic regression of a public opinion survey of Canadian residents, found indications suggesting a digital divide in accessing e-government; found that government websites were most commonly used for information purposes, while the phone was most commonly used to solve problems. In regards to citizens' satisfaction, the apparent digital divide was bridged when females and older Canadians were more satisfied with their contact with a government website. In addition, a positive experience with service delivery and positive public service values lead to greater website satisfaction. The results of this study imply that the phone is a more effective service channel for solving problems, and the website is more effective for getting information. Therefore, governments need to provide multiple contact channels for citizens, depending upon their task at hand, while ensuring consistency of information and service response across channels. Creating a positive experience for citizens when they received a service translates into a more satisfied experience with e-government.

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## 1. Introduction

This study examines citizens' use of and satisfaction with e-government compared to traditional service channels. Electronic government or e-government uses digital means through a website or email, or other digital methods, for citizens to initiate contact with government (Kanat & Ozkan, 2009; Kolsaker & Lee-Kelly, 2008). There remain other, more traditional, methods such as visiting a government office, or calling a government agency over the phone. One of the original visions for the development of e-government was to create a more citizen-focused government (Aikins & Krane, 2010; Bertot, Jaeger, & McClure, 2008; Thomas & Streib, 2003; Torres, Pina, & Acerete, 2006). This study examines factors that explain citizens' use of one contact channel over another, something that has received very little scholarly attention in the public administration literature (Ebbers, Pieterston, & Noordman, 2008; Ong & Wang, 2009; Streib & Navarro, 2006). This study also examines the level of satisfaction that citizens have with e-government compared to traditional service channels.

Some existing literature on citizens and e-government has examined why certain channels are used and preferred by citizens (Pieterston & Ebbers, 2008), with much of the existing literature examining the supply of e-government (Andersen & Henricksen, 2006). However, there is no empirical research, that we are aware of, that examines satisfaction with contact channels and few public opinion surveys have been analyzed examining citizens and their reactions to e-government (Gauld, Goldfinch, & Horsburgh, 2010; Reddick, 2010; Thomas & Streib, 2003). This is an important piece of the puzzle that is missing, since one needs to know the relative satisfaction that citizens have with e-government compared to other alternative service channels to determine its effectiveness (Cohen, 2006).

Given the large sums of money that are invested in public sector service delivery, and e-government in particular, determining effectiveness is extremely important, since many information systems projects end up in failure (Goldfinch, 2007). Research shows that e-government development lags behind the private sector in the delivery of high quality services to citizens (Morgeson & Mithas, 2009), which should be of concern to governments. In addition, there is little research that examines e-government in Canada (Allen, Juilett, Paquet, & Roy, 2001; Roy, 2006; Roy, 2007). For example, the United Nations, 2010 survey of e-government ranked Canada third, West's, 2007 rankings found Canada to be sixth (United Nations, 2010; West, 2007), and Accenture ranked

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Canada first in e-government from 2001 through 2005 (Government of Canada, 2006).

Channel choice is the use by citizens of one media channel compared to another. Channel choice comes from the use and gratification literature in media studies (Kaye & Johnson, 2002). To the extent that one media is perceived as superior for meeting a particular need or serving a particular function, people will choose that media over others (Althaus & Twesbury, 2000). Essentially, citizens use different contact channels depending upon the utility and gratification that they receive. The satisfaction with the channel choice is a newer literature and something important to the study of public administration in line with the evaluation of program effectiveness (Cohen, 2006; Thomas & Streib, 2003). Citizens may use one channel compared to another, but are they satisfied with the experience that they have using a specific channel? This is especially important for understanding the digital divide in which certain demographic groups are more likely to adopt e-government such as the younger, educated, and higher income (Morgeson, VanAmburg, & Mithas, 2010).

There are two research questions addressed in this paper: (1) What factors explain citizens' use of e-government compared to traditional channels when they want to obtain information or receive a service from their government? and (2) What factors explain citizens' satisfaction with e-government compared with traditional service delivery channels? These questions are addressed through an examination of a large public opinion survey of citizens across Canada, asking them their opinions on government service delivery.

In order to understand channel choice and service delivery the following section of the paper provides background information on the evolution of citizen-centric e-government in Canada. This is followed by a framework for understanding why citizens choose one channel over another, and what satisfaction is derived from these contacts. There is next a presentation of the research methods used in this study. This is followed by the examination of the results of the statistical tests of the public opinion survey. The conclusion provides a discussion of the results and limitations, and future research is proposed.

## 2. Citizen-centric e-government in Canada

Canadian e-government has an interesting history, similar to other countries, of instilling citizen-centric e-government policies and attitudes. This section of the paper provides an overview of its evolution (Fig. 1). The first Canadian government Web sites began to appear in 1994, after Mosaic, the first effective browser, appeared in 1993, and by 1995, the federal government had established its first web portal. By the late 1990s, all provincial governments had their own web portals, as did many major cities. However, at this stage such facilities were portals in name only, essentially being a list of links to various services and information sites operated by disparate departments and agencies of each government.

Earlier federal government decisions which helped create the environment whereby it became practical to offer online or e-government services had included establishment of the Electronic Commerce branch and Information Highway group within Industry Canada and development of legislation in the 1990s designed to ensure that electronic transactions would have the same standing in law as regular paper-based transactions. This included acceptance of electronic signatures and provision of privacy protection through passage of the Personal Information Protection and Electronic Documents Act (PIPEDA) in 2000. Federal Cabinet decisions had also included the SchoolNet program, whereby all 15,300 schools, including 480 First Nations schools and 4800 libraries across the country were connected to the internet by April 1999 (Industry Canada, 2004), and the associated Computers for Schools program, which has supplied equipment to schools. Canada was the first nation to achieve this goal of connecting all schools to the internet (Industry Canada, 2003). The first year of SchoolNet was concurrent with the launch of the Community Access Program (CAP) in 1994 managed by Industry Canada, which provided computers with internet connections in local community centers (Industry Canada, 2004). As of March 2002, approximately 9200 CAP sites had been established. A later study funded by Industry Canada also determined that there had been significant social benefits to facilitating

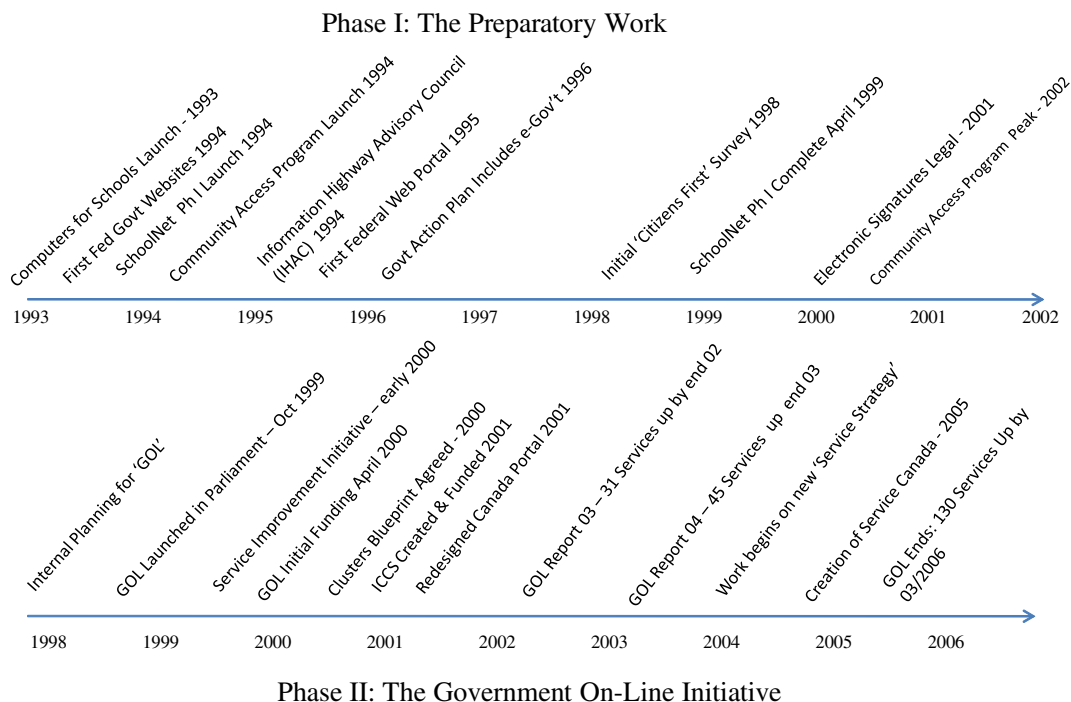


Fig. 1. Canada's federal e-government timeline.

broader connectivity at the community level through the CAP model, although 1200 of those early sites had been closed by the time of this evaluation (Secor, 2003).

Also in 1994, a federal external blue ribbon panel was appointed, entitled the Information Highway Advisory Council (IHAC). Its first reports stressed the importance of ensuring widely available access by Canadians to electronic networks as a means of ensuring broader public participation (Information Highway Advisory Council, 1995). In its response to the work of IHAC, the government set out a four part action plan with the objective of improving government services in an affordable manner in support of the government's Information Highway theme (Borins et al., 2007).

In 1998, work began on the framework for a federal government-wide initiative that would focus government resources on development of electronic service delivery using the internet to permit citizens to obtain services from the government departments and agencies. These citizen-centric e-government proposals were announced in the October 1999 speech from the throne, the centerpiece of the opening of a new Parliamentary Session in Canada (Parliament of Canada, 1999, September 12: 4): "Our goal is to be known around the world as the government most connected to its citizens, with Canadians able to access all government information and services on-line at the time and place of their choosing." From this, the Government On-Line (GOL) initiative was implemented. The GOL Initiative was to be implemented as a service improvement opportunity, leveraging technology to bring government information and transactional services closer to the nation's citizens and businesses.

In keeping with the citizen-centric approach to putting government services online, the government approved an overall GOL vision of using information and communication technology to enhance Canadians' access to improved citizen-centered, integrated services, anytime, anywhere, and in the official language of their choice. The specific goal was to have the most frequently used federal services available online by 2005.

The term *citizen-centered* appears in the full wording of the GOL Vision adopted by the GOL senior oversight committee (Treasury Board of Canada Secretariat, 1999). It then came into common usage, indicating a focus on ensuring attention to accessibility, security, efficiency, and effective service and information delivery as seen from the user perspective, while being able to respond quickly to changing service expectations. Officials stressed that information and services were to be provided in a seamless manner that addressed citizen and business needs (i.e., a 'No-Wrong-Door' approach).

Early in 2000, the government then announced the Service Improvement Initiative (SII), aiming to achieve a 10% increase in the overall citizen/client satisfaction with federal services by 2005. The service improvement goal was formally integrated into the GOL initiative during the early delivery planning phase.

Also in 2000, the Treasury Board approved the cluster blueprint concept of three major gateways, each with multiple interest areas or clusters, so that users were offered multiple avenues of access to informational and transactional services (Mantagaris, 2003). In 2001, the main federal web portal, referred to as the Canada Site, was completely redesigned and relaunched around the cluster approach, based largely on citizen and business consultations, through use of focus groups, online surveys, and user emails (Government of Canada, 2003). By this stage, the focus on developing e-government services was felt to be in line with citizen desires and guidance, to the point that by 2002, a European research group noted that Canada's approach stands out because "information and services are not provided along the administrative structures, but are instead offered according to user needs" (Bertlesmann Foundation, 2002, p.8).

It was apparent that Canadians strongly supported putting government information and services online in this citizen-centric approach. A series of extensive surveys in 2002 indicated that more than 80% of citizens surveyed agreed with the government's

increasing use of information technology (Ekos, 2002); and 70% of internet users thought that it is important to put all government services online. Almost 50% of Canadians expected that the internet would be their primary way of interacting with government in five years (Ekos, 2002). About 80% would prefer to access related government services through a single website—a "one stop shop" (Malatest, R. A. & Associates, Ltd, 2002).

In 2005, Accenture had rated Canada as first in e-government (for the fifth year in a row) and first in citizen-centered service maturity. On the Accenture index, Canada ranked 64 points in citizen-centered interactions, compared to the United States at 49 points and the United Kingdom at 39 (Accenture, 2005). By 2007, in its annual review of government service delivery, Accenture rated Canada second (at 88%) to Singapore (89%) in what it terms "Customer Service Maturity," with the next closest nation being the United States at 79% (Accenture, 2007). Apparently, this improved result was largely the impact of a revised methodology from previous years which the authors indicate now factored in citizen feedback.

At the formal conclusion of Canada's federal GOL initiative at the end of March 2006, 130 services were available online, with 63 of the 123 public services considered informational, and 67 transactional. The online share of public transactions with the federal departments and agencies had gone from a small proportion in the late 1990s to 22% in 2002, to 30% in 2005, and the volume of transactions with the federal government had increased markedly from 62 million in 2002, to 72.1 million in 2005, excluding Canadian Border Services, the Post Office, and other Crown Corporations. Total recorded interactions with the federal government had increased significantly over a similar period, rising from a recorded 470 million in 2001 to 1.1 billion in 2005 (Government of Canada, 2006).

In 2005 the federal government announced the creation of the new Service Canada agency. Since then, the focus has been largely on service integration, wherein online service delivery over the internet or other telecommunications-supported media is but one of a number of service channels, which must each be capable of providing efficient and effective services with consistent results across various geographies, technologies, and user groups. Channel management and client segmentation are now terms in frequent use within the federal government. Increasingly, it appears that citizens will often use multiple service channels during a single transaction, as the data reviewed for this study confirms.

### 3. Frameworks for understanding channel choice and satisfaction

Figs. 2 and 3 provide two frameworks for understanding the relationship between contacting government through e-government (website and/or email) compared to more traditional contact channels (phone or visiting a government office). Both figures also show the expected positive, or negative, impacts on channel choice and satisfaction using e-government and the traditional methods of contact. There are two dependent variables as shown on the right side of Figs. 2 and 3, which are choice of channel and satisfaction with channel choice. The literature on why citizens initiate contact with government through different channels identifies four factors which are the independent variables used in this study. Specifically, the independent variables can be grouped into the digital divide, the nature of the interaction, the value placed on public services, and citizens' overall satisfactory experience with government service delivery.

#### 3.1. Digital divide and demographics

The digital divide is commonly known as the difference between individuals that have access to the internet and individuals that do not have access (or have limited access) to the internet (Helbig, Gil-Garcia, & Ferro, 2009; Van Deursen & van Dijk, 2009). The digital divide is normally related to the demographics of certain populations (Morgeson et al., 2010; Mossberger, Tolbert, & Stansbury, 2003). As shown in Fig. 2, there

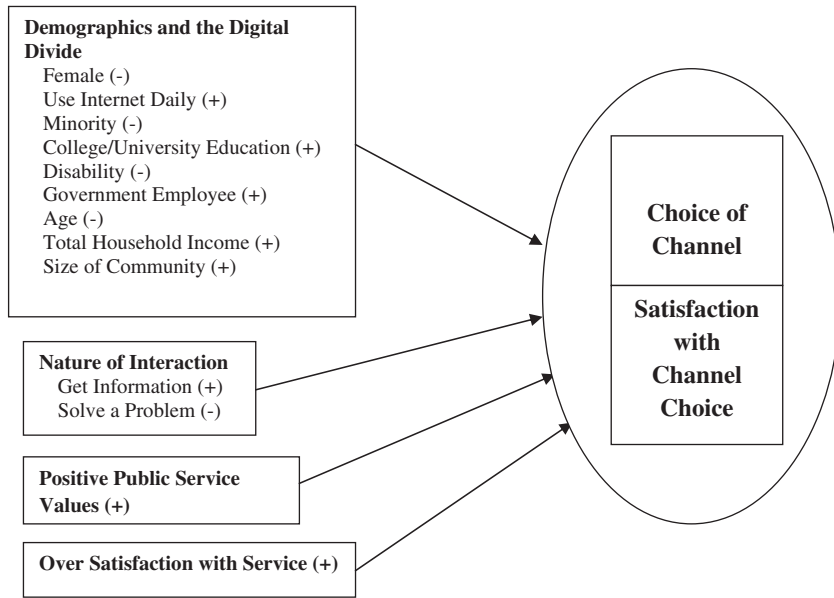


Fig. 2. Channel choice and satisfaction with contacting government through e-government (website or email).

are certain demographic groups, as noted in the literature, that are more likely to have less access to the internet. The predicted directions of impacts from demographic factors on using e-government are shown in Fig. 2. Fig. 3 also shows the predicted direction of the impact of the digital divide variables on the traditional methods of phone and office visits for citizens.

For instance, research shows that females compared to males tend to have less access to the internet (Al-Rababah & Abu-Shanab, 2010; Mossberger et al., 2003), though none of these studies focused specifically on Canada. This digital divide is applicable to minority groups, in general, who often have less access to the internet (Morgeson et al., 2010; Thomas & Streib, 2003). Those citizens that have university or college education should have greater access to the internet and e-government; therefore, there is usually a digital divide in terms of education level (Belanger & Carter, 2009; Norris, 2001). There is predicted to be a digital divide in regards to whether the person has a disability, which may prevent them from obtaining full access to the

internet (Helbig et al., 2009). Other areas related to the extent of any digital divide are the level of income that the individual has, which may prevent them from being able to access the internet (Belanger & Carter, 2009; Norris, 2001) and the size of the community in which the person lives, which is predicted to have a positive impact, with larger-sized communities having more resources to devote towards internet access (Noce & McKeown, 2008). Finally, being a government employee could explain increased access to and use of e-government services, since these employees may be more familiar with government, its structures and functions and, therefore, may be more adept at using the internet to contact government.

3.2. Nature of interaction

As shown in Figs. 2 and 3, a second area that is predicted to be related to channel choice and satisfaction is the nature of interaction that citizens have with their government (Pieterse & van Dijk, 2007; Reddick,

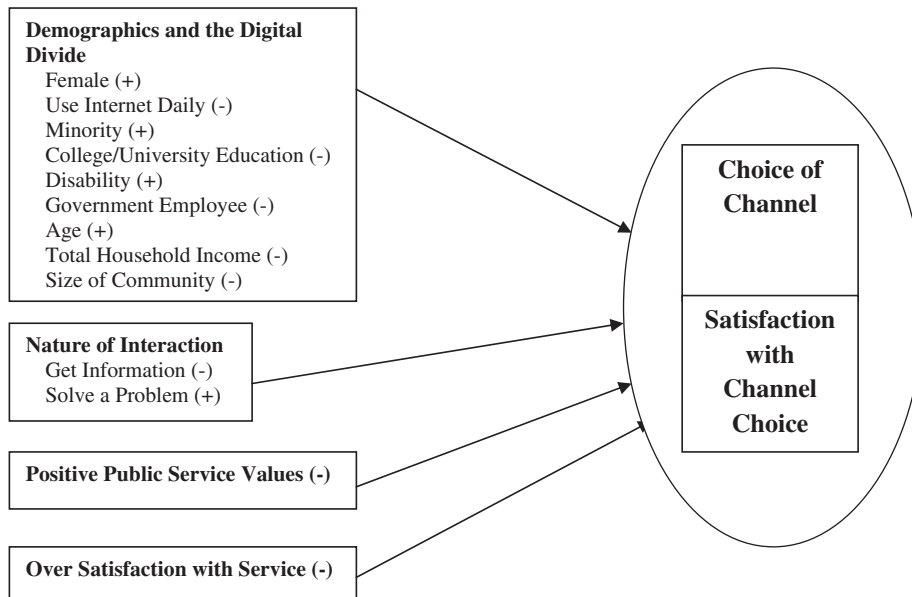


Fig. 3. Channel choice and satisfaction contacting government with a phone or visiting a government office.

2005). Research shows that individuals that only need information are more likely go online to a website to get information, and individuals that need to solve a problem would most likely turn to the phone or visit an office (Reddick, 2010). Therefore, differences in choices depend upon the task at hand, and citizens may choose different contact channels, or a combination of channels, depending upon the nature of the interaction that they have with their government. This can be problematic for governments since traditional service channels, such as the phone and visiting a government office, can be much more expensive to maintain than e-government (Moon, 2002).

### 3.3. Public service values

The values that citizens place on public service are also an important predictor of understanding channel choice (Figs. 2 and 3). If citizens believe that their public service provides good quality services to them, this should have an influence on channel choice (Carter & Belanger, 2005; Morgeson et al., 2010; Parent, Vandebek, & Gemino, 2005; Tolbert & Mossberger, 2006; Welch, Hinnant, & Moon, 2004; West, 2004). For instance, do citizens trust their public servants to do the right thing? Are citizens treated fairly by public servants? Are there competent managers in charge of public sector agencies? Is there strong leadership in the public service? Essentially, whether citizens believe strongly in their public service working for them and in their best interests should have an influence on their choice of channel. If citizens rate the public service highly they may be more likely to use e-government as a channel choice, since they are more likely to trust the information on a government website (see Fig. 2). This research predicts that those that rate public service in a positive manner would rely more on e-government to get service or information.

### 3.4. Satisfaction with service received

As shown in Figs. 2 and 3, a final area examined is the overall satisfaction that citizens place on the service that they receive from their government (Cohen, 2006; Welch et al., 2004). E-government is said to lead to greater satisfaction with service received because of its convenience and ability to empower citizens to make their own choices for needed information or services (Roy, 2006; Torres, Pina, & Acerete, 2005, 2006, Torres et al., 2006). The opposite is the case for traditional service channels, where citizens may become frustrated with attempting to navigate interactive voice response (IVR) systems to speak to an actual public servant over the phone, or with visiting a government office and experiencing delays through waiting in line. Therefore, the

impact of overall satisfaction and service delivery is examined in this paper as a driver of channel choice and satisfaction.

## 4. Research methods

This paper uses data from a national survey administered between October and December 2007 by the Institute for Citizen-Centered Services<sup>1</sup> (ICCS) in Canada to residents across the country asking their opinions on services they have received from their federal, provincial/territorial, and municipal governments (Table 1). The survey asked citizens their overall rating of services for the different levels of government and found that citizens rated their satisfaction level at around 50 on a 100 point scale for the different levels of government. There does not appear to be much difference in the level of satisfaction with services received from the different levels of government.

There was both a mail version of the survey and an internet version that was sent out to a large representative sample of Canadian residents. All of the provinces and territories were included in the survey and it was administered in both English and French across the country. This was the fifth time that the ICCS administered this type of survey to residents in Canada. The overall response rate for the survey was 13% for the mail and 13% for the internet version, which is similar to the response rate for past surveys.

Comparing this response rate to a Pew Internet & American Life survey of government online, which showed a response rate of 19.1%, indicates that the ICCS survey had a slightly lower response rate to a comparable study (Pew, 2010). However, the sample size is very large with 6743 respondents, while the Pew survey sample size is only one third of this size at 2258 respondents for a population ten fold greater. This research is limited in that the survey was completed at the end of 2007. There have been some changes, most notably social media technology and their use by government. However, even knowing the dataset is somewhat dated, it does provide valuable information on the main contact channels that citizens would use and satisfaction with those contact channels. In addition, the survey data is unique and different from the Pew survey, since it asked about citizen satisfaction with each of the major contact channels, something the Pew survey does not address.

In order to determine how representative the sample is compared to the Canadian population, Statistics Canada census information is compared. According to census data, the median total family income for 2008 was \$68,860, whereas for the survey respondents it was in the range of \$30,000 to \$49,999. There was 20.7% of the workforce in Canada composed of government workers, which is similar to the survey respondents at 19%. According to census data, 39.8% of Canadians hold at least a college education, while for the survey respondents it was 42%. Finally, minorities composed 16.2% of the Canadian population, while for the survey respondents it was 13%.

**Table 1**

Regional distribution of the survey sample.

Jurisdiction	Number of responses	Percent
Newfoundland and Labrador	123	1.8
Prince Edward Island	36	0.5
Nova Scotia	200	3.0
New Brunswick	136	2.0
Quebec	1573	23.3
Rest of Ontario	1651	24.5
Toronto, Ontario	532	7.9
Peel, Ontario	254	3.8
York, Ontario	196	2.9
Manitoba	246	3.6
Saskatchewan	199	3.0
Rest of Alberta	476	7.1
Calgary, Alberta	217	3.2
Rest of British Columbia	765	11.3
Vancouver, British Columbia	119	1.8
Yukon Territory	6	0.1
Northwest Territories	9	0.1
Nunavut	5	0.1
Total	6743	100

<sup>1</sup> The predecessor to the ICCS began in 1997, with the creation of the volunteer Citizen-Centered Service Network (CCSN), consisting of an interdisciplinary team working across jurisdictional and organizational boundaries. The CCSN was set up by a group of public servants working within the federal, provincial/territorial, and municipal governments to examine ways of improving citizen focused services across all levels of government. By 1999 this group, working with the support of the non-profit group the Institute of Public Administration of Canada (IPAC), and with funding from government, had developed the first Common Measurement Tool (CMT), carried out the initial Citizens First survey across selected federal/provincial/local governments in Canada, and began to collect and organize performance information in a database. By 2001, the ICCS was established as a jointly funded endeavor of the individual participating government organizations across Canada, with one staff member seconded from each of the Canadian federal and Ontario (provincial) governments (Prychokow & Vincent, 2002). Since 2005, the Institute has been incorporated as a non-profit organization, with a Board of Directors representative of the various jurisdictions which fund and participate in its work. It is still largely funded through in-kind and financial contributions from each participating government. Its surveys are all developed, executed, and analyzed by contracted professional polling firms.

Comparing the population as a whole in Canada with the survey respondents there were no major differences, except for income levels.

There are two primary research methods that are employed in this study to analyze the survey data. The first method is the use of descriptive statistics examining the mean, standard deviations, and range of the data. The second method is through logistic regression examining how the four factors outlined in the literature review of demographics and the digital divide, nature of interaction, satisfaction with the service, and public service values explain channel choice and satisfaction.

## 5. Descriptive statistics

In order to get a feel for the data used in this study, descriptive statistics are reported on the dependent and predictor variables that are examined in this study (Table 2).

### 5.1. Choice of channel and satisfaction

There are four dependent variables that examine the choice of channels that citizens use when they contacted their municipal, provincial/territorial, or federal government in Canada for a service in 2007. Examining the mean values, the most common contact channel for citizens was over the phone, with 51% of respondents to the survey using this contact method. Office visits were the second most commonly used contact channel for citizens, with 44% of individuals using this method. Not far behind was using a government website, done by 43% of citizens that were surveyed. The least common method of contacting government was through email, at only 12% of respondents to the survey using this method. However, summing the contacts via the website and email, the internet was the most commonly used contact channel for citizens in Canada at 55%. The figures add to well over 100%, indicating that completion of many services involved more than one channel, which is itself an important factor.

**Table 2**  
Descriptive statistics of the dependent and predictor variables.

	N	Minimum	Maximum	Mean	Standard deviation
<i>Dependent variables</i>					
Office	6743	0	1	0.44	0.50
Phone	6743	0	1	0.51	0.50
Website	6743	0	1	0.43	0.50
Email	6743	0	1	0.12	0.32
Satisfied office	2948	0	1	0.60	0.49
Satisfied phone	3429	0	1	0.46	0.50
Satisfied website	2927	0	1	0.58	0.49
Satisfied email	804	0	1	0.48	0.50
<i>Predictor variables</i>					
<i>Demographics and the digital divide</i>					
Female	6743	0	1	0.51	0.50
Use internet daily	6743	0	1	0.79	0.41
Minority	6743	0	1	0.13	0.34
College/university education	6743	0	1	0.42	0.49
Disability	6743	0	1	0.13	0.34
Government employee	6743	0	1	0.19	0.39
Age	6700	1	6	3.28	1.28
Size of community	6556	1	6	2.58	1.25
Total household income (before taxes)	5106	1	7	4.43	1.56
<i>Nature of the interaction</i>					
Get information	6743	0	1	0.29	0.46
Solve a problem	6743	0	1	0.21	0.41
Positive public service values	6743	0	10	1.99	2.82
Overall satisfied with service received	6194	1	5	3.35	1.36

Table 2 also provides information on the level of satisfaction that citizens have with each of the four contact channels. This question was worded on a 5-point Likert scale ranging from "not at all satisfied" to "very satisfied." The satisfied and very satisfied scores were collapsed and coded as "1" for satisfied and "0" otherwise. The greatest level of satisfaction was with citizens going into a government office to get a service, at 60% of respondents being satisfied with this method of contact. This was followed by 58% of respondents being satisfied with the use of a government website for the service or information they received. The least level of satisfaction was with citizen-initiated contacts over the phone and email, with each of these channels registering only 46% and 48% satisfaction levels, respectively.

Overall, the descriptive statistics in Table 2 indicated that the phone was the single most commonly used channel to contact government for information or a service. However, when combining the website and email the internet is then the most commonly used channel. In addition, even knowing the phone was the most used, it has the least citizen satisfaction. The most satisfaction was with citizens visiting an office for information or a service. Clearly, there are alternative sources of contact channels available to citizens. Therefore, understanding why each of them is selected and how each is used, in comparison to the other, can provide valuable insights into how and why citizens initiate contact with their government.

### 5.2. Predictor variables

As mentioned in the literature review, there are four areas that are important in the channel choice literature that are tested in this study (Table 2). The first area is the demographic statistics, which showed that the sample of respondents was 51% female, almost 80% of respondents used the internet daily, 13% was from a minority group, and 42% had at least a community college diploma or university degree. Some other characteristics of respondents were an average age range of 35–49 years or a score of 3.28; 13% of them said they had a disability; 19% were government employees; and the average household income for respondents was \$30,000 to \$49,999. The size of the community the average respondent was located in was between 100,000 and 1,000,000 residents.

The survey asked questions on the nature of the citizens' interaction with government. Respondents were given five choices and were allowed to check more than one category, if necessary. In regards to the nature of the interaction that respondents had with their government, 29% of respondents were seeking general information, while 21% of respondents needed to contact government to get a problem solved. The remaining categories that are not shown in Table 2 are for routine transactions such as paying taxes or getting a library book, completed by 22% of respondents. Application or registration such as for a permit, license, or certificate was done by 28.7% of respondents. There was also a category for any other types of interaction at 19.1%. However, since the existing literature focuses on using e-government to solve problems and obtaining information only these categories were tested in this study.

The positive public service values question was the summation of agree and strongly agree responses to 10 Likert scale questions on how citizens rated their experience with public services and officials in general, rather than for the specific service received. The public service was defined as people and agencies within government that provided the respondent government services. The lowest score question was in regard to the respondent's view on whether the public service is honest in its dealings with citizens, with only 7% of respondents agreeing to this statement. The highest scored question at 31% was whether the public service provides good quality service to "citizens like me". Using a scale from 1 to 10 for the question, the highest score was 10, and the average score for citizens that responded to the survey was 1.99. Therefore, just 2 out of 10 citizens that

responded had a positive impression of public services in Canada. This is a rather low score given the diversity of question asked and responses provided. For example, there were about one third of respondents that had neutral responses for these 10 questions.

The final question addressed in Table 2 shows descriptive statistics for citizens' views on their overall satisfaction with the most recent service they received. The range here was on a 5-point Likert scale, ranging from strongly disagree (1) to strongly agree (5) and the average score was 3.35, which indicated that agree was the most common response. Therefore, when citizens received a service in Canada they were generally satisfied with their outcome. The difference between the general public perception of public service and officials as noted above, on the one hand, and the public's views regarding their most recent actual service experience on the other hand, has been a consistent and notable feature throughout several ICCS surveys.

## 6. Logistic regression of channel choice

Table 3 provides logistic regressions examining the four factors of demographics and the digital divide, nature of interaction, public service values, and overall satisfaction with service received, to determine whether this explained the use of each of the contact channels. Each of the channels was coded as 1 if the citizen used that channel and 0 if it was not used. The Odds Ratio (OR) was calculated for the logistic regressions to examine the likelihood of each of the events occurring, of using the phone, website, email, or visiting an office.

### 6.1. Demographic variables and the digital divide

For the demographic variables, some of what is written in the digital divide literature may be applicable to Canadian citizens and their contact with e-government (Table 3). For instance, females were less likely to use a website to get a service or information from government, with an OR of 0.87. While those citizens that used the internet daily were four times more likely to visit a government website (OR = 4.16). As the age of the person rises, they were less likely to visit a government website (OR = 0.81). Finally, individuals in larger-sized communities were less likely to frequent a government website (OR = 0.85). Overall, the demographic factors showed evidence that there were some aspects of the digital divide present in Canadian e-government. However, other socio-cultural factors may be at play here, which we explore further in the discussion section of the paper.

Examining the other contact channels, such as the phone, there is evidence that females were more likely to use the phone (OR = 1.39), and as age increases there was a greater likelihood of an older person using the phone to contact their government (OR = 1.09). When comparing websites to phones, females and the elderly tended to turn to the phone to contact government rather than the website.

Out of the four contact channels examined, email contacts had the most demographic factors that were statistically significant. When it came to using email to contact government, females were less likely to use this method (OR = 0.73), minorities were more likely (OR = 1.27), those with a college or university education were more likely (OR = 1.20), and those with a disability were more likely (OR = 1.39). If an individual used the internet daily, they were over three times more likely to use email to contact government (OR = 3.16). Overall, there were many of what are traditionally considered digital divide factors present in email contacts, but some of them showed evidence of statistical significance in opposite directions than predicted. For instance, one would have predicted that minorities and those with disabilities would be less likely to use email to contact government because of the digital divide, but they turned out to be more likely to use this contact channel. It may be that individuals with disabilities have accessibility issues preventing them from contacting government through an office visit; therefore, email would make sense to get a service or information. This finding also suggests that these two groups are more comfortable using a text-focused method, perhaps due to either their tentative command of English or French (for minorities, of which a significant proportion are first generation immigrants) or, for those with disabilities, it may be that a proportion of these have challenges with verbal conversation or near real-time internet interactions, but are able to use a keyboard and mouse. However, without more detailed research, it's not possible to confirm if this is the case.

Finally, for office visits, citizens with a college or university education were more likely to contact government (OR = 1.27), as well as those individuals in larger-sized communities (OR = 1.05). As the age of someone rises, they were just slightly less likely to visit a government office (OR = 0.95). The results for the office visits were interesting in that college educated individuals were more likely to visit an office; however, one would expect them to be more likely to use the internet for contacts. A college-educated individual may have more complicated dealings with government and, therefore, need that office visit rather than getting a service online. This finding could also be related to the personal ability or fluency in communicating face-

**Table 3**  
Logistic regression of channel choice.

Predictor variables	Website		Phone		Email		Office	
	Odds ratio	Prob. sign.	Odds ratio	Prob. sign.	Odds ratio	Prob. sign.	Odds ratio	Prob. sign.
<i>Demographics and the digital divide</i>								
Female	0.87**	0.03	1.39***	0.00	0.73***	0.00	0.97	0.62
Use internet daily	4.16***	0.00	1.00	0.96	3.16***	0.00	0.85	0.06
Minority	1.18	0.08	1.15	0.13	1.27**	0.05	1.00	0.95
College/university education	0.97	0.61	1.05	0.44	1.20**	0.05	1.27***	0.00
Disability	1.11	0.24	0.95	0.54	1.39***	0.00	1.14	0.11
Government employee	1.02	0.86	0.96	0.58	0.96	0.75	0.95	0.48
Age	0.81***	0.00	1.09***	0.00	1.06	0.11	0.95**	0.04
Total household income (before taxes)	1.01	0.67	0.97	0.19	0.99	0.65	0.99	0.53
Size of community	0.85***	0.00	1.04	0.11	1.01	0.81	1.05**	0.05
<i>Nature of the interaction</i>								
Get information	3.03***	0.00	1.87***	0.00	1.98***	0.00	0.74***	0.00
Solve a problem	0.90	0.19	4.32***	0.00	1.46***	0.00	0.71***	0.00
<i>Positive public service values</i>								
Overall satisfied with service received	0.96***	0.00	0.99	0.43	0.99	0.41	1.01	0.40
Constant	0.99	0.66	0.75***	0.00	0.89***	0.00	1.08***	0.00
Nagelkerke R-square	0.66**	0.04	1.39	0.10	0.05***	0.00	0.94	0.73
	0.19		0.19		0.08		0.03	

\*\*\* Significant at the 0.01 level.

\*\* Significant at the 0.05 level.

to-face from the better educated. It also might be due to the fact that not all services are available online and therefore the individual needs to go into a government office. Since the data does not indicate purpose of the contact it is impossible to determine the reasons for this result, which again suggests a need for more detailed research to determine if there are unexpected impediments for this group in electronic access, or if some other factor is at work. E-government services planners need to better understand these phenomena.

## 6.2. Nature of interaction

In addition to the demographic factors, the nature of interaction citizens had with their government showed some interesting results (Table 3). Regarding government websites, citizens were three times more likely to use this channel if they needed information from their government (OR = 3.03). While citizens that used the phone were 1.87 times more likely to use this channel for information from government and 4.32 times more likely to use the phone to solve a problem. It appears that the website is the preferred source for information for citizens in their initial interaction with government, but the phone is the more frequent source for citizens seeking to resolve problems. Email contacts data showed that individuals that used this method were 1.98 times more likely to get information and 1.46 times more likely to use the email for solving a problem. While citizens that visited a government office were less likely to use this contact channel to solve a problem (OR = 0.74) and get information (OR = 0.71). Overall, the nature of interaction results showed that a government website was the preferable source for getting information, while email and the phone were preferable channels for solving problems as well as useful for getting information. But in visiting a government office, citizens were the least likely to do these two types of interactions, which raises interesting questions as to the purpose of their visit, if not to obtain information or resolve a problem. Perhaps a significant proportion of office visits were driven by the necessity of picking up or dropping off official documents or personally appearing to confirm eligibility for a service. Again, further research is indicated.

## 6.3. Public service values

There was little evidence that if citizens had positive public service values, this impacted use of the four contact channels. However, with

positive public service values, citizens were slightly less likely to visit a government website (OR = 0.96).

## 6.4. Citizen satisfaction with service

If citizens were satisfied with the service that they received they were less likely to have used the phone (OR = 0.75), less likely to have used email (0.89), but more likely to have used the office (OR = 1.08). It appears that office visits to government agencies is either spurred on by citizens' satisfaction with a service, or that those visiting an office after preliminary contacts and information from other service channels were then able to complete the service at an office as suggested above, and expressed satisfaction as a result.

## 7. Logistic regression of satisfaction with channel choice

Table 4 shows the four factors as predictor variables of contact channel satisfaction. Using logistic regression, 1 represented a citizen agreeing or strongly agreeing that they were satisfied with the service or information they received from government, and a 0 represented otherwise for each of the contact channels. The results showed some interesting findings, especially as they related to public service values and citizen satisfaction with services.

### 7.1. Demographic variables and the digital divide

As shown in Table 4, for the demographic variables if the individual was satisfied with the website, they were more likely to be female (OR = 1.29). In addition, daily users of the internet were 2.89 times more likely to be satisfied with the government website. Yet government employees of the federal, provincial (or territorial), and municipal governments were 0.70 times less likely to be satisfied with a government website. Age did have an impact on satisfaction level, as with an increase in the citizens' age, they were more likely to visit government websites (OR = 1.10). Household income showed that citizens with higher levels were more likely to be satisfied with the website (OR = 1.16). Finally, larger-sized communities were less likely to have citizens that were satisfied with the website (OR = 0.88). Overall, some of the demographic factors showed evidence of a digital divide, such as household income and daily internet use. However, there was inconsistency in that age was positively related to satisfaction and female was

**Table 4**  
Logistic regression of channel choice satisfaction.

Predictor variables	Website satisfied		Phone satisfied		Email satisfied		Office satisfied	
	Odds ratio	Prob. sign.	Odds ratio	Prob. sign.	Odds ratio	Prob. sign.	Odds ratio	Prob. sign.
<i>Demographics and the digital divide</i>								
Female	1.29**	0.02	0.85	0.12	2.43***	0.00	1.33**	0.02
Use internet daily	2.89***	0.00	1.68***	0.00	4.23***	0.00	1.25	0.17
Minority	1.04	0.79	0.77	0.10	0.85	0.60	0.55***	0.00
College/university education	1.13	0.28	0.95	0.63	0.97	0.88	0.97	0.79
Disability	1.01	0.94	0.92	0.55	0.88	0.65	0.90	0.51
Government employee	0.70***	0.01	0.94	0.64	1.06	0.84	0.71**	0.02
Age	1.10**	0.03	1.19***	0.00	1.25**	0.02	1.12**	0.03
Total household income (before taxes)	1.16***	0.00	0.98	0.58	1.09	0.23	1.02	0.60
Size of community	0.88***	0.00	1.03	0.46	1.15	0.15	0.96	0.37
<i>Nature of interaction</i>								
Get information	1.18	0.13	1.18	0.14	0.66	0.06	1.15	0.29
Solve a problem	0.97	0.84	1.01	0.91	1.28	0.34	0.96	0.77
Positive public service values	1.10***	0.00	1.12***	0.00	1.15***	0.00	1.06***	0.01
Overall satisfied with service received	2.78***	0.00	4.02***	0.00	3.93***	0.00	4.04***	0.00
Constant	0.01***	0.00	0.00***	0.00	0.00***	0.00	0.01***	0.00
Nagelkerke R-square	0.40		0.55		0.56		0.53	

\*\*\* Significant at the 0.01 level.

\*\* Significant at the 0.05 level.



positively related as well, both in the opposite direction than what was predicted. As noted earlier, it may be that other factors than the traditional meaning of *digital divide* are at play.

### 7.2. Nature of interaction

There was no evidence that the nature of the interaction that citizens had with their government predicted satisfaction with any of the four contact channels. This result was different from the previous regressions in Table 3, which showed that there was a relationship between the contact channel and the nature of the interaction.

### 7.3. Public service values

Positive public service values did show evidence across the four channels that having a more positive perception of the values of public services leads to greater citizen satisfaction with each of the contact channels. The results in Table 4 showed that when the individual had positive public service values, they were 1.10 times more likely to be satisfied with the government website. If the citizen had positive public service values, they were 1.12 times more likely to use the phone and 1.15 times more likely to use email to contact government. Finally, citizens who had positive public service values were 1.06 times more likely to visit a government office. It appears from Table 4 that having positive public service values, leads to greater satisfaction with all four contact channels, which seems intuitively reasonable.

### 7.4. Citizen satisfaction with service received

The final question in Table 4 examines whether citizens had overall satisfaction with the service they received, and if this predicted satisfaction with each of the four contact channels. The results indeed showed strong evidence that overall citizen satisfaction with the service received was related to contact channel satisfaction. This was especially the case for the phone and office visits, where citizens that had overall satisfaction with these channels were four times more likely to use each of them. If the individual had an overall satisfactory experience they were 3.93 times more likely to be satisfied with email. If citizens were overall satisfied with their service experience, they were 2.78 times more likely to be satisfied with a government website.

## 8. Discussion of results

This study found some interesting results that are worth reviewing. First, in regards to channel choice the digital divide would appear to be prevalent in access to Canadian e-government, where women and older Canadians are less likely to access an e-government website. In addition, individuals with at least a college or university education are more likely to access email. Essentially, the survey data suggests that there is a digital divide in access to e-government in Canada, with both females and older Canadians more likely to use the phone to contact their government for information or a service. However, the most recent data from ComScore (2011) indicates that internet usage is divided 50/50 between males and females, (a slight improvement since 2007) with only very small variations across age groups, and the over 55 age group is the most rapidly growing segment of internet users, with the total number now greater than the total aged 17 and younger. This appears to indicate that digital divide as represented by access to the internet may not be the reason for the ICCS survey results, but rather social and cultural norms and preferences. The ICCS data is thus limited in terms of what information can be teased out through statistical analysis. Understanding just why the apparent digital divide exists for e-government services, but not for other uses of the internet, is a research area that should be considered in the future.

Another interesting finding was that individuals who wanted to obtain information were three times more likely to use a government website, indicating that government websites were considered an excellent source for Canadians to find information from their government. However, individuals who wanted to solve a problem were four times more likely to turn to the phone. Essentially, the website is a good source to provide information for citizens, but the phone is still the main source to solve problems for Canadian citizens. This finding is interesting in that governments in Canada are now cognizant that citizens require multiple contact channels to complete tasks, and should be recognized when devoting resources to these systems.

From the data analysis it appears that Canadians have settled into a pattern of using the internet-based government services as an initial preference, but if the information needed, or transaction required, is not entirely routine, citizens revert to the telephone, despite that channel showing lower satisfaction levels. Email or the phone is also used to seek clarification or additional information, and particularly complex issues or those demanding physical presence are often still dealt with across the counter. This suggests that channel choice is therefore no longer a matter of simple binary preference, but is rather a question of channel sequencing, with an interaction with government now routinely involving at least two, and often three or more service channels.

From the public services administration perspective, this has significant implications for staff and, of course, costs. Government agencies must now pay particular attention to cross-channel integration and response consistency, ensuring that citizens receive the same data or response to a query or transaction, no matter the channel selected or the order of multiple channels used by an individual citizen or business to complete an interaction with a government agency. This is an area which will likely require further research to fully understand its implications.

In the examination of citizen satisfaction with e-government versus traditional service channels, the results also proved to be interesting with some opposite findings to what was predicted. There was evidence found that females and older Canadians are more likely to be satisfied with e-government. Therefore, if these groups had a satisfactory experience with the service they received, their e-government satisfaction level rose as well. These two groups may have less access to e-government, or as recent data suggests (ComScore, 2011) they may choose to use their internet access for other purposes than dealing with their governments, but when they do access government services they are more likely to have a satisfactory experience.

In addition, Canadians who had positive public service values were more likely to be satisfied with all four of the contact channels. Similarly, when citizens had an overall satisfactory experience with the service they received this also led to greater contact channel satisfaction. For instance, those Canadians that had an overall satisfactory experience were almost three times more likely to be satisfied with their website experience.

## 9. Conclusion, implications, and future research

This study examined e-government in Canada, comparing e-government to traditional service delivery channels. Through a survey of citizens across Canada there was evidence that e-government has really taken hold as the dominant contact channel, with 55% of Canadian residents surveyed used the Web or email to contact government for a service or information, which rivals the phone at 51%. However, even knowing the phone is the most commonly used single channel, it provides the least satisfaction for citizens. Whether dissatisfaction with the telephone channel has driven citizens to the Web, or whether improved service delivery by on-line methods has reduced the need for phone calls, could be an area for further research. But the data indicates that citizens actually received the most satisfaction by receiving a service or information in a government office. But while the traditional methods of contact seemed to provide the most

satisfaction, they of course have the greatest costs. This has significant policy implications for governments, since much of the expected savings from use of e-government services is often predicated on assumptions on the ability of governments to easily switch citizens over to newer, lower cost, service channels. Canadian governments may need to consider programs to ensure citizens are fully aware of the benefits of using the e-services, and encourage their usage through hands-on demonstration, for example, at in-person service sites.

There appears to be a digital divide in access to e-government in Canada and it is centered on age and gender, but its cause may not be attributable to simply differences in access. The digital divide can be mitigated if there is greater citizen satisfaction with e-government. Further research might focus on whether complexity of use, socio-cultural preferences, or actual accessibility are the most significant inhibitors to greater use by seniors and minority groups, as the limitations in the ICCS data does not permit such analysis. Finally, an overall positive perception of public service values by citizens, and satisfaction with services received, improves satisfaction for all of the contact channels. This finding, which has already received considerable attention within Canadian public service organizations, may have significant policy implications for the future of service delivery. The concept is under review within the Canadian federal public service under the heading of improving understanding of the “public sector service value chain” (Heintzman & Marson, 2005).

What do these results imply for the future of e-government in Canada? First, governments in Canada should expand their survey efforts to determine if what appears to be a digital divide amongst females and the elderly is a reality, or evidence of other socio-cultural factors at work. If an access problem is found to exist, governments should mitigate the digital divide by providing more access to the internet for females and the elderly. Second, governments should realize that citizens use many contact channels, and often several in a single interaction or transaction with government, with some of them being better suited for certain tasks than others. However, governments should realize that citizens receive less satisfaction with the phone. Third, they must find better ways to integrate contact channels as one method to move e-government forward, ensuring that the information received through use of different channels is consistent and service responses are of equivalent quality. Then, where citizens have multiple choices to contact government, they can use the channel that best suits their needs. Continuing use of customer feedback surveys should prove beneficial to address this problem. Fourth, if citizens have a positive view of public services in Canada, they tend to be satisfied with all four contact channels, and the inverse appears likely as well. A positive view of all contact channels leads to a positive overall view of public services, so governments will need to continue focusing on service channel improvement to improve overall views of public service.

Future research could examine some of these issues in more detail through focus groups. Collecting aggregate survey data is limited because of its inability to discern nuances in the data which can better be teased out with more direct methods of observing citizen behavior. In addition, the survey did not include questions on the impact of social media technologies as one of the channels that citizens can use to contact their government (Chun, Shulman, Sandoval, & Hovy, 2010). Social media would provide an interesting alternative service channel, and future research could examine this technology. This is of particular interest within Canada, as Canadians have, for some years now, been very high users of social media technology such as Facebook, YouTube, and Twitter.

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