Plastic Waste Management Practices *In The Rural Areas Of Canada*

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ABSTRACT. This study investigates the digital divide in Canada related to access to online government services. Since digital equity can have welfare implications, it is an important area to explore. We use a bivariate logit model to estimate the determinants of access to e-government services. The results show significant disadvantages for females, those who cannot speak official languages, those living in rural areas and those in the lower quantiles of household income. Public policy measures such as infrastructure development in rural areas, improvement in digital equity and streamlining of e-government access can help address this issue.

INTRODUCTION

The concept of e-government has significantly developed and incorporates information and communication technologies (ICTs) to improve the effectiveness and efficiency of public service delivery to citizens and enterprises (UNDESA 2018). It has become an essential focus for governments with the increased use of ICTs in our day-to-day lives (Alshehri and Drew 2011). Internet usage rose to almost 60% of the global population in 2020, a 7.3% increase from the previous year (Kemp 2021). The delivery of online government services continues to accelerate globally, with the average world E-Government Development Index (EGDI) score increasing from 0.47 in 2014 to 0.55 in 2018 (UNDESA 2018).1 This trend is likely to speed up due to the focus on the online provision of government services, generate cost savings, increase quality, access and

efficiency of service delivery, improve government transparency and enhance citizen convenience (Ndou 2004; Carter and Bélanger 2005; Gil-García and Pardo 2005; Maureen Brown 2007; Yildiz 2007; Alshehri and Drew 2011; UNDESA 2018). The recent pivot to work from home measures to protect public health because of the COVID-19 pandemic has also accelerated the process. However, despite these benefits, several challenges persist, such as the lack of technological competency amongst users, internet access, IT infrastructure, digital inclusion, and language and communication (Jaeger and Thompson 2003). These disadvantages pose obstacles to accessing and using ICTs or contribute to a digital divide (Castells 2002).

Specific segments of the Canadian population are particularly disadvantaged in ac- cessing ICT, such as the elderly (Reddick et al. 2000; Howard et al. 2010; Haight et al. 2014; Berkowsky et al. 2015; Davidson and Schimmele 2019; Andrey et al. 2021), those with low educational levels (Reddick et al. 2000; Howard et al. 2010; Haight et al. 2014), low-income households (Reddick et al. 2000; Howard et al. 2010; Haight et al. 2014; Andrey et al. 2021), foreign-born (Haight et al. 2014), and those living in rural environments (Reddick et al. 2000; Cullen 2001; Looker and Thiessen 2003; Singh 2004; Howard et al. 2010; Haight et al. 2014; Andrey et al. 2021). The COVID-19 pandemic has accelerated the world's transition to the digital environment, with many people increasing their reliance on the internet for access to information, work, school, social support, and services (Lai and Widmar 2021).

While the pandemic has highlighted the inequities within health care systems and the quality of patient care worldwide, it has also increased the disparity in access to e- government services (Martins Van Jaarsveld 2020; Eruchalu et al. 2021). In Canada, several pandemic financial support programs, such as the Canada Emergency Response Benefit (CERB), were mainly accessible online as part of the significant pivot toward e-governance for the broader population (Boin et al. 2020; Petit and Tedds 2020). Other government services, such as mental health support and counselling, also transitioned to the online delivery mechanism, which posed access issues for the marginalized population who needed these services the most (UNDESA 2020). Thus, the pandemic extenuated the digital divide and accessibility of e-government services amongst vulnerable groups living in Canada (McMullin 2021). It is important to note that while the transition to the virtual environment was seamless for a section of society, for others, it posed a significant digital divide (Camillo and Longo 2020).

Many studies highlight the obstacles to access to e-government services amongst marginalized communities before (Howard et al. 2010; Reddick and Turner 2012; Haight et al. 2014) and during the pandemic (Beaunoyer et al. 2020; Herath and Herath 2020; Lopez et al. 2021; Meijer and Webster 2020; Robinson et al. 2020; Andrey et al. 2021). However, the literature fails to address how the digital divide has emerged in Canada related to the access and usage of e-government services. Our study investigates the determinants of access to online

government services to provide recommendations for best practices. We ask the primary research question: What segments of the Canadian population face obstacles in using e-government services? Using a logistic regression method, we identify the determinants of access to online government services using the Canadian Household Internet Usage Survey (CIUS) data. We find significant disadvantages for females, rural areas, low education, low-income households, and those who do not speak English and/or French at home.

In contrast to the somewhat mixed outcomes of e-government access during the pan- demic in Canada, other jurisdictions have fared much better. Several countries embraced the movement toward the digital environment during the pandemic as an opportunity to enhance the accessibility and usage of e-government services across both general and vulnerable populations (UNDESA 2020). In particular, Scandinavian countries such as Denmark, Finland, Sweden, Iceland, and Norway improved their overall EGDI scores and maintained their positions as global leaders in e-governance, especially among their vulnerable communities (UNDESA 2020; Botric´ and Božic´ 2021). Denmark recorded the highest EGDI value for the second consecutive year, resulting from implementing new investment fund initiatives to improve digital welfare solutions using Artificial Intelligence (AI) (UNDESA 2020).

The motivation for this study stems from the fact that the digital divide leads to immense social welfare costs (Kim et al. 2009; Sanders and Scanlon 2021). Digital exclusion equates to social exclusion (Robinson et al. 2015; Tewathia et al. 2020); thus, it is a critical area for investigation for public policy formulation. Digital inclusion increases social linkages, and public engagement can support vital programs to enhance general welfare, such as care for the aged and disabled (Peek et al. 2016; Tsai et al. 2015). This study makes several valuable contributions. First, given the lack of current literature on e-government access by marginalized communities, it bridges a critical literature gap. Second, the results can help develop strategies to support the most vulnerable by improving accessibility to e-government services and resources within this digital environment during the pandemic and post-pandemic recovery phases.

The study is structured as follows. Section 2 includes a detailed literature review on the pre-pandemic digital divides in Canada and Scandinavia, the interplay between COVID-19 and the digital divides, and the accessibility of e-government services amongst vulnerable individuals during the pandemic. Section 3 describes the model and the data. Section 4 presents the results. Section 5 provides a discussion, while Section 6 concludes.

LITERATURE REVIEW

Digital Divide

Many studies attribute geographical location as a factor in the digital divide in Canada, where individuals living in rural areas experience poor internet accessibility and ICT usage than those living in urban areas (Reddick et al. 2000; Cullen 2001; Looker and Thiessen 2003; Singh 2004; Howard et al. 2010; Andrey et al. 2021). Although commonly identified as a quantifiable gap, recent literature has attempted to investigate the qualitative aspects beyond information technology infrastructure that drives this divide (Andrey et al. 2021). For instance, Dilmaghani (2018) explores the relationship between religiosity, internet access, and online activity in Canada. Their findings suggest that religious individuals have less access to the internet and are less engaged online than their non-religious counterparts. The difference remained consistent even after considering demographic and socioeconomic factors, such as age, marital status, and household size. While such studies suggest a negative, nonlinear correlation between religiosity and internet access, there is a lack of literature that explores the impact of COVID-19 on internet access and, in particular, access to e-government services.

The literature also investigates the impact of the digital divide on marginalized popu- lations in Canada. Sciadas (2002) finds that ICT penetration has a positive relationship with income, education, children in urban areas and younger individuals. However, a digital divide, although declining, is evident between low-income and high-income individuals. Howard et al. (2010) compare the causes, consequences, and policy impacts of the digital divide between Canada and the US. They find that, whereas the US public policies aim to increase physical access to ICT, they aim to promote digital skills and develop culturally appropriate internet content in Canada. While they find that Canadian public policies are more successful than those in the US, the gap in technology usage follows income disparity amongst the vulnerable sections of the population. Lastly, Haight et al. (2014) take a more tailored approach by analyzing the socio-demographic variables contributing to digital inequities in internet access, online activity, and social networking sites (SNS). Specifically, income remains a critical component of internet access and online engage- ment inequalities. They find persistence in the education-based digital divide, with recent Canadian immigrants falling behind in internet access. Notably, they fail to detect a gender-based gap—although men perform more activities online, SNS usage among women is significantly higher. Some studies also identify the impact of ICT adoption on corporate performance (Barba-Sanchez et al. 2018). Puckett (2022) introduces the concept of digital adaptability (DA) that can profoundly impact labor market outcomes.

While the digital divide remains an area of concern for Canadian policymakers, other jurisdictions, such as the countries in the Scandinavian

region, have done better in address- ing this issue (Bilozubenko et al. 2020). Research shows that the Scandinavian countries lead in digital development amongst marginalized populations by having been able to reduce the digital divide (Warf 2011; Armas Quintá and Macía Arce 2013; Fifeková et al. 2019; Lucendo-Monedero et al. 2019; Bilozubenko et al. 2020; Sala et al. 2020; European Commission 2021). For example, the 5G broadband program for rural areas in Denmark (European Commission 2021), the Rural Fibre Program (Ísland Ljóstengt) in Iceland (Gov- ernment of Iceland n.d.), the #fulltäckning project in rural Sweden (Cedergren et al. 2021) has led to better outcomes in this region in reducing the digital divide and improving access to their marginalized population. Such innovative programs can provide the means to tackle the digital divide issue in Canada, especially among its vulnerable population.

COVID-19

The COVID-19 pandemic has had an unprecedented impact on health and economic wellbeing, with three billion individuals around the world being forced into isolation and becoming heavily dependent on the digital environment for access to information, resources, services, and activities (Beaunoyer et al. 2020; Herath and Herath 2020). While digital inequality was evident before, the pandemic worsened the problem, especially for those most vulnerable (Robinson et al. 2020; Beaunoyer et al. 2020; Stewart 2020; Lopez et al. 2021). From a health perspective, these individuals faced obstacles in accessing public health and government information, services, and resources, thus placing them at higher risk of contracting the virus and facing adverse health outcomes. For example, the COVID Alert app developed by public authorities for contract tracing met poor acceptance and usage, especially amongst the marginalized population who faced obstacles in using the required smartphone technology (Herath and Herath 2020; Nielsen 2020). Besides, many disadvantaged individuals lost employment during the pandemic because of their inability to work from home or telecommute, leading to a loss of income and extreme financial hardship that further increased financial barriers to technology (Robinson et al. 2020). In addition, the physical isolation and the inability to use digital platforms to connect with friends, family, and loved ones worsened mental health issues (Beaunoyer et al. 2020; Robinson et al. 2020). Lopez et al. (2021) investigate the impact of COVID-19 on digital adoption and connectedness among elderly Canadians aged 65 and over. The findings indicate that the elderly Canadians generally found a sense of togetherness when using digital applications such as WhatsApp, FaceTime, and Zoom to socialize with loved ones virtually, which reduced the isolation of the pandemic somewhat. However, privilege, race, education, and economic status drove the inequities in accessing such digital applications. While these studies provide perspectives on the interplay between COVID-19 and the digital divide in

Canada, they do not examine the impact on the access to and usage of e-government services.

Access to e-Government Services

The COVID-19 pandemic caused an abrupt pivot toward the digital environment in Canada, including the shift in government and public services (Boin et al. 2020). While before the pandemic, the transition to such digital services was slow and gradual, the pandemic rapidly accelerated the pace of the online services by various levels of the governments (McMullin 2021). Consequently, such a push intensified the barriers to e- government services amongst the vulnerable segments of the population. McMullin (2021) finds several reasons, such as the absence of consistent access to ICTs, and a lack of divide between public and private spaces. More specifically, refugees and economic migrants were amongst many disadvantaged individuals who suffered from the pandemic's digital divide. The closure of libraries and other public access areas for Wi-Fi and digital devices made access even more challenging, along with a lack of trust in government and privacy concerns. While the study provides novel insights into the digital divide during the pandemic, it limits its analysis to the experiences of migrant integration services offered by not-for-profit organizations.

Others, such as Boin et al. (2020), take a more generalist approach by discussing the impacts of the pandemic on the success of Canada's public sector in providing online ser- vices. While the transformation to the online medium was quick, delays and complications plagued the systems in processing applications. A shortcoming of this study is that it did not assess the digital divide amongst the vulnerable segments of the population. Another study by Andrey et al. (2021) surveys the digital divide in Toronto in terms of internet speed, affordability and quality, household access to internet-enabled devices, and usage of critical digital services. Although e-governance is not the main focus, it provides several findings regarding the accessibility and uses amongst vulnerable residents. It finds that almost half of the households identified high monthly costs as barriers to home internet access. Common underlying socioeconomic factors of households facing access issues were those with lower incomes, older age, and those living in apartment buildings. While this study provides a much-needed insight into the issue of internet access, it does not investigate if such issues impact access to online government services. While we do not examine the COVID-19 period due to a lack of data, we aim to provide an investigation into the determinants of access to online government services to assess the areas of public policy improvement in the post-pandemic period.

METHODOLOGY AND DATA

This study uses data from the 2018 Canadian Internet Use Survey (CIUS) conducted by Statistics Canada, with a sample size of 13,810 individuals in Canada. CIUS aims to assess the impact of digital technology and the Internet in Canada.2 A binary logistic model is used to assess the determinants of usage of online government services. Several alternative methods have been used in past studies, such as the general linear model (two-way MANCOVA), while deciphering the causes of the digital divide (Tewathia et al. 2020). Given that we are dealing with categorical variables, the use of logistic regression is appropriate compared to the Ordinary Least Square (OLS) method, supported by previous studies such as Noce and McKeown (2008), Uzuegbunam (2016), Woo et al. (2021) and Asenso Barnieh et al. (2021).3

Initially, we used an expanded model by including other variables such as aboriginal ancestry, household size, immigration, household composition, employment status, and the variables listed in Table 1. However, these variables fail the parameter test and thus are excluded from our model (see Table A1, Appendix A). The model is listed below:

$$y_i = pop_{1.2} + educ_{1..10} + gender_{1.2} + age_{1..6} + lang_{1..4} + hinc_{1,5} + smartp_{1.2} \quad (1)$$

Other than parameter estimates, we also estimate the odds ratio, which according to Asenso Barnieh et al. (2021), calculates the odds of an outcome given a particular event in comparison to the odds of the outcome in the absence of that event. We use the odds ratio in our case to identify the independent variables that increase the probability or propensity to use online government services.

Table 1. Variable definitions.

y_i	dichotomous variable shows if the individual uses online government services.	$y_i = \begin{cases} 1 = \text{yes} \\ 0 = \text{no} \end{cases}$
	Independent Variables	
$pop_{1.2}$	population center indicator	1 = Large urban center—Census Metropolitan Area (CMA)/Census Agglomeration (CA) 2 = rural and small town (non CMA/CA)
$educ_{1..10}$	educational attainment	1 = high school diploma or equivalency certificate or less 2 = certificate, diploma, university below bachelor/college/CEGP/trade 3 = university degree above the bachelor or bachelor degree
$gender_{1.2}$	sex of the respondent	1 = male 2 = female

$age_{1..6}$	age group	1 = 15–24 years 2 = 25–34 years 3 = 35–44 years 4 = 45–54 years 5 = 55–64 years 6 = 65 years and over
$lang_{1..4}$	language spoken	1 = English only 2 = French only 3 = Both English and French 4 = Neither English or French
$hinc_{1,5}$	household income	1 = quantile 1 $\leq$ CAD 35,000 2 = quantile 2 = CAD 35,000–CAD 60,000 3 = quantile 3 = CAD 60,000–CAD 95,000 4 = quantile 4 = CAD 95,000–CAD 150,000 5 = quantile 5 $\geq$ CAD 150,000
$smartp_{1.2}$	smartphone user	1 = yes 2 = no

RESULTS

A descriptive analysis of the CIUS data shows a significant difference between internet usage and access to online government services (Figure A1, Appendix A). For example, nearly 90% of immigrants are likely to use the internet. However, the percentage falls to less than 80% who are likely to access e-government services. Another category of concern is low-income individuals, where access to the internet stood at 66%, while only 56% are likely to access online government services.

The coefficient and odds ratio from the logistic regression model shows that loca- tion, gender, age, language, and income impact the digital divide regarding access to e-government services (Table 2). Those living in rural and small towns face greater disad- vantages than those in larger urban centers. Gender disparity is also evident, with women at a disadvantage compared to males. Those who are in the younger age group (15–24) years, along with those older (45 years and older), are also at a disadvantage compared to the middle age group (25 to 44 years). Income levels also are determinants of the likelihood of accessing e-government services. In particular, a lower probability exists for those in low-income households with an income of less than CAD 35,000. Lastly, those who do not speak English and/or French (Canada's two official languages) at home are more likely to face obstacles.

Table 2. Determinants of access to government services.

Dependent Var: Use of Online Government Services	Coef.	Odds Ratio
Population center:		
Larger Urban Centers (CMA/CA)	0.009	0.991
Rural and Small Town (non-CMA/CA)	−0.178 *	0.836 *
Education:		
High school diploma or an equivalency certificate or less	0.542 ***	1.256 ***
Certificate/diploma Univ. below bachelor/College/CEGEP/trade	1.311 ***	2.707 ***
University degree equal to bachelor's or above	1.930 ***	5.007 ***
Gender:		
Female	−0.196 ***	0.822 ***
Age Group:		
15 to 24 years	−0.525 ***	0.591 ***
25 to 34 years	0.244 ***	1.280 ***
35 to 44 years	0.213 ***	1.178 ***
45 to 54 years	−0.212 ***	0.808 ***
55 to 64 years	−0.197 ***	0.821 ***
65 years and over	−0.694 ***	0.499 ***
Language:		
English only	0.515 *	1.689 *
French only	0.274	1.331
Both English and French	0.674 **	1.985 **
Neither English nor French	−0.912 **	0.393 **
Household Income Quantile:		
Quintile 1—≤ CAD 35,000	−0.586 ***	0.554 ***
Quintile 2—CAD 35,000–CAD 60,000	−0.098	0.904
Quintile 3—CAD 60,000–CAD 95,000	−0.124	1.084
Quintile 4—CAD 95,000–CAD 150,000	0.079	0.883
Quintile 5—≥ CAD 150,000	0.122	1.132
Smart phone user	1.567 ***	4.789 ***
Constant	−1.627 ***	0.188 ***
N	13810	
Wald chi2	3367.100 ***	
Pseudo R2	0.248	

Note: *, **, *** denote the levels of significance at 10%, 5% and 1%, respectively. The odds ratio higher than 1 signifies a greater propensity to use online government services, and less than 1 signifies a lesser propensity. Source: Authors' calculations.

Given the need to investigate further, looking at cross characteristics, we use interaction variables—a summary of the results is depicted in Table 3.4 Several attributes of rural residency inhibit access to online government services, such as females, those in the lower household income bracket and most of the age categories. Notably, age variations do not influence, as most age classifications in rural areas are likely to face a digital divide. Gender disparities are apparent with females, particularly those in rural locations and at the lowest income quantile, showing poor outcomes. The younger age category, those living in urban areas, in the lowest income category face the digital divide. Similar results are apparent for those who do not speak English and or French. Lack of language skills is most debilitating for large urban areas and those in the lowest income bracket, irrespective of gender differences. Finally, regardless of location, gender, and age, individuals in the lower-income categories face challenges.

Table 3. Interaction variables.

Variables		Large Urban	Rural	Female	Male	Income Quantile 1	Income Quantile 2	15–24	35–44	45–54	55–64	>65	Neither English or French
Location	Large urban			x		x	x						
	Rural			x		x	x		x	x	x	x	
Gender	Female		x			x							
Age	Age 15–24	x		x	x	x							
	Age > 64					x							
Language	Neither English or French	x		x	x	x							
Household Income	Income quantile 1	x	x	x	x			x	x	x	x	x	x
	Income quantile 2								x		x	x	
	Income quantile 3		x										

Note: The table depicts the negative impact of interaction variables on the propensity to use online government services. Source: Authors' calculation.

DISCUSSIONS

Individuals in smaller population centers face obstacles in using online government services, likely due to the higher cost and lack of high-speed broadband access. According to OECD (2018), the lack of high-speed internet remains a significant obstacle to support- ing the ecosystems required for basic human needs. Traditionally, the digital divide is attributed to rural locations in Canada (Andrey et al. 2021). Several studies, such as Stewart (2020) and Hambly and Rajabiun (2021), point to challenges with speed and cost in rural areas, especially in southwestern Ontario, northern and indigenous communities. Their research show that while almost 87% of Canadian households can avail of a basic universal service target of 50Mbps download and 10 Mbs upload as required by the Canadian Radio- television and Telecommunication Commission (CRTC), it falls to less than 50% of those living in the rural areas. Others, such as Singh (2004), point out "rurality" as a significant determinant of the lack of household internet usage, with lack of digital infrastructure along with the quality of service and cost being major obstacles in rural areas (Andrey et al. 2021). Even though the pandemic has exemplified the significant disadvantage of the digital divide to those in rural areas, the issue has persisted even during the pre-pandemic period (Reddick et al. 2000; Looker and Thiessen 2003; Singh 2004; Howard et al. 2010; Haight et al. 2014; Andrey et al. 2021; Hambly and Rajabiun 2018a, 2018b, 2021).

Females are less likely to use online government services than males alluding to gender disparity, as studies point to a persistent digital divide (Brisson-Boivin and McAleese 2021). Those who are in the youngest and oldest age categories face significant barriers. This is an interesting finding as it alludes to the skill levels or incentives to access such services. Reddick et al. (2000) and Berkowsky et al. (2015) find that older individuals do not see the need to engage through the internet, are uninterested in online content or lack the required technical skills. A lack of online engagement by older individuals is also evident in other countries,

such as Australia (Barbosa Neves et al. 2018). A study by Andrey et al. (2021) finds a direct relationship between older individuals and slower home internet that can be a significant stumbling block to online engagement, supported by other studies such as Brisson-Boivin and McAleese (2021). Skinner et al. (2003) find that the quality of the internet, including factors such as privacy, gate-keeping, timeliness, and functionality, impacts the young segment of the population's ability to access health information and relevant online resources.

Higher income levels lead to greater access of e-government services. The literature documents the negative relationship between low income and e-government access. Many studies find low income a significant obstacle in accessing and using computers and the internet (Reddick et al. 2000; Howard et al. 2010; Haight et al. 2014; ISEDC 2019; Andrey et al. 2021). Low-income earners are less likely to own computers or devices, which increases the income divide in access to online content (De Clerq 2020). The inability to speak the official languages as a barrier is substantiated by studies such as Haight et al. (2014), which document the lack of language ability amongst the racialized population as a significant obstacle in digital engagement.

CONCLUSIONS

We investigate the determinants of access to online government services to identify the most disadvantaged segment of the Canadian population. Results show those in rural locations, females, younger and older, those who cannot speak English or French and in low- income households are determinants of lack of use of online government services. Overall, the poor outcome of online government access reflects Canada's declining position in the global e-government index. Furthermore, a comparative analysis with other successful jurisdictions such as Scandinavia, shows that Canada continues to lag in internet usage and e-government services amongst the marginalized segment of the population. Thus, a more robust, targeted and national program is warranted to address this problem.

The results highlight the need for infrastructure development and equitable access to bridge the digital divide. The following recommendations can address the problem:

- Infrastructure support in rural areas: One of the key contributors to the digital divide in accessing government services is the higher cost and lack of support for high-speed internet in rural areas. A national infrastructure program to increase internet access and direct user support can help address this issue. A supplementary federal Wi- Fi program in rural communities such as community centers and libraries can also improve access to high-speed internet.
- Improvement in digital equity: The poor outcomes for some of the marginalized seg- ments of the population in accessing online government

services exemplify the digital inequity in Canada. It is not just the lack of infrastructure but the lack of opportunities and outreach amongst the marginalized communities that exasperates this issue. An income-based subsidy program can address the financial support required to improve the digital divide.

- Streamlining e-government access: A national central portal that can integrate various government programs can help access more efficiently and remove the hesitancy in the marginalized population. Such a portal can offer services in major spoken languages other than English and French to improve outcomes amongst the racialized minorities. A permanent national outreach program using community and ethnic associations can supplement such measures.

Given that equity in digital participation has been equated to a principal component of citizenship (Camillo and Longo 2020), infrastructure development and reaching remote areas with affordable broadband access will be vital in addressing the issue. However, a technological approach will not be sufficient. A cohesive, national strategy using some of the recommendations highlighted is needed to remove the disadvantages the vulnerable population segment faces.

While a limitation of the study is that due to lack of data, we cannot compare the results during the COVID period, understanding the factors that reduce access to government services can help understand how they can be mitigated during times of such crisis. This provides several opportunities for future research, as studies can conduct a comparative analysis between pre-pandemic and post-pandemic data to precisely determine the impact of COVID-19 on e-government services for marginalized Canadians. This can also include comparing Canada's quantitative results to other countries across the world.

Conflicts of Interest

The authors declare no conflict of interest.

APPENDIX A

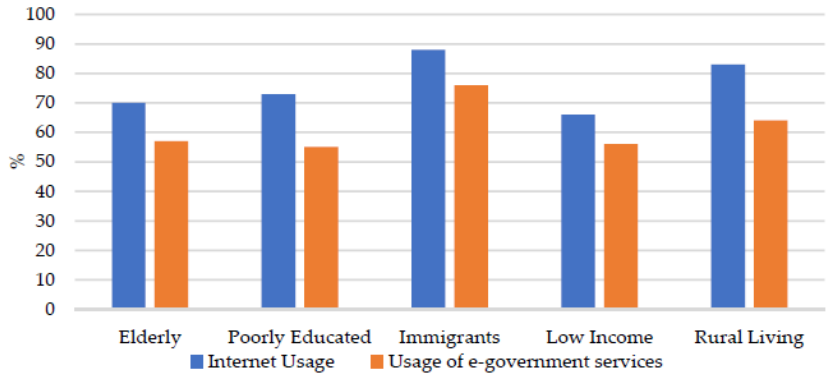

Figure A1. Disadvantaged Groups. Source: Canadian Internet Use Survey, Statistics Canada, 2018.

Table A1. Parameter Test.

	χ^2
Population center indicator	12.29 ***
Aboriginal ancestry	2.71
Educational attainment	604.41 ***
Household Size	4.08
Gender	19.29 ***
Age group	152.72 ***
Household Composition	4.47
Language spoken	58.19 ***
Employment status	1.41
Immigration status	4.74
Household Income	89.11 ***
Smartphone user	975.3 ***

Note: *** denote the levels of significance at 1%. Source: Authors' calculations.

Notes

- E-Government Development Index (EGDI) is a composite index that measures a nation's ability to utilize ICTs to deliver public services (UNDESA 2020).
- For further details on the CIUS including the survey questionnaire and methodology, see https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=4432. (accessed on 8 January 2022)
- STATA software is used to estimate the model. For further examples of logistic regression and its interpretation, see Hailpern and Visintainer (2003). For an exploration of alternative regression methodology, see Athey and Imbens (2019).
- Detailed results using interaction variables are available upon request from authors.

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