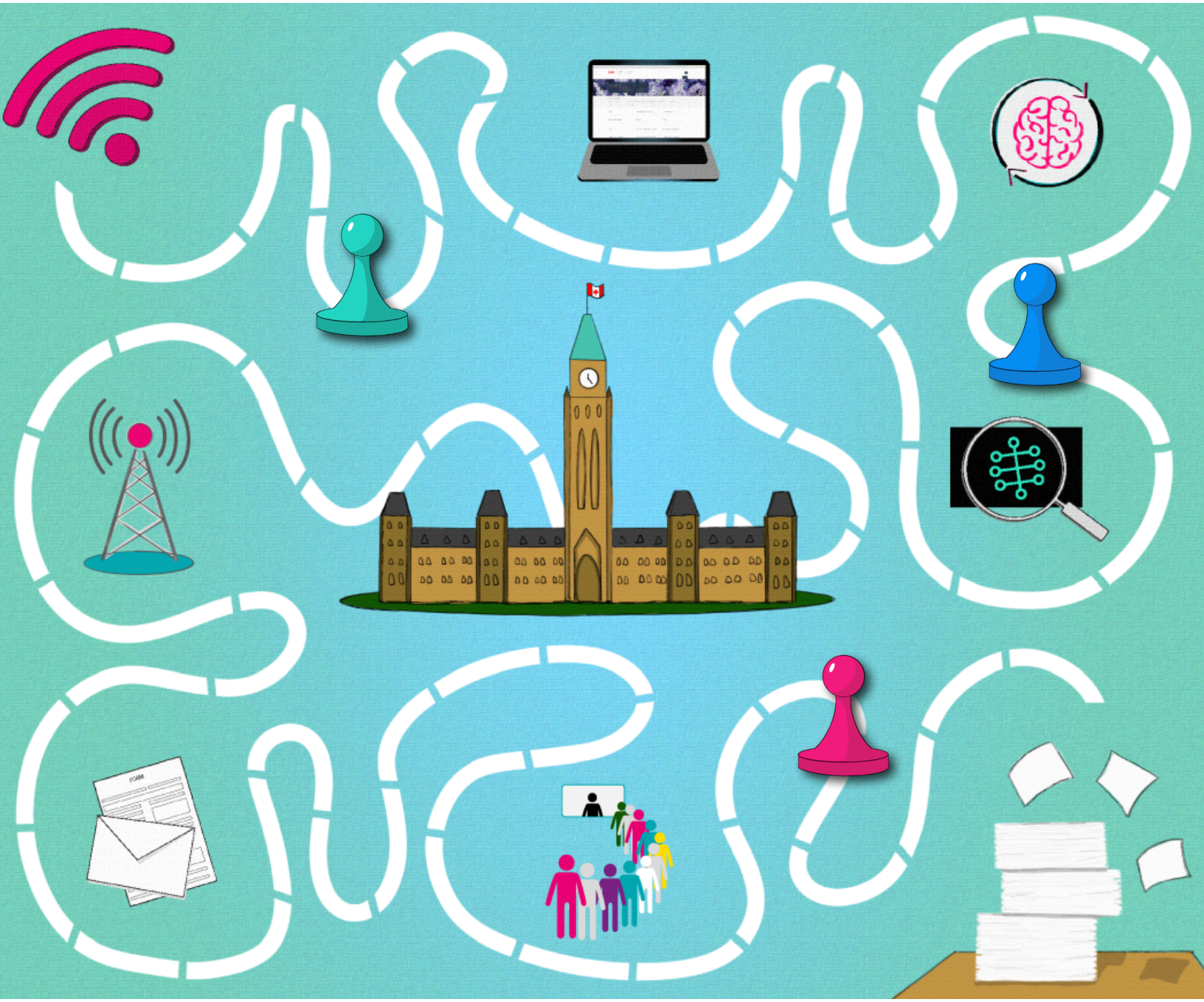
Byte-Sized Progress:

Assessing Digital Transformation in the Government of Canada

Creig Lamb, Daniel Munro, Viet Vu | September 2023



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Mariana Rodrigues

Copy-Editing
Suzanne Bowness

Contributors
Andre Côté
Mark Hazelden
Erin Ellis
Nina Rafeek Dow
Sanjana Shah
Angus Lockhart

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Authors

Creig Lamb
Co-founder & Principal, Shift Insights

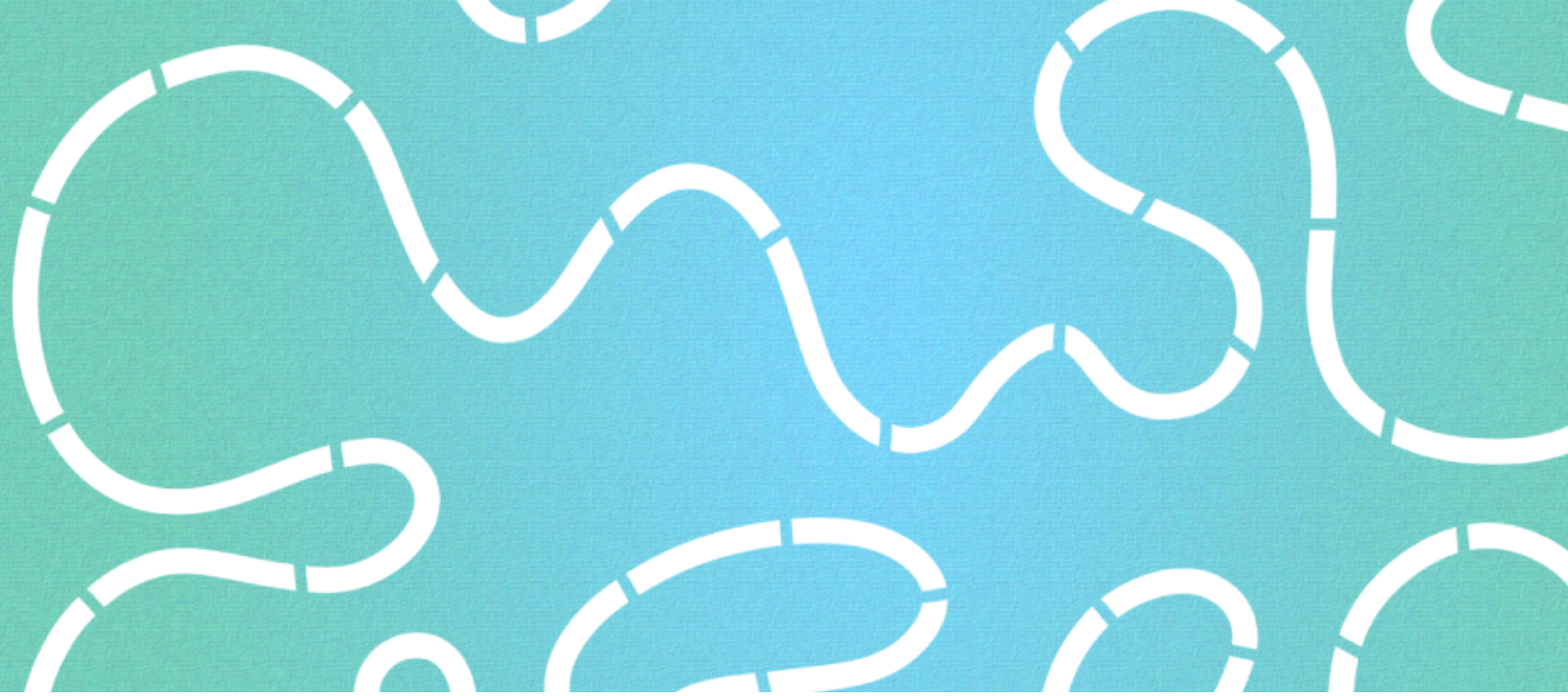
Creig Lamb is Co-Director of Shift Insights, a research organization focused on innovation and technology policy. Prior to Shift, Creig worked as a Senior Policy Advisor with the Brookfield Institute for Innovation + Entrepreneurship (BII+E), where he wrote extensively about technology, skills, inequality, and building a more inclusive, innovative economy.

Daniel Munro
Co-founder & Principal, Shift Insights

Dr. Daniel Munro is a Senior Fellow, teacher and the Director of Policy Projects in the Innovation Policy Lab at the Munk School of Global Affairs and Public Policy, Researcher in Residence at Actua, and Co-Director of Shift Insights. Previously, he was a Research Fellow at the Brookfield Institute for Innovation + Entrepreneurship (2017-2021), Associate Director of Public Policy at the Conference Board of Canada (2008-2017), and Senior Analyst at the Council of Canadian Academies (2007-2008). Dan's research spans science, technology, and innovation policy; skills and education; and applied ethics, including the ethics of innovation.

Viet Vu
Manager, Economic Research

Viet leads economics research at the Dais. Viet is interested in how governments and companies design policies and markets to drive human behaviour. He is also fascinated by how the world adapts to emerging new markets, especially since legal frameworks are often slow to respond. Viet holds a Master of Science in Economics from the London School of Economics and Political Science and a Bachelor of Arts in Economics with Honours from the University of British Columbia.



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Executive Summary

From long lineups for passport applications, to delayed processing times for tax and benefit claims, people in Canada often encounter challenges with government digital services. Despite significant digital advancements in the private sector, government digital services have struggled to meet rising expectations.

This report assesses the level of digital transformation of Canadian government services through the lenses of digital culture, skills, and access. Despite efforts by dedicated civil servants, the government faces challenges to be a global leader in these efforts, such as a fragmented bureaucracy, legacy systems, deficient digital skills, and equity considerations. In contrast, government peers globally exhibit more agile and inclusive digital services. The report aims to understand the factors hindering Canada's progress and offer recommendations for enhancing digital maturity across government functions.

Key Findings

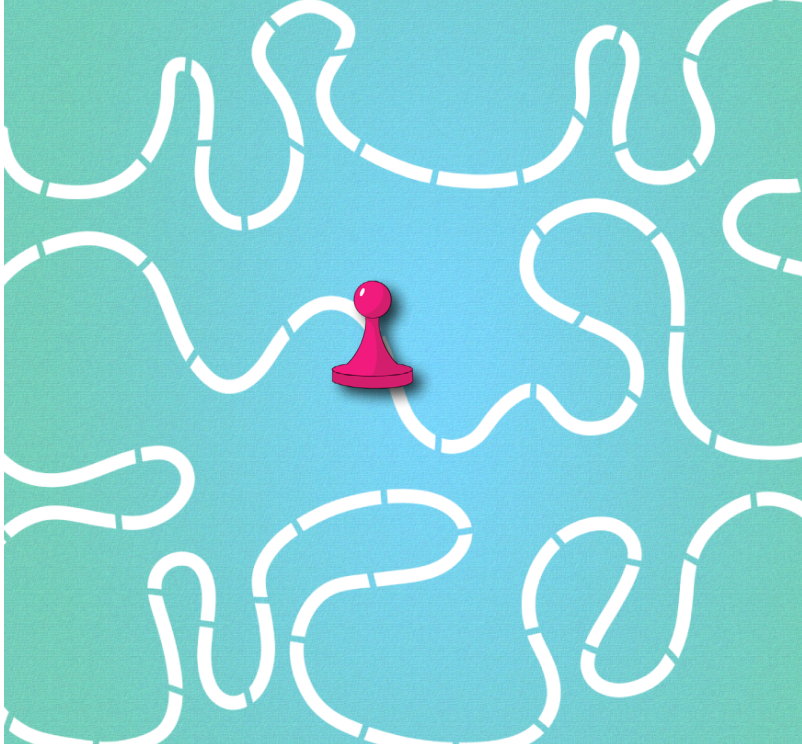
The Government of Canada's digital maturity lags behind both peer governments and the private sector. Canada's ranking on the United Nations' E-Government Development Index has dropped from sixth in 2003 to thirty-second in 2022, with only 23 percent of government services available online end-to-end.

Existing digital infrastructure makes it difficult for the Government of Canada to put its robust policy guidelines for delivering digital services into practice. Outdated and siloed legacy digital systems hinder data-sharing and digital service delivery across departments, and prevent innovations from being scaled across the government.

Government culture is at odds with effective digital adoption. A heavy reliance on external vendors, antiquated project management methodologies, and inconsistency in approaches to IT projects across departments are standard, and often result in IT that is delayed, over-budget, and ineffective.

There is a digital skills deficit in the federal government. Despite having a strong pool of digital talent to draw from, the federal government fails to attract and retain top digital and design talent, and also lacks basic digital literacy and skills across all positions.

Canada faces a stark digital divide. A lack of basic digital infrastructure and a wide array of social and economic barriers contribute to gaps in the accessibility of digital services. These gaps disproportionately affect Indigenous peoples, older Canadians, those living in rural and remote communities, and those with lower income and education levels.



Recommendations:

1. Cultivate a digital culture. The successful implementation of digital transformation requires a strong management structure that promotes a culture of digital design and collaboration. Leaders in each government department should regularly address the challenges posed by outdated IT systems and establish processes to improve outcomes.

2. Improve digital procurement practices. Digital procurement plays a vital role in improving digital services within the Canadian government. The government should consider adopting agile project management methodologies and smaller contracts open to a wider range of domestic and small to medium-sized firms.

3. Attract, retain and train digital talent. Basic digital literacy and user-centric design skills should be considered core competencies for public servants. These skills should be incorporated through hiring procedures, formal training programs, and flexible strategies like microcredentials, mentorships, coaching, workshops, and job shadowing.

2 Introduction: Preparing Canada for Digital-Age Government Services

Technology has transformed Canadian society. It has changed the ways Canadians live, work, socialize, buy and sell products, and access services. For most Canadians, digital advances have made a range of services more efficient, customized, and accessible. What previously required in-person interaction and hard copies of relevant documents, now often simply requires visiting a website and sharing secure versions of digital documents. While many of these innovations have been led and implemented by private-sector organizations, there are rising expectations that government services should also be digital. Yet Canadians often find that government services are not available through digital technologies. Or when they are, services are frequently poorly designed or continue to require some level of in-person interaction. The rising expectations are not being met by equally rising digital service standards.

At the same time, government services must be more secure, accessible, and equitable than services delivered in the private sector. These additional requirements make it harder for governments to provide digital services than private sector actors, with the result that public-private sector comparisons of performance are not always fair. Still, digital government services could be improved. Setting aside comparisons with the private sector, it appears that Canadian government services lag behind those provided by peer governments globally. How far behind is the federal public sector in developing and delivering digital services? What explains its lagging performance? And what can be done to spur improvement, all while recognizing that government services must meet standards that are often more demanding than services provided in most sectors of the economy?

This report examines the level of digital maturity in Canadian government services, and explores some of the key reasons why those services are not as advanced as they could be. It does so through three lenses—digital culture, digital skills, and digital access. All three perspectives reveal a picture of lagging performance, but also insights into the challenges government agencies face in improving that performance. As the report reveals, there are many civil servants working hard to improve the digital services provided by the Canadian government, and their efforts are generating better performance in some areas. Yet challenges related to a fragmented bureaucracy, management processes and techniques, legacy technology systems, insufficient in-house digital and design skills, and procurement hurdles—as well as the need to ensure that data and digital services are consistent with principles of accessibility, equity, and security—have resulted in less-than-ideal results. By contrast, many peer governments globally are managing the challenges, embracing data and digital technologies, and offering more open, agile, responsive and inclusive, user-centred services.[1] What's holding Canada back from achieving this same level of success?

This report examines the level of digital maturity in Canadian government services, and explores some of the key reasons why those services are not as advanced as they could be.

Approach

This paper first outlines a framework for digital maturity and provides a broad assessment of the Government of Canada's performance relative to its international peers. Next, using three separate lenses—digital culture, digital skills and digital access—it examines in greater detail how digitally mature the Government of Canada is, and provides explanations for that performance. Throughout these sections, the report makes comparisons to international peers and, where appropriate, to other sectors in Canada. Finally, the paper draws some implications from the analysis and provides recommendations to help the Government of Canada improve.

3 Digital Maturity in Government Services: A First Look at Canada's Performance

What is Digital Maturity?

In line with the United Nations Sustainable Development Goals, a digitally mature public sector is widely recognized as essential to "building effective, accountable, resilient and inclusive institutions at all levels"[2] and providing accessible, timely, equitable, and secure services to citizens and residents with a wide variety of needs. But what is digital maturity, and how can it help us understand Canada's performance and opportunities for improvement?

Digital maturity has three lenses or pillars which, when used to examine and assess resources, activities, and achievements in a public service, provide a picture of the capacity of a public service to provide digital services to citizens:

1. Digital Culture: Digital culture refers to the extent to which an organization embraces technology and the infrastructure of policies, procedures, and management required to enable effective use of that technology. A strong digital culture in government embraces digital technology and user-design principles throughout the policy process – from formal policies aimed at fostering digital transformation to the design and implementation of digital technology to "rethink[ing] and re-engineer[ing] public processes, simplify[ing] procedures, and creat[ing] new channels of communication and engagement with public stakeholders." Digital culture requires not only effective technology adoption, but also an institutional framework that supports the adoption and use of accessible, efficient, user-centred digital services and infrastructure.

2. Digital Skills: Skills are the foundation of any digitally mature organization, enabling the planning, design, management, implementation, and monitoring of user-centric digital services. These include ***advanced digital skills*** to design, implement and maintain technologies; ***digital literacy and operations skills*** to use digital systems and technology effectively to assist clients; and ***digital management skills*** to ensure knowledgeable and responsible procurement of technology and to oversee the implementation of digital services, support operation, and navigate issues related to secure, accessible, equitable, and efficient digital service performance.

3. Digital Access: The first principle in Canada's Digital Charter is Universal Access: "all Canadians will have equal opportunity to participate in the digital world and the necessary tools to do so, including access, connectivity, literacy, and skills." Unlike private-sector organizations, a digitally mature government must ensure that all citizens have access to government digital services and the ability to participate and thrive in an increasingly digital society. This requires not only having the infrastructure to access digital services, but also the skills and knowledge to use digital services efficiently, effectively, and safely.

Digital maturity has three lenses or pillars which, when used to examine and assess resources, activities, and achievements in a public service, provide a picture of the capacity of a public service to provide digital services to citizens.

Canada's digital government maturity has declined relative to peer governments

The Government of Canada invests significantly in digital technology. Annual information technology (IT) expenditures alone amount to $5 billion.[3] In 2021-22, the Government of Canada spent nearly $4.6 billion in IT contracts, the largest single procurement category across the federal public service. Despite these significant investments, the government is falling further behind international peers on digital maturity.

The most comprehensive and consistent assessment of government digital maturity is the United Nations' E-Government Development Index (EGDI). Focused on the digital maturity of all 193 member states since 2003, the EGDI includes three composite indices:

- the Online Service Index (OSI), which assesses the efficiency and effectiveness of governments' digital service provision;
- the Human Capital Index (HCI), which takes a broad look at the overall talent base to support digital public services (including adult literacy rate, educational enrolment, and expected and average years of schooling); and
- the Telecommunications Infrastructure Index (TII), which assesses the availability of digital technology infrastructure across the country.[4]

Canada's rank in the EGDI Index has steadily declined over the past two decades, dropping from sixth among all UN member states in 2003 to thirty-second in 2022 (putting Canada between Saudi Arabia and Greece in the latest ranking). Leading countries include Denmark, Finland, the Republic of Korea, New Zealand, Sweden, Iceland, and Australia, while the United States ranks tenth and the United Kingdom eleventh. While the Government of Canada has made strides over the past two decades to enhance digital maturity, international peers seem to be working at a faster pace, ultimately leaving Canada behind.

The Government of Canada invests significantly in digital technology. Annual information technology (IT) expenditures alone amount to $5 billion.

Table 1: Canada's EGDI rank out of 193 countries*

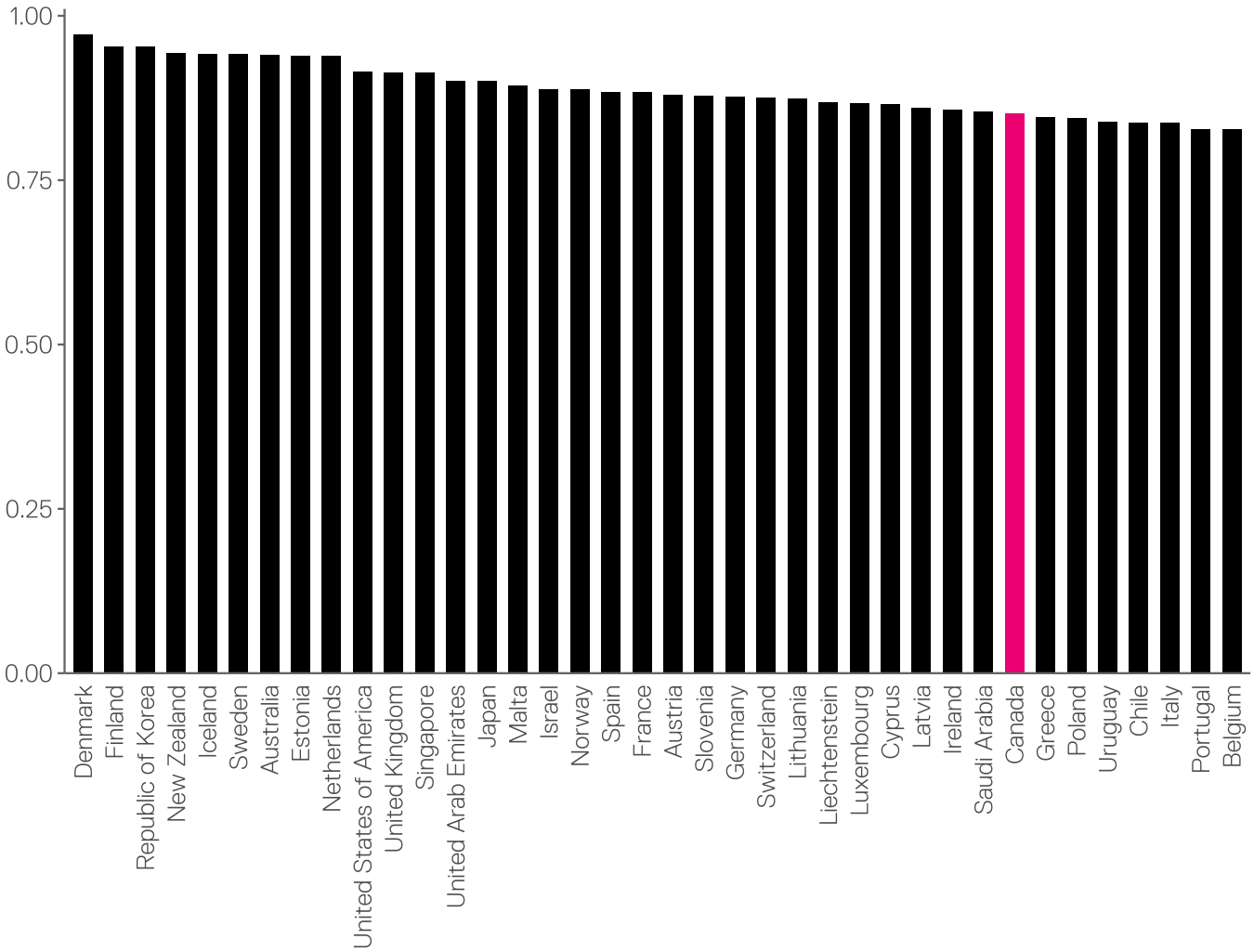
Survey Year	Canada's Rank
2003	6
2004	7
2005	8
2008	7
2010	3
2012	11
2014	11
2016	14
2018	23
2020	28
2022	32

*There is a gap in survey years because they have not been completed annually.

Canada's rank in the E-Government Development Index has steadily declined over the past two decades, dropping from sixth among all UN member states in 2003 to thirty-second in 2022.

Figure 1

E-Government Development Index, Top Ranking Countries, 2022

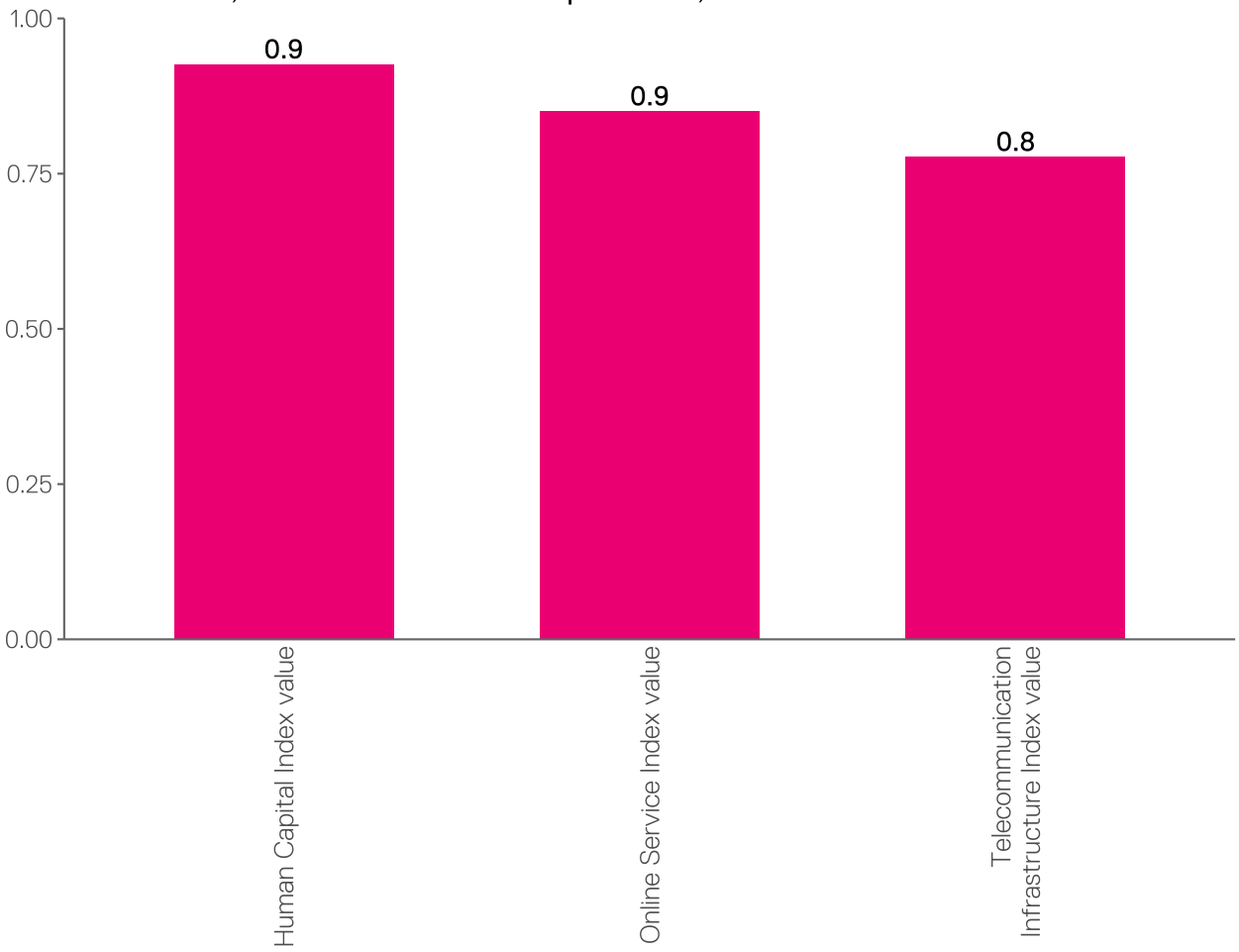


Source: United Nations

Canada's weakest performance in the EGDI comes on the telecommunications infrastructure (TII) pillar—ranking 58 of 193 countries, largely owing to a significant digital divide across the country in terms of digital infrastructure. (This report examines this more closely in the ***digital access*** section below). The Government of Canada also underperforms in the Online Service Index (OSI) pillar, ranking twenty-second overall (which we explore further in the ***digital culture*** section of the report). Finally, while Canada achieved its highest ranking on the human capital (HCI) pillar - ranking seventeenth—this metric examines skills and talent more generally rather than digital talent and skills more specifically. (The ***digital skills*** section of the report examines this in more depth).

Figure 2

Canada Score, Three Indices That Make Up the EDGI, 2022



Source: United Nations

4

Lens I: Assessing Digital Culture

A digitally mature public sector requires a strong digital culture—one that integrates technology and user-design principles at all levels, from policy design to implementation. Strong digital cultures view technologies as central components in service delivery, require supporting policies, and have the capacity to design, manage, and deliver better services using digital technologies.

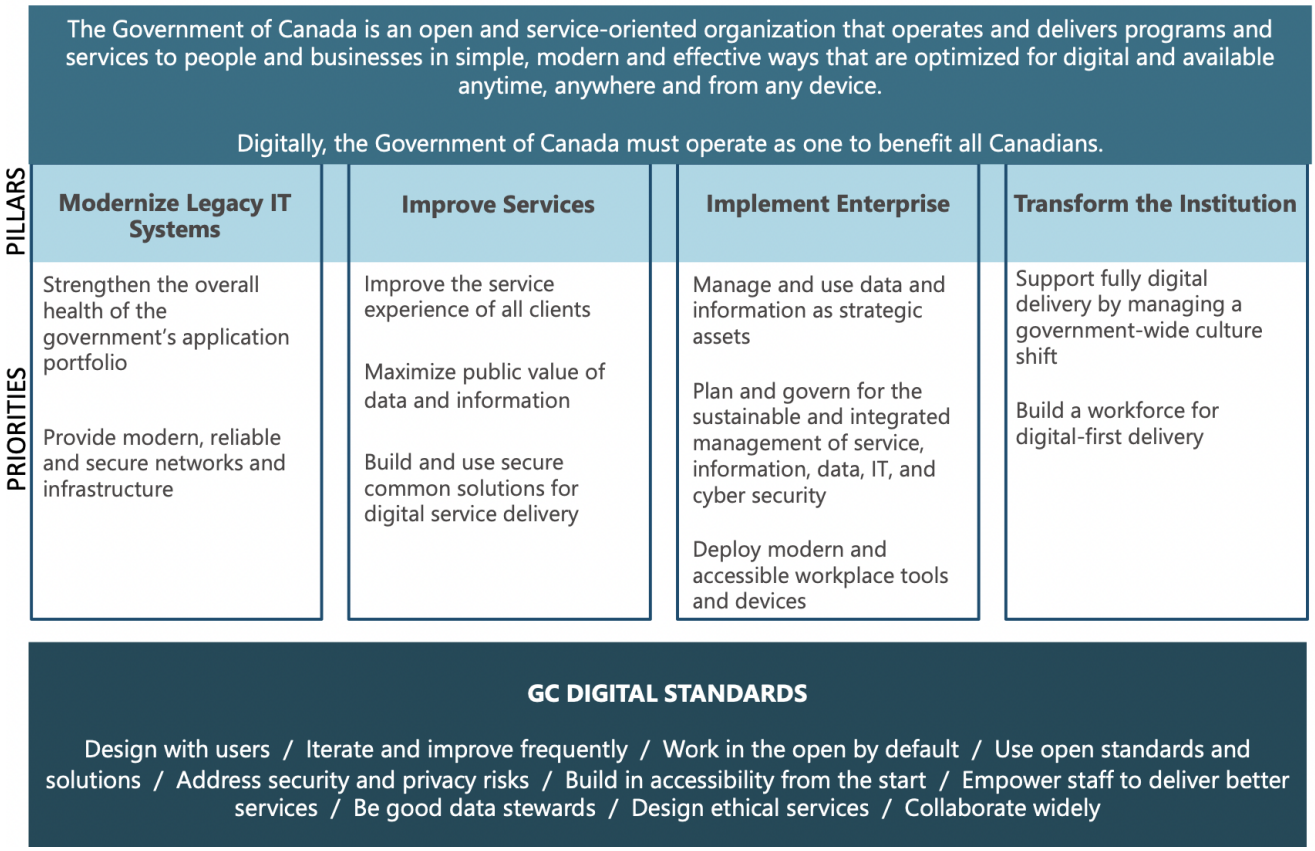
Despite having a strong institutional framework to support digital adoption and invest significantly in digital technologies, the federal government struggles to digitize services, modernize legacy systems, and meet user needs. Federal departments lack unified approaches to planning for and managing IT projects. Sample issues include overreliance on external vendors and traditional project management methodologies to deliver IT solutions, siloed innovations that are rarely scaled across government, and the difficulties adopting agile, open, user-centric design principles into its existing culture.

Canada's digital culture: Strong policy, stalled practice

Canada has a strong policy foundation and is developing institutional capacity for designing and delivering digital services. For example:

- The Treasury Board's Policy of Service and Digital - the "integrated set of rules that articulate how Government of Canada organizations manage service delivery, information and data, information technology, and cyber security in the digital era"[5] - includes The Digital Operations Strategic Plan: 2021-2024, which establishes key priorities and actions under four strategic pillars.

DOSP Pillars and Priorities for 2021-2024



Reproduced from: Treasury Board of Canada Secretariat

- Canada also has a robust framework to support open data—a key element of digital maturity. The first version of Canada's Open Data Portal was launched in 2011 and, in 2012, Canada signed the international Open Government Partnership (OGP), which promotes accountable, responsive, and inclusive governance. Moreover, Canada's Directive on Open Government (2014) aims to "maximize the release of government information and data of business value to support transparency, accountability, citizen engagement, and socio-economic benefits through reuse, subject to applicable restrictions associated with privacy, confidentiality, and security." And, in 2018, Canada developed its National Cyber Security Action Plan (2019-2024) which commits to ensuring "secure and resilient Canadian systems in government."

- Institutionally, Canadian Digital Service (CDS) was launched in July 2017 with a mandate to change the way the government designs and delivers services. CDS is expected to: deliver services by partnering with departments and building prototypes of user-centric services, build the capacity of departments to apply modern service design and technological methods and tools, and provide advice on key technology and service investments. The CDS functions through partnerships with specific departments, using lean, agile start-up methodologies to help departments apply user-centred design principles when adopting technology. They select potential projects based on: departmental readiness and willingness to change, reach and impact of the proposed service, priority of the proposed service for the department and the Government of Canada, and CDS's capacity and availability. To date, 14 product partnerships have been launched, with two currently in live status.

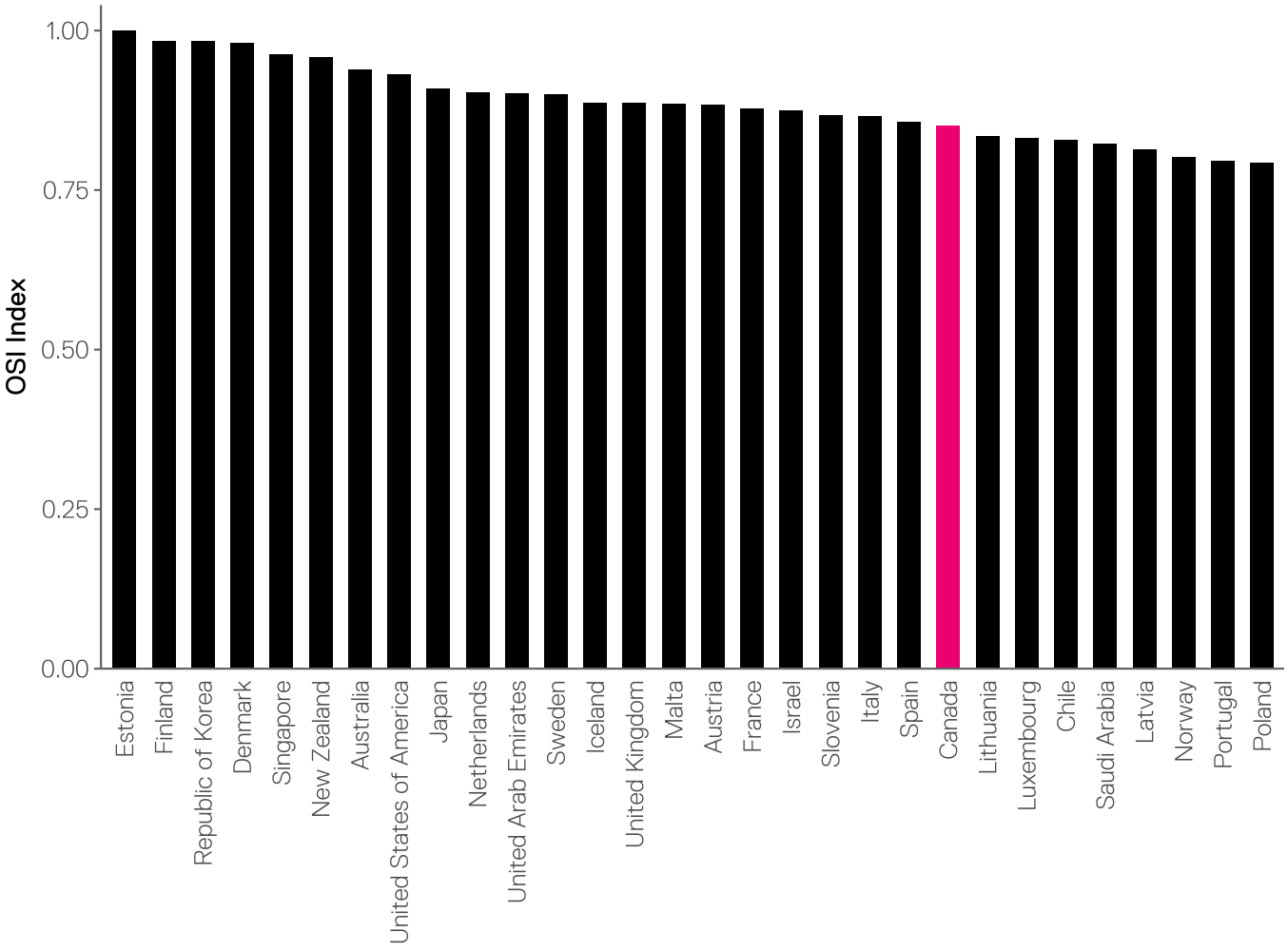
Despite having an increasingly robust policy and institutional foundation for digital services, the Government of Canada struggles to translate those strengths into effective digital solutions.

By contrast, a leading peer—Estonia—has established a highly-regarded platform government, with standardized digital systems across departments to share databases and sign-in information, enabling citizens to access a variety of government services with a single password.

Despite having an increasingly robust policy and institutional foundation for digital services, the Government of Canada struggles to translate those strengths into effective digital solutions—as evident in Canada's twenty-second rank on the UN's Online Service Index (OSI). Relative to peer governments, Canada lags on the availability and accessibility of government digital services, open portals, data sets, and the extent to which the government provides important information to citizens and engages them in policy design and implementation through online channels—all metrics in the OSI. By contrast, a leading peer—Estonia—has established a highly-regarded platform government, with standardized digital systems across departments to share databases and sign-in information, enabling citizens to access a variety of government services with a single password. [6] [7] [8]

Figure 3

United Nations Online Service Index (OSI), Top 30 Countries, 2022



Source: United Nations

The digital landscape of the federal public sector—both internal and external facing—is "highly complex with a myriad of networks, applications, programs, collaboration tools, and data centres – many unique to individual departments."[9] The government has generated a network of thousands of critical, yet outdated, legacy digital systems with siloed, vertically segregated back-office systems. Each system is highly customized, built over many years, with independent data storage systems, all of which prevent data sharing and front-end service delivery across departments.[10] Many departments, as a result, struggle to move applications and services online, coordinate services, and manage the modernization of aging IT assets—forcing public servants to rely on inefficient and ineffective digital tools, and citizens to have to sign-in to multiple government platforms, struggle to find and access services and information, or simply rely on in-person or paper transactions.[11] [12] [13] [14]

The complex ecosystem of segregated legacy systems has made it difficult for the public sector to deliver digital services. In 2020-21, the Government of Canada accepted 264,365,923 applications for its 1,375 services across 72 departments and agencies. While not all government services have the potential to be offered online, among those with the potential for online offerings, more services remain offline compared to those that have made the digital transition. Only 319 of the 1,375 services—23 percent—were available online end-to-end.[15] Canada still largely offers services that require hard-copy documents and in-person visits to government offices. Moreover, a number of apparently online services still require documents to be printed and submitted manually at certain stages. This not only represents administrative burden, but in some cases, presents a security and privacy risk compared to locally stored and properly encrypted methods of digital verification. In particular, access through mobile devices—a preferred method for many Canadians—is limited.[16]

Only 319 of the 1,375 services—23 percent—were available online end-to-end.

Of those services that have moved online, many are difficult to navigate and lack an emphasis on the overall user experience. In 2020-21, 61 percent of services had set service standards--of those, only 61 percent met these standards.[17] The Government of Canada has recognized the need to adopt user design principles and use open and agile approaches to digital development, such as shifting to more open-source platforms and cloud services. However, departments often struggle to apply these principles and techniques within the existing architecture of government. Many departments lack familiarity with and comfort using open-source technology. In addition, improving existing legacy systems is an on-going challenge across the government.[18] [19] [20] [21] The result is that very few government digital services are focused on client needs, many are difficult to locate and navigate, few services can be completed online-only from start to finish, and users often have to sign up for multiple platforms in order to access often-interrelated government services.[22] [23]

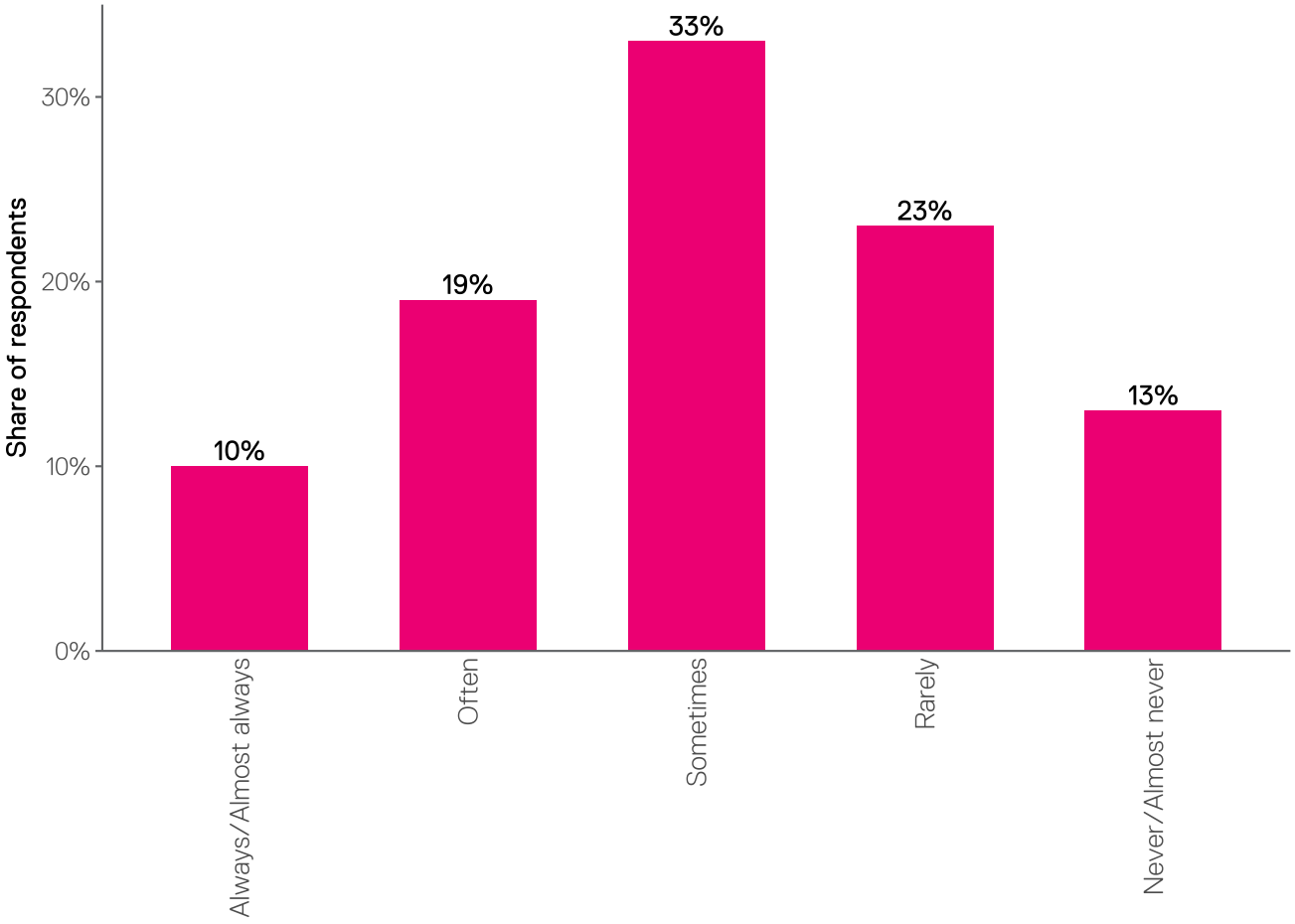
An evaluation of the Government of Canada's Open Government Initiative showed that while the open government portal has seen increases in the number of data sets available–increasing by 1,108 from 2016-17 to 2018-19, for a total of 11,340, there are persistent issues with the portal's design and user-experience. Focus group and interviewee participants note that the portal is not user-friendly and users often find it difficult to find data sets. Even when users find the data sets they are after, many report difficulty understanding and using the data as presented.[24] We will return to these issues when we examine the access challenges Canadians face.

Internal digital challenges

Issues with government digital technology are not relegated to client services alone. In the 2020 survey of public sector employees, nearly one-third said that the quality of their work "always/almost always" (10 percent) or "often" (19 percent) suffers because of unreliable technology. Another third of employees report that the quality of their work "sometimes" suffers because of unreliable technology. This level of dissatisfaction with internal digital products highlights major issues with existing government digital systems across government–impeding productivity and the overall quality of work.

Figure 4

Public Sector Employee Survey, Government of Canada - I feel that the quality of my work suffers because of unreliable technology.



Source: Statistics Canada

Digital Verification: A Foundation for Digital Public Services

To access a wide array of digital services across the government, individuals and businesses must be able to confirm who they are. Digital verification is a central authentication service that allows users to sign up once and access a wide array of government digital services, from health records and financial assistance to driver's license applications and tax information. In a world where governments are becoming increasingly digital, digital verification is a prerequisite to providing user-centred government services.

Currently, there is a fundamental lack of consistency when it comes to digital verification across the federal government, with different departments using different individual and business authentication services–often as the result of siloed legacy systems and data storage across departments. This requires an individual to provide similar data and go through lengthy, complex sign-up processes for a variety of government departments, recall each of their verification keys and passwords, and sign into different departments to access often interrelated services. Some progress has been made at the federal level to facilitate access to Government of Canada services online, including use of the *Interac* sign-in service (which allows citizens to authenticate themselves using existing sign-in credentials from participating financial institutions) and GCKey (which allows citizens to use a single username and password to access online services across various departments and agencies). Digital verification for individuals and/or businesses have been implemented or are in the process of implementation in other jurisdictions across Canada, including: MyAlberta Digital ID, Digital ID in Ontario and the BCeID Identity and Authentication Service in British Columbia. While in some instances a digital ID was used for the process of digital verification, this need not always be the case.

Despite their clear benefits, digital verification systems do come with privacy and security concerns that must be addressed at the outset. While the Digital ID program in Ontario remains in development after considerable consultations, the Ontario Government has released an overview of how it plans to ensure privacy and security. Digital ID will be stored only on a user's mobile device, not in a central database, and can be turned off remotely if the device is lost or stolen. All data will be encrypted and users must consent before sharing any information. They can choose what information to share, and it will not track users.

The Government of Canada, recognizing the importance of digital verification, has announced that it is in the planning stages of a "digital credential ecosystem" and will hold consultations at an undisclosed date.

Architecture of government often at odds with effective digital adoption

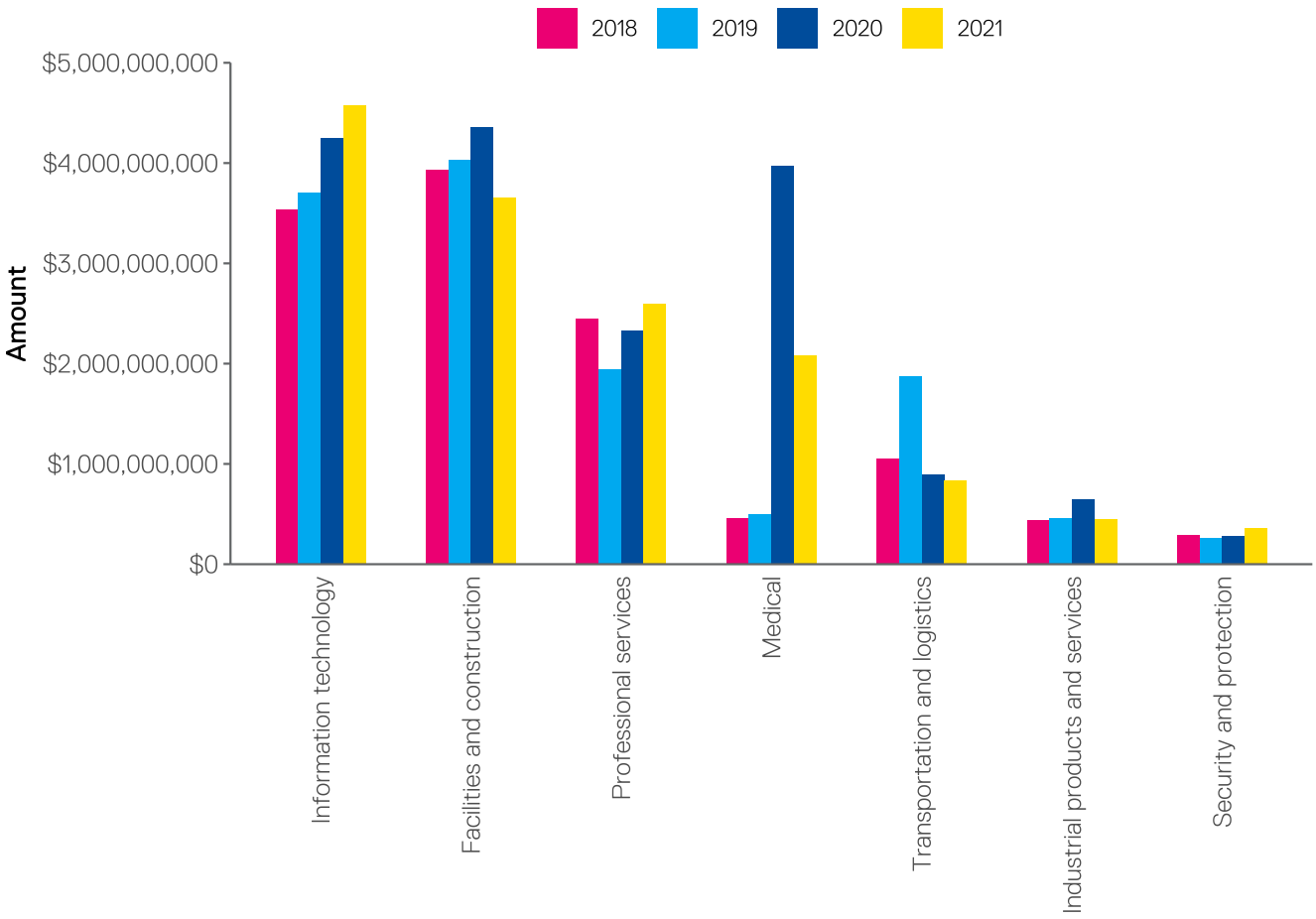
Despite the strong directive from the top to adopt digital design and management principles and ultimately deliver digital services that meet the increasingly complex needs of end users, the Government of Canada often lacks the capacity and culture to effectively manage digital transformation.

A key challenge for the federal government is adopting a user-centric approach to the design and delivery of digital services. Currently, services are designed with the needs of the departments prioritized over the needs of the end users. To embed user-centric design principles into the institution, major shifts are required in how projects are identified, designed, and implemented, as well as in the overall incentive structures for civil servants within government.[25]

Currently, the federal government's digital transformation efforts rely heavily on external vendors and antiquated project management methodologies. The Government of Canada spends an estimated $5 billion annually on IT.[26] The vast majority of this goes towards large-scale IT contracts procured from a limited number of vendors. In 2021-22, the Government of Canada spent $4.6 billion on external IT contracts. IT represents 30 percent of the Government of Canada's $15 billion procurement budget—the largest single procurement category. In 2021-22, IBM, a global leader in digital technologies, was awarded over $476.2 million in contracts–the second-highest contract value of any single vendor.[27] According to the Canadian Digital Service, large-scale Requests for Proposal (RFPs) are favoured by the federal government to minimize the number of times a department has to go to market – with the effect of preventing many smaller, willing organizations from participating in government contracting processes.[28]

Figure 5

Government of Canada Contract Expenditures



Source: Public Services and Procurement Canada, vendor categorization from Clarke & Boots (2022)

A key challenge for the federal government is adopting a user-centric approach to the design and delivery of digital services.

Departments also typically use a traditional "waterfall" methodology to manage digital projects, which is a non-iterative process moving steadily from design to implementation to maintenance.[29] [30] This approach often prioritizes a "big release" of a completed application over the needs of the user. In addition, with the size and length of the contracts, this approach can result in large vendor lock-in, limiting future opportunities for iteration, as well as over-budget, delayed, and ineffective information technology.[31] [32]In contrast, the private sector often uses an agile approach to project management–where minimum viable products are developed, released, tested, and, based on user feedback, improved. This iterative, non-linear process is centred on identifying and addressing user needs and often takes many rounds to get the product right.[33]

Despite large expenditures on IT projects across the Government of Canada, many departments lack oversight and management of their IT systems. In a 2019 internal audit of Natural Resources Canada (NRCan), it was revealed that the committees in charge of managing IT systems rarely discussed and planned to renew aging IT systems–those meetings that did occur were relegated to ongoing projects rather than identifying and planning to address emerging issues with aging legacy systems. The audit also discovered that accountability for identifying and addressing issues with aging IT systems was not clearly defined.[34] A 2020 audit of Public Safety Canada (PS), found no formal mechanisms to identify, analyze, and evaluate security risks in their IT systems. Responding to security risks is done on an ad-hoc basis, depending on the availability of resources, and issues are not formally documented preventing systematic monitoring and planning for future issues.[35]

Another audit of Health Canada and the Public Health Agency of Canada (PHAC) revealed that there was no defined management framework for the development of IT systems. The Chief Information Officer (CIO) did not follow the roles and responsibilities outlined by the Treasury Board Secretariat policy, including consistently approving the IT components of department strategies, plans, initiatives, and projects. A lack of quality assurance (QA) and project management oversight resulted in a client-led contract not being scrutinized to the same extent as an internal contract, resulting in one branch's externally sourced project costs to increase from the expected $110,000 to $680,000. The auditors also found that both Health Canada and PHAC lacked any sort of plan to implement an agile digital development methodology, and continued to prioritize the "waterfall" approach.[36]

Generally, digital maturity requires a culture that encourages innovation, works in the open, and fosters horizontal collaboration. However, Government of Canada departments remain insular, with their own "sub-cultures often characterized by hierarchy, caution about novel approaches, and organizational silos".[37] When innovations do occur in pockets of the government, the lack of coordination often prevents them from scaling.[38]

In an evaluation of the Open Government program, it was highlighted that there was a lack of internal knowledge across departments as to how to work in the open by default, and those that do work on open government initiatives are often stretched thin–doing the work in addition to their existing workload. Silos within government also often result in the duplication of work and under-use of open government activities.[39] In addition, there are no single assigned owners for digitizing a service end-to-end, but rather responsibility for service delivery exists across separate branches, such as those responsible for "technology, operations, service, customer experience, and communications"[40], each with different priorities. This can make it challenging to design, coordinate and implement projects.[41]

5

Lens II: Assessing Digital Skills

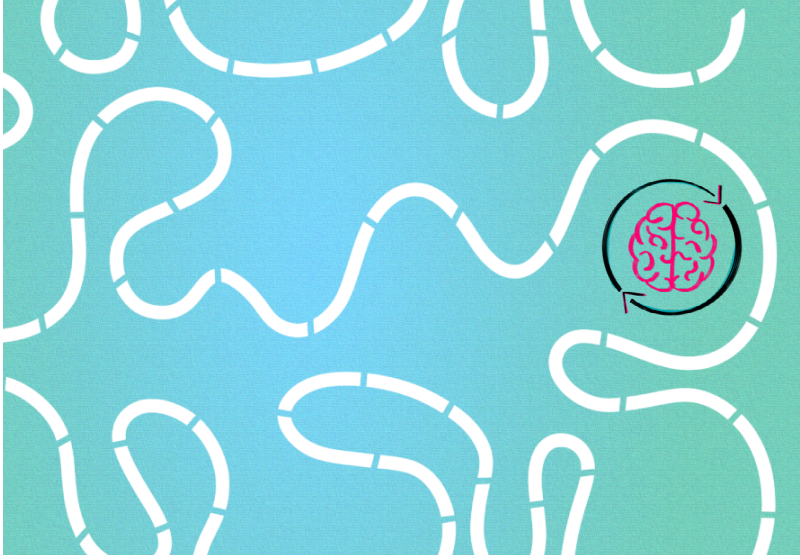
Digital skills are the most important resource for any digitally mature organization. While Canada is home to a large and growing digital talent base, the federal government struggles to attract and retain top digital and design talent. Digitally skilled workers are sometimes unaware of public sector opportunities or believe that public sector work will be bureaucratic and less interesting than private sector work. Those who apply face lengthy hiring processes and compensation packages that lag behind leading private sector packages. As a result, the government often has to outsource or contract digital projects and services. This is itself problematic because there are too few government employees with the technical skills to properly plan, manage, and articulate technology needs and standards in procurement materials for digital projects.

Setting aside the challenges of recruiting and retaining workers with advanced digital skills, the civil service also faces deficits in functional digital literacy and skills across all positions in the government. These skills are often not emphasized in hiring processes, and existing training mechanisms come up short. The upshot is that even where digital transformations have been made, some employees who must use and maintain the digital services do not have the operational skills to do so.

What are digital skills?

Digital skills are the foundation of any digital transformation and are the most valuable resource for a digitally mature organization. This includes ***advanced digital skills*** to design, implement and maintain digital infrastructure and projects; ***digital literacy and operation skills*** to use digital systems and technology effectively to assist clients; and ***digital management skills*** to ensure knowledgeable and responsible procurement of technology and to oversee the implementation of digital services, support operation and navigate issues related to secure, accessible, equitable, and efficient digital service performance. While advanced digital skills typically receive the most attention, a digitally mature public sector requires a variety of digital skills that vary significantly in terms of technical ability.

Across job categories, basic digital literacy skills are a prerequisite to work in an increasingly technology-rich environment. These baselines include the ability to use email, conduct research efficiently and effectively online, handle basic data and design tasks, and use general software such as Microsoft Excel in addition to software that is specific to a given job.[42] Another important category are the professional digital skills, which are required to design and implement digital technologies. These skills vary significantly and include more complex data skills such as artificial intelligence (AI) and machine-learning tools and techniques, software and product development skills, along with IT system infrastructure skills. They also include more technical design-oriented skills such as user-experience design skills.[43] Finally, there are the often-overlooked but transformational digital skills needed to drive and manage the adoption of digital technologies, mitigate risk, manage change, and ensure technology solutions are implemented efficiently and effectively and achieve positive outcomes.[44] Underpinning all of these baskets of skills are the complementary human skills that become increasingly important in digitally mature organizations. These include social and emotional skills, teamwork, problem-solving, critical thinking and creativity, growth mindset, leadership, and basic design-oriented skills.[45]



Canada's digital talent

In the aggregate, Canadians possess a strong set of digital skills. When it comes to problem-solving using technology skills, Canadians score much higher than the OECD average.[46] Canada is also home to a large, highly-skilled digital workforce. In 2016, roughly 935,000 Canadians were employed in technology occupations—roughly five percent of the total labour force. The vast majority of these tech workers were employed in digital occupations—681,000 digital workers, constituting 73 percent of Canada's tech workers and nearly four percent of the total labour force. Zooming in to the tech workforce, the four occupations employing the most Canadians were digital occupations—160,000 Canadians worked as information systems analysts and consultants; 104,000 worked as computer programmers and interactive media developers; 68,000 as computer network technicians; and 63,000 as computer and information systems managers.[47]

Technology occupations are growing faster than the rest of Canada's labour market. Between 2006 and 2016, the workforce grew by 183,000 tech workers. This growth is expected to continue–with high-tech workers expected to grow by 45,000 workers between 2016 and 2026, and digital workers expected to increase by 144,000 workers over the same period. Digital occupations also earn significantly more than the rest of the Canadian labour force. In 2016, digital occupations earned on average $66,000 annually, nearly $21,000 more than non-tech occupations.[48]

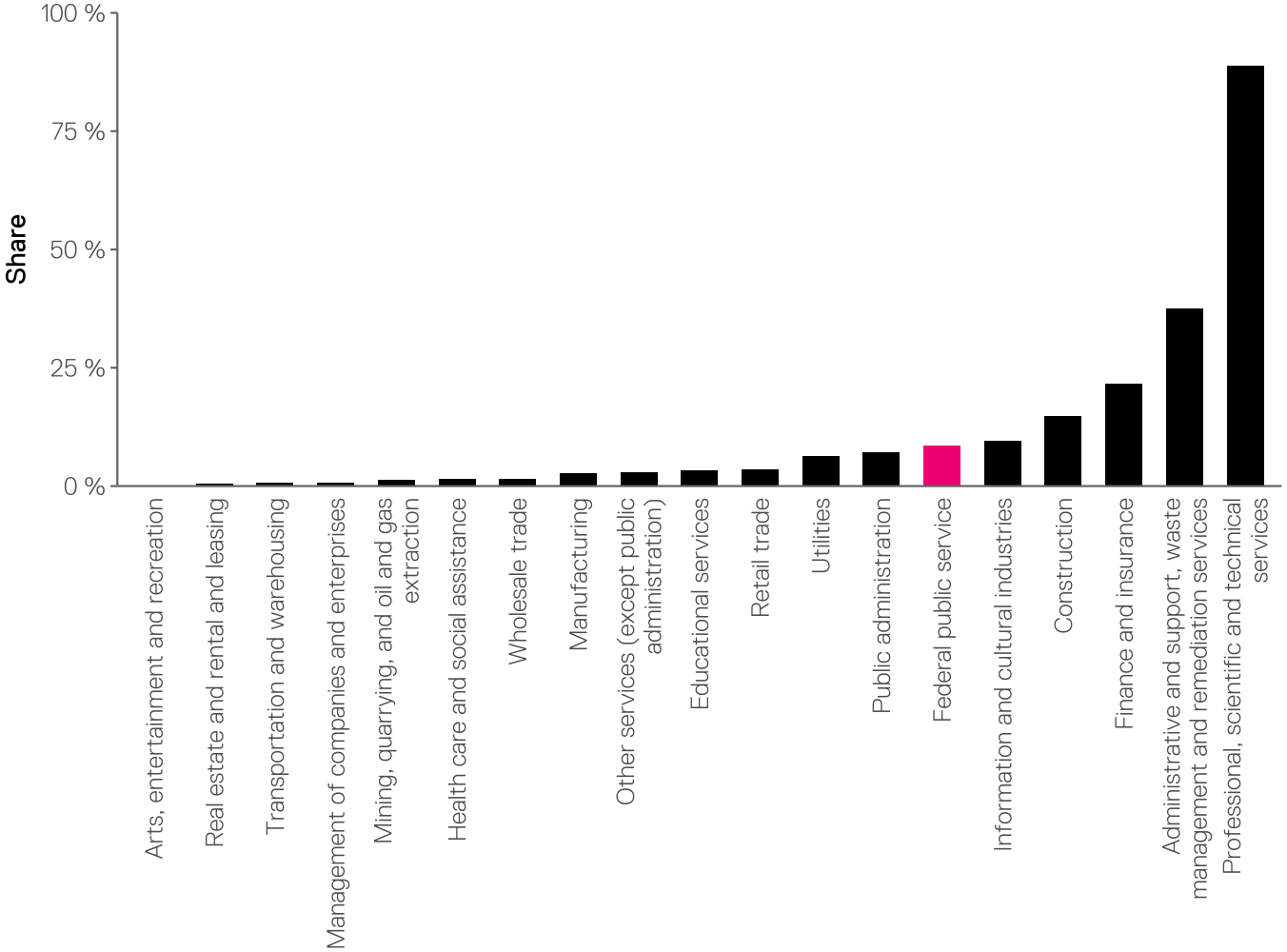
Digital skills in the Government of Canada

Despite having a strong pool of digital talent to draw from, the Government of Canada struggles to attract and retain the kinds of digital skills it needs to keep up with digital advances and deliver user-centric digital services.[49] According to the CDS, there are over 17,200 federal employees who are a part of the Computer Systems (CS) classification. Using a broader definition of digital workers from Vu, Lamb, Zafar (2019), in 2021, the Government of Canada employed nearly 28,000 digital workers.

However, compared to other industries across Canada, the federal public service is a middling performer when it comes to the relative size of its digital workforce. In 2021, digital workers comprised roughly 8.5 percent of the federal government's workforce. This is proportionally larger than what we see in the public service at all levels of government in Canada, but overshadowed by comparable professional sectors of the economy such as professional, scientific and technical services, where 89 percent are digital workers, and administrative and support services, and finance and insurance where 37 percent and 22 percent are digital employees, respectively.[50]

Figure 6

Digital Employee Proportion, Canadian Industries, 2021



Source: 2021 Canadian Census, author calculations. Digital employee definition from Vu, Lamb, Zafar (2019)

Digital skills challenges in the federal public service

There are three major overarching issues when it comes to building and developing digital skills across the federal government–fostering core digital literacy skills, attracting and retaining top talent, and building digital leadership skills.

Fostering core digital literacy skills across the federal public service

When studying the digital needs of the federal public service, the Canadian Digital Service (CDS) discovered that foundational digital literacy, user-centred design and digital project management skills, which are increasingly foundational in the private sector, are still rare in government.[51] Basic digital and design skills underpin most policy areas, programs, and services, but are still often not considered core skill sets for public servants. As a result, they are not skills the government typically hires for, considers as a part of the intake process, or generally incorporates into its organizational structure or formal skills development opportunities.[52]

There are three major overarching issues when it comes to building and developing digital skills across the federal government–fostering core digital literacy skills, attracting and retaining top talent, and building digital leadership skills.

A report from the Future Skills Centre highlighted how the current training practices in the federal public service are poorly designed to help instill digital and design skills across the workforce. Current training practices favour intensive formal education, in the form of long courses or degree or diploma programs. These programs require considerable effort and often force public servants to take time off work. This not only makes investing in training less appealing for managers and employees, but it also deemphasizes many of the more flexible, adaptive ways in which people tend to learn digital skills, such as workshops, microcredentialing, mentorship, and job shadowing.[53] Digital literacy skills are essential across the government, but continue to be overlooked when it comes to hiring and training practices.

Attracting and retaining top digital talent

Despite the large, globally recognized digital talent pool in Canada, the federal government also struggles to attract and retain top digital talent–one of the most vital resources for any digitally mature organization. Digital talent is often either unaware of opportunities within government or unwilling to work in the government due to barriers that arise during recruitment and hiring processes. The bureaucracy and culture inside government, pay and benefits, as well as the location and nature of work can also prevent top digital talent from moving into the public sector.

Currently, the Government of Canada is struggling to refresh its aging digital workforce. According to the CDS only 15 percent of the federal government's digital employees are millennials, compared to nearly one-quarter across the entire federal public service; the average age of digital employees increased from 40 in 2006 to 46 in 2016.[54] Finding and recruiting digital talent is a challenge for any organization. For the federal government, with rigid human resource processes and limited capacity in hiring for digital skills, these challenges are amplified. On the one hand, hiring managers in the government often do not know what digital skills they need or where to find them. On the other hand, digital workers often do not consider the public service as a potential

employer and do not know where to find public sector job opportunities.[55] [56] There is an urgent need to match digital talent, both recent graduates and mid-career, with opportunities that exist in government.[57] [58]

The federal government is often seen as not doing enough to engage students at top post-secondary institutions specializing in digital skills such as computer science, data science, and design-thinking programs, and often limits itself to schools in the National Capital Region.[59] Meanwhile, tech companies are always in active recruitment mode– engaging students from a variety of university and college programs across the country early on in their schooling, educating them about opportunities, providing placements, and directly recruiting students into positions.[60]

The public perception of the government as an employer also acts as a barrier, as top digital workers often view the private sector as offering more flexible, exciting opportunities with the potential for better pay. Despite these perceptions, the federal government does offer competitive salaries for individuals, especially earlier in their career.[61] In 2021, the average salary for federal digital workers was nearly $85,500, which is only around $3,000 lower than the average salary for digital workers across the country.[62] The government can also provide meaningful, challenging work with the potential to positively impact individuals across the country. Location is another challenge for digital workers, many of whom live and work in large cities across Canada and abroad. These workers are often hesitant to move to the National Capital Region, which is often a prerequisite for government positions.[63]

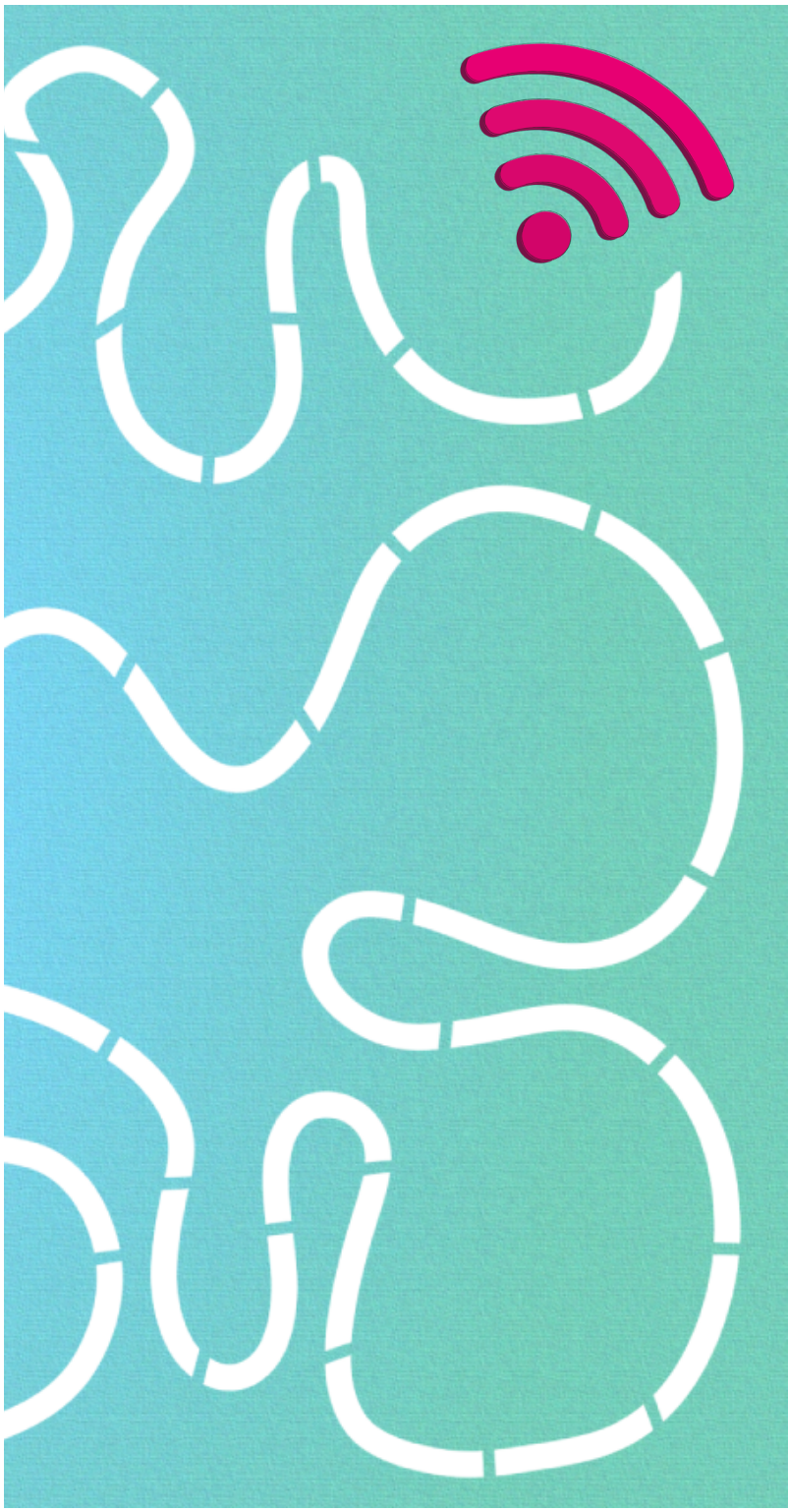
The Government of Canada's hiring systems also pose challenges for recruiting digital talent. Individuals with strong digital skill sets have expressed a lack of knowledge about the opportunities that exist within government and where to find them.[64] [65] The federal government needs to do more to target qualified candidates and enhance the visibility of opportunities. At the same time, hiring mechanisms still rely on imprecise measurements of digital skills, such as education levels and formal credentials. The hiring process is also complex and takes a long time to issue offers, which in the highly competitive market for digital talent can result in individuals finding other jobs before the process is complete. This impedes short-term staffing opportunities, and can also reinforce candidates' perceptions of government being an unexciting, slow-moving, bureaucratic organization.[66] Hiring mechanisms like private sector interchanges and the government's Talent Cloud pilot to recruit for digital roles offer potential, but are unlikely to be sufficient.[67] [68] [69] [70]

Finally, the current job classification system in government does not reflect the kind of user-centric digital design required for modern digital product creation. Job classifications do not include essential skills like user-centred design research and implementation skills along with product management. Employees who do similar jobs are being placed under different classifications such as Computer Systems (CS), Information Services (IS), and Economics and Social Science Services (EC), and cluster individuals based on these classifications. This does not recognize the interdisciplinary nature of modern digital design teams, and how individuals often move seamlessly between these defined roles on a day-to-day basis. In addition, only those entering a management track are promoted into higher salary bands. These practices can prevent the formation of effective interdisciplinary design teams and can squeeze out invaluable members of the team.[71] [72]

Managing digital transformation effectively

Beyond attracting top digital talent, the federal government also lacks the transformational digital skills required to plan, oversee, implement, and adapt to digitization. Transitioning to a primarily digital organization requires significant leadership and managerial skills to identify pain points and systems that need revamping. It also requires planning for and ensuring large complex digitization projects, such as transitioning legacy systems to more modern digital tools, to be delivered on time, on budget, and ultimately to be effective in meeting the needs of the end users. These transitional digital skills, required to manage change and ensure employees are able to adapt and thrive in their new digital environments, are key to successful digitization but are often overlooked in large organizations. There is considerable evidence that shows that "many large-scale projects have failed not because of technology but because strategies are not implemented to change project management, accountability mechanisms, and contract and relationship management."[73]

A number of internal evaluations have revealed many of the challenges that managers in departments across the government face when it comes to overseeing successful digital transformations. In an evaluation of the CDS, it was shown that departments were often "unable to independently manage their product once CDS ended its involvement because they lacked the capacity to maintain the needed level of user-centric improvements after the end of the partnership."[74] There are major deficiencies when it comes to systematically planning for and managing the revitalization of aging IT systems, monitoring security concerns, adopting agile project management techniques, and integrating user-centric design principles throughout the organization.[75] [76] [77] [78] [79]



6

Lens III: Assessing Digital Access

Unlike private-sector organizations, digital access for the Government of Canada requires the provision of digital services. At the same time, the Government also has responsibilities to ensure that all those in Canada have the ability to access and use digital technologies for government services, and ultimately to participate in an increasingly digital society. The first principle in Canada's Digital Charter is entitled Universal Access, stating: "all Canadians will have equal opportunity to participate in the digital world and the necessary tools to do so, including access, connectivity, literacy, and skills."

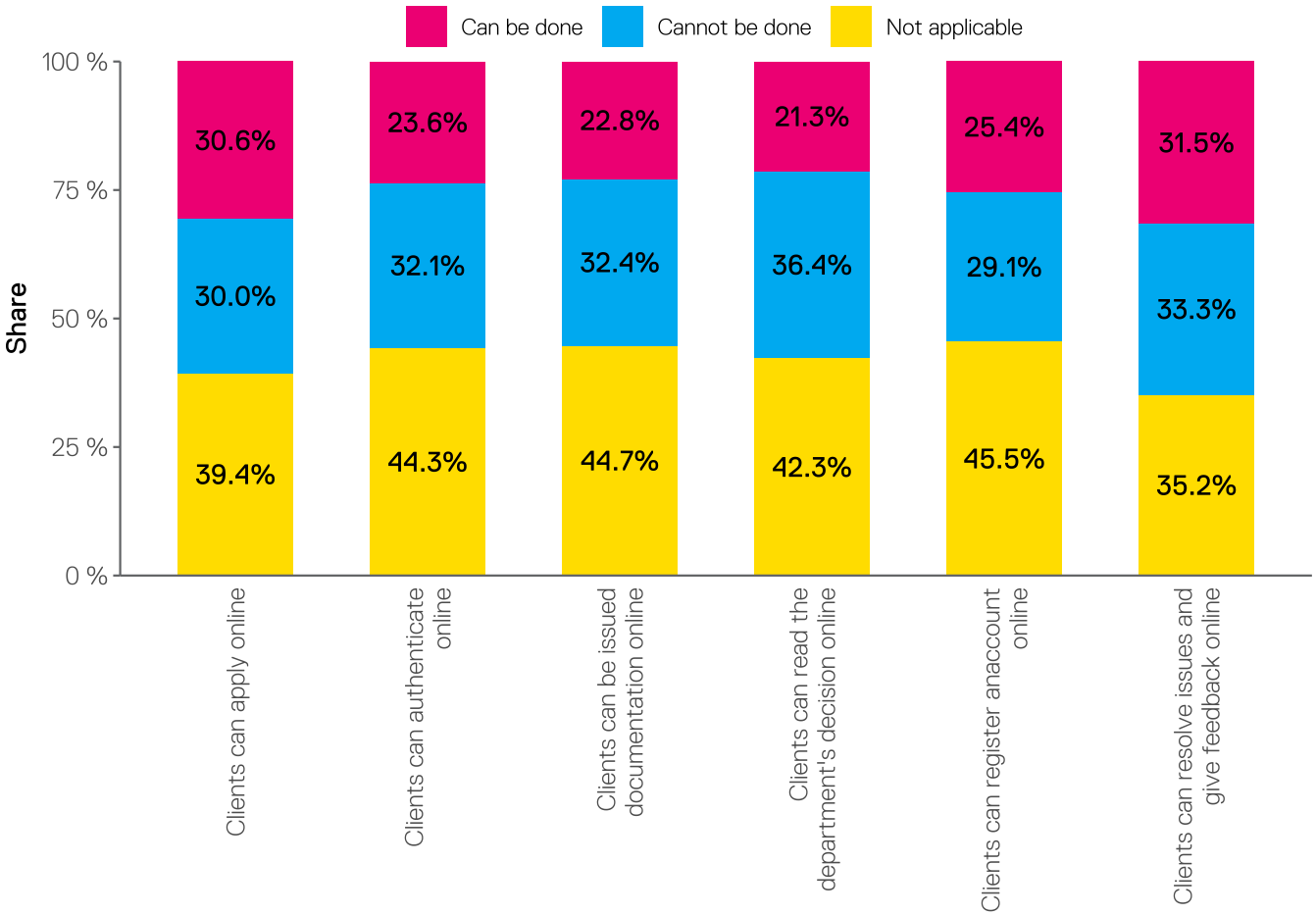
Currently, the Government of Canada not only struggles to provide digital services, but the lack of both infrastructure and digital literacy has created a stark digital divide across Canada–leaving many rural and remote communities, Indigenous peoples, and older Canadians, as well as those with less education and lower incomes without the ability to access adequate digital services. While the Government of Canada is providing significant support for Canadians to develop basic digital literacy as well as investing significantly in digital infrastructure, with the goal of providing universal high-speed Internet access to all Canadians by 2030, some have concerns that they are investing too little and not urgently enough. To achieve digital maturity, it is essential that the Government of Canada provide all Canadians with the infrastructure and tools, as well as the skills and abilities to use digital technologies and access the digital services provided by the government.

Government of Canada digital services

A prerequisite for digital access is ensuring that services are available online. As discussed in the digital culture section of the report, the Government of Canada often struggles to shift services online. While not all Government of Canada services have the potential to be digitized, amongst those with the potential for online offerings, more services remain offline compared to those that have made the digital transition. Twenty-one percent of the 1,375 services offered by the federal government in 2020-21 allowed clients to read the department's decision online, compared to the 36 percent of services that have yet to move decisions online. Thirty-two percent of services have the potential for online authentication, but have not yet made the transition to digital, compared to the 24 percent of services that have. Similarly, 29 percent of services have the potential to allow users to register online, yet this service remains unavailable, compared to the 25 percent of services that allow online registration. And while 31 percent of services allowed clients to apply online, 30 percent of federal services require in-person or paper applications despite having the potential to allow clients to apply online. However, the federal government has prioritized the digitization of high-volume services–before the pandemic, roughly half of all applications for services received by the federal government were online, which increased to over 80 percent in 2020-21. [80] This is commendable progress.

Figure 7

Online Status of Government of Canada Services, 2020-2021



Source: Treasury Board of Canada Secretariat

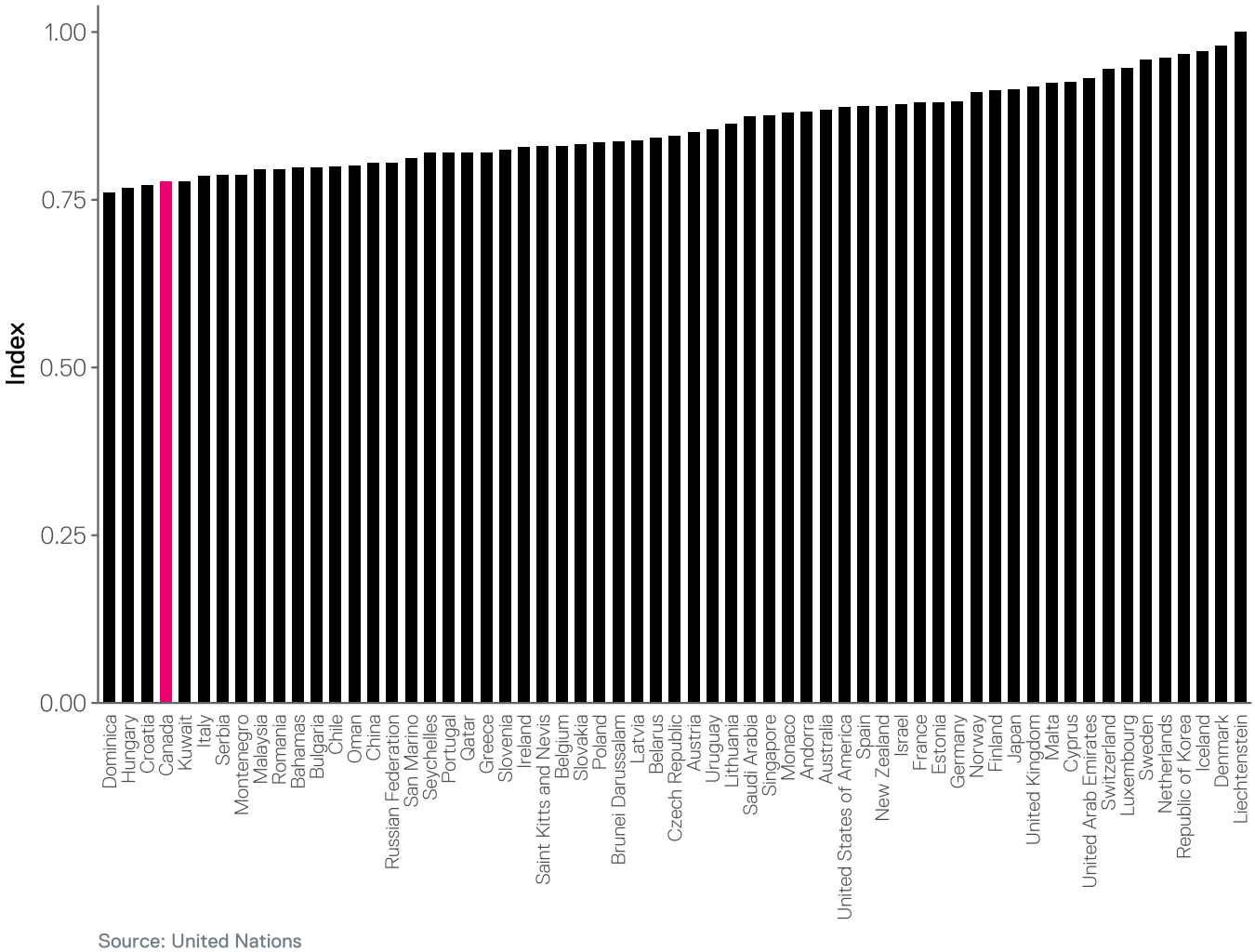
Before the pandemic, roughly half of all applications for services received by the federal government were online, which increased to over 80 percent in 2020-21.

Canada's digital divide

In addition to many Government of Canada services remaining offline, Canadians across the country lack the ability to access the services that have been digitized. Among the three main components that make up the UN's E-Government Development Index (EGDI), Canada scores the lowest on the Telecommunications Infrastructure Index (TII). With a score of 0.77 out of a possible 1, Canada sits fifty-eighth out of the 193 countries included in the ranking–just above Croatia and just below Kuwait, and well below the leading countries of Liechtenstein, Denmark, Iceland, and Korea. Canada is also eclipsed by G7 peer countries such as the UK, Japan, Germany, France, and the United States.

Figure 8

Telecommunications Infrastructure Index (TII), Top Ranking Countries, 2022

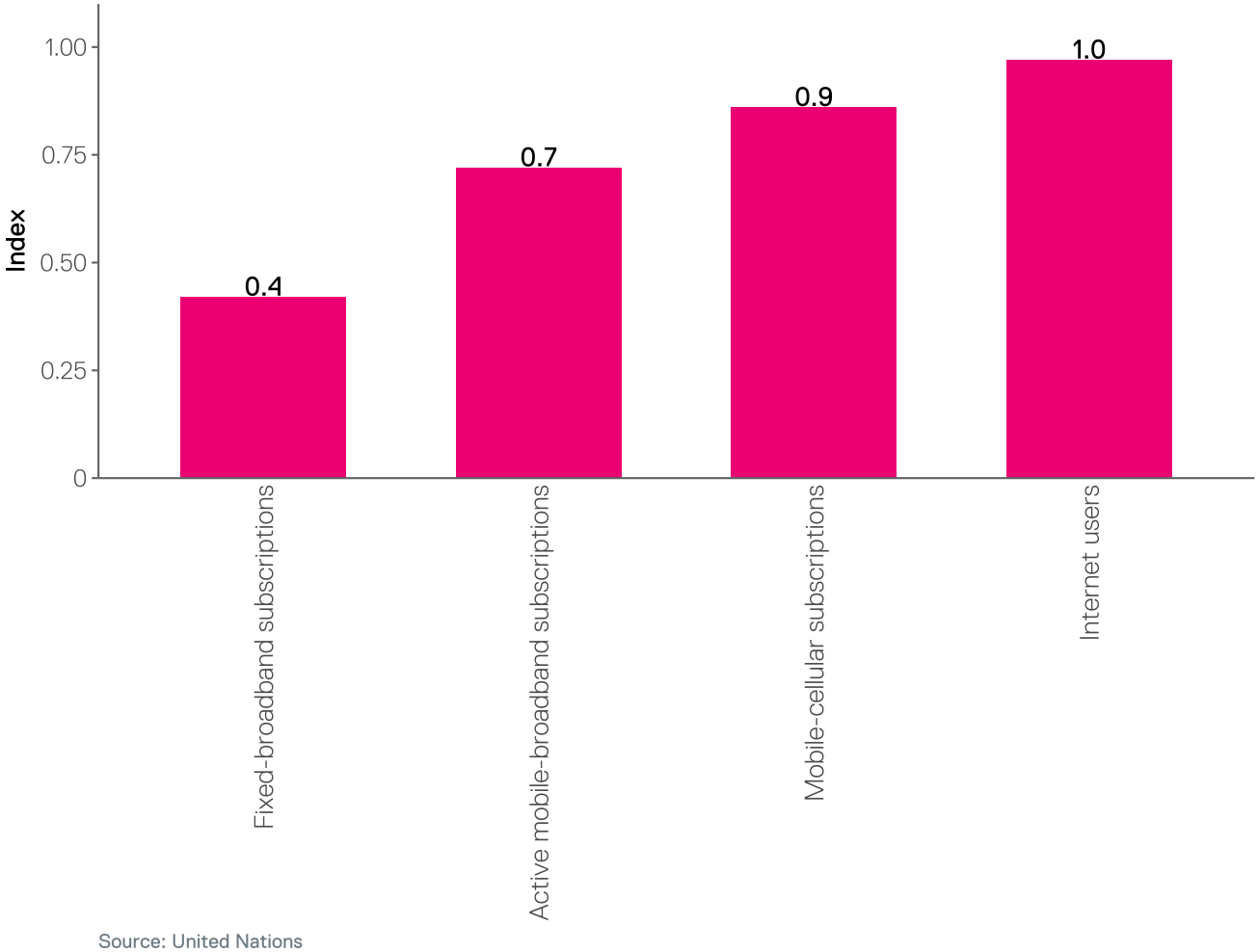


Source: United Nations

When zooming in to the measures that comprise the TII, Canada scored the lowest when it comes to fixed-broadband subscriptions, which measures high-speed Internet connections with download speeds at, or exceeding, 256 kilobits per second (kbit/s) per 100 habitants. Canada also scores relatively low on measures of mobile Internet access, including: active-mobile broadband subscriptions per 100 inhabitants with download speeds of at least 256 kbit/s, as well as mobile-cellular subscriptions per 100 inhabitants. Canada performs relatively high on the proportion of Internet users, with 97 percent of the population reporting using the Internet in the past three months.

Figure 9

Canada Score Sub-Components, Telecommunications Infrastructure Index, 2022



Source: United Nations

Canada's digital divide, which refers to the gaps in accessibility to digital technologies for different demographics and regions across the country, is stark and well documented—stemming from a lack of basic digital infrastructure, as well as a wide array of economic and social barriers that make it challenging or impossible to access digital technologies. Studies have shown that digital divides are embedded in "social, economic, and cultural contexts, and necessarily intersect with categories of race, class, gender, age, and so on."[81] According to one study, in order to close the digital divide, there are five key criteria that must be met:

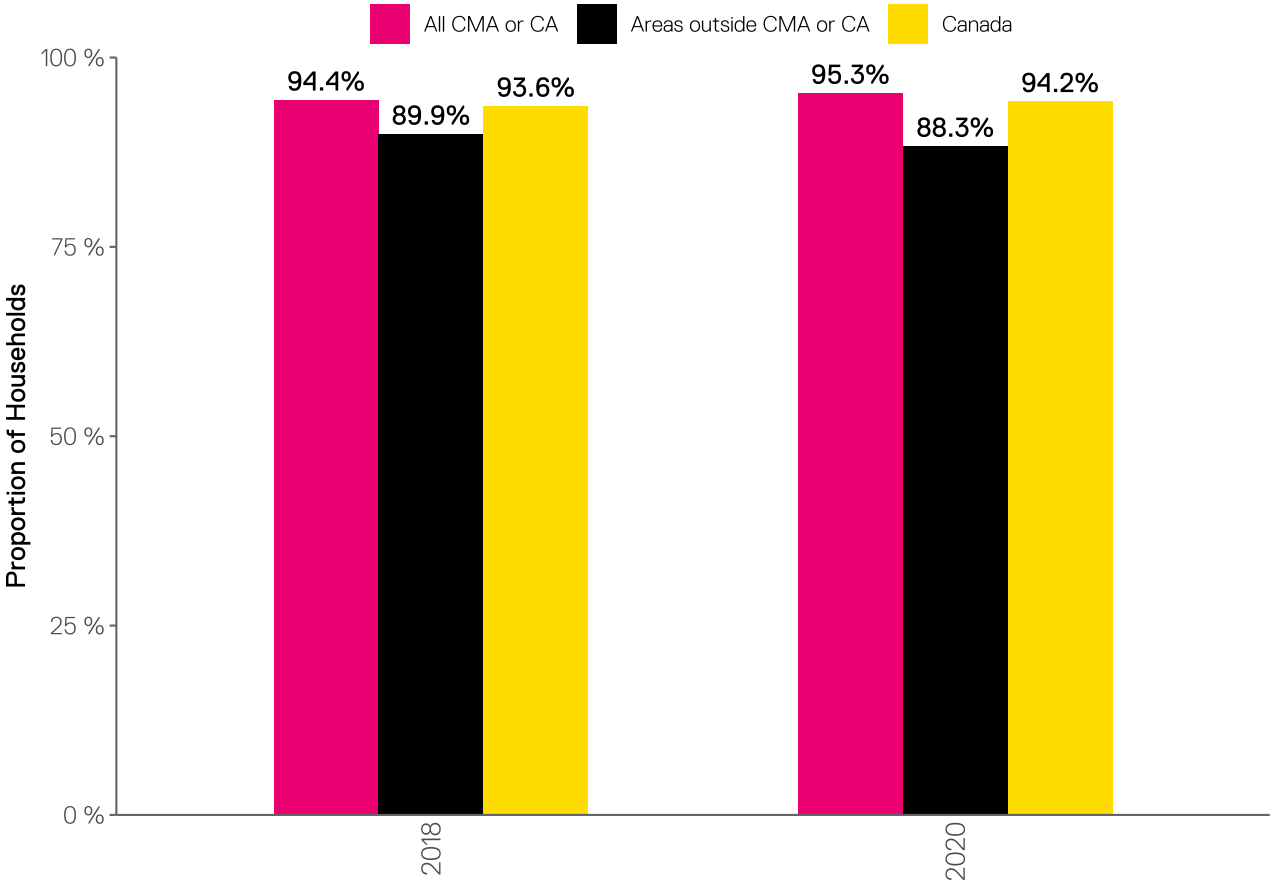
1. Affordable, robust broadband Internet service
2. Internet-enabled devices that meet the needs of the user
3. Access to digital literacy training
4. Quality technical support
5. Applications and online content designed to enable and encourage self-sufficiency, participation, and collaboration[82]

Demographics of Canada's digital divide

Infrastructure challenges associated with Canada's vast land mass, along with existing economic, social, and skills barriers have resulted in significant discrepancies when it comes to Internet access and Internet quality for rural, remote, and Indigenous communities, low-income households and older residents.[83] [84] According to the Canada Internet Use Survey (CIUS) in 2018 and 2020, 94 percent of Canadian households had Internet access. For urban residents, this increased to 95 percent of households in 2020, up one percentage point from 2018. In contrast, 88 percent of rural households had access to the Internet–a decline of roughly two percentage points from 2018.

Figure 10

Urban-Rural Divide in Internet Access



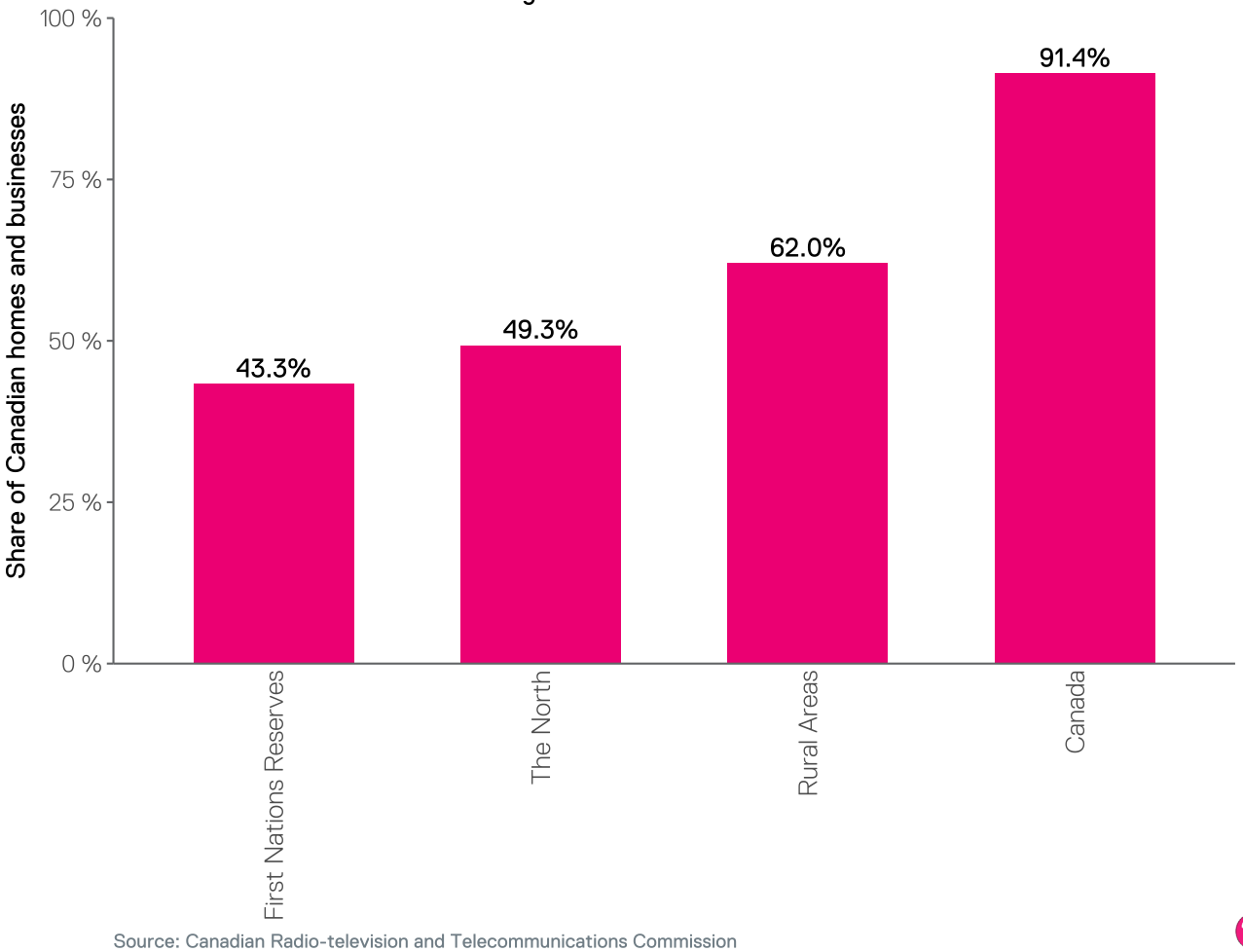
Source: Canada Internet Use Survey, Statistics Canada.
A census metropolitan area or census agglomeration are defined by commuting flows and represent core population areas

The urban-rural digital divide becomes even more stark when examining Internet quality. The Canadian Radio-television and Telecommunications Commission (CRTC) set a goal for 90 percent of Canadian homes and businesses to have access to Internet with speeds of at least 50 megabits per second (Mbps) for downloads and 10 Mbps for uploads (50/10) by 2021–with the remaining 10 percent of the population to achieve this access target by 2030. In 2022, 93.5 percent of households have access to at least 50/10 broadband coverage.[85]

However, there remains 1.3 million households without coverage-the vast majority in rural areas, where only 62 percent of households have access to this standard of Internet. Nearly 24,000 (or over 51 percent of households) in the North do not have access to 50/10 broadband, a figure which increases to 76,000 (or nearly 57 percent of households) in First Nations reserves.[86]

Figure 11

50/10 Unlimited Broadband Coverage



Source: Canadian Radio-television and Telecommunications Commission

Nearly 24,000 (or over 51 percent of households) in the North do not have access to 50/10 broadband, a figure which increases to 76,000 (or nearly 57 percent of households) in First Nations reserves.

While the lack of sufficient broadband infrastructure across much of Canada is a major root cause of the country's digital divide, Internet affordability as well as access to necessary hardware such as computers, tablets, and routers can impede access to necessary digital services. Canada's Internet services are comparatively expensive. According to one international study, out of 62 countries surveyed, Canada ranked as the fifth most expensive for Internet with speeds of 100 Mbps.[87] A 2021 federal government study, comparing Canada with its G7 countries plus Australia, showed Canada as the third most expensive for Internet speeds up to 100 Mbps, with an average monthly price of nearly $78.[88] One contributing factor many commentators have pointed to is a lack of competition in the Canadian telecommunications industry–where five companies account for 87 percent of revenue in the industry.[89]

For lower-income households, the result is prohibitively high Internet costs, disproportionately impacting certain individuals. One study showed that four percent of households in the bottom quartile of the income distribution did not have access to the Internet, compared to one percent of the population as a whole.[90] For seniors (aged 65+), only 54 percent with incomes under $20,000 reported Internet use, compared to 73 percent of those with incomes between $60,000 and $79,000 and 79 percent of those with incomes over $100,000.[91]

One contributing factor many commentators have pointed to is a lack of competition in the Canadian telecommunications industry–where five companies account for 87 percent of revenue in the industry.

A 2020 study that surveyed 2,500 residents in Toronto found that two percent of the population reported not having access to the Internet. The cost of Internet services and the lack of devices were the most commonly cited reasons for not having Internet access. And despite the high proportion of Torontonians reporting having access to the Internet, 38 percent of those surveyed report speeds below the CRTC's 50/10 speed target; this includes more than half of Toronto's low-income households, with incomes less than $30,000, and 48 percent of households whose residents are aged 60 or over. When asked about whether individuals worry about being able to pay their home Internet bill over the next few months, the majority of Toronto's low-income households are worried–a sentiment which is highest among those who identify as Latin American, South Asian, Black, and Southeast Asian.

Basic digital literacy is also a fundamental prerequisite for accessing digital services and navigating an increasingly digital society. While trends suggest that digital literacy skills are increasing–enabling individuals to become more proficient in their use of digital technologies – barriers still persist for certain individuals, especially those who are older or less educated. Using data from Statistics Canada's CIUS, from 2018 to 2020 the proportion of Canadians who identified as non-users or basic users of digital technologies fell by almost five percent, from roughly 24 to roughly 19 percent of the population. While the share of individuals aged 65 and over who identified as non-users or basic users of digital technologies declined from 62 to 48 percent, they still accounted for 64 percent of non-users and 49 percent of basic users. Similarly, though the share of individuals with high school or less education who were basic or non-users declined by 11 percentage points from 2018 to 2020, they still accounted for almost two-thirds of non-users and half of basic users in 2020.[92] Digital literacy skills are also essential for safely navigating an increasingly digital society; according to the CIUS, 58 percent of Canadians were involved in some form of cyber security incident, an increase of six percent from 2018.[93]

Basic digital literacy is also a fundamental prerequisite for accessing digital services and navigating an increasingly digital society.

To lower the cost of Internet for Canadians, the CRTC is once again looking to initiate competition in the telecommunications industry by imposing an immediate 10 percent reduction on some wholesale rates–the rates that smaller companies have to pay to access the larger telecoms infrastructure–and launching a consultation to inform a future plan to "increase competition, create more choice and lower prices."[99] In addition, the Government of Canada's Connecting Families initiative is working with a voluntary group of Internet service providers (ISPs) to offer $20/month high-speed Internet to low-income families who receive the maximum Canada Child Benefit (CCB) and low-income seniors who receive the maximum Guaranteed Income Supplement (GIS). This program was launched in 2017 and has thus far supported 82,000 families.[100] The federal government has also invested significantly in digital literacy skills; in 2022, $17.6 million was allocated to the Digital Literacy Exchange Program (DLEP), which will support initiatives in providing digital literacy training to Canadians who face barriers to participating in a digital economy.[101]

How is the Government of Canada addressing the digital divide?

The Government of Canada has recognized the significance of the digital divide across Canada and is actively attempting to close it. In 2019, Canada's Connectivity Strategy was announced, targeting 98 percent of Canadians having access to 50/10 Internet by 2026 and 100 percent connectivity by 2030.[94] The federal budget that year dedicated $1.7 billion to funding high-speed Internet in rural and remote communities.[95] In 2020, the Universal Broadband Fund was launched with $3.225 billion to support high-speed Internet projects across Canada–awarding up to $750 million for large, high-impact projects and up to $50 million for smaller mobile projects that primarily benefit Indigenous Canadians.[96] Federal funding for broadband has increased to $3.6 billion for 2022-23, an increase of $934 million from the previous year.[97] However, some critics estimate that it will cost up to $6 billion to roll out broadband access to all Canadians.[98]

The Government of Canada has recognized the significance of the digital divide across Canada and is actively attempting to close it.

7 Strategies to Advance the Government of Canada's Digital Maturity

Building a Digital Culture

Management structure

Effective digital transformation requires focused leadership roles to plan, manage, and oversee digital development. These individuals should be responsible for promoting a culture of digital design across their department, while also looking beyond departmental silos to build partnerships and develop user-centric digital services across the organization. In each department, the leadership responsible for digital service delivery should regularly engage in discussions to assess the issues and risks associated with aging IT systems and develop processes to address these issues.[102] [103]

In addition, departments across the federal government should consider adopting a management framework that establishes clear roles and responsibilities for the oversight and development of digital projects, reporting requirements, and quality assurance processes for IT system development.[104] [105] Each digital project should have a single owner responsible for all aspects of digital service development. These service owners should have the authority to assemble cross-functional teams, with expertise in software development, user-experience design, product management, as well as any necessary specialized business functions such as legal, sales/marketing and procurement. They should also have autonomy over the creation of the digital product, with clear reporting structures.[106]

Agile project management and user-experience design

The federal government, alongside department digital leaders, should consider developing clearly defined expectations around agile project management for all digital projects.[107] Project managers, for both internally and externally developed projects, should start small, releasing and testing products that aren't fully complete, and based on rigorous examination of user feedback, they should iterate and improve digital products until they meet user needs. This approach not only requires departments to accept more risk, but also necessitates embedding user-experience design expertise across the organization to assess and build on user feedback at all stages of the project.[108] Individual departments can potentially draw upon the internal expertise of the CDS to build capacity in this space.

Adopting an agile approach means shifting away from traditional waterfall gating processes that govern the funding and approval of IT projects. In their place, the federal government should consider developing processes to fund projects incrementally, enabling "service delivery teams research, design, build, and continuously improve their products."[109] Facilitating agile project management will also require access to consistent and continuous user-feedback data. Based on best practices, this data should be collected using common data collection standards across departments, made public as early as possible, and published using service dashboards.[110]

Working in the open, by sharing data, code, and publishing progress and failures is also critical for a digitally mature government. The Government of Canada should consider adopting "working in the open" principles and techniques to allow for feedback from other experts and the sharing of learning and best practices across the organization to scale successful innovations and develop solutions to challenges many departments may be facing simultaneously. Working in the open also helps to improve efficiency and avoid duplication of work across the government, while also demonstrating transparency and fostering collaboration with citizens.[111]

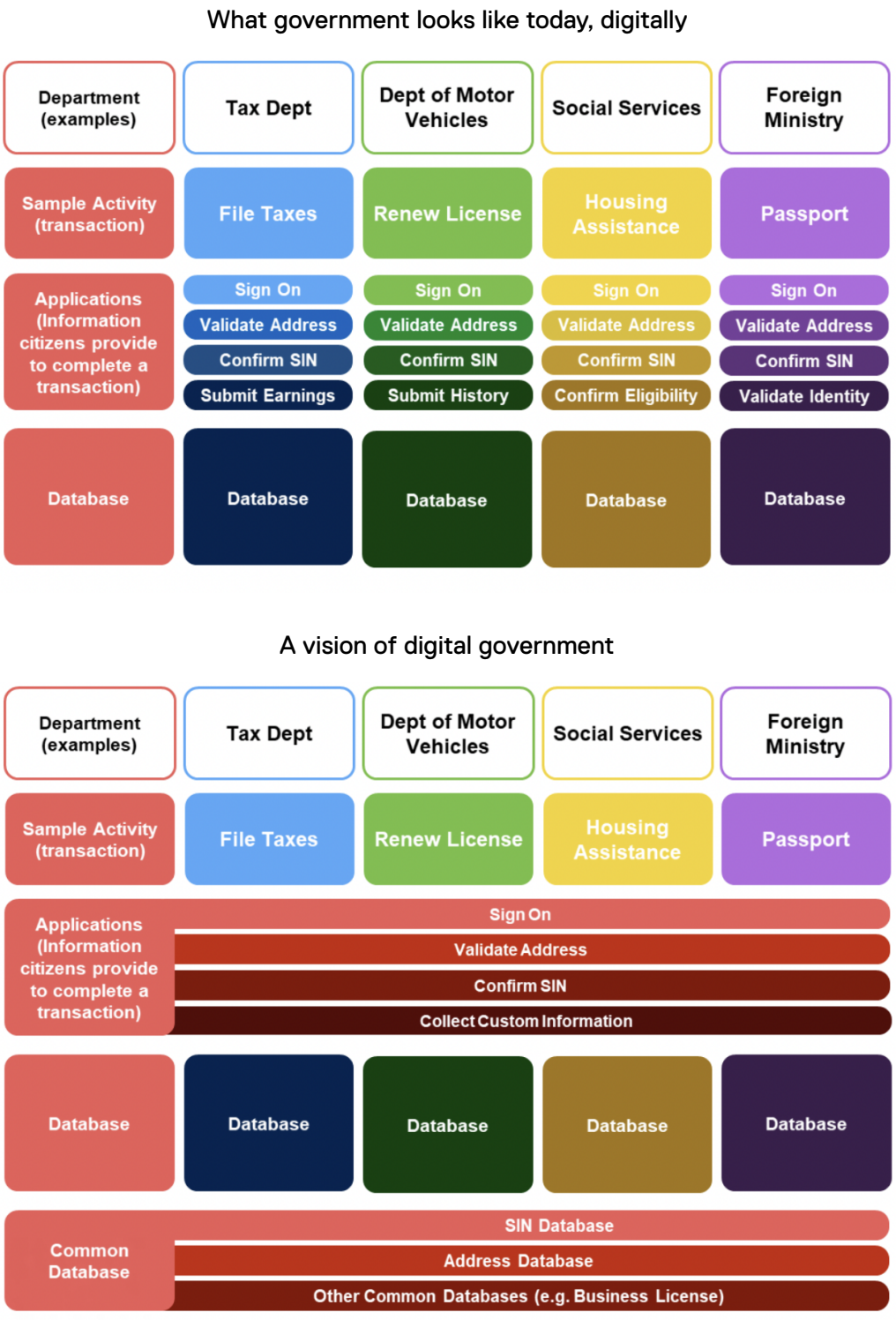
The federal government, alongside department digital leaders, should consider developing clearly defined expectations around agile project management for all digital projects.

Digital infrastructure and resources

Project teams also require the resources they need to successfully execute digital projects. Departments, along with Shared Services Canada (SSC), which is responsible for IT infrastructure across the federal public service, should ensure that teams can access the data, systems and tools–both software and hardware–needed to more effectively design and deliver digital services. Breaking barriers around universal adoption of cloud services is an important first step, since cloud infrastructure and applications are often "better, less expensive, more secure, and improving at a pace that government cannot match. Departments should be allowed and supported to purchase and use them."[112] Cloud adoption requires the Government of Canada to become more familiar and comfortable using open-source technology.

In addition to cloud services, moving away from the myriad of vertically-integrated systems across the federal public service and building shared infrastructure, such as shared data storage, is essential for coordinating services and ensuring the Government of Canada can move towards a more platform-based model, which would allow for initiatives like the creation of a centralized digital verification system. The Estonian model, for example, allows for different departments and private-sector utilities to maintain independent databases, while allowing each and every other public sector institution to securely access these databases.[113] When an individual or business updates its information in one department, it is updated in a centralized database, meaning that same individual does not need to input the same data (e.g., a new address) multiple times across multiple platforms. Building this kind of centralized back-end infrastructure is a fundamental prerequisite for allowing a single digital verification system. It also enables government departments to more efficiently build new digital services–connecting to an existing database means when a new service is needed a department only has to build the "last mile" to the user. SSC must play a key role in any efforts to centralize and allow shared access to data storage across federal departments. This aligns with its existing strategy to create an enterprise approach to managing the federal government's IT services, as outlined in Shared Services Canada 3.0: An Enterprise Approach.

Figure 12: Model of digital infrastructure



Reproduced from: Eaves and McGuire, "Lessons from Estonia on Digital Government," *Policy Options*.

Digital procurement

A large proportion of federal digital services are developed and maintained through external request for proposals (RFPs). Therefore, improving digital services also necessitates improving procurement. Current digital procurement mostly focuses on large IT contracts, open to a select few large players, executed over many years using waterfall project-management methodologies. This opens up a number of potential risk factors, including cost and deadline overruns, vendor lock-in, and ineffective, inefficient digital systems. While there is a place for large digital transformation projects, the Government of Canada should also consider cases where comparatively smaller contracts, open to a wider array of domestic, as well as small- and medium-sized firms managed using the aforementioned agile project management methodologies, might be appropriate. With these smaller, agile RFPs, the federal government can address uncertainties associated with digital product development by designing and testing digital services early, and, based on rigorous user data collection and examination, adjusting digital services until the end product meets user needs. This strategy also distributes risk–focusing on smaller contracts will help departments avoid getting locked into a large, lengthy contract with one vendor; instead they will have the flexibility to switch vendors should problems arise. This will also build more accountability, since the government has options to switch vendors when the shorter contract expires. Crucially, lessons learned through this agile process can then be applied to mitigate risks in large digital transformational projects (that may be necessitated in some cases).[114]

To accomplish this, federal departments should consider adopting modular contracting principles–a combination of agile project management, user-centred design, and product and data ownership, as well as breaking up larger projects into smaller constituent parts and continuously building.[115] Instead of purchasing software from a vendor, the government would buy from the internal development teams, requiring them to demonstrate incremental service improvements. The federal government should work to eliminate barriers for innovative small and medium-sized enterprises to bid successfully on RFPs–reducing administrative burdens, rethinking mechanisms such as standing offers that favour large incumbents, and generally implementing "streamlined, short-term procurement approaches that are designed around modern digital capacities."[116]

The federal government has already developed procurement programs to help SMEs participate in procurement processes. For instance, Innovative Solutions Canada (ISC) requires participating departments to dedicate one percent of their 2015-16 research and development (R&D) and procurement budgets to issuing challenges based on immediate needs and supporting SMEs through gated processes to solve them.[117] The federal government should continue to support innovative procurement and partnership programs such as ISC to help build partnerships with SMEs to design and build digital services and solutions.

Federal departments should consider adopting modular contracting principles–a combination of agile project management, user-centred design, and product and data ownership, as well as breaking up larger projects into smaller constituent parts and continuously building.

Building Digital Skills

Fostering digital and design skills throughout the public service

Basic digital literacy and user-centric design skills should become a core competency of public servants across the federal public service and a central goal for public sector talent development. Digital and design skills should be identified, mapped, and formally incorporated into the organization through hiring procedures, formal skills-training programs, and other, more flexible and adaptive strategies, such as microcredentials, mentorships and coaching, workshops, and job shadowing programs. User-experience design as well as agile project management methodologies should also become a key component in hiring and training for managerial roles throughout the public service. Managers across the organization should incentivize employees to build these skill sets, measure these competencies, and continually address skills gaps.[118] [119]

Attracting and retaining top digital talent

In addition to basic digital and design skills, fostering a digitally mature public sector requires attracting and retaining top digital talent. As an initial step, the federal government should consider clearly identifying digital and design skill deficits across the public service. Adjusting human resources (HR) policies and procedures is also critical–including the addition of much-needed skills and roles, such as product and service management and design research, and eliminating existing practices to cluster individuals in the organization based on job classifications (i.e., software developers work only in IT units) to enable the formation of multidisciplinary digital teams. Individuals with specific skill sets should also be able to move more seamlessly throughout the government–deployed in areas that need them most. These practices would require coordination across the 43 HR systems that currently operate in the federal government.[120] [121]

The federal government also needs to take a more proactive approach to targeting and recruiting digital talent. They must broaden their approach and actively recruit people from top computer and data science and design programs across the country and abroad, earlier on in their education. They need to identify and communicate their unique value proposition to specific individuals, such as benefits and competitive salaries for individuals early in their career,[122] as well as the intellectual challenges of certain jobs in the government and the opportunity

In addition to basic digital and design skills, fostering a digitally mature public sector requires attracting and retaining top digital talent.

to work on issues that can positively impact the lives of Canadians.[123] The federal government should also continue to explore opportunities to bring on top digital talent for short stints such as the Code for Canada model, where digital and design professionals are embedded into the government for a relatively short period of time to tackle pressing challenges and design more inclusive, user-centric digital tools and services.[124]

In addition, removing barriers to entry for many digital and design professionals, such as offering more remote work opportunities and reducing bilingualism requirements, might also open up the digital talent pool. Finally, the federal government should focus on building capacity—such as user-experience design skills—in their existing digital workforce through mentorship, microcredential, job shadowing, workshops, as well as formal training.[125]

Bridging the Digital Divide

In addition to improving government digital services, it is perhaps just as essential that the Government of Canada bridge existing digital divides to ensure all Canadians are equipped to access government digital services and more broadly, participate in an increasingly digital society. To do so, the federal government should continue to fund and support efforts to bring high-speed broadband access to all Canadians, ensuring that they meet their target of universal access to 50/10 Mbps Internet by 2030, as outlined in Canada's Connectivity Strategy. National consultations and research about Canada's digital divides have recommended increased emphasis on building out the necessary infrastructure in remote communities, particularly Indigenous communities and the North to meet the Government of Canada's connectivity goals.[126] Some promising alternatives have emerged in recent years, such as satellite based broadband Internet services like Starlink.[127] However, before relying on alternative solutions, issues associated with accessibility and quality need to be addressed.[128]

Closing the digital divide across particularly vulnerable groups such as low-income and older Canadians requires targeted policy solutions that go beyond infrastructure.[129] Efforts to subsidize the Internet, such as the Connecting Families initiative, could be expanded to include more Canadians. Efforts to reduce Internet costs could also be expedited and expanded, including the CRTC's efforts to target wholesale rates in the telecommunications industry to induce competition. It is also essential that the Government of Canada continues to provide, and potentially expanding upon, its suite of programs to support digital literacy training for Canadians who need it the most, such as seniors and individuals with lower levels of education. To support the federal government's efforts to bridge the digital divide, Statistics Canada should also continue to identify gaps in Internet speeds and service, while also rigorously monitoring digital literacy skills across various regions and demographics to better target programming and assess progress.

Closing the digital divide across particularly vulnerable groups such as low-income and older Canadians requires targeted policy solutions that go beyond infrastructure.

8

Conclusion

Digital advances and the availability of digital services have allowed many Canadians to perform all of their daily tasks from the comfort of their home–digital services now meet Canadians where they are, and when they are needed. To meet expectations, services must be accessible, efficient, customized, and entirely user-friendly. These expectations now extend to government services. It is no longer sufficient for the federal government to only digitize certain aspects of a service or require an individual to sign-in to multiple platforms and fill out multiple forms to perform often interrelated tasks. Government digital services must meet, and sometimes even exceed, those offered by the private sector.

However, as is often the case, there is a large gap between expectations and reality. How well has the Government of Canada been able to adopt digital technology to improve its business processes and meet citizen's expectations? This report examined the level of digital maturity across the federal public service, while exploring why, in some cases, those services are not as advanced as they could be. By looking at this issue through three lenses – digital culture, digital skills, and digital access – this report reveals a picture of lagging performance, as well as insights into the challenges the federal government faces when it comes to improving its digital maturity.

This report highlights that while the federal government has been able to establish a strong institutional foundation for digital government, it often struggles to coordinate digital services across departments, and to offer end-to-end digital experiences that meet increasingly complex user-expectations. To be fair, the federal government has many additional requirements and must meet higher thresholds of security, accessibility, and equity compared to the private sector. Still, the government faces a number of interrelated hurdles. The federal government struggles to incorporate modern digital practices and a tolerance for risk into the architecture of the bureaucracy, including agile project management and user-centred design. Individual departments often struggle to plan for and manage aging legacy systems and large IT projects–and are often reliant on external contractors instead of internal expertise to deliver projects. This combined with existing procurement practices has resulted in digital transformation that is driven by large, lengthy and risky RFPs led by a handful of multinational corporations, along with a federal public service that lacks the digital, design, and managerial skills and capacity needed to drive their own digital transformation. On top of these challenges, unlike many private sector companies, the federal government must also work to ensure that all Canadians have the infrastructure, tools, and capacity to access their digital services and participate in a digital society. Yet despite considerable efforts to ensure Canadians have the skills and infrastructure to use digital technology, there exists considerable digital divides for many Canadians–particularly rural, remote and Indigenous communities—along with older Canadians and those with lower levels of income and less education.

Despite these challenges, the federal government has the potential to improve its overall digital maturity along each of the three lenses – digital culture, digital skills, and digital access. This report outlines a roadmap, providing high-level recommendations to help guide departments across the federal government to improve their digital capacity and ultimately provide digital services that are designed and delivered with Canadians' needs and expectations in mind.

The federal government has the potential to improve its overall digital maturity along each of the three lenses – digital culture, digital skills, and digital access.

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