The Conference
Board of Canada
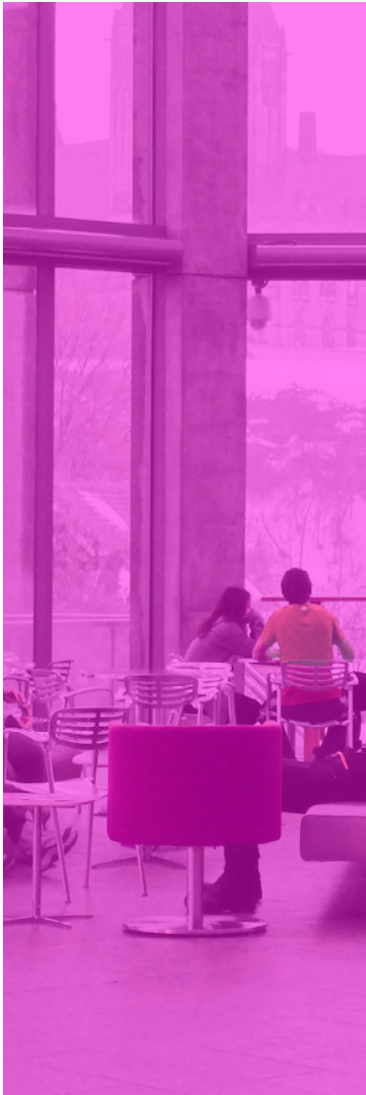
Building a Digitally Skilled Workforce

Insights From Canadian Employers and Skills Leaders

Future Skills Centre

The Future Skills Centre – Centre des Compétences futures (FSC-CCF) is a forward-thinking centre for research and collaboration dedicated to preparing Canadians for employment success. We believe Canadians should feel confident about the skills they have to succeed in a changing workforce. As a pan-Canadian community, we are collaborating to rigorously identify, test, measure, and share innovative approaches to assessing and developing the skills Canadians need to thrive in the days and years ahead.

The Future Skills Centre was founded by a consortium whose members are Toronto Metropolitan University, Blueprint, and The Conference Board of Canada.

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Key Findings

- Employers need more workers with advanced digital skills that go beyond basic digital literacy. While the types of advanced digital skills depend on the specific industry and role, most industries in Canada need skills in cybersecurity, cloud computing, and data analysis.

- Barriers to Canada's advancement in the digital skills landscape include unequal access to digital infrastructure and digital skills training among Northern, Indigenous, and other rural communities as well as businesses' continued reliance on legacy technology.

- Employers should create a culture of continuous learning and development that allows their employees to consistently upgrade and maintain their digital skills.

- Digital skills training in post-secondary education (PSE) should be mandatory and embedded into existing curricula. This training should be practical, hands-on, and tied to industry needs.

- Governments should set guidelines and provide more funding for digital skills training in PSE and provide free community training, particularly for under-served populations.

Introduction

When it comes to digital skills, Canada is falling behind. How can we ensure that Canadian employers have the skills they need to adapt, innovate, and grow in an increasingly digital future?

The rapid pace of digitalization, which was accelerated by the COVID-19 pandemic, has increased the need for digital skills in the workplace. Today, virtually every Canadian company requires workers with the digital acumen to keep up with and benefit from the continuous advancement of digital tools and technology.

Digital skills in Canada are in critically short supply. Only 30 per cent of the Canadian population is currently "very prepared with workplace digital skills," and this number is expected to drop to 23 per cent within the next five years as technology continues to evolve.[1] A lack of digital talent in Canada can inhibit innovation and growth and have serious consequences for businesses, the economy, and communities.[2] Without addressing this gap, Canada risks falling increasingly further behind in the global economy.

Our work explores how to better position Canadian employers for success in the digital workplace of today and tomorrow. To begin, we held 21 key informant interviews with Canadian employers and industry leaders. Insights from these interviews were shared in a prior report[3] and used to inform the design of a survey of over 500 skills leaders[4] across different industries and regions in Canada (see Appendix A for a breakdown of respondents by industry and region). In this impact paper, we build on the themes identified in our prior report by integrating insights from our key informant interviews with findings from our nationwide survey.

Our findings support the claim that the onset of the COVID-19 pandemic drastically increased the need for digital skills in the Canadian workplace. In particular, employers and skills leaders agree that the pandemic accelerated the pace of digitalization (85 per cent) and increased the need for talent with digital skills in their industry (74 per cent). However, the digital skills of Canadian workers today aren't sufficient. Nearly all skills leaders surveyed (95 per cent) believe that the digital skills of workers in their industry could be improved. Employers, workers, and governments would benefit from a deeper understanding of the specific types of digital skills that are needed and the training/upskilling required to meet those needs.

1   Salesforce, *Salesforce Launches Global Digital Skills Index.*
2   Mahboubi, *The Knowledge Gap.*
3   Hutchison, *Digital Skills for Today and Tomorrow.*
4   A skills leader is anyone with a specific focus or leadership role in their community related to education, training, job transitions, skills, and/or the future of work.

In-Demand Digital Skills

While basic digital skills lay the foundation for success in the digital workplace, Canadian skills leaders see a need for more workers with advanced digital skills that go beyond basic digital literacy.

Digital skills exist on a spectrum, ranging from basic (e.g., interacting with a computer, digital communication such as texting on a smartphone or sending an e-mail) to more advanced (e.g., cybersecurity, cloud computing, data analysis). The Canadian skills leaders we surveyed see a need for both basic and advanced digital skills in the workplace. On average, they perceive skills related to interacting with a computer, communication software, word processing software, cybersecurity, and troubleshooting as the top five most important digital skills for pandemic recovery and the continued success of Canadian businesses (see Chart 1).

Though basic digital skills are useful, most Canadian skills leaders surveyed (83 per cent) agree that businesses in their communities need workers with digital skills that go well beyond the basics. Proficiency with advanced digital skills and tools is now a must-have in order for companies to continue to grow and remain competitive. The questions then become, what exactly are the advanced digital skills that companies need, and how do they acquire them?

While the types of advanced digital skills depend on the specific industry and role, most industries in Canada need skills in cybersecurity, cloud computing, and data analysis. According to data from Vicinity Jobs, which draws from job postings data, demand for these more advanced digital skills has increased significantly since the early days of the pandemic.[5]

Chart 1

Perceived Importance of Each Digital Skill Area for COVID-19 Recovery and the Continued Success of Canadian Businesses
(1 = not at all important; 2 = somewhat important; 3 = moderately important; 4 = very important)
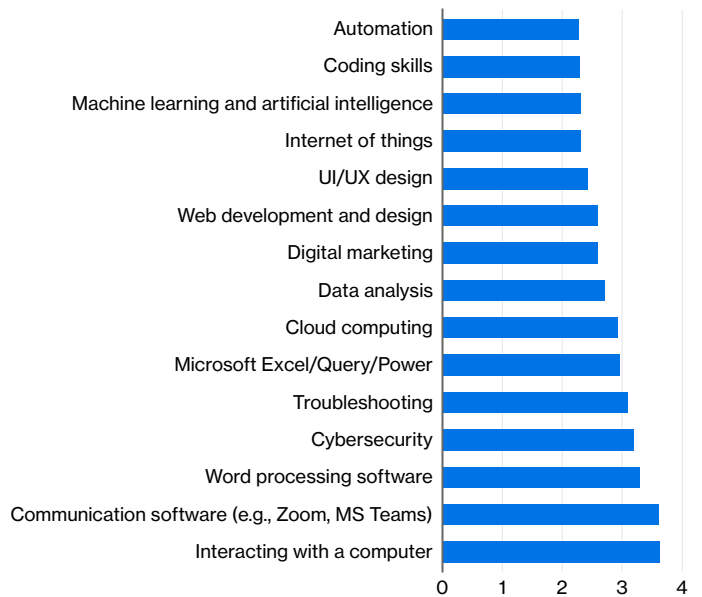
Notes: Responses are aggregated across all participants.
UI/UX design = the design of digital interfaces and experiences that benefit the user; Internet of things = set of technologies that connect computing devices with everyday objects, e.g., app-controlled thermostats; machine learning and artificial intelligence = the development of systems that allow computers to perform tasks that typically require human intelligence.
Source: The Conference Board of Canada.

5   Vicinity Jobs, "Hiring Demand Analytics Suite."

In April 2022, compared with April 2020, there were 235 per cent more job postings that included information technology (IT) infrastructure and cybersecurity skills,[6] 282 per cent more job postings that included cloud computing skills,[7] and 513 per cent more job postings that included data analysis skills.[8] These skills are essential for Canadian employers to be able to keep up with and benefit from the continuous advancement of digital technology in the workplace. However, finding skilled workers in these areas is no easy feat. Nearly 70 per cent of Canadian employers are struggling to find workers with the digital skills they need to grow.[9]

Cybersecurity

Our survey finds that cybersecurity skills are among the top five skills needed for pandemic recovery and the continued success of Canadian businesses. These skills are consistently ranked by employers as some of the most sought-after skills.[10] Despite the demand, we heard from key informants that cybersecurity skills are incredibly scarce, with many employers considering looking outside of Canada to fill this gap.[11]

According to prior work by The Conference Board of Canada, the increasing reliance on digital technology in the workplace, while beneficial in many ways, puts Canadian companies in a vulnerable position.[12] The rate of cyberattacks in Canada is staggering. In 2021, 62 per cent of employers reported that they were exposed to a ransomware attack.[13] As technology continues to evolve, cyberattacks are expected to increase in frequency and become even more damaging.[14] Investing in cybersecurity training in Canada is essential for ensuring that employers have the skills they need to prevent and fight against cyber threats.

Cybersecurity comprises many different skills, including network security, application security, and end-user education. Better understanding the specific aspects of cybersecurity that are most in need in Canada is an important next step in addressing the cybersecurity talent shortage.

Cloud Computing

Across our key informant interviews and survey findings, cloud computing stands out as a top skill for success in the digital future. The onset of the pandemic forced many companies to shift their activities online and significantly increased investment in cloud technology.[15] Over half of Canadian organizations have already invested in or intend to invest in cloud technology to improve their business operations and services.[16]

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6   There were 589 job postings that included IT infrastructure and cybersecurity skills in April 2020, compared with 1,974 in April 2022.

7   There were 1,500 job postings that included cloud computing skills in April 2020, compared with 5,725 in April 2022.

8   There were 1,339 job postings that included data analysis skills in April 2020, compared with 8,215 in April 2022.

9   KPMG, *Canadian Businesses Struggling to Find Skilled Talent.*

10 KPMG LLP, "Nearly 70 Per Cent of Canadian Businesses Struggling to Find Skilled Talent."

11 Hutchison, *Digital Skills for Today and Tomorrow.*

12 Conference Board of Canada, *Strengthening Canada's Digital Defences.*

13 PwC, *Canadian Cyber Threat Intelligence.*

14 Ibid.

15 CDW Canada and IDC Canada, *A Cloud-Based Fabric.*

16 Ibid.

The adoption of cloud technology is expected to increase over time as companies continue to seek reliable and flexible solutions to support their digital transformation initiatives.[17]

Despite the importance of cloud technology in the digital workplace, we heard from employers and industry leaders that workers with cloud computing skills (e.g., cloud development and programming, cloud database management) are hard to come by. When cloud computing is included as a required skill in a job description, 33 per cent less talent is available compared with similar job descriptions that don't require cloud computing skills.[18] The benefits of investing in cloud technology are clear—over 70 per cent of employers that have implemented cloud infrastructure have seen positive impacts on both innovation and operational efficiency.[19] To reap these benefits and help future-proof Canadian businesses, Canada needs more workers with the skills required to implement, operate, and maintain said technology.

Data Analysis

With the continuous advancement of technology in the workplace, employers have an ever-increasing amount of data at their disposal. We heard from key informants that being able to leverage this data to inform business decisions is critical to company innovation and growth. The demand for data analysis skills in the workplace has increased by over 500 per cent since the start of the pandemic.[20] However, we also heard from key informants that there are currently not enough workers in Canada to meet this demand. There is an estimated gap of 150,000 workers in data analysis roles and of 19,000 workers in deep analytics roles (i.e., the application of sophisticated data mining and analysis techniques to yield insights and trends from very large amounts of data[21]).[22]

Canada needs not only more workers with the technical skills to manage and analyze large data sets, but also more workers who can use such data to derive actionable insights that inform business solutions.[23] Finding workers with the right mix of both technical and critical thinking skills is a challenge, but it's necessary for companies to continue to grow and remain competitive in the digital workplace of today and tomorrow.

17 Aptum Technologies, *Cloud Impact Study 2022.*

18 Randstad, "Training Up-and-Coming Talent."

19 Aptum Technologies, *Cloud Impact Study 2022.*

20 Vicinity Jobs, "Hiring Demand Analytics Suite."

21 Komprise, "Data Management Glossary."

22 Canada's Big Data Consortium, *Closing Canada's Big Data Talent Gap.*

23 Key informant interviews; and Cukier and Anani, "The Future of Digital Work Relies on People."

Barriers to Canada's Advancement in the Digital Skills Landscape

Canada's place in the global digital skills landscape is grim. Canada currently ranks well below other countries in digital preparedness and is particularly lacking the more advanced digital skills that are critical for innovation and growth.[24]

To keep up and better prepare for the digital future, Canada must first address the barriers to advancing its position in the digital skills landscape. We identified two key barriers:

• Unequal access to digital infrastructure and digital skills training among Northern, Indigenous, and other rural communities.

• Employers' continued reliance on legacy technology.

Unequal Opportunities for Digital Skills Development

The increase in the demand for digital skills in the workplace further disadvantages certain groups, particularly those living in Northern and/or Indigenous communities or other rural areas.

Around 60 per cent of skills leaders we surveyed believe that workers living in these areas experience unequal access to digital skills training and upskilling. Northern and Indigenous communities have less access than the rest of Canada to high-speed broadband Internet and other digital tools that facilitate the development of digital skills. In particular, only 24 per cent of Indigenous households have access to high-speed Internet,[25] compared with 94 per cent of Canadian households more broadly.[26] While efforts are under way to improve the digital infrastructure and skills of Northern and Indigenous communities,[27] progress has been limited.

Because of limited access to digital infrastructure and tools, Indigenous individuals' digital skills tend to lag behind those of non-Indigenous individuals.[28] For example, we found that the basic skill of interacting with a computer is a particular priority for communities with limited access to broadband Internet—64 per cent of skills leaders who serve communities with limited access to broadband Internet believe that basic computer skills could be improved, compared with 47 per cent of skills leaders who serve communities with adequate Internet access.

If Canada doesn't first address the basic infrastructure and skills needs of Northern, Indigenous, and other rural communities, these communities risk falling further behind.

24 Salesforce, *Salesforce Launches Global Digital Skills Index.*

25 Canadian Radio-television and Telecommunications Commission, *Communications Monitoring Report.*

26 Statistics Canada, "Access to the Internet in Canada."

27 Such as Innovation, Science and Economic Development Canada, "Universal Broadband Fund."

28 Schrumm, Bell, and Smith, "Building Bandwidth."

Reliance on Legacy Technology

Another major barrier to Canada's advancement in the digital skills landscape is the continued reliance on legacy technology. Legacy technology refers to systems, platforms, or other technologies that are old or outdated. We heard from key informants in industries such as banking and entertainment that legacy technology remains critical to the success of their business operations but that their reliance on this technology prevents them from moving into the digital future.[29]

Of the Canadian skills leaders we surveyed, 91 per cent said that businesses in their industry rely on legacy technology at least to some extent, and 36 per cent said that they don't have enough workers with the skills needed to operate this legacy technology.

Legacy technology is particularly problematic for the banking industry.[30] Many core banking functions, including setting up accounts and processing transactions, continue to depend on decades-old legacy systems.[31] Banks have been particularly slow to evolve because of how complex and engrained their legacy systems are and the disruption that a technological transformation would cause to their business operations and customers.[32] Until the rise in start-ups and the financial technology industry, the benefits didn't outweigh the costs. But with this rise, traditional banks will need to modernize their legacy systems in order to keep up.[33]

Ultimately, Canadian employers will be able to reap the benefits of digitalization only if they have the proper infrastructure and skills. Investing in the digitalization of Canadian organizations and businesses is a key first step in improving Canada's position in the digital skills landscape.

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29 Hutchison, *Digital Skills for Today and Tomorrow.*

30 Canadian Bankers Association, *Technology-Led Innovation in Banking;* Erlebach and others, "The Sun is Setting on Traditional Banking"; Gardner, "The Biggest Threat to Banks?"; Organisation for Economic Co-operation and Development, *Digital Disruption in Banking;* PwC, *Financial Services Technology 2020 and Beyond;* and Tapestry Networks and Pogson, "Why Banks Can't Delay Upgrading Core Legacy Banking Platforms."

31 Ibid.

32 Ibid.

33 Ibid.

Recommendations for Building a Digitally Skilled Canadian Workforce

When it comes to building a digitally skilled workforce, Canada has much room to grow. How can we better prepare Canadian employers and communities for success in the digital future?

We heard from Canadian employers and skills leaders that improving Canada's position in the digital skills landscape won't be easy and will require collaboration among Canadian employers, post-secondary education (PSE), and governments.

Workplace Training

Canadian employers play an important role in the digital upskilling of employees. Although 61 per cent of skills leaders surveyed state that their workplace currently offers digital skills training, they also see a need for more. Over 80 per cent of respondents agree that workplaces should offer more opportunities for digital skills training.

Our survey findings indicate that the most important factor for effective training/upskilling in digital skills is creating a culture of continuous learning and development. This finding is consistent with what we heard in our interviews with Canadian employers and industry leaders.[34] Digital technology and the skills needed to use it are constantly evolving. To remain competitive, companies need to provide their employees with the time, space, and motivation to continuously upgrade and maintain their digital skills.

Employee upskilling can take many forms, such as one-on-one peer mentorship, online learning, and micro-credentialling. Micro-credentialling, in particular, has become increasingly popular over the last few years and is an innovative, cost-effective, and flexible way to upskill employees in both niche and broad topics.[35] Unlike traditional degrees, micro-credentials can be acquired within a few days or weeks, allowing the individual to immediately apply what they've learned to the workplace. Employees may also be more motivated to pursue a micro-credential as opposed to traditional workplace training, as the credential can be used to bolster their resumés and advance their careers.

While employers play an important role in digital skills training, individuals also must ensure that they're equipped with the skills they need to participate in the digital economy. By being aware of the digital skills that are most in-demand, Canadian workers and students can actively seek out opportunities to acquire them, whether through school, their employer, or other training programs. Pursuing training in in-demand skills, such as data analysis, cybersecurity, and cloud computing, can provide Canadian workers and students with increased opportunities for gainful employment and career advancement.

34 Ibid.
35 Gooch and others, *The Future Is Micro;* and Perna, "Small but Mighty."

Post-secondary Education

Of Canadian skills leaders surveyed, 84 per cent agree that PSE should offer more opportunities for digital skills training. This finding is consistent with what we heard in interviews with employers and industry leaders who repeatedly state that higher education doesn't place enough focus on workplace digital skills. Canadian students are entering the workforce without the digital skills they need for success.

The Canadian skills leaders we surveyed say that digital skills training should be mandatory and embedded into existing curricula. Skills leaders believe that instructors in all fields should provide more opportunities for practical, hands-on digital skills training that's tied to industry needs. Skills leaders call for more exposure to the advanced digital skills that are currently in high demand, including cybersecurity, data analysis, and cloud computing.

Skills leaders also suggest that students should have more opportunities to work with digital tools that are commonly used in the world of work, such as Microsoft Teams and other online collaboration tools and business analysis software. PSE institutions may consider partnering with industry to provide work-integrated learning experiences that allow students to gain hands-on experience working with the digital tools and skills needed in the digital workplace.

By working together, PSE and Canadian employers can equip Canadian students with the future-proof digital skills they need to navigate and succeed in the complex and ever-evolving world of work.

Government

The majority of skills leaders surveyed (71 per cent) agree that the federal and provincial governments should play a larger role in the digital skills training and upskilling of Canadians. Skills leaders call for more government funding and guidelines for digital skills training within PSE, as well as more opportunities for free community training geared toward under-served populations (e.g., older workers, individuals living in Northern and/or Indigenous communities and other rural areas).

The Government of Canada has taken some steps toward creating a more digitally skilled workforce. In 2022, the federal government introduced the Canada Digital Adoption Program, which will provide $4 billion over four years to support 160,000 small businesses in their digital transformation initiatives.[36] And through the Digital Literacy Exchange Program, the federal government committed to invest $17.6 million in initiatives that teach digital literacy skills to under-represented groups.[37]

While a step in the right direction, these government initiatives are typically focused on the acquisition of basic digital skills such as interacting with a computer and safely navigating the Internet. We see limited government support for the acquisition of advanced digital skills like data analysis, cybersecurity, and cloud computing, that are critically needed in the workplace.

To help fill skills gaps and advance Canada's position in the digital skills landscape, the government should consider setting guidelines and providing funding for initiatives that will help workers and students acquire the advanced digital skills that are essential for success in the increasingly digital future.

36   Prime Minister's Office, "New Canada Digital Adoption Program."

37   Innovation, Science and Economic Development Canada, "Government of Canada Announces Additional Funding."

Appendix A

Methodology

Background

This project was developed to address a call for a better understanding of the digital skills Canadians need to succeed in an increasingly digital future, as well as the tools and training required to respond to these needs. We conducted this research in two stages. First, we held 21 key informant interviews with executives and upper-level managers at leading Canadian companies, as well as representatives from sector organizations. The goal of these interviews was to hear directly from employers about their digital skills needs, the impacts of the COVID-19 pandemic on the workplace, and ideas for training/upskilling. Insights from these interviews were shared in a prior report[1] and used to inform the design of a larger survey that was delivered to 526 skills leaders across the country. The goal of this nationwide survey was to dig deeper into the specific digital skills that are needed and how we can better prepare for the digital future.

The research design and protocols were reviewed and approved by Veritas, a third-party ethics review organization.

Research Questions

1. How are digital skills defined and used across different industries in Canada?

2. What are the digital skills upskilling needs of the organizations and communities that Canadian employers and skills leaders represent?

3. What are the impacts of COVID-19 on digitalization and digital skills needs in the workplace?

4. What tools and training would be most useful to respond to digital skills upskilling needs?

Interview Sample

We recorded and transcribed 10.5 hours of interviews, yielding 156 pages (100,756 words). The 21 employers we spoke with represented various industries in Canada, including:

- accounting
- banking
- broadcast media
- computer software
- construction
- e-commerce
- electric utility
- financial services
- financial technology (fintech)
- insurance
- manufacturing
- media and entertainment
- oil and gas
- pharmaceuticals
- professional services
- restaurants
- retail
- skilled trades
- telecommunications

Interview Methodology and Analysis

We recruited interview participants by identifying relevant individuals through either our networks or the Internet and sending them an e-mail invitation to participate. We also asked interview participants to recommend others who might be interested in participating. The interviews were semi-structured and organized according to four different topics:

1. How digital skills are defined/used and why they are important.

2. Digital skills talent gaps and upskilling needs.

3. Tools and training required to respond to these needs.

4. COVID-19 and how digitalization is transforming the world of work.

All interviews were transcribed and recorded. Transcripts were anonymized and analyzed in NVivo. Coding themes were developed based on the research questions and literature review, as well as an exploratory examination of the interview transcripts. One researcher was responsible for coding the transcripts, and themes were examined based on how frequently they were noted.

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1   Hutchison, *Digital Skills for Today and Tomorrow.*

Sample Interview Questions

- Why are digital skills important?
- What are some examples of digital skills that are commonly used in your industry?
- Are you aware of any digital skills gaps within your industry?
- If you have identified a digital skills gap within your industry, what are some potential solutions to this gap?
- Are you aware of any existing digital skills training programs and/or tools that have been particularly effective that could/should be scaled? If yes, please describe.
- What are the challenges or barriers associated with the training of digital skills within your industry? How do you think that these challenges or barriers could be overcome?
- In general, how do you think that digitalization (or the increasing use of technology in the workplace) is transforming the world of work? Do you see this as a good thing or a bad thing?
- Overall, what is the most pressing issue related to digital skills and the future of work in Canada? What do we need to do to address this issue?

Online Survey Sample

The online survey was designed according to insights from the key informant interviews and was completed by 526 skills leaders across the country. We defined a skills leader as anyone with a specific focus or leadership role in their community related to education, training, job transitions, skills, and/or the future of work. Skills leaders represented a variety of different regions (see Chart 1), industries (see Table 1), and communities (see Chart 2). Of survey respondents, 46 per cent represented communities with limited access to high-speed Internet.

Chart 1

Distribution of Survey Respondents by Region
(per cent)
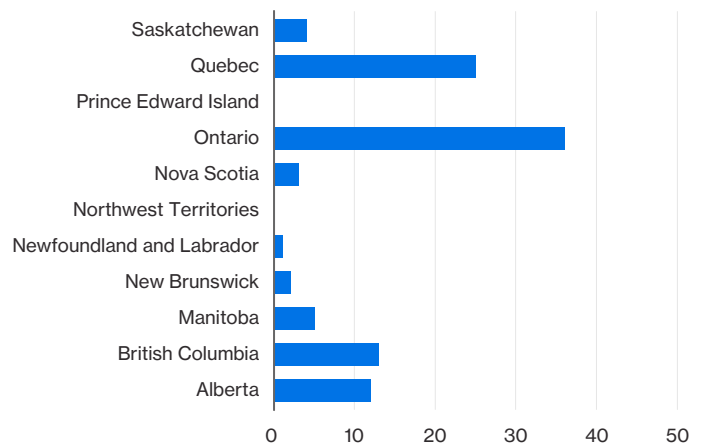
Source: The Conference Board of Canada.

Table 1

Distribution of Survey Respondents by Industry
(count; per cent)

| Industry	n	%
Agriculture, forestry, fishing, and hunting	9	2
Mining, quarrying, and oil and gas extraction	3	1
Utilities	9	2
Construction	8	2
Manufacturing	14	3
Wholesale trade	11	2
Retail trade	10	2
Transportation and warehousing	2	0
Information and cultural industries	14	3
Finance and insurance	14	3
Real estate and rental and leasing	8	2
Professional, scientific, and technical services	43	8
Management of companies and enterprises	2	0
Administrative and support, waste management, and remediation services	6	1

(continued ...)

Table 1 (cont'd)
Distribution of Survey Respondents by Industry
(count; per cent)

Industry	n	%
Educational services	256	49
Healthcare and social assistance	31	6
Arts, entertainment, and recreation	12	2
Accommodation and food services	4	1
Other services (except public administration)	6	1
Public administration	35	7
Other	28	5
Total	**525**	**100**

Source: The Conference Board of Canada.

Chart 2
Distribution of Survey Respondents by Types of Communities Served
(per cent)
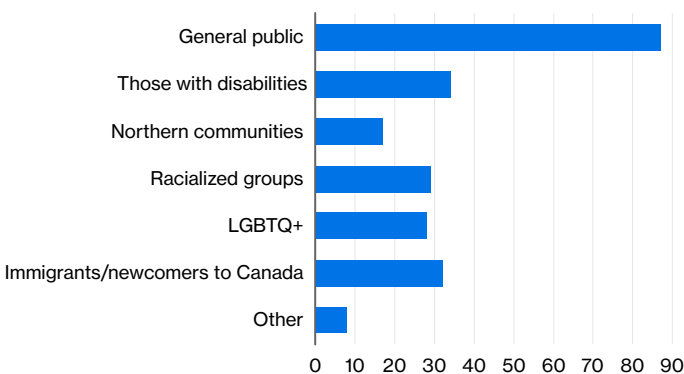
Source: The Conference Board of Canada.

Online Survey Methodology and Analysis
The survey was completed anonymously, consisted of 31 questions, and took 10–15 minutes to complete. The questions were divided into the same four sections as the key informant interviews:

1. How digital skills are defined/used and why they are important.
2. Digital skills talent gaps and upskilling needs.
3. Tools and training required to respond to these needs.
4. COVID-19 and how digitalization is transforming the world of work.

To recruit participants, we first sent out the survey to relevant Conference Board mailing lists and our networks. Subsequent responses were collected by the market research firm Leger.

Analyses were conducted in SPSS. For quantitative questions, we analyzed the data by calculating the frequency of responses for each question. For qualitative, open-ended questions, we pulled out main themes according to how frequently they were cited by respondents.

Sample Survey Questions
Q1: In general, do you think that the digital skills of workers in your industry could be improved?

1. Yes
2. No

Q2: In which specific areas do you think that digital skills could be improved in your industry? (select all that apply)

1. Interacting with a computer
2. Word processing software
3. Microsoft Excel/Query/Power
4. Communication software (e.g., Zoom, MS Teams)
5. Data analysis
6. Coding skills
7. Automation (e.g., building and testing automation)
8. Internet of things (e.g., knowing about how sensors work)
9. User interface (UI)/User experience (UX) design
10. Machine learning and artificial intelligence
11. Digital marketing
12. Cybersecurity
13. Cloud computing
14. Web development and design
15. Troubleshooting
16. Other (please specify)

Q3: To what extent do businesses in your industry rely on legacy technology (i.e., outdated or old technology)?

1. Not at all
2. Slightly
3. To some extent
4. To a great extent

Q4: In your opinion, how important are each of the following factors for the effective training/upskilling of digital skills in the workplace?

	Not at all important	Somewhat important	Moderately important	Very important
Flexibility	○	○	○	○
Peer supports	○	○	○	○
Emphasis on the benefits of such training and why it's needed	○	○	○	○
Instilling a workplace culture of continuous learning and development	○	○	○	○
Providing opportunities for training during work hours	○	○	○	○
Other	○	○	○	○

Q5: From your perspective, do any of the following groups experience unequal access to digital skills training/upskilling? (select all that apply)

1. Older workers
2. Workers with disabilities
3. Immigrant/newcomer workers
4. Racialized workers
5. LGBTQ+ and gender-diverse workers
6. Workers living in Northern and/or Indigenous communities
7. Workers living in other rural areas
8. Low-income workers
9. Not sure
10. Other (please specify)

Q6: Did the COVID-19 pandemic increase the need for talent with digital skills in your industry?

1. Yes
2. No

Q7: In your opinion, how important are digital skills within each of the following areas for COVID-19 recovery and the continued success of Canadian businesses in your industry and/or community?

	Not at all important	Somewhat important	Moderately important	Very important
Interacting with a computer	○	○	○	○
Word processing software	○	○	○	○
Microsoft Excel/Query/Power	○	○	○	○
Communication software (e.g., Zoom, MS Teams)	○	○	○	○
Data analysis	○	○	○	○
Coding skills	○	○	○	○
Automation (e.g., building and testing automation software)	○	○	○	○
Internet of things (e.g., knowing about how sensors work)	○	○	○	○
User interface (UI)/User experience (UX) design	○	○	○	○
Machine learning and artificial intelligence	○	○	○	○
Digital marketing	○	○	○	○
Cybersecurity	○	○	○	○
Cloud computing	○	○	○	○
Web development and design	○	○	○	○
Troubleshooting	○	○	○	○
Other	○	○	○	○

Q8: In your opinion, do businesses in your industry and/or community need workers with digital skills that go beyond basic digital literacy to succeed in the future of work?

1. Yes
2. No

Appendix B
Bibliography

Amazon Web Services. Cloud Computing Micro-Credential. Seattle: Amazon Web Services, 2022.

Aptum Technologies. Cloud Impact Study 2022: Part 1. Toronto: Aptum Technologies, 2022. https://aptum.com/cloud-hub/2022-cis-part-1/.

Bredin College. Cyber Security Professionals Micro-Credential. Edmonton: Bredin College, 2022. https://bredincollege.ca/micro-credentials/cyber-security-professionals-micro-credential/.

Canadian Bankers Association. Technology-Led Innovation in Banking. Canadian Bankers Association, February 18, 2022. https://cba.ca/technology-innovation-banking.

Canada's Big Data Consortium. Closing Canada's Big Data Talent Gap. Toronto: Toronto Metropolitan University, October 2015. https://www.torontomu.ca/content/dam/provost/PDFs/Big_Data_Talent_Gap.pdf.

Canadian Radio-television and Telecommunications Commission. Communications Monitoring Report. Ottawa: Government of Canada, 2018. https://crtc.gc.ca/pubs/cmr2018-en.pdf.

CDW Canada and IDC Canada. A Cloud-Based Digital Fabric Supports a Transformed Enterprise. Toronto: CDW Canada, 2022. https://www.cdw.ca/content/cdwca/en/solutions/cloud/cloud-report.html?cm_mmc=Vanity-_-cloudreport-_-NA-_-NA.

Conference Board of Canada, The. Strengthening Canada's Digital Defences: A Cybersecurity Playbook. Ottawa: The Conference Board of Canada, March 23, 2022. https://www.conferenceboard.ca/e-library/abstract.aspx?did=11553.

Cukier, Wendy, and Namir Anani. "The Future of Digital Work Relies on People, Not Just Technology." Policy Options, March 25, 2022. https://policyoptions.irpp.org/magazines/the-future-of-digital-work-relies-on-people-not-just-technology/.

Erlebach, Jörg, Marc Pauly, Lucas Du Croo De Jongh, and Michael Strauß. "The Sun Is Setting on Traditional Banking." Boston Consulting Group, November 24, 2020. https://www.bcg.com/en-ca/publications/2020/bionic-banking-may-be-the-future-of-banking.

Gardner, Mike. "The Biggest Threat to Banks? Legacy Technology Systems, Not Fintech." The Globe and Mail, November 22, 2016. https://www.theglobeandmail.com/report-on-business/rob-commentary/the-biggest-threat-to-banks-legacy-systems-not-fintech/article32967786/.

Gooch, Emma, Mary Chaktsiris, Kevin Jae, Lena Patterson, Salima Suleman, Michael Crawford Urban, Wendy Cukier, and Robert Luke. The Future Is Micro: Digital Learning and Microcredentials for Education, Retraining and Lifelong Learning. Toronto: Future Skills Centre, March 10, 2022. https://fsc-ccf.ca/research/micro-credentials-for-retraining-and-lifelong-learning/.

Hutchison, Jane. Digital Skills for Today and Tomorrow: Perspectives From Canadian Employers and Industry Leaders. Ottawa: The Conference Board of Canada, September 27, 2022. https://www.conferenceboard.ca/e-library/abstract.aspx?did=11807.

Innovation, Science and Economic Development Canada. "Government of Canada Announces Additional Funding for Digital Literacy Skills Training to Help More Canadians Get Online." Government of Canada, July 28, 2022. https://www.canada.ca/en/innovation-science-economic-development/news/2022/07/government-of-canada-announces-additional-funding-for-digital-literacy-skills-training-to-help-more-canadians-get-online.html.

—. "Universal Broadband Fund." Government of Canada, November 8, 2022. https://ised-isde.canada.ca/site/high-speed-internet-canada/en/universal-broadband-fund.

Komprise. "Data Management Glossary." Komprise, n.d. https://www.komprise.com/glossary_terms/deep-analytics/.

KPMG LLP. "Nearly 70 Per Cent of Canadian Businesses Struggling to Find Skilled Talent." Cision, August 31, 2021. https://www.newswire.ca/news-releases/nearly-70-per-cent-of-canadian-businesses-struggling-to-find-skilled-talent-893065566.html.

—. "No Backing Down on Cyber: Keeping Cybersecurity a Priority Among Canada's CEOs." KPMG, 2022. https://home.kpmg/ca/en/home/insights/2022/10/no-backing-down.html.

Mahboubi, Parisa. The Knowledge Gap: Canada Faces a Shortage in Digital and STEM Skills. Ottawa: C.D. Howe Institute, August 2022. https://www.cdhowe.org/sites/default/files/2022-08/Commentary_626.pdf.

Organisation for Economic Co-operation and Development. Digital Disruption in Banking and its Impact on Competition. Organisation for Economic Co-operation and Development, 2020. https://www.oecd.org/competition/digital-disruption-in-banking-and-its-impact-on-competition-2020.pdf.

Perna, Mark C. "Small but Mighty: Why Micro-credentials Are Huge for the Future of Work." Forbes, October 5, 2021. https://www.forbes.com/sites/markcperna/2021/10/05/small-but-mighty-why-micro-credentials-are-huge-for-the-future-of-work/?sh=404daca1302b.

Prime Minister's Office. "New Canada Digital Adoption Program to Help Small Businesses Thrive in the Digital Economy." News release, March 3, 2022. https://pm.gc.ca/en/news/news-releases/2022/03/03/new-canada-digital-adoption-program-help-small-businesses-thrive.

PwC. Canadian Cyber Threat Intelligence. PwC, 2021. https://www.pwc.com/ca/en/services/consulting/cybersecurity-privacy/cyber-threat-intelligence/year-in-review.html.

PwC. Financial Services Technology 2020 and Beyond: Embracing Disruption. PwC, 2020. https://www.pwc.com/gx/en/financial-services/assets/pdf/technology2020-and-beyond.pdf.

Randstad. "Training Up-and-Coming Talent: The Ideal Solution to Cloud Talent Scarcity." Randstad, March 8, 2021. https://www.randstad.ca/workplace-insights/job-market-canada/training-talent-to-counter-cloud-talent-scarcity/.

Salesforce. Salesforce Launches Global Digital Skills Index: In-Depth Insights From 23,000 Workers. Salesforce, January 27, 2022. https://www.salesforce.com/news/stories/salesforce-digital-skills-index-details-major-gaps-across-19-countries/.

Statistics Canada. "Access to the Internet in Canada, 2020." The Daily. Statistics Canada, May 31, 2021. https://www150.statcan.gc.ca/n1/daily-quotidien/210531/dq210531d-eng.htm.

Schrumm, Andrew, Sonya Bell, and Tracee Smith. "Building Bandwidth: Preparing Indigenous Youth for a Digital Future." Royal Bank of Canada, July 13, 2021. https://thoughtleadership.rbc.com/building-bandwidth-preparing-indigenous-youth-for-a-digital-future/.

Tapestry Networks and Keith Pogson. "Why Banks Can't Delay Upgrading Core Legacy Banking Platforms." Ernst & Young, June 18, 2019. https://www.ey.com/en_gl/banking-capital-markets/why-banks-can-t-delay-upgrading-core-legacy-banking-platforms.

University of Waterloo Co-Operative Education. "Skill Development for Transition to a Digital Workplace." University of Waterloo, n.d. https://uwaterloo.ca/co-operative-education/supports-and-resources/skill-development-transition-digital-workplace.

Vicinity Jobs. "Hiring Demand Analytics Suite." Vicinity Jobs, n.d. https://www.vicinityjobs.net/hiring-demand-analytics-suite.

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