



# The Canadian Digital Skills Gap

A Cross-Jurisdictional Review of Digital Skills  
Policies and Strategies Across Canada, Singapore,  
Finland, and the United Kingdom

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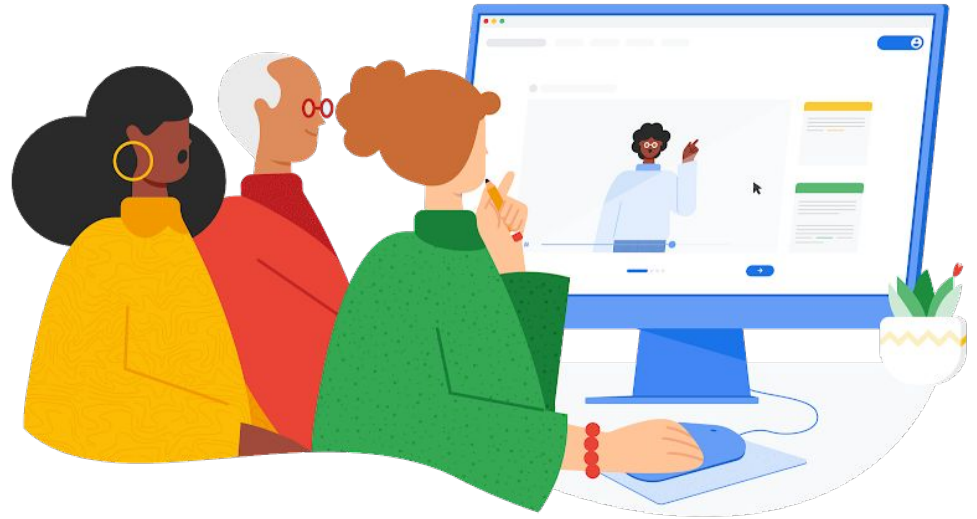


# Issue Statement

What is the issue we are addressing?

# Issue Statement

Given the **increasing importance of addressing the Canadian digital skills gap**, what can Canada do to ensure its **long-term international competitiveness** and meet the demand for **specialized and sector-matched digital skills**, while ensuring **equitable and sustainable outcomes**?





# 2

## Background

What is a 'digital skills gap'? How prevalent is this phenomenon in Canada? How prepared is Canada, today?



# A Digital Skills Gap?

A 'digital skills gap' refers to a **gap between the supply and demand** for workers who possess valuable and vital digital skills.

Such skills can range from the **basic ability** to use a computer or smartphone to **highly-sought after digital talents**: including programming, digital data analysis, UX/UI design, digital marketing, digital commerce, numerical modelling, information security, and more.

If governments fail to invest in digital skills in an **ever-increasingly digital world**, and fail to implement **effective institutions and solutions to train and foster local digital skills education**, there will be crippling economic consequences.

# The Numbers in Canada

**9** OUT OF **10**...

...Canadian jobs will require some form of digital skills or qualification

# Canada's Digital Skills Gap

## Employment Sector

Out of Canadian employers in 2019,

- 28% needed computer science skills, of these **16%** had a **skill shortage**
- 22% needed data science and analytical skills, of these **14%** had a **skill shortage**

**Employment** in these sectors increased by 79 percent in 2021 compared to 2000

## Postsecondary Institutions

In 2019,

- The **number of STEM graduates** was much lower than the **number of jobs** added to the digital economy
- Only a **fraction** of STEM graduates tended to **work in STEM occupations**
- STEM **graduation rate** is 6.1% lower than the overall graduation rate in all areas of study



# Canada's Digital Skills Gap

## Demographics in Postsecondary Education

Between 2019 and 2020 women represented,

- **56%** of postsecondary enrollments
- **38.5%** of enrolment in STEM programs
  - 22% in engineering and engineering technology
  - 28% in mathematics and computer information sciences
  - 58% in science and science technology

In 2019,

- **28%** of STEM graduates were **international graduates**, but only **11,565** of all permanent residents admissions related to former international students out of **642,500 study permit holders** in Canada

# Background

With talented workers possessing any form of digital skills already in low supply, a 'specialized' digital skills gap is already emerging in sectors such as artificial intelligence, automation and machine learning, and numerous STEM-based industries that have a heavy reliance on a cutting-edge workforce. Years ago, a rudimentary understanding of computer interfaces was enough for most workers to be considered 'digital talent'. Now, important digital skills include digital design, digital visualization, data science, data analytics, and programming.

The extensive time and investment required to train and engender not only valuable digital skills, but an adaptability in the workforce to be responsive and adaptable, requires urgent and innovative policy that offers effective and immediate transformations to how Canada thinks about the digital realm. COVID-19 indisputably proved the need for both a skilled digital workforce and the necessity of digital futurity.


Considering the socioeconomic potential from ensuring a strong digital skills future - or the socioeconomic disaster from neglecting it - how can Canada catch up?



# 3

## Methods

How are we organizing this jurisdictional review? What factors and considerations are we looking for? How did we select our case studies?



# Case Study Selection

Our jurisdictional scan will assess three national case studies, providing a breadth of contextual and empirical data and ensuring that our policy recommendations are modelled after clear successes in the space of resolving digital skills gaps.

Given that we have determined the digital skills gap and the demand for continually intensive digital skills to be a new and worldwide phenomenon, our selection process was relatively streamlined and simple.

We selected from high-performing candidates as based on relevant metrics, such as Wiley's **Digital Skills Gap Index**. Whilst we chose to vary the geographies from which we selected, we selected jurisdictional contexts with similar institutional arrangements: highly-developed economies with strong, diversified, high-technology industries.

We also conducted a brief scan of our remaining candidates and sought cases in which both **digital demand and equity considerations** were effectively targeted.



# Key Considerations

## 1 Identifying different needs between **specific sectors** and ensuring **matching supply**

- Develop a common skills framework to match talent with business skill demand

## 3 Ensuring **equitable outcomes**, and that needs of marginalized communities are always addressed

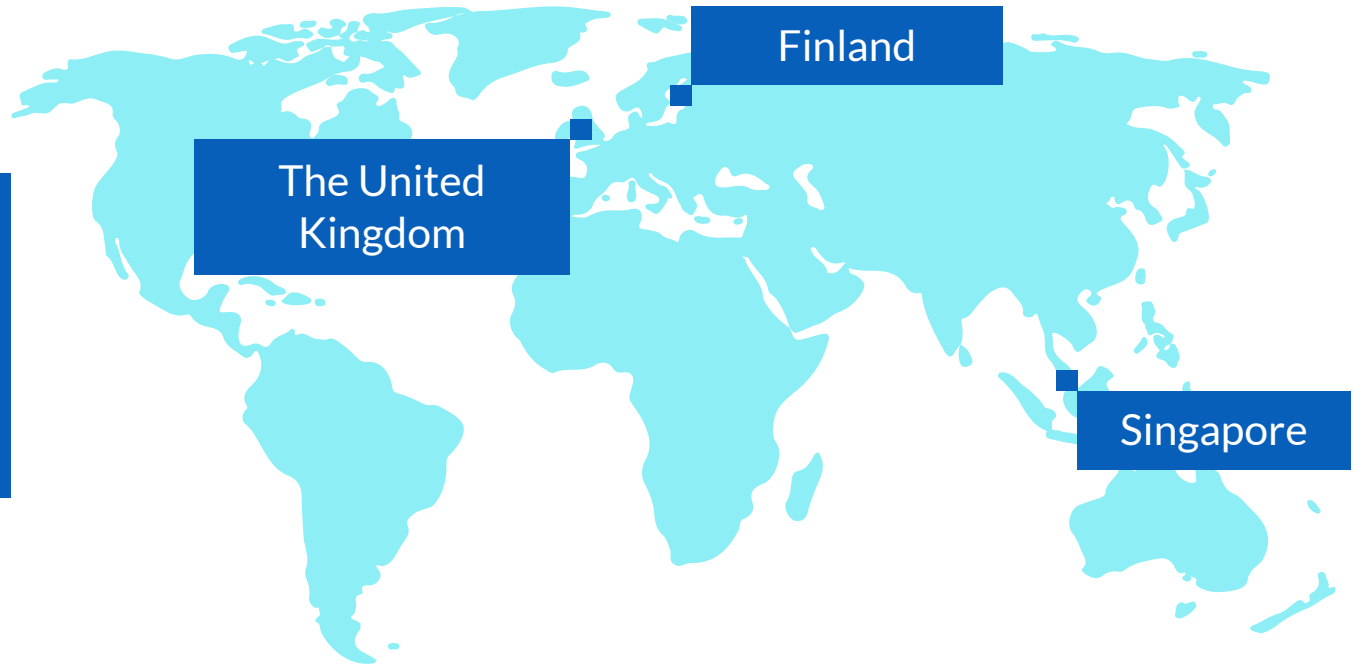
## 2 Creating a robust **educational and training pipeline** for continuous learning and job preparation

- Incentivize lagging industries to increase training
- Increase upskilling and reskilling education

## 4 Developing **cross-sector partnerships** between varied stakeholders (such as the public, private, and higher education sectors)

# Jurisdictions

Our selected case studies: three flourishing economies that are poised to lead the world in tackling their 'digital skills gap'





# 4

## Case Studies

How have other countries faced and tackled the digital skills gap in their locales? What essential policies are demonstrated?



# Singapore

Singapore scored consistently well across most of the Digital Skills Gap Index pillars. **Its K-12 and higher education systems rank among the best in the world.** Singapore's digital focus, reflected in the number of articles published on digital subjects (per '000 postgraduates), is another key strength.

The city-state's well-funded **lifelong learning entitlement**, galvanized by the SkillsFuture Initiative since 2015/16, **is second to none globally.** Singapore's **digital competitiveness** is rivalled only by that of the US.



# What has Singapore done well?

## **National Policy/Strategy & Education and Talent Pipelines**

The SkillsFuture initiative will drive much of Singapore's workforce development policies, focusing on instilling a lifelong learning culture. Within this initiative, Sectoral Manpower Plans focus on skills issues relevant to specific sectors. The bulk of these plans is focused on skills development.

# Identifying Success

<b>Targeting Priorities</b>	Singapore identified and invested in key growth areas and sectors: <i>Digital Economy</i> (powered by Smart Nation initiatives and the National Artificial Intelligence Strategy), <i>Green Economy</i> (restructuring and creating new business functions by shifting from environmentally harmful business activities to greener ones) and <i>Care Economy</i> (driven by an ageing population, evolving demands for care and the future of work and learning). These efforts will leverage data to bring about innovations in new care models, teaching and learning, and health and wellness.
<b>Creating New Jobs</b>	New opportunities in these economies affect changes in work processes and job functions. This, in turn, changes the content and skills profile of existing jobs while creating new jobs. To take advantage of the new opportunities, employers and citizens must prioritize acquiring relevant skills in new and emerging areas.
<b>Transferable Skills</b>	The priority set of skills needed to support new economic developments becomes transferable across various industries as enterprises create demand for similarly-skilled workers to achieve their goals.
<b>Public Accessibility</b>	Many curated jobs-skills resources and programmes available for public access are already aligned to these growth economies. The Enterprise Training Support Schemes, introduced in 2013, provide grants to employers to make skills development more relevant to workplace performance and link skills acquisition and utilisation to employer retention.

# Finland

Finland is a **strong pioneer in digital skills attainment** within Europe. Finland ranks first out of 27 European Union countries in many human capital metrics. It ranks high in **basic and specialist digital skills**, according to the European Commission 2021 Digital Economy and Society Index.

Finland's proportion of ICT graduates out of all graduates is 7.4%, ahead of the EU at 3.9%. Finland's proportion of female ICT specialists is 23%, ahead of the EU at 19%. In Finland, 50% of individuals have above basic digital skills, compared to 31% in the EU.

# Identifying Success

## National Strategy

The Finnish Parliament adopted a **continuous learning platform** involving the development of digital skills. The digital platform promotes opportunities for continuous learning, competence identification, and career planning for adults (2020)

Finland's has a **national strategy** up until 2030 – the digital compass – that overviews Finland's digital transformation and the direction for national development. It focuses on **skills, digital infrastructure, the digital transformation of businesses, and digital public services** (2022)

## Cross-Sector Collaboration

The LUMA center is meant to increase cooperation between **schools, universities, and the private sector** by implementing innovative pedagogical methods to motivate children to study **STEM** and incorporate lifelong learning for teachers

Finnish small and medium-sized enterprises (SMEs) effectively **integrate digital technology**. Of Finnish SMEs, 88% have at least a basic level of digital intensity (60% in the EU) and 62% of all enterprises use cloud solutions (26% in the EU), and 38% provide **ICT training** (20% in the EU)

## Early and Postsecondary Education

The Ministry of Education and Culture implemented a programme targeting the development skills in **ICT, media literacy and programming skills** and awarded grants for the drafting of **competence descriptions** (2021-2022) and to providers of **early childhood education to secondary education** (2020-2022)

Digivisio 2030 is a digitisation project for higher education institutions in Finland that supports **flexible learning opportunities** and **improves the competitiveness** of higher education institutions. All institutions pledged their contribution to the project in 2020

# The United Kingdom

The United Kingdom had previously lagged behind other developed countries in its digital preparedness. Recently, it has emerged as a **strong frontrunner in generating talent for 'super-high-tech' industries**, using its strong educational institutions, diverse immigrant talent, and excellent innovation/start-up space.

High recent levels of venture capital secured in the digital **start-up and scale-up sectors**. Estimates suggest that the United Kingdom's digital-based economy could grow by as much as 41.5 billion GBP between 2022 and 2025 and create 678,000 jobs through robust government-led support as well as innovative, entrepreneur-focused digital policy.

# Identifying Success

## Centralized Recognition and Strategizing

Greater government recognition and government-led strategizing of the Digital Skills Gap as a discrete problem (“the 2017 UK Digital Strategy”), including: the formation of an expert- and industry leader-led **Digital Skills Council** and a particular focus **on supporting digital-based start-ups and entrepreneurs**: as a result, in 2022 the UK led China in secured venture capital funding for digital start-ups, and only narrowly followed behind the US, securing 12 billion GBP in funding in the first half of 2022 alone; an extremely notable achievement.

## Policy Adaptation and Deregulation

Commitments to “light-touch, pro-growth” digital policy that emphasizes entrepreneurial-led growth and innovation, including **commitments to upgrading national and universal broadband internet connectivity**, emphasizing **pension funds to re-strategize investments** in the British start-up and scale-up sector, focusing on developing the United Kingdom to becoming a leader in academic-adjacent, **‘pioneering’ fields such as artificial intelligence, semiconductors, and quantum computing**, and strengthening local and national digital talent pipelines through **educational reforms and immigration policy**.

Importantly, since 2017, the UK has doubled its number of ‘unicorn’ companies (companies, typically highly successful tech-based entrepreneurs, that are valued at over 1 billion USD).



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# Case Analysis

What takeaways are applicable for Canada? What can be learnt from these cases?



# Singapore: What's Applicable for Canada?

## Empowering Corporate-Led Training

The availability of employee training programs relative to the demand for digital retraining/ upskilling was generally considered to be insufficient. Some 60.6% of the survey respondents believe that the availability of digital skills training programs is below what is required. Peru, Republic of Korea, and Singapore were the best performers. Canada, Indonesia, Mexico, Thailand, US, and Vietnam are economies that perhaps should do more to improve the provision of corporate training.

## Importing Foreign Talent

Foreign expertise can be used to temporarily bridge the digital skills gap and over time transfer those skills to the local labor force. The economies most open to foreign digital talent (>25% of respondents see no immigration constraint) include Australia, Canada, Hong Kong, Malaysia, Mexico, and the Philippines.



# Finland: What's Applicable for Canada?

## Identify and Quantify Sectoral Needs

A national strategy can help Canada overcome challenges in identifying and quantifying sectoral needs in order to attain correspondence between the problem and solution and incite private and public sector cooperation.

## Incentivize Private-Led Retraining

The predominance of small and medium sized businesses in Canada means that they often lack economies of scale needed to decrease long term costs of investments in skill development. Initiatives in skill development could lessen the gap between the supply and demand of specific skills. Broader economic digitization could also encourage businesses to follow economic trends and standards.

## Opportunities for Continued Learning

Our current educational architecture lags behind the pace of industry and technological changes, innovative and flexible solutions in continuous learning and micro-credentials could mitigate this issue.

# U.K: What's Applicable for Canada?

## Centralized National Strategy

Within five years, the United Kingdom is poised to become a notable world leader in super-high-tech industries by adopting an official, discrete national digital strategy. Canadian government involvement in the digital realm is very lacking: Canada lacks any national and central commitments to digital policy strategies, and at face value lacks a clear recognition of the potential of the digital age, and the necessity to secure digital talent access in the decades to come.

## Use Existing Comparative Advantages

Identifying and using existing comparative advantages: the United Kingdom is particularly well-positioned as a global hub for super high-tech industries, such as in artificial intelligence and quantum computing, and has formed strategies revolving around drawing from robust academic talent and sponsoring tertiary education channels



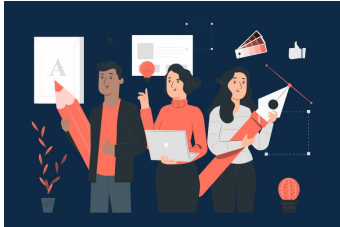
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## Recommendations

Highlighting lessons and constructing policy recommendations for  
Canadian digital policy



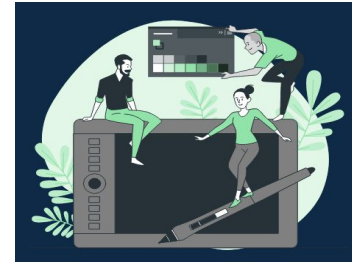
# Directions Forward?



**Forming a  
National Digital  
Strategy**



**Creating Robust  
Long-Term Education  
Pipelines**



**Equity and  
Sustainability of  
Outcomes**

# Policy Recommendations

## **Build Effective Private Partnerships with Expert**

Invest in effective digital retraining and upskilling programs, and incentivize firms and businesses to partner together to reduce transitional inefficiencies or losses, bolster digital and economic resiliency, and foster both the supply and demand for critical digital talent.

## **Refine Current Educational and Talent Institutions**

Certificates and micro-credentials could provide opportunities for upskilling and reskilling and improve accessibility. Canada could coordinate a national strategy for adult education and professionalize the sector.

## **Create a Centralized Federal Digital Strategy and Direction**

Develop a national digital skills strategy that aligns the skills in demand with appropriate supply. This should be informed by the needs of existing, impactful stakeholders in the tech sector, such as the Canadian Council of Innovators' Talent & Skills Strategy.

## **Commit to Equity and Sustainability Objectives**

Incorporate those excluded from the high skill digital sector by investing in the development of hybrid skills (a blend of digital and non-digital skills); continue to enforce diversity of representation in Canadian workplaces and universities.

# Implementation Lessons

## **Integration with Existing Policy and Programs**

Integrating the digital skills strategy with existing national or provincial programs can help align the strategy with government priorities. Moreover, the impact of the digital skills strategy can be enhanced further by tapping into established federal networks and resources and leveraging existing infrastructure to drive implementation.

## **Engage and Balance Stakeholders' Needs**

Developing a national strategy would involve extensive stakeholder engagement, which includes stakeholder mapping, consultation sessions, forming a working group, sharing periodic updates, and provide training and workshop opportunities. The stakeholders could include government representatives, industry leaders, educational institutions, non-profit organizations, and community groups, to ensure the strategy reflects the needs, priorities, and budgets of diverse groups.

## **Emphasize Communication to Sustain Change**

To ensure the successful implementation of a nation-wide strategy, it is imperative to develop a well-planned communications strategy that can raise awareness, provide clarity, foster engagement and build support. At the same time, a change management process will reduce resistance, encourage uptake and adoption, and track progress periodically.



THANK YOU!

Questions?



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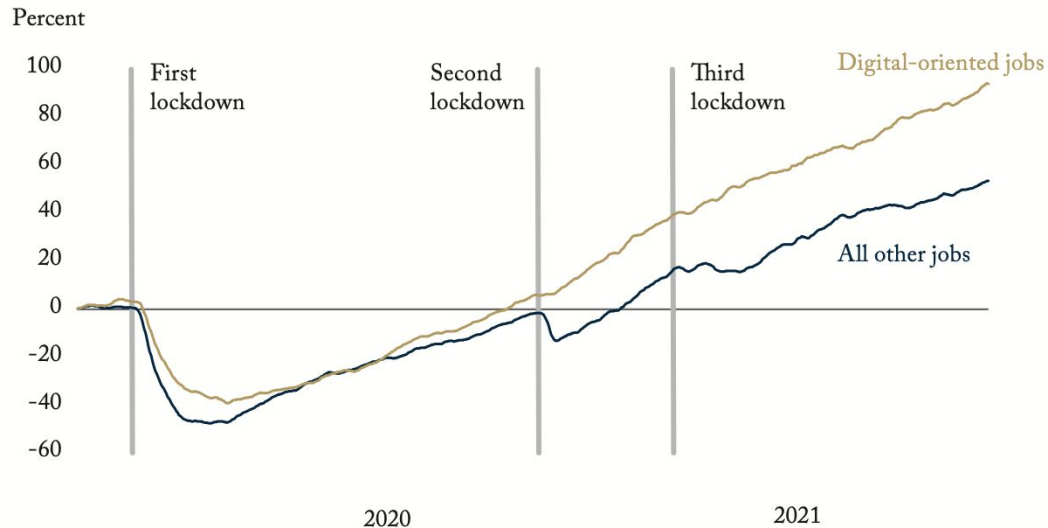
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# Appendix A: Growth in Employer's Demand for Digital Skills, February 2020-November 2021



Source: C.D Howe Institute