



RESEARCH

DIGITAL ECONOMY ANNUAL REVIEW 2020



The Information and Communications Technology Council



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PREFACE

The Information and Communications Technology Council (ICTC) is a not-for-profit, national centre of expertise for strengthening Canada’s digital advantage in a global economy. Through trusted research, practical policy advice, and creative capacity-building programs, ICTC fosters globally competitive Canadian industries enabled by innovative and diverse digital talent. In partnership with an expansive network of industry leaders, academic partners, and policy makers from across Canada, ICTC has empowered a robust and inclusive digital economy for over 25 years.

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ICTC’s labour market research captures critical labour market and other economic indicators to inform competitive businesses as well as human resource strategy planning, decision-making, and career development in ICT, which together drive the development of a more prosperous Canadian ICT workforce and industry in a global digital economy.

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EXECUTIVE SUMMARY

The Information and Communications Technology Council (ICTC) is pleased to present the *Digital Economy Annual Review 2020*, exploring broad trends over the past year in Canada's digital economy with respect to economic impact, labour market, technology adoption, and more.

The report utilizes historical data starting from 2010 through to 2020.

ICT's contribution to GDP continues to rise

Over the last five years, annual growth in Canada's ICT sector averaged 4.1%. For comparison, the wider Canadian economy grew at an average 0.67% a year. The ICT sector's strong growth in absolute terms continued at a slower rate through 2020 even as the COVID-19 pandemic caused the Canadian economy to decline by 5.2%. Real gross domestic product (GDP) produced by Canada's ICT sector increased in 2020 by over \$2 billion, reaching \$96.5 billion.

Technologies developed within the ICT sector such as Artificial Intelligence (AI), Big Data, 5G, and Blockchain have done more than benefit the ICT sector directly; they have also fueled the growth of the entire Canadian economy. Digitization has been an increasingly prominent feature of the economy for the past five years, and is poised to accelerate in the wake of COVID-19.

Competitive, fast-growing labour market

In 2020, 1,935,100 people worked in the Canadian digital economy. They included 1,553,800 ICT professionals employed across all industries in Canada, with the remainder being non-ICT professionals working in the ICT sector. As of 2020, 63% of ICT workers worked in non-ICT sectors of the economy, while the remaining 37% were employed in the ICT sector. The top industries employing ICT workers included professional and scientific services, construction, and finance. The unemployment rate for ICT occupations averaged 2.8% in 2020, essentially unchanged from 2.7% in 2019. By contrast, unemployment in the overall Canadian economy shot up from 5.7% to 9.5%.

Diversity – a mixed bag

Over the past 10 years, the Canadian ICT workforce has undergone diversification. The main driver of this diversification is the rapid growth of immigrant participation in the Canadian ICT workforce; In 2020, 38% of Canada's ICT workforce was born outside of Canada, compared to 28% in 2010. The representation of immigrants in ICT roles was up from 37% in 2019, despite the considerable restrictions placed on mobility by the COVID-19 pandemic.

However, diversification of the Canadian ICT workforce in other areas has been stagnant. There was small growth in female representation; in 2020, women made up 27.3% of the ICT professionals in Canada, compared to 24.6% in 2010. Furthermore, the age composition of the ICT workforce has remained identical, with limited participation from both youth and older workers. In 2020, 13% of Canada's ICT professionals were aged of 55-64, compared to 14% in 2010. Youth (those aged 15-24) comprised only 7.3% of all ICT employees, compared to 7.6% in 2010.

Canada's digital economy has a lot to look forward to – in the long term

While the ICT industry is a key pillar of Canada's economy and has seen substantial growth, its growth is only a small part of the economic impact of technology in Canada; roughly two thirds of Canada's ICT employees work outside the ICT sector. Digitization holds promise for the entire Canadian economy. Already, technologies such as

AI are being rapidly adopted to deliver value in sectors as diverse as Agriculture, Manufacturing, Retail, Resource Extraction, and Health.

Whether Canada can continue exploiting its digital potential will depend on whether Canadians are equipped with the skills to innovate new technologies and adopt existing ones to create value. Ensuring Canadian workers have the talent to create and use technologies is more critical than ever before. Partnership and communication between industry, government, and the education sector can be leveraged to ensure a smooth pipeline of talent that creates start-ups and satisfied the needs of established employers.

Interested readers are encouraged to review ICTC's recent research exploring the long-term labour market outlook, talent solutions, and the adoption of digital technology by Canadian enterprises of all sizes. These studies provide insight at the municipal, provincial and federal level. This insight is designed to assist employers, policy-makers and educators to optimize their contributions to the digital economy through appropriate policies and training programs.

Recent ICTC insights, studies, and solutions addressing these issues include:

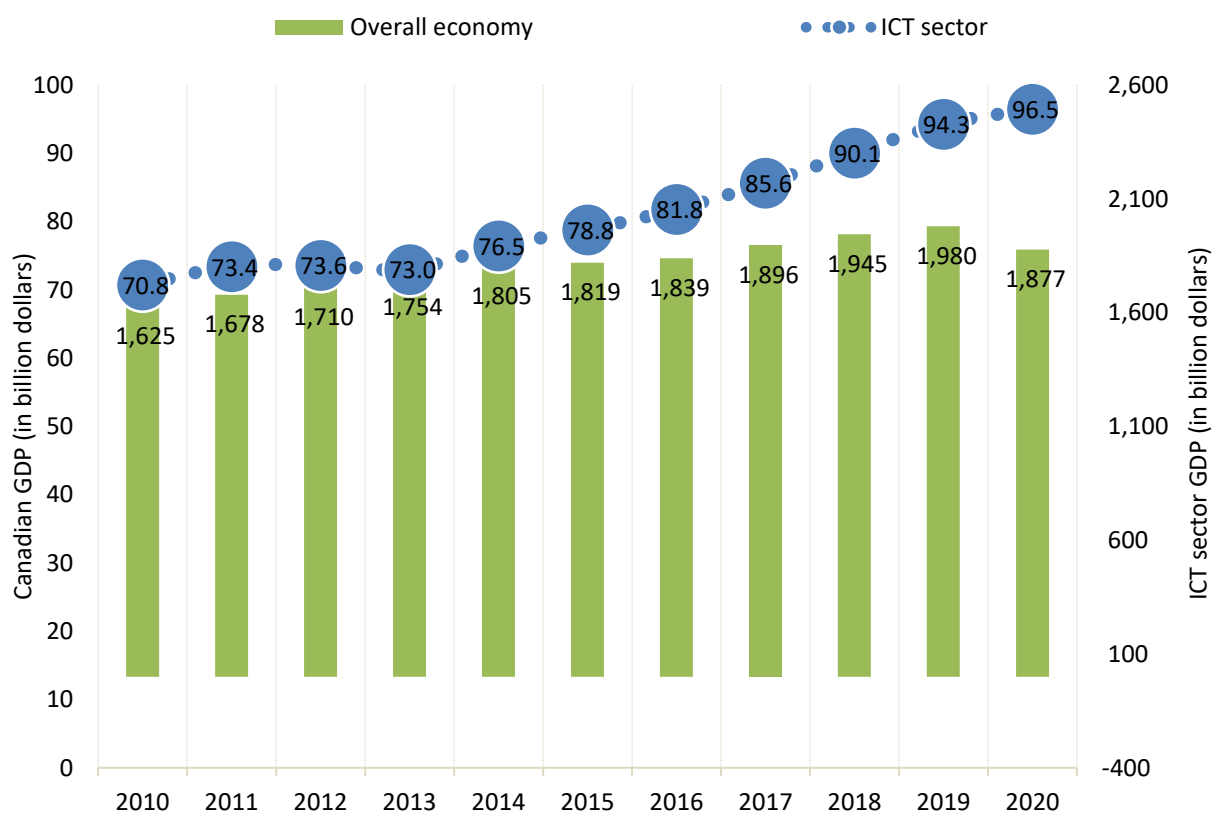
- ❖ [Work in Progress: Emerging Smart City Occupations](#)
- ❖ [Building Canada's Future AI Workforce in the Brave New \(Post-Pandemic\) World](#)
- ❖ [The Digital-Led New Normal: Revised Labour Market Outlook for 2022](#)
- ❖ [On The Edge of Tomorrow: Canada's AI-Augmented Workforce](#)
- ❖ [Building Canadian Consensus: Our Maturing Blockchain Ecosystem](#)
- ❖ [Canada's Growth Currency: Digital Talent Outlook 2023](#)
- ❖ [Smart City Priority Areas and Labour Market Readiness for Canadians](#)
- ❖ [A Digital Future for Alberta](#)
- ❖ [Developing Cyber Talent for Canadian Critical Infrastructure – Road Transportation](#)
- ❖ [Enabling Change: Removing Barriers and Supporting Meaningful Employment of Ontarians with Disabilities in Information and Communications Technology \(ICT\)](#)

ECONOMIC GROWTH

Contribution To GDP

The economic output of Canada's ICT sector reached \$96.5 billion¹ in 2020 and accounted for 5.1% of Canada's total output of \$1,877 billion. The ICT sector grew by nearly \$2.2 billion (or by 2.4%), while the overall Canadian economy contracted by 5.2%. Average annual growth in Canada's ICT sector has been 4.1% over the last five years.

Canadian and ICT sector GDP (in billion dollars)



Source: ICTC; Statistics Canada

The ICT sector's two sub-sectors (manufacturing and services) experienced different growth trajectories. The ICT manufacturing² sub-sector, representing 3.1% of the ICT sector, shrunk by 12.7%, or \$500 million. This large drop was the only the third largest yearly decline the ICT manufacturing sub-sector has experienced in the previous decade. ICT manufacturing has declined in eight of the previous ten years, with an average annual decline of 2.6% in the previous five years. By contrast, ICT services,³ which represents 96.9% of the total Canadian ICT sector, grew

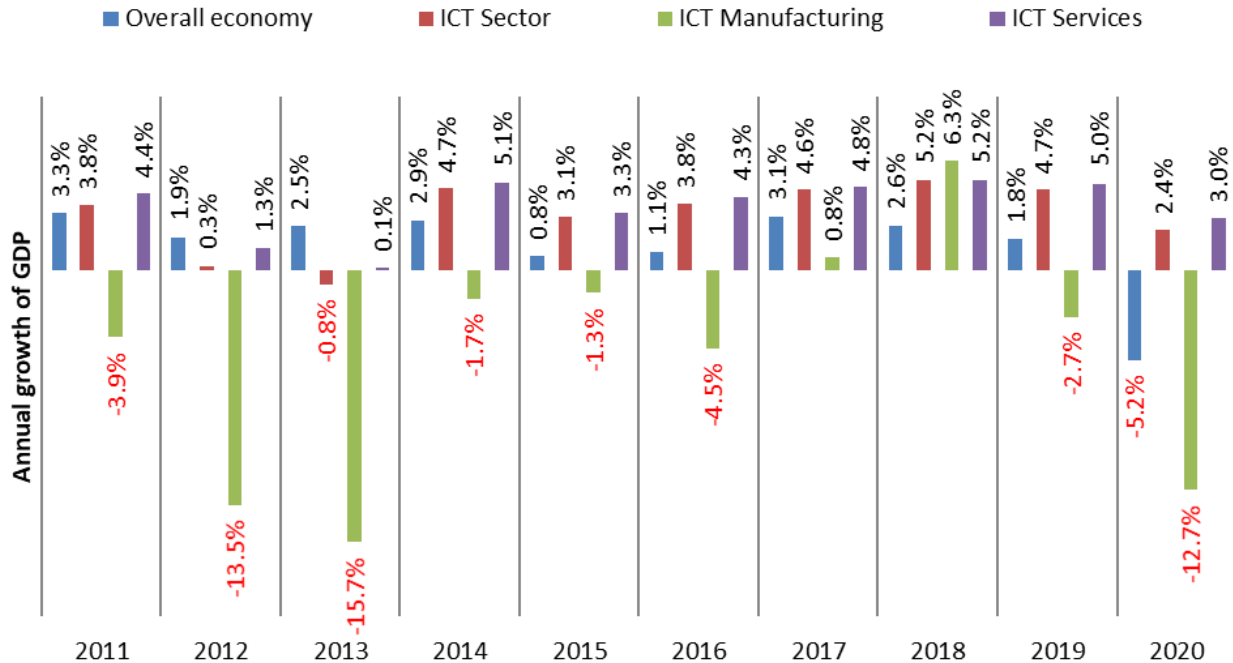
¹ In 2012 chained dollars. Chained dollars are real dollar amounts adjusted for inflation.

² This combines the North American Industry Classification System (NAICS) codes 3341, 3342, 3343, 3344, 3346. See Appendices

³ This combines the North American Industry Classification System (NAICS) codes 4173, 5112, 517, 518, 5415, 8112. See Appendices

by 3.0% or \$2 billion in 2020. ICT services has seen positive GDP growth in each of the previous 10 years, with growth averaging 4.4% over the last five years.

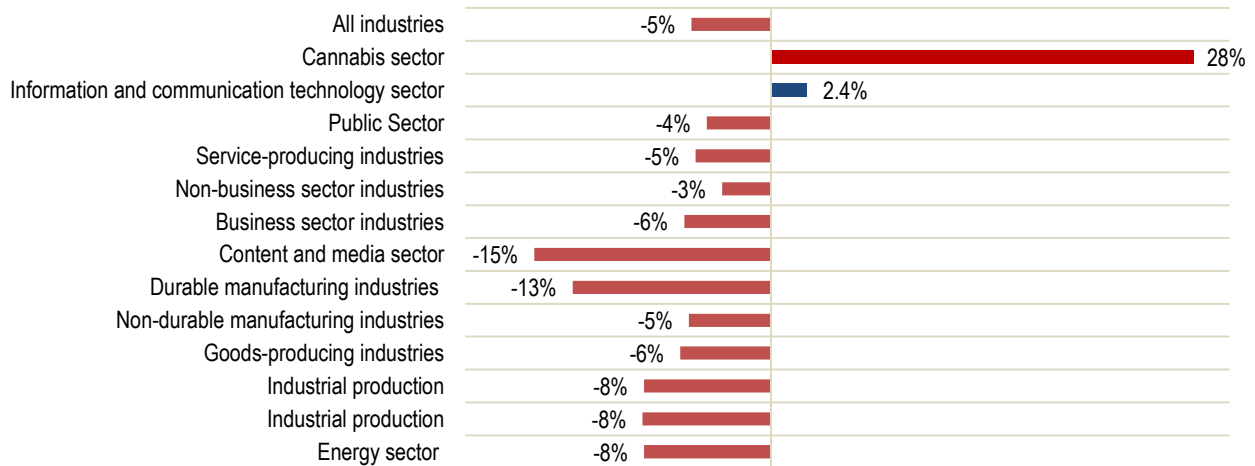
Annual growth of GDP



Source: ICTC; Statistics Canada

The ICT sector's growth of 2.4% in 2020 was not as high as that of the rapidly emerging cannabis sector, but ICT was the only other sector to not experience decline during 2020. In fact, the annual growth rate of the ICT sector during 2020 was higher than the average growth rate of the entire Canadian economy between 2011 to 2019 (2.2%).

Average annual growth by sector/industry – 2020



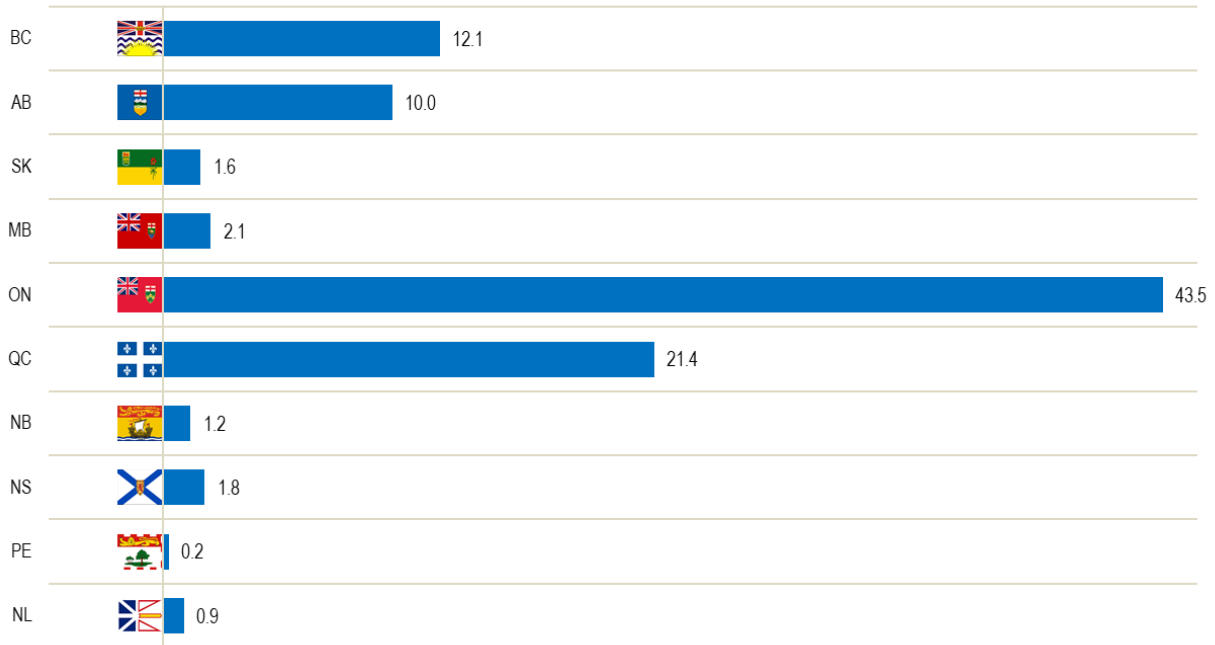
Source: ICTC; Statistics Canada



GDP growth by province

Ontario, Canada's largest province by population, remains Canada's dominant ICT economy leader and is estimated to have contributed \$43.5 billion to the total Canadian ICT economic output in 2020⁴. Canada's other key provinces for ICT output were Quebec (\$21.4 billion), British Columbia (\$12.1 billion), and Alberta (\$10.0 billion). Collectively these four provinces represent around 92% of Canada's ICT output.

ICT sector output by province (in billion dollars) — 2020



Source: ICTC; Statistics Canada

⁴ 2020 ICT sector GDP data across province is estimated

Nine of Canada's ten provinces experienced growth in the ICT sector in 2020. The ICT sectors in British Columbia (▲5.6%), Prince Edward Island (▲4.2%), New Brunswick (▲3.8%), and Nova Scotia (▲3.5%) grew the fastest in 2020, while Alberta (▼2.9%) was the only province whose ICT sector declined.

ICT sector GDP by province (annual percentage change)

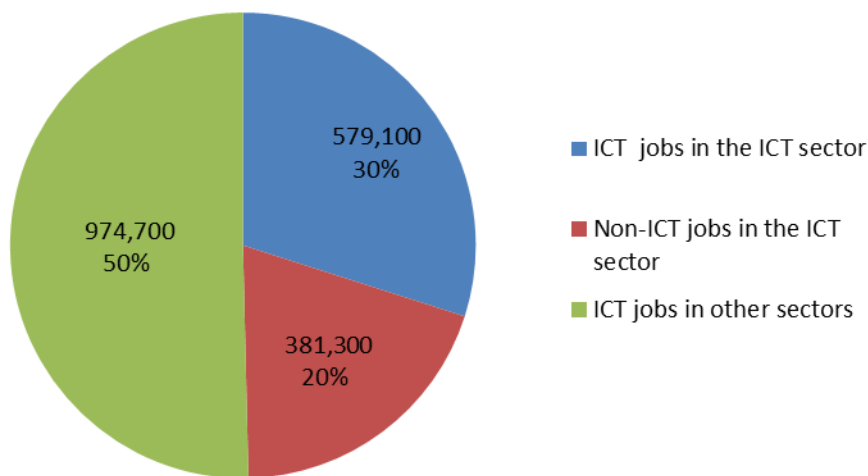
	2014	2015	2016	2017	2018	2019	2020
Newfoundland and Labrador	1.4%	5.9%	4.7%	4.5%	1.9%	6.1%	1.3%
Prince Edward Island	3.7%	5.5%	4.8%	3.4%	4.5%	4.9%	4.2%
Nova Scotia	5.4%	7.1%	4.8%	2.1%	5.0%	2.4%	3.5%
New Brunswick	1.5%	1.9%	4.6%	4.1%	3.5%	2.6%	3.8%
Quebec	0.4%	0.7%	4.3%	8.0%	4.4%	4.9%	5.0%
Ontario	3.4%	5.1%	4.3%	5.0%	6.2%	5.9%	0.3%
Manitoba	-0.4%	-0.7%	5.3%	0.0%	3.6%	4.2%	0.1%
Saskatchewan	2.6%	3.1%	6.3%	-4.2%	2.7%	2.0%	2.4%
Alberta	8.4%	-1.5%	0.3%	2.0%	4.3%	1.9%	-2.9%
British Columbia	6.9%	3.7%	4.5%	4.1%	5.2%	3.1%	5.6%

Source: ICTC; Statistics Canada

Employment and unemployment

In 2020, around 1,935,100 professionals were employed in the Canadian digital economy, a figure that is 6.6% higher than in 2019. The digital economy included 579,100 ICT professionals working in the ICT sector; 974,700 ICT professionals working in other sectors of the economy; and 381,300 non-ICT professionals working in the ICT sector. Strong growth was observed in all areas of the digital economy, and the composition of the digital economy changed minimally compared to 2019.

Employment segmentation of the digital economy - 2020



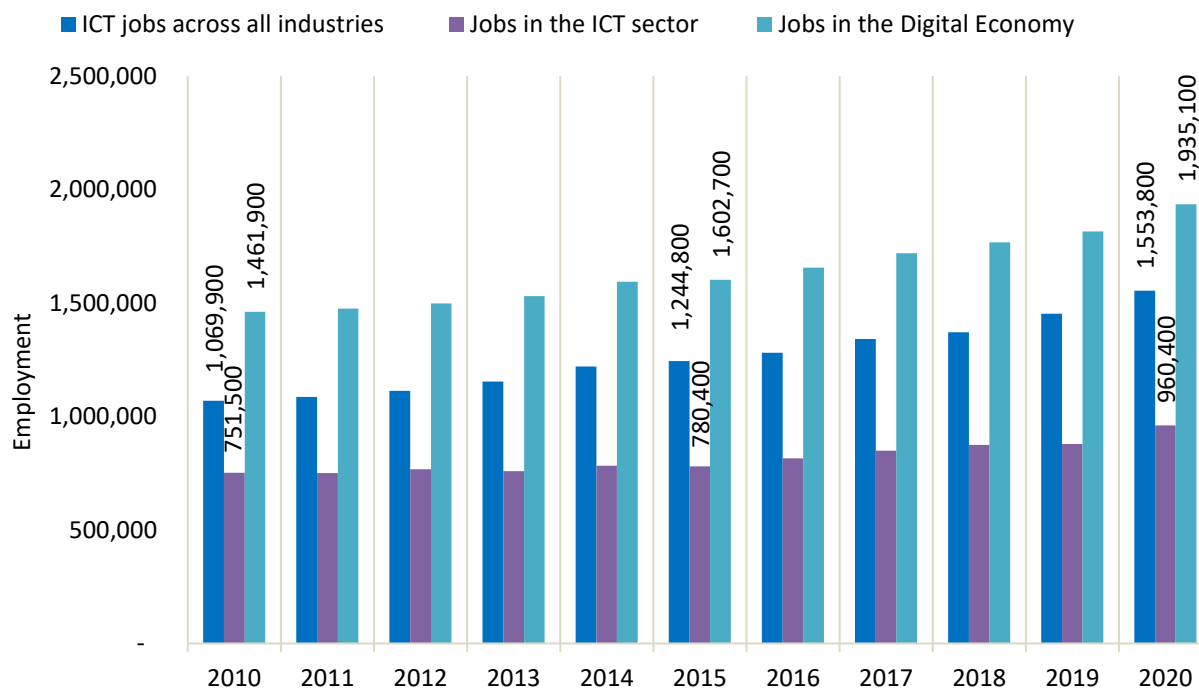
Source: ICTC; Statistics Canada

In 2020, employment in Canada's digital economy grew by 119,400 (6.6%) and accounted for 10.8% of total employment in Canada, up from 8.6% in 2010. Employment in ICT roles across all sectors grew by 100,600, or 6.9%. Employment in the ICT sector grew in 2020 by 81,900 jobs. This growth was concentrated in ICT roles, which grew by 63,100 (12%). However, there was also a 5% growth in non-ICT jobs in the ICT sector. The employment of ICT professionals outside of the ICT sector also grew by 4%, or 37,500 jobs.



While Canada’s digital economy and ICT sector did not experience decline in size during 2020, there was substantial volatility in the composition of ICT employment. In 2020 compared to 2019, there was decline the number of employed workers in 12 of 30 ICT National Occupation Codes (NOCs), compared to 10 in 2019. Several roles saw particularly steep declines. Employment in the “Electrical power line and cable workers” (NOC 7244) saw a decline of 25.0% in employment, corresponding with a loss of 4,600 jobs. Employment of “Telecommunications line and cable workers” (NOC 7245) fell by 14.5% or 1,000 jobs.

Employment in ICT and the Digital Economy – 2010 - 2020



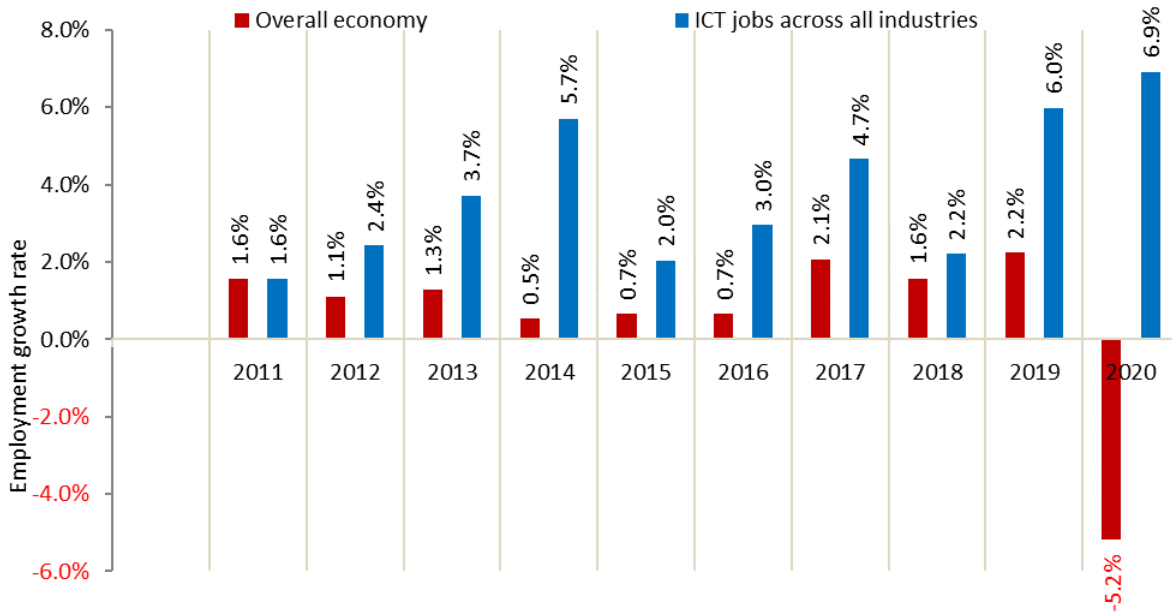
Source: ICTC; Statistics Canada

By contrast, employment in several ICT occupations grew precipitously in 2020. The top growth areas were in software, engineering and telecommunications. Employment of “Electrical and electronics engineering technologists and technicians” (NOC 2241) grew by 65.9%. Employment of “Information systems testing technicians” (NOC 2283) grew by 54.1%. The largest absolute growth in employment was among “Information systems analysts and consultants” (NOC 2171); this NOC grew by 47,800 in 2020, accounting single-handedly for over a third of the net growth in ICT employment. However, because there was already a large base of employment in this area, year-on-year percentage growth was only 20.0%.



The unemployment rate for ICT positions ticked up from 2.7% in 2019 to 2.8% in 2020. The digital economy's robust growth in employment stood in sharp contrast to the rest of the Canadian economy; general employment across the Canadian economy dropped by 986,400 people, a fall of 5.2%. The unemployment rate in the entire Canadian economy jumped from 5.7% in 2019 to 9.5% in 2020.

Unemployment rates – 2010 - 2020

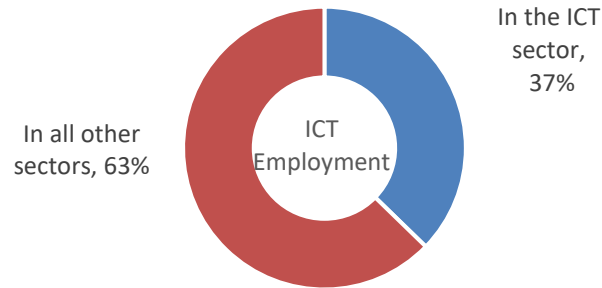


Source: ICTC; Statistics Canada

Employment by sector

Canada continues to embrace digital technologies throughout the economy. In 2020, 63% of ICT workers worked in non-ICT sectors, while 37% worked in the ICT sector. The roughly two-to-one ratio of ICT employment outside ICT compared to within the ICT sector has been a consistent feature of the Canadian digital economy for over a decade.

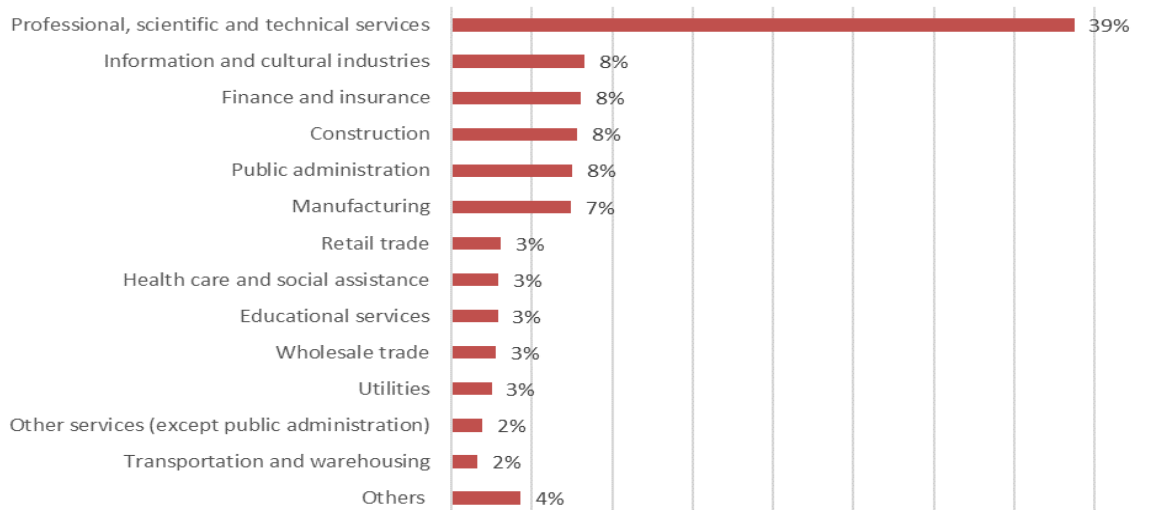
ICT employment - 2020



Source: ICTC; Statistics Canada

Businesses in the professional, scientific, and technical services industry employed 39% of all ICT professionals in Canada in 2020. The next top industries employing ICT workers were information & cultural industries (8%), public administration (8%), finance & insurance (8%), and construction (8%). The industries employing the fewest ICT professionals were agriculture, forestry, fishing & hunting; management of companies and enterprises; and accommodation & food services. These industries collectively employed less than 1% of ICT professionals in Canada.

ICT employment by industry – 2020



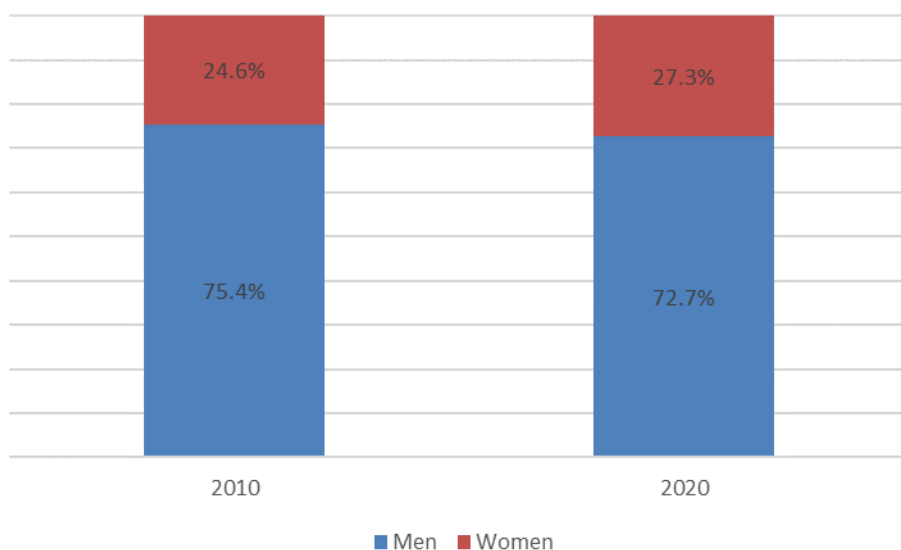
Source: ICTC; Statistics Canada

TALENT SUPPLY

Women in ICT

Women made up 27.3% of ICT professionals across all sectors of the Canadian economy in 2020. However, the representation of women is now slightly higher than it was in 2010 (24.6%).

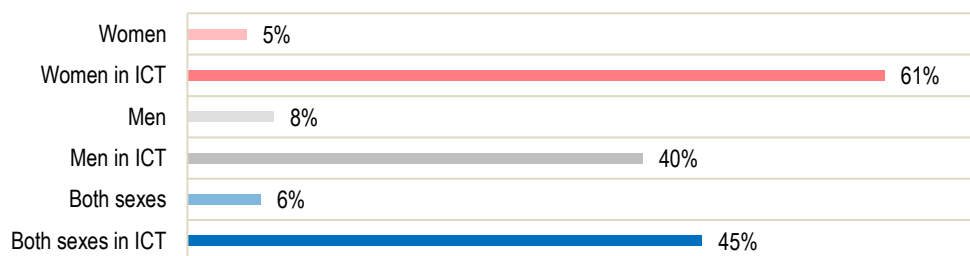
ICT employment by gender – 2010 and 2020



Source: ICTC; Statistics Canada

Since 2010, the employment of women grew by 5% across all sectors of the economy, compared to an 8% growth in employment among men. Moreover, during that time, ICT employment for women increased by 61%, compared to 40% for men.

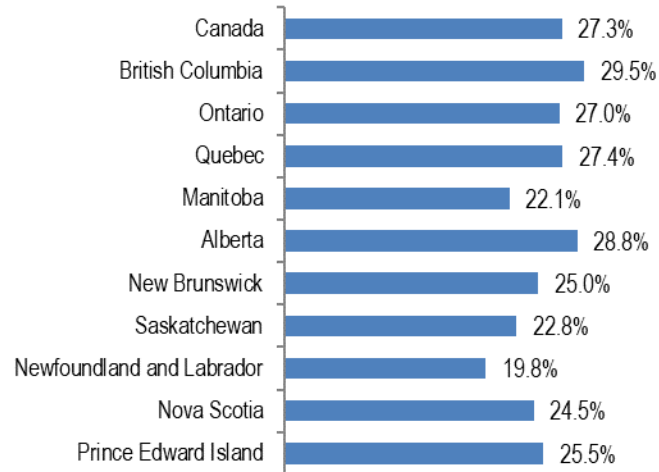
Employment growth by gender and type of job 2010 - 2020



Source: ICTC; Statistics Canada

The representation of women in the ICT workforce also fluctuates across provinces. In 2020, women made up the largest share of ICT professionals in British Columbia (29.5%), Alberta (28.8%), and Quebec (27.4%). All other provinces had female representation below the national average, with representation of women among ICT professionals being the lowest in Newfoundland and Labrador (19.8%) and Manitoba (22.1%).

Proportion of women in ICT positions by province - 2020



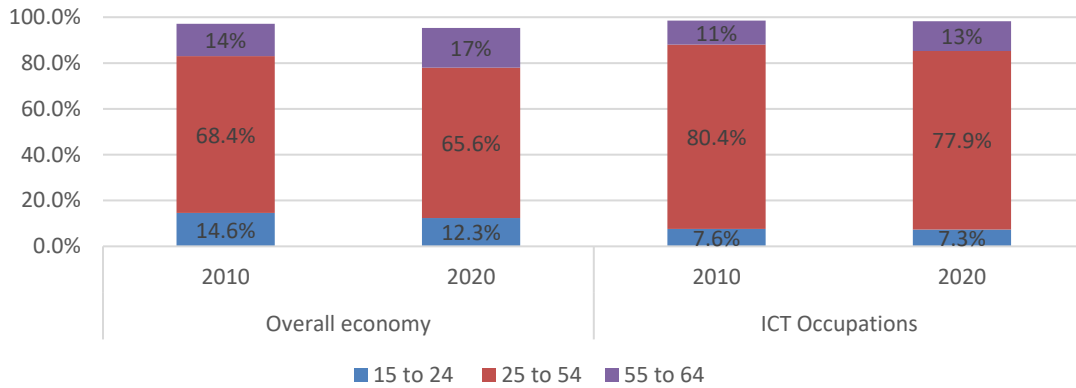
Source: ICTC; Statistics Canada

The unemployment rate for women in ICT professions averaged 5.6% in 2020, compared to 2.6% in 2019. By comparison, the average unemployment rate for men in ICT professions in 2020 was 4.8%, up from 2.9% in 2019; the unemployment rate for women in the overall Canadian economy in 2020 was 9.4%, up from 5.3% in 2019.

Youth in ICT

Youth (those aged 15 to 24 years old) represented 7.3% of all ICT workers in Canada in 2020. The number of youth working in ICT has grown at a similar rate to the rest of the ICT workforce, and the share of youth working in the ICT sector is slightly lower than it was in 2010 (7.6%). Between 2010 and 2020, the share of older workers (aged 55 to 64) working in the ICT sector increased from 11% to 13%.

ICT employment breakdown by age 2010 vs 2020



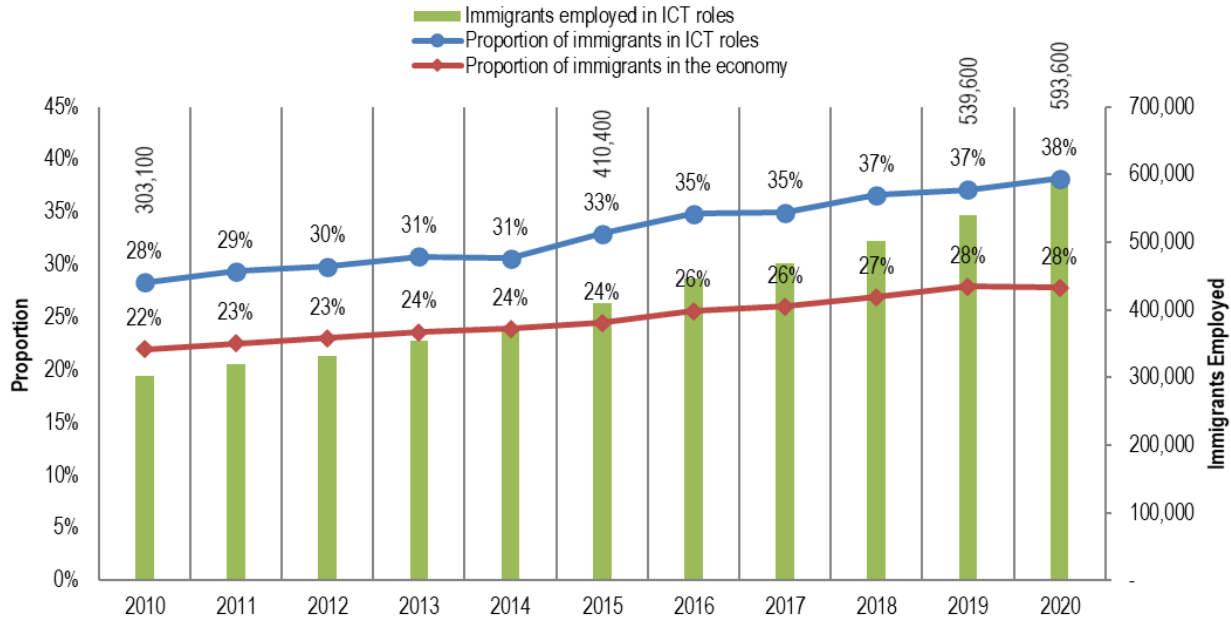
Source: ICTC; Statistics Canada

The unemployment rate for youth in ICT professions averaged 11.1% in 2020, compared to 5.4% in 2019. By comparison, the unemployment rate for youth in the overall Canadian economy in 2020 was 20.1%, up from 11.0% in 2019.

Immigrants in ICT

Over half a million (593,600) of Canada's ICT jobs were held by immigrants in 2020.⁵ Overall, the share of Canada's ICT positions occupied by immigrants has grown from 28% in 2010 to 38% in 2020. In the same period, the share jobs in the wider economy held by immigrants grew from 22% to 28%. The elevated share of immigrants in ICT professions is evidence of the strong demand for ICT talent throughout the Canadian economy.

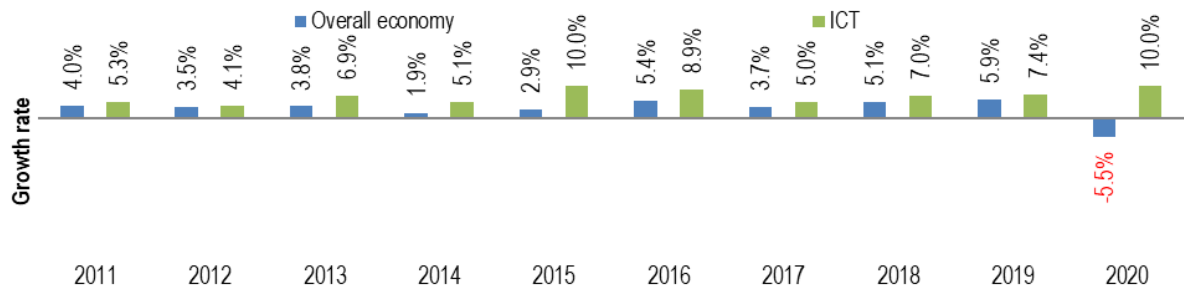
Employment for immigrants 2010 - 2020



Source: ICTC; Statistics Canada

Between 2010 and 2020, ICT employment of immigrants grew at an average rate of 7% a year, compared to 3% for employment of immigrants in the wider economy. In 2020, growth of immigrant employment in ICT was 10.0%, even as the employment of immigrants in the overall Canadian economy dropped by 5.5%.

Growth in employment among immigrants 2010-2020

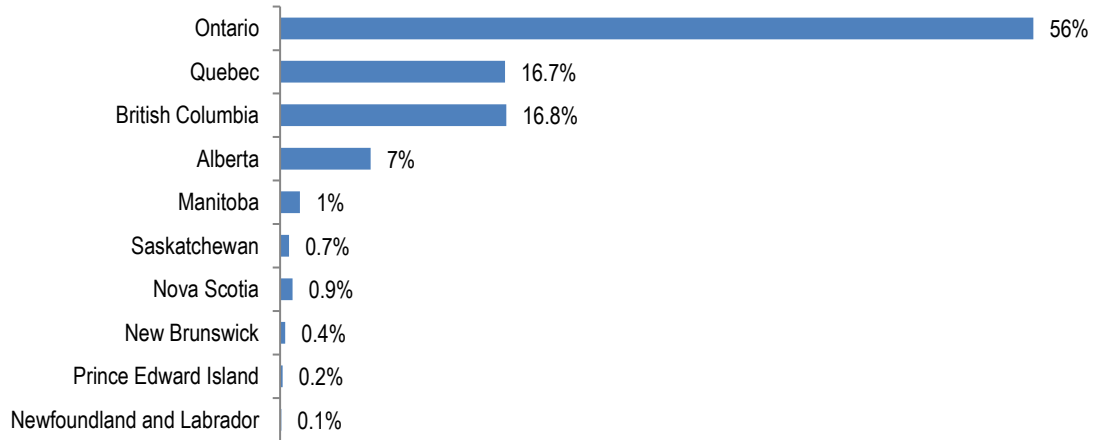


Source: ICTC; Statistics Canada

⁵ "Immigrants" refers to people who were born outside of Canada, regardless of citizenship status.

Unemployment amongst ICT immigrant professionals was consistently low at 5.1% in 2020, compared to 10.6% for all immigrants in the general Canadian economy. Over the last five years, the unemployment rate for immigrants in ICT roles has consistently been far lower than the unemployment rate for immigrants in the general Canadian economy.

Proportion of immigrants in ICT positions by province - 2020



Source: ICTC; Statistics Canada

In 2020, Ontario employed 332,300 immigrants in ICT and accounted for 56% of Canada’s immigrant ICT workforce. British Columbia employed 99,800 immigrants in ICT roles. Quebec employed 99,200 immigrants in ICT roles, and Albert employed 40,000. Together, these four provinces contained 96.5% of Canada’s immigrant ICT workforce.

APPENDICES

ICTC's labour market research captures critical economic and labour market indicators to inform competitive business and human resource strategy planning, decision-making and career development in ICT, thereby driving the development of a more prosperous Canadian ICT workforce and industry in a global digital economy.

The sum of workers (workers that are employed in these occupations as well as workers that are currently unemployed, but actively looking for work) in these occupations and workers in all other (non-ICT) occupations in the ICT sector is the total digital economy labour force in Canada. The table below summarizes the core ICT occupations:

Index	National Occupation Classification (NOC)	Occupation Title
1	0015	Senior managers - trade, broadcasting and other services, n.e.c.
2	211	Engineering managers
3	213	Computer and information systems managers
4	601	Corporate sales managers
5	1123	Professional occupations in advertising, marketing, and public relations
6	1253	Records management technicians
7	2133	Electrical and electronics engineers
8	2147	Computer engineers (except software engineers and designers)
9	2148	Other professional engineers, n.e.c.
10	2161	Mathematicians, statisticians and actuaries
11	2171	Information systems analysts and consultants
12	2172	Database analysts and data administrators
13	2173	Software engineers and designers
14	2174	Computer programmers and interactive media developers
15	2175	Web designers and developers
16	2241	Electrical and electronics engineering technologists and technicians
17	2281	Computer Network Technicians
18	2282	User support technicians
19	2283	Information systems testing technicians
20	4163	Business development officers and marketing
21	5223	Graphic arts technicians
22	5224	Broadcast technicians
23	5241	Graphic designers and illustrators
24	7241	Electricians (except industrial and power system)
25	7242	Industrial electricians
26	7243	Power system electricians
27	7244	Electrical power line and cable workers
28	7245	Telecommunications line and cable workers

29	7246	Telecommunications installations and repair workers
30	7247	Cable television service and maintenance technicians

ICT SECTOR

The table below summarizes the ICT sector:

Index	North American Industry Classification System (NAICS)	ICT Sub-sector
1	3333	Commercial & service industry machinery manufacturing
2	3341	Computer & peripheral equipment manufacturing
3	3342	Communications equipment manufacturing
4	3343	Audio & video equipment manufacturing
5	3344	Semiconductor & other electronic component manufacturing
6	3345	Navigational, medical & control instruments manufacturing
7	3346	Manufacturing and reproducing magnetic and optical media
8	4173	Computer & communications equipment & supplies wholesale distribution
9	5112	Software publishers
10	5121	Motion picture and video industries
11	5173	Wired and wireless telecommunications carriers (except satellite)
12	5174	Satellite telecommunications
13	5179	Other telecommunications
14	5182	Data processing, hosting, and related services
15	5191	Other information services
16	5415	Computer systems design & related serv.
17	7115	Independent artists, writers and performers
18	8112	Electronic & precision equipment repair & maintenance