

SHR	S	%CPU	%MEM
8816	S	27.9	21.4
576	S	11.3	0.6
0	S	0.3	0.0
756	R	0.3	0.0
484	S	0.0	0.2
0	S	0.0	0.0



RESEARCH

DIGITAL ECONOMY ANNUAL REVIEW 2015





RESEARCH BY:



THE INFORMATION AND COMMUNICATIONS TECHNOLOGY COUNCIL (ICTC)

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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.

This study was funded by the Government of Canada's Sectoral Initiatives Program. The authors made all reasonable efforts to ensure accuracy in compiling the document. The opinions and interpretations in this publication are those of the authors and do not necessarily reflect those of the Government of Canada.

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TABLE OF CONTENTS



EXECUTIVE SUMMARY	IV
ECONOMIC GROWTH	1
CONTRIBUTION TO GDP	1
GDP GROWTH BY PROVINCE.....	4
TECHNOLOGICAL INNOVATIONS	5
LABOUR MARKET	6
EMPLOYMENT AND UNEMPLOYMENT	6
EMPLOYMENT GROWTH	7
EMPLOYMENT BY SECTOR.....	8
TALENT SUPPLY.....	9
WOMEN IN ICT.....	9
YOUTH IN ICT	10
IMMIGRANTS IN ICT	11
LOOKING AHEAD.....	12
APPENDICES.....	13

The Information and Communications Technology Council (ICTC) is pleased to present the *Digital Economy Annual Review 2015*, exploring broad trends of recent years as well as looking ahead to 2015 and beyond in Canada's digital economy with respect to economic impact, labour market, technology adoption, and more.

Skilled Canadians are the foundation of economic growth in today's globalized digital economy. The latest innovations in ICTs – in particular the internet of things (IOT) as well as Social, Mobile, Analytics, Apps, and Cloud (SMAAC) – have the potential to significantly heighten Canada's competitive advantage. Over the next few years, the adoption of smart and connected technologies will continue to reshape all sectors of our economy including manufacturing, natural resources, financial services, health, transportation, and more.

Looking ahead, the technological subsectors that are primed to grow the fastest and make the largest economic contributions to the Canadian economy over the next few years include Analytics, Informatics and Social Networks, Automation & Robotics, High Performance Computing, FinTech, e-Commerce, Virtual Construction, and Connected Cars. The confluence of these interconnected technologies is creating unprecedented volume and depth of data – widely known as big data – that is increasingly being used by companies large and small to transform products and services to reach new clients, achieve scale, and grow.

The increasing adoption of these smart technologies will continue to reshape all sectors of our economy. Canada has a pressing need for workers with the in-demand skills to ensure her pre-eminent place in a global innovation economy. Emerging technologies are driving the demand for talent, and considered approaches are needed that can be adopted by stakeholders to the benefit of all Canadians.

This report is beneficially read in the context of ICTC's related recent research exploring long term labour market outlook, talent solutions, and the adoption of digital technology by Canadian enterprises of all sizes. These studies and solutions provide insights at the municipal level to assist employers, policymakers, educators, and Canadians make an optimal contribution to the digital economy with appropriate policies and training to ensure jobseekers have the skills they need, and employers the human capital they require.

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

- ❖ Canada's first online Talent insights for the digital economy at www.etalentcanada.ca
- ❖ Labour Market Outlook [2015–2019](#)
- ❖ Intelligent Industrialization: [The Next Wave](#)
- ❖ [Digital Adoption Compass](#) accelerating adoption of technologies in Canada

HIGHLIGHTS

ICT's contribution to GDP continues to rise

Four consecutive years of the ICT sector outperforming the overall economy since the onset of global financial downturn in 2008 helped a great deal in stabilizing the Canadian economy. Real GDP produced by the Canadian ICT sector in 2014 increased by nearly \$2 billion compared to 2013. This trend is set to continue, as initial data shows that the ICT sector's contribution to Canadian GDP has grown by \$500 million in the first two months of 2015, reaching \$72.7 billion at present. Gradually increasing adoption of ICT products and services in all economic sectors is the driving force behind this encouraging growth.

Canada's ICT sector is a diverse, innovative, and growing segment of the overall economy. Average annual growth in Canada's ICT sector has been 2.0% over the last five years – achieved through strong growth in ICT services industries that recorded 2.5% average annual growth in that period, while ICT manufacturing industries experienced a 5.6% average annual decline in the same period. Some of the emerging ICT subsectors (e.g. automation, mobile apps, cloud services, digital platforms) have been growing in an even more rapid pace, fuelling the growth in Canada's ICT sector as well as the overall economy.

Strong showing in the labour market

Since the collapse of the dot-com bubble at the turn of century (2001), over 239,000 new ICT jobs have been created in Canada (▲42%). As more ICT jobs continue to be created, more people join or return to the ICT labour force. The demand for talent has been so strong that the ICT labour market has been able to absorb almost all of the available supply of talent. As a result, the ICT unemployment rate remained reasonably steady during the incredible growth period of the previous 15 years and is currently the lowest it has ever been, 1.9%. In contrast, the unemployment rate in the overall Canadian labour market is 6.8%.

With the sole exception of 2009, growth in ICT jobs outpaced the job growth in the overall Canadian economy in each year of the previous decade, and notably so in most years. For instance, of the total 111,000 jobs created in Canada in 2014, over 52,000 were ICT positions. In fact, 28,000 new ICT jobs have been created in Canada annually over the last five years at an average annual employment growth rate of 4%, compared to 1% average annual employment growth rate in the overall economy. This is strong evidence of a strong demand for ICT talent throughout the economy.

Among employed ICT professionals, 44% are employed in Canada's ICT sector; 56% are in all other sectors (e.g. service, finance, health). This is a leading indicator that ICTs will continue to play a leading role in the growth of the overall Canadian labour market and economy. It also reinforces the reality that all Canadians need to have the technical skills, understanding, and opportunities necessary to effectively use ICTs and succeed in an interconnected global economy.

Improved workforce diversity critical to Canada's future

In the span of the last 15 years, a lot has changed in the composition of Canada's ICT workforce. It has become:

- ❖ Older, with 11% (88,000) of today's ICT workforce above the age of 55 compared to 4% (24,000) in 2001
- ❖ More educated, where 52% of today's ICT workforce have a bachelor degree or higher compared to 44% in 2001
- ❖ More multicultural, with 37% of today's ICT workforce were born outside of Canada compared to 28% in 2001

At the same time, a lot has also remained the same. Canada's ICT workforce is still as male-dominated as ever, with three-to-one male-female ratio remaining constant throughout that period. The transitioning of younger workers into the ICT workforce is also not happening at the desired rate. A lack of diversity means a limited talent pool, fewer ideas and perspectives, among other things. On the bright side, three-quarters of the ICT jobs held by women or youth are in positions such as software programmers, GUI developers, business systems analysts, informatics specialists, multimedia designers, graphic illustrators, technical support analysts, web administrators, and network support technicians. These are all key roles in the technological subsectors that are primed to grow the fastest and make the largest economic contributions to the Canadian economy over the next few years, improving the diversity of Canada's ICT workforce. This can be further facilitated through measures such as incentive schemes, skills training programs, work placements, and apprenticeships.



Canada's digital economy has a lot to look forward to in 2015 and beyond

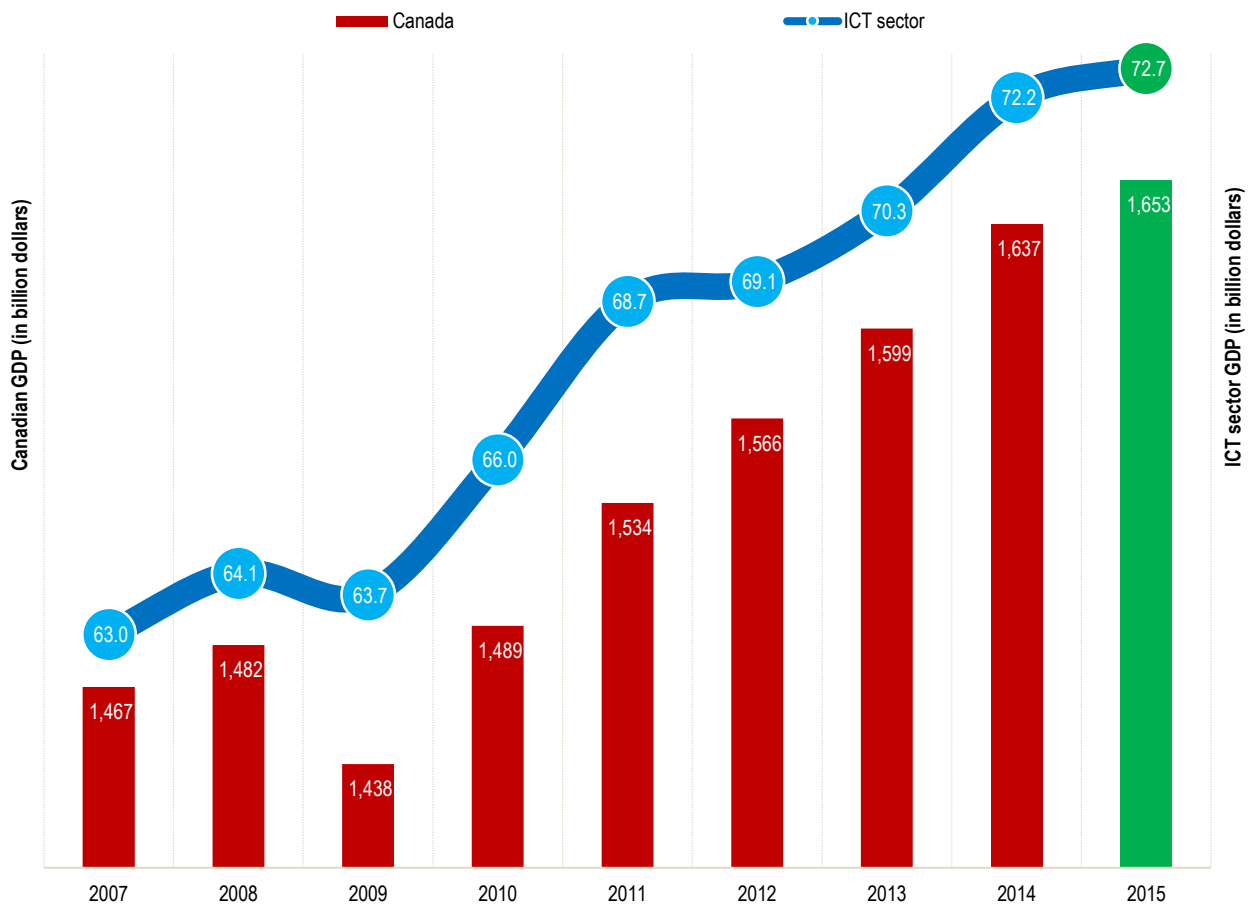
The strong economic and employment growths Canada's digital economy enjoyed in recent years are robust building blocks, and ICTC expects Canada's ICT employment to rebound in the second half of 2015 following some job losses in the first quarter. Talent is key to leverage the full potential of exciting new technologies that will drive the future growth and prosperity of the Canadian economy. Prioritising skills enhancement – of jobseekers, career-transitioners, and also those already in the ICT workforce – is thus paramount to support business growth across all sectors of the economy.

We hope you enjoy reading *Digital Economy Annual Review 2015!*

CONTRIBUTION TO GDP

Real gross domestic product (GDP) produced by Canada's ICT sector in 2014 increased by nearly \$2 billion compared to 2013, to \$72.7 billion.¹ This trend is set to continue, as initial data shows that the ICT sector's contribution to Canadian GDP has grown by \$500 million in the first two months of 2015.² Gradually increasing adoption of ICT products and services in all economic sectors is the driving force behind this encouraging growth.

Canadian and ICT sector GDP (in billion dollars)



Source: ICTC; Statistics Canada

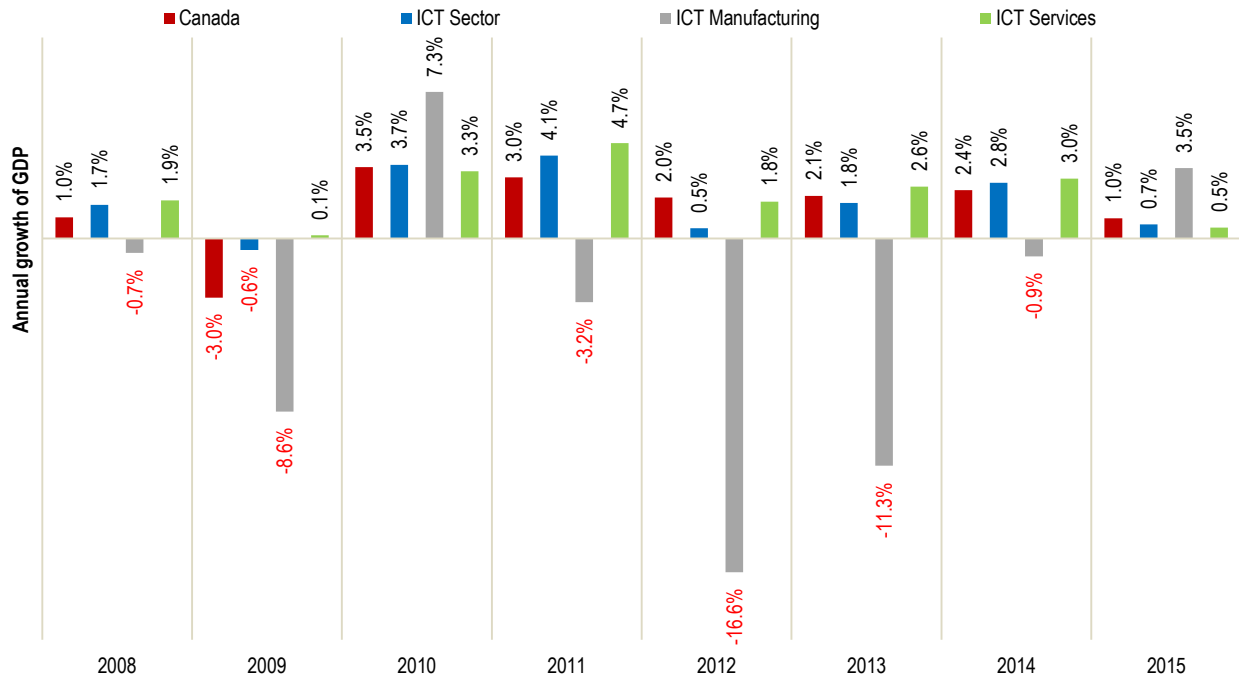
The ICT sector currently accounts for 4.4% of Canada's total output of \$1,653 billion in early 2015. Service-producing industries contribute 70% to the total Canadian GDP and with rapid automation and increasing adoption of other enabling technologies in the service-producing industries, ICTs are a catalyst for Canada's prosperity.

¹ In 2007 chained dollars. Chained dollars are real dollar amounts adjusted for inflation.

² GDP figures for 2015 are calculated using January and February 2015 data.

Four consecutive years of the ICT sector outperforming the overall economy since the onset of global financial downturn in 2008 helped a great deal in stabilizing the Canadian economy, which experienced stronger growth in the following two years (2012, 2013). In fact, there is an 82% positive correlation between growth in the ICT sector and growth in the overall Canadian economy over the past eight years, further evidence that Canada's ICT sector and the overall economy are strongly intertwined.

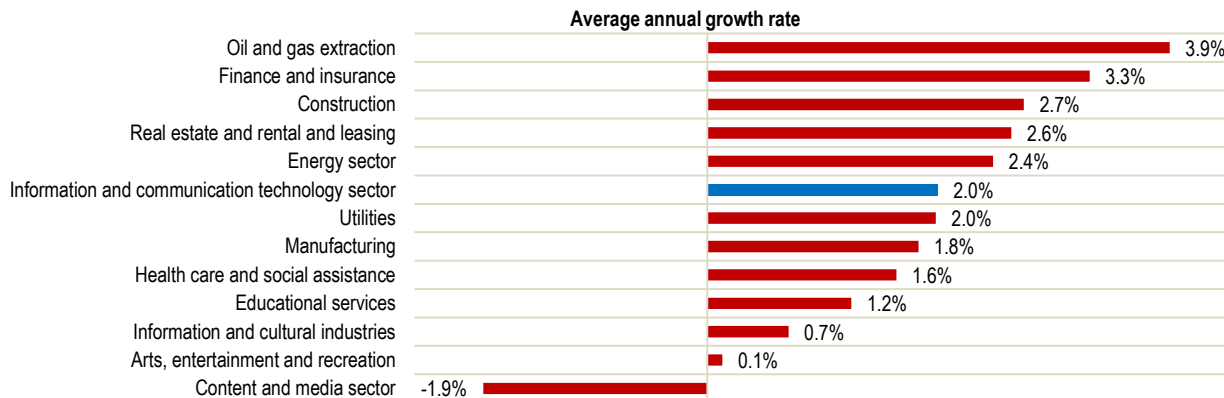
Annual growth of GDP



Source: ICTC; Statistics Canada

Canada's ICT sector is a diverse, innovative, and growing segment of the overall economy. Average annual growth in Canada's ICT sector has been 2.0% over the last five years – achieved through strong growth in ICT services industries that recorded 2.5% average annual growth in that period, while ICT manufacturing industries experienced a 5.6% average annual decline in the same period. Some of the emerging ICT subsectors (e.g. automation, mobile apps, cloud services, digital platforms) have been growing in an even more rapid pace, fuelling the growth in Canada's ICT sector as well as the overall economy.

Average annual growth



Source: ICTC; Statistics Canada



The ICT sector grew more than the overall economy in 2014 (2.7% to 2.4%). ICT sector output of \$72.7 billion at present (2015) is \$453 million higher than it was in 2014 – a year-over-year output growth of 0.6%, a 5.2% increase compared to three years ago (2012), and a 10.1% growth compared to five years ago (2010).

ICTs have a profound direct and enabling impact on the overall economy. These technologies enable workers and businesses to upgrade existing business strategies, workplaces, and operational procedures to improve productivity. Output growth in the ICT sector was a contributing factor to 1% year-over-year growth in the overall Canadian economy in 2015.

Nevertheless, it is evident that the Canadian economy is now in a phase of slower economic growth. Canada experienced modest growth in the last three years, as growth rates have been below those during the period of recovery from the global crisis (2010, 2011). Global growth in the past few years have been driven mainly by Asian countries, while growth in Euro Zone stagnates and the economic recovery of the U.S. is gaining ground.

GDP GROWTH BY PROVINCE

Prince Edward Island, Quebec, Saskatchewan, and British Columbia are the only provinces that have been able to maintain a positive ICT sector GDP growth rate in each of the previous four years. More recently, while Nova Scotia's (↑8.3%) and Ontario's (↑6.3%) ICT sector grew the most in the past year, the ICT sector in Newfoundland (↓6.9%), Alberta (↓3.9%), and Manitoba (↓2.0%) shrank.

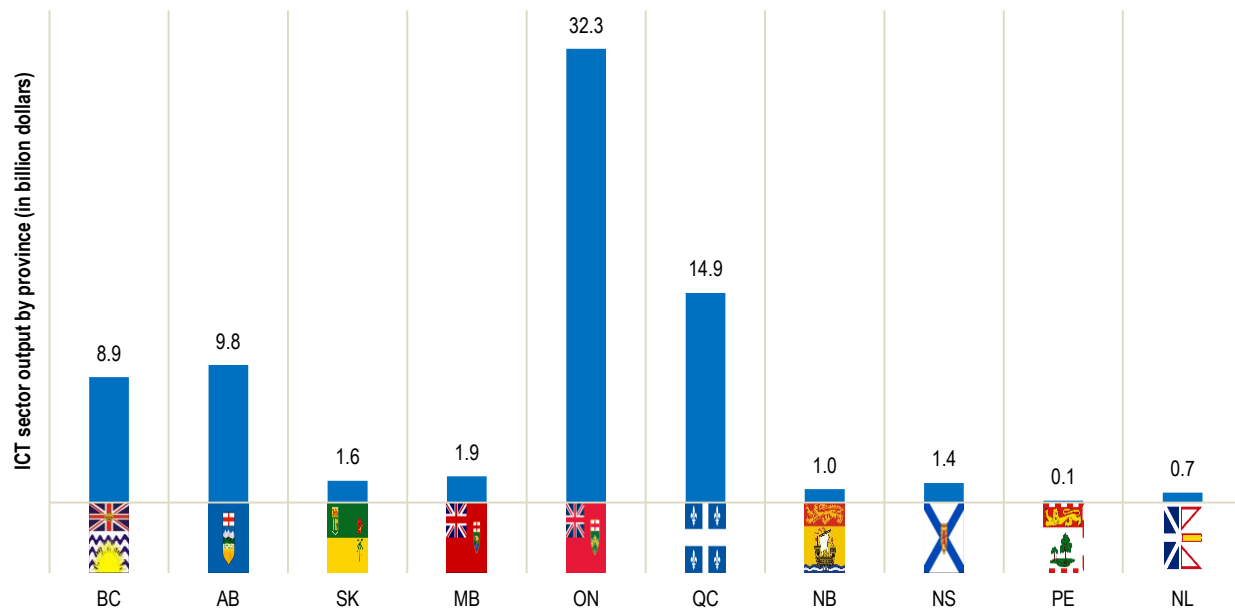
ICT sector GDP by province (annual percentage change)

	2011	2012	2013	2014
Newfoundland and Labrador	4.5 %	1.1 %	0.8 %	-6.9%
Prince Edward Island	4.0 %	3.2 %	1.0 %	3.1 %
Nova Scotia	-1.5%	2.2 %	-0.6%	8.3 %
New Brunswick	4.6 %	-0.4%	0.8 %	2.4 %
Quebec	5.3 %	0.7 %	2.5 %	2.2 %
Ontario	2.8 %	-0.8%	1.5 %	6.3 %
Manitoba	5.6 %	1.4 %	1.9 %	-2.0%
Saskatchewan	5.5 %	3.4 %	1.7 %	2.4 %
Alberta	6.6 %	3.3 %	2.6 %	-3.9%
British Columbia	3.2 %	1.4 %	0.7 %	3.1 %

Source: ICTC; Statistics Canada

Ontario is Canada's ICT leader, contributing \$32.3 billion to the total Canadian ICT output in 2015. Other notable ICT output contributors are Quebec (\$14.9 billion), Alberta (\$9.8 billion), British Columbia (\$8.9 billion), Manitoba (\$1.9 billion), Saskatchewan (\$1.6 billion), and Nova Scotia (\$1.4 billion).

ICT sector output by province (in billion dollars) — 2015



Source: ICTC; Statistics Canada

The substantial growth that Canada's ICT sector achieved in recent years owes a lot to the tremendous growth in consumer and business adoption of the latest innovations in ICTs – IOT, mobile technologies, apps, big data, informatics, cloud services, and digital platforms – to name a few. The emergence of these technologies has created incremental economic opportunities in all sectors of the economy. ICTC's [in-depth research](#) in close partnership with industry and other stakeholders gives a good basis to quantify the economic and labour market impacts of these enabling technologies. For instance, a recently released [ICTC study](#) on Canada's industrial automation finds that this sector generates an estimated \$2 billion in revenues annually and is faced with growing competition from international vendors, as three-quarter of Canada's end-user companies turn to suppliers outside of Canada for their automation equipment.

Looking ahead, the technological subsectors that are primed to grow the fastest and make the largest economic contributions to the Canadian economy over the next few years include Analytics, Informatics and Social Networks, Automation & Robotics, High Performance Computing, FinTech, e-Commerce, Virtual Construction, and Connected Cars. The confluence of these interconnected technologies is creating unprecedented volume and depth of data – widely known as Big Data – that is increasingly being used by companies large and small to transform products and services to reach new clients, achieve scale, and grow.



The increasing adoption of these smart technologies will continue to reshape all sectors of our economy. Canada has a pressing need for workers with the in-demand skills to ensure her pre-eminent place in a global innovation economy. Emerging technologies are driving the demand for talent, and considered approaches are needed that can be adopted by stakeholders to the benefit of all Canadians.

This digital resurgence will impact all stakeholder groups and all Canadians alike. While having an enabling business environment, suitable infrastructure, access to skilled talent, and enhanced security are top of mind of industry and policymakers, the net economic and social gains of many new technology platforms are yet to be fully researched.

From a Canadian viewpoint, it is imperative to understand the economics of these interconnected technologies in Canada, their job creation capacity, potential demand and supply imbalance in the labour market, solutions for overcoming skills-related and other challenges, and key required policy supports to enable service providers and user companies to maximize the potential gains of adoption. It is critical to implement programs that will help build the required skills to help Canada not only create jobs, but also continue transitioning to a complete knowledge based economy.

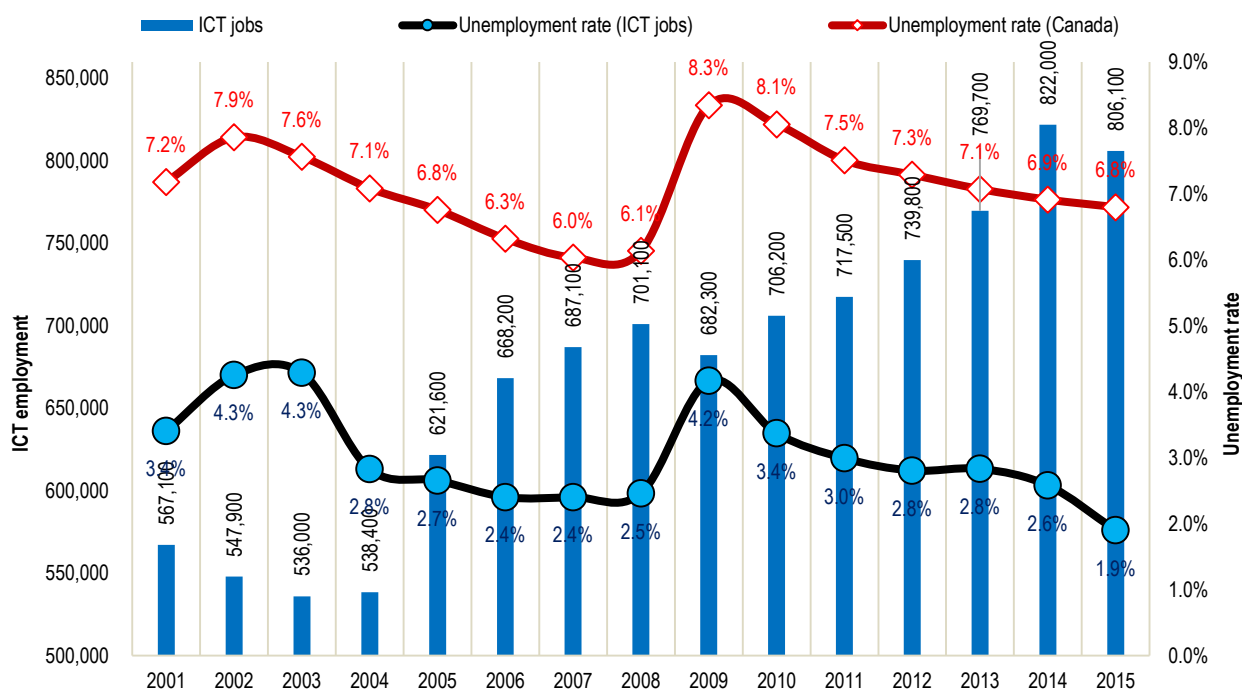
ICTC is currently conducting forward looking research on Big Data Analytics – to be released in fall 2015 – encompassing all these areas. Watch this space to engage and learn more about the impact of Big Data in Canada.

EMPLOYMENT AND UNEMPLOYMENT

806,100 ICT professionals are employed in Canada at present. Since the collapse of the dot-com bubble at the turn of century (2001), over 239,000 new ICT jobs have been created in Canada (▲42%). As more ICT jobs continue to be created, more people join or return to the ICT labour force. The demand for talent has been so strong that the ICT labour market has been able to absorb almost all of the available supply of talent. As a result, the ICT unemployment rate remained reasonably steady during the incredible growth period of the previous 15 years and is currently the lowest it has ever been, 2.1%. In contrast, the unemployment rate in the overall Canadian labour market is 6.8%.

Canada's latest city- and province-specific granular data for the digital economy are [available here](#) and long term labour market insights are [available here](#).

ICT employment and unemployment rates



Source: ICTC; Statistics Canada

In the span of the last 15 years, a lot has changed in the composition of Canada's ICT workforce. It has become:

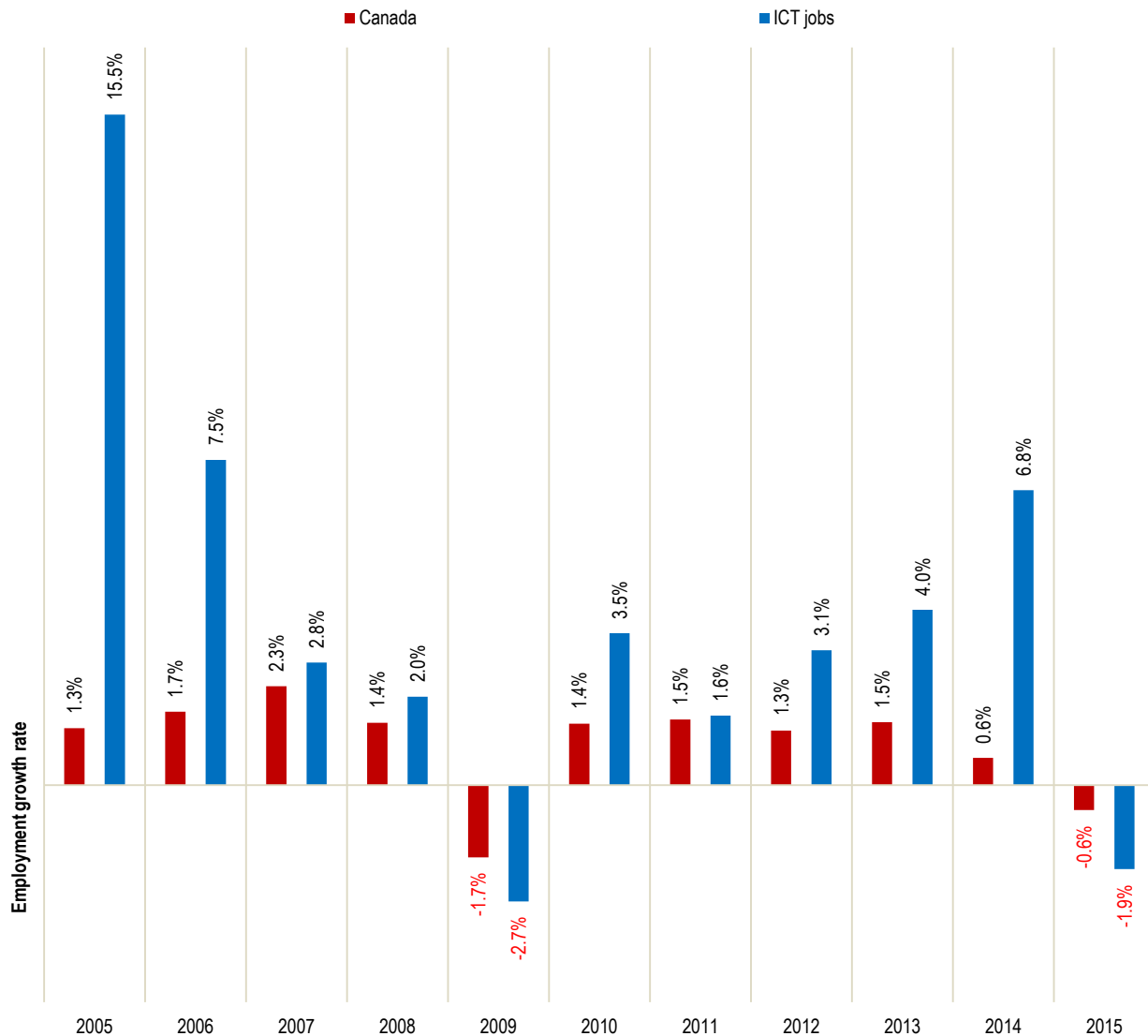
- ❖ Older, with 11% (88,000) of today's ICT workforce above the age of 55 compared to 4% (24,000) in 2001
- ❖ More educated, where 52% of today's ICT workforce have a bachelor degree or higher compared to 44% in 2001
- ❖ More multicultural, with 37% of today's ICT workforce were born outside of Canada compared to 28% in 2001

At the same time, a lot has also remained the same. Canada's ICT workforce is still as male-dominated as ever, with three-to-one male-female ratio remaining constant throughout that period. The transitioning of younger workers into the ICT workforce is also not happening at the desired rate.

EMPLOYMENT GROWTH

With the sole exception of 2009, growth in ICT jobs outpaced the job growth in the overall Canadian economy in each year of the previous decade, and notably so in most years. For instance, of the total 111,000 jobs created in Canada in 2014, over 52,000 were ICT positions. In fact, 28,000 new ICT jobs have been created in Canada annually over the last five years at an average annual employment growth rate of 4%, compared to 1% average annual employment growth rate in the overall economy.

Employment growth



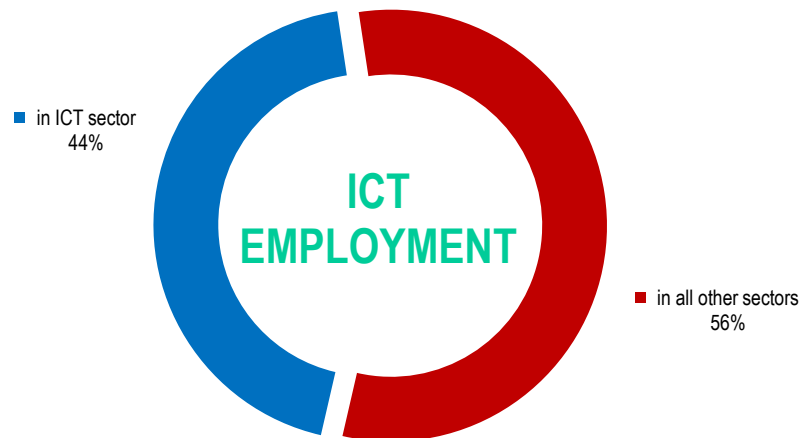
Source: ICTC; Statistics Canada

The strong employment growth ICT professions enjoyed in recent years is a robust building block, and ICTC expects Canada's ICT employment to rebound in the second half of 2015 following some job losses in the first quarter.

EMPLOYMENT BY SECTOR

All sectors of the Canadian economy employ ICTs to boost productivity and efficiency. The demand for top ICT talent continues to grow as a result and has resulted in expanding career options for ICT professionals, placing competitive pressure on the employers seeking technical ICT talent. Among employed ICT professionals, 44% are currently employed in Canada's ICT sector, and 56% are in all other sectors (e.g. health, finance).

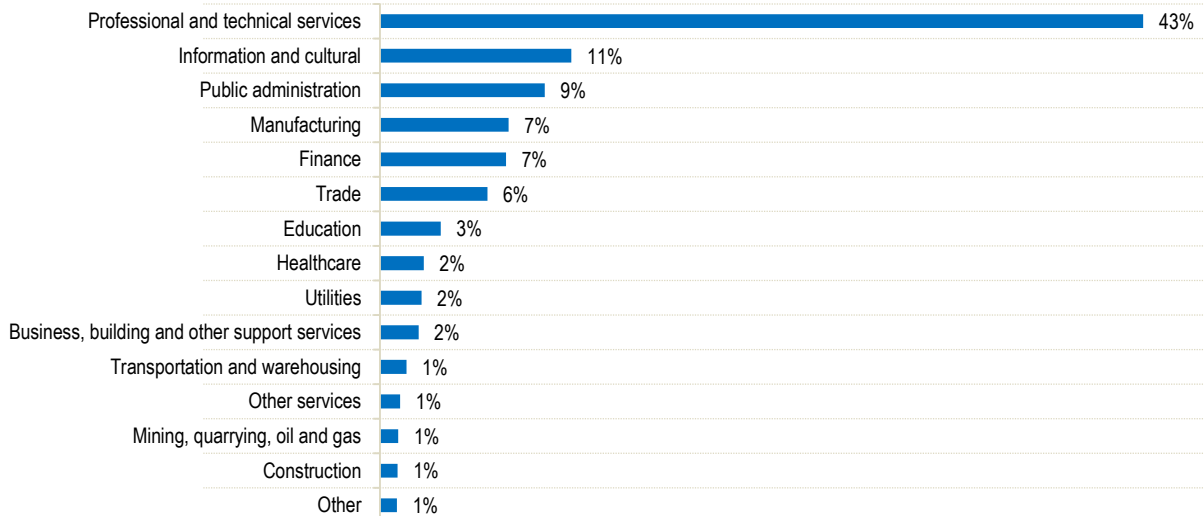
ICT employment



Source: ICTC; Statistics Canada

Companies in the professional and technical services industry are Canada's largest ICT employer. They employ 43% of all ICT professionals in Canada. By comparison, ICT employment is 11% in the information and cultural industry, 9% in the public sector, 7% in manufacturing and in the finance industry, 6% in the trade sector, 3% in the education sector, 2% in the healthcare sector.

ICT employment by industry



Source: ICTC; Statistics Canada

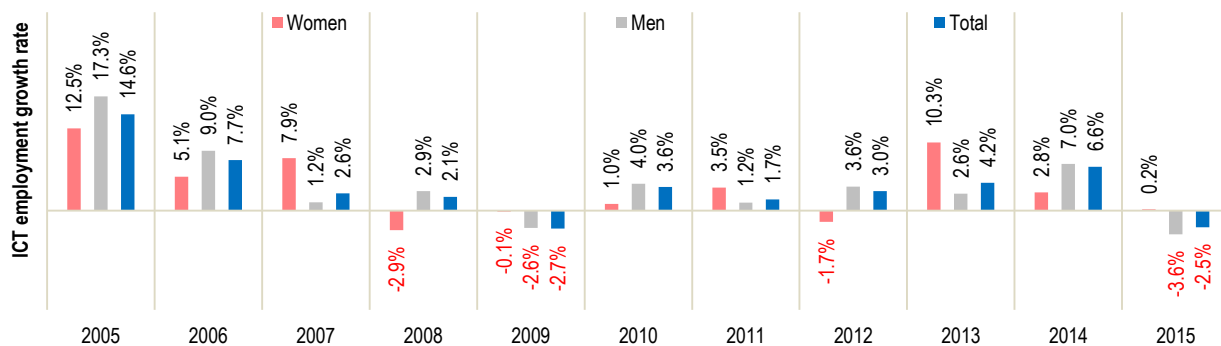
WOMEN IN ICT

Women's participation in ICT professions is gradually improving, as seven of the ten years in the previous decade saw employment growth for women in ICT positions. Much work, however, still remains. Following considerable growth in 2013 (▲10.3%), women's employment in ICT grew more modestly in 2014 (▲2.8%). 200,700 women are employed in ICT positions in Canada at present, compared to over 605,000 men.

ICT positions that are more gender-balanced and are occupied by many women include business systems analysts, informatics specialists, multimedia designers, graphic illustrators, software programmers, GUI developers, technical support analysts, web administrators, and network support technicians. Incidentally, these are all key roles in the technological subsectors that are primed to grow the fastest and make the largest economic contributions to the Canadian economy over the next few years. As such, it bodes well for women's increasing participation in ICT careers.

The highest number of women in ICT positions are employed in Ontario, a total of 94,000 at present. By comparison, ICT employment for women is 45,000 in Quebec, 24,000 in British Columbia, 19,000 in Alberta, 4,000 in Manitoba and Nova Scotia, 3,000 in Saskatchewan and New Brunswick, 2,000 in Newfoundland & Labrador, and less than 1,000 in Prince Edward Island.

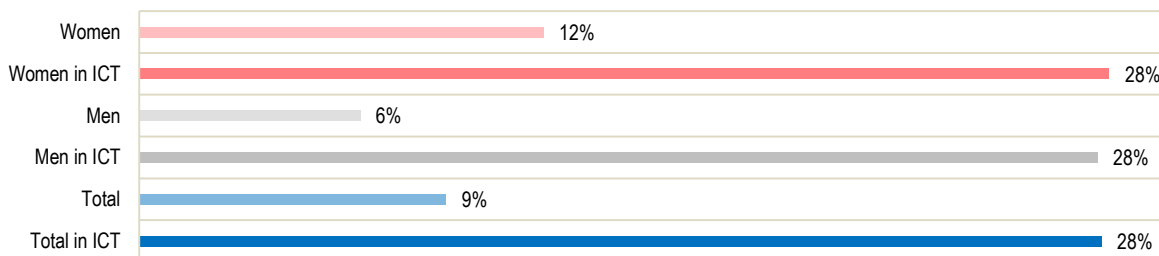
ICT employment growth by gender



Source: ICTC; Statistics Canada

Since 2005, women's employment grew by 12% in all sectors of the economy, compared to 6% amongst men. In that time, ICT employment for both men and women increased equally, by 28%. This is indicative that increase in women's participation in the digital economy is slower than that in the overall labour market. Stakeholder collaboration in this regard will help, as research indicates increase in gender diversity in any workplace supports with talent enrichment, innovative ideas, and new perspectives.

Employment growth by gender and type of job – 2005 to 2015



Source: ICTC; Statistics Canada

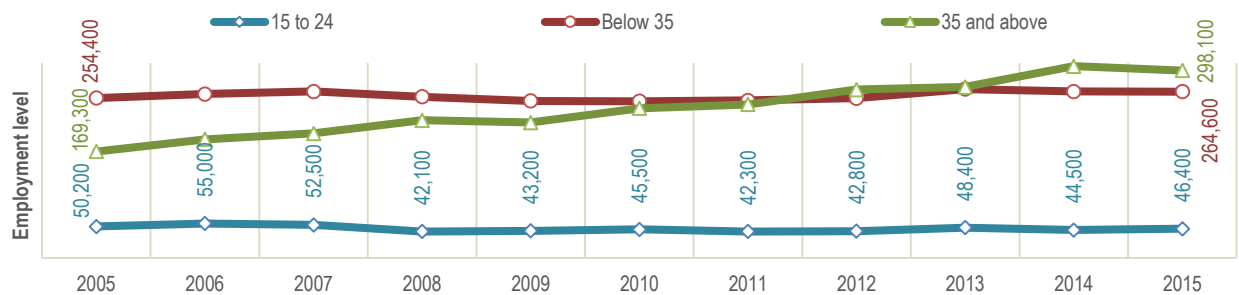
YOUTH IN ICT

A strong 13% growth in 2013 in youth – defined as those aged 25 or younger – employment in ICT jobs was followed by a sizable decline (↓8%) in 2014. There is early indication that youth employment in ICT jobs will grow in 2015. 46,400 youth are employed in ICT positions in Canada (6% of total) at present, still ways to go to return to the pre-recession (2006) high of 55,000.

The oldest cohort of millennials (Generation Y) – people born between 1980 and 2000 – are turning 35 in 2015 and are increasingly making a larger share of the Canadian workforce. Since 2005, ICT employment among those aged below 35 has grown from 254,400 (41% of total) to 264,600 (33% of total) at present. In that period, ICT employment among those aged 35 and above has grown from 169,300 (27% of total) to 298,100 (37% of total).

70% of the ICT jobs held by those aged below 35 are in positions such as software programmers, GUI developers, business systems analysts, informatics specialists, multimedia designers, graphic illustrators, technical support analysts, web administrators, and network support technicians. These are all key roles in the technological subsectors that are primed to grow the fastest and make the largest economic contributions to the Canadian economy over the next few years, expected to result in an improved blend of youth and experience in Canada's ICT workforce.

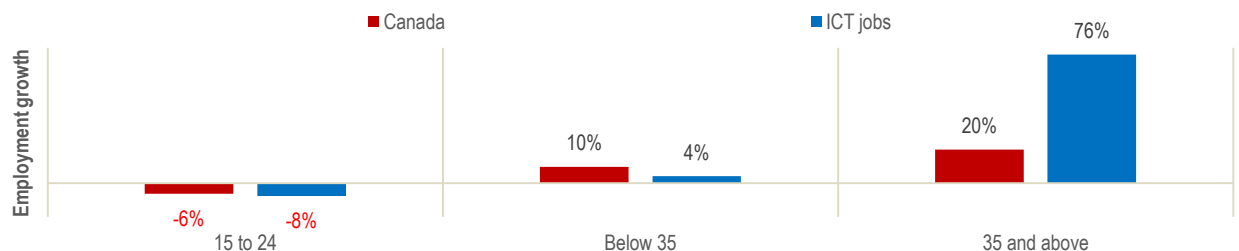
ICT employment by age groups



Source: ICTC; Statistics Canada

The growth rate (↑4%) in ICT employment among those aged below 35 did not keep up with the growth rate (↑10%) among that age group in the overall labour market. In stark contrast, the growth rate (↑76%) in ICT employment among those aged 35 and above was nearly four times the growth rate (↑20%) among that age group in the overall labour market.

Growth in ICT employment by age groups – 2005 to 2015



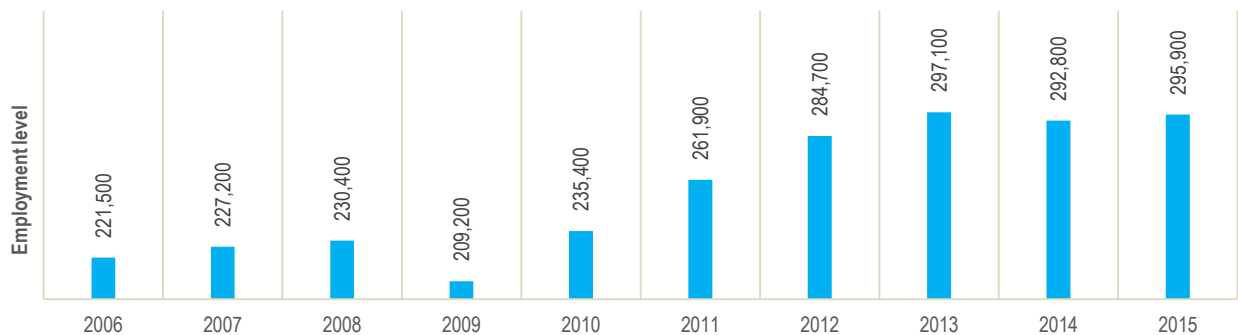
Source: ICTC; Statistics Canada

With the Canadian economy gradually [growing](#) and companies in all sectors of the economy adopting technologies more and more, we will see an [increased hiring requirements](#) in Canada for ICT talent. As more retirement occurs in the top-heavy ICT workforce, knowledge retention and leadership vacuum are two critical challenges that Canada's digital economy has to plan for and address in the coming years.

IMMIGRANTS IN ICT

Of the total employed workers in ICT occupations at present, 295,900 (37%) are immigrants.³ Jobs that have a strong emphasis on technical skills – for instance software programming or web development – are highly in demand and these skills are relatively easier to transfer across geography. The proportion of immigrants has remained consistent in recent years at just above a third of the ICT workforce. This is in sharp contrast with the overall economy, where a quarter of all jobs are held by immigrants. This is evidence of a [strong demand](#) for ICT talent throughout the economy.

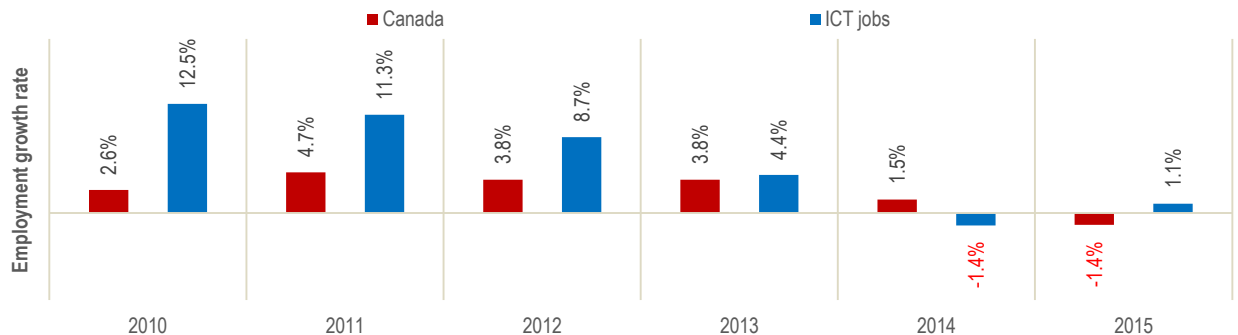
ICT employment for immigrants



Source: ICTC; Statistics Canada

This is a 4.8% average annual growth for the previous five years as ICT employment among immigrants increased by 60,500 since 2010 (▲26%). With the sole exception of last year (2014), growth in immigrant employment in ICT jobs outpaced the job growth among immigrants in the overall Canadian economy in each of the last five years, and notably so in most years.

Growth in employment among immigrants



Source: ICTC; Statistics Canada

In ICT occupations, unemployment among immigrants is consistently lower and is currently 3.2%, remaining steady for the past four years. In contrast, the unemployment rate among immigrants in the overall Canadian labour market is 6.9% at present.

In ICT jobs, Ontario employs the highest number of immigrants, 162,000 at present. By comparison, ICT employment for immigrants in Quebec is 47,000, 42,000 in British Columbia, 32,000 in Alberta, 3,200 in Manitoba, 1,900 in New Brunswick and in Saskatchewan, 1,600 in Nova Scotia, 400 in Newfoundland & Labrador, and 200 in Prince Edward Island.

³ Refers to people who were born outside Canada

Canada's ICT sector is a diverse, innovative, and growing segment of the overall economy that contributes \$72.7 billion to Canadian GDP at present, growing 2.0% annually over the last five years. Some of the emerging ICT subsectors (e.g. automation, mobile apps, cloud services, digital platforms) have been growing in an even more rapid pace, fuelling the growth in Canada's ICT sector as well as the overall economy.

The demand for ICT talent continues to be very strong in all provinces and sectors, evidenced by the creation of over 239,000 new ICT jobs in Canada since 2001. The Canadian labour market absorbs almost all of the available supply of ICT talent, resulting in the lowest ever ICT unemployment rate of 1.9% at present. In contrast, the unemployment rate in the overall Canadian labour market is 6.8%.

ICTC's in-depth consultation with Canadian employers – through a survey of over 1,000 representative employers across Canada, with representation of all provinces and sectors – clearly shows a skills gaps in the ICT workforce, often resulting in a lack of candidates with the ideal blend of skills, qualifications, and experience during recruitment.

As greater technology adoption holds tremendous promise for the Canadian economy, ensuring that we have the right talent to lead the adoption and use of emerging technologies is more critical than ever before, as talent is key to leverage the full potential of exciting new technologies that will drive the future growth and prosperity of the Canadian economy.

Prioritising skills enhancement – of jobseekers, career-transitioners, and also those already in the ICT workforce – is thus paramount to support business growth across all sectors of the economy. Improving gender diversity as well as the blend of youth and experience in Canada's ICT workforce are of critical importance that can be facilitated through measures such as incentive schemes, skills training programs, work placements, and apprenticeships.

DIGITAL ECONOMY WORKFORCE

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 total 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 (ICTC's framework of Canada's ICT sector is explained below) is the total digital economy labour force in Canada. The table below summarizes the core ICT occupations:

Index	NOC Code	Occupation Title
1	0131	telecommunication carrier managers
2	0213	computer and information system managers
3	2133	electrical and electronics engineers
4	2147	computer engineers
5	2171	information systems analysts and consultants
6	2172	database analysts and data administrators
7	2173	software engineers
8	2174	computer programmers and interactive media developers
9	2175	web designers and developers
10	2241	electrical and electronics engineering technologists and technicians
11	2281	computer network technicians
12	2282	user support technicians
13	2283	systems testing technicians
14	5224	broadcast technicians
15	5241	graphic designers and illustrators

ICT SECTOR

The table below summarizes the ICT sector:

Index	NAICS Code	ICT Sub-sector
1	3333	Commercial & Service Industry Mach. Manuf.
2	3341	Computer & Peripheral Equip. Manuf.
3	3342	Communications Equip. Manuf.
4	3343	Audio & Video Equip. Manuf.
5	3344	Semiconductor & Other Electronic Component Manuf.
6	3345	Navigational, Medical & Control Instruments Manuf.
7	4173	Computer & Comm. Equip. & Supplies Wholesale distribution
8	5112	Software Publishers
9	5171	Wired Telecommunications Carrier
10	5172	Wired Telecommunications Carrier (except satellite)
11	5174	Satellite Telecommunications
12	5179	Other Telecommunications
13	5182	Data Processing, Hosting, and Related Services
14	5415	Computer Systems Design & Related Serv.
15	8112	Electronic & Precision Equip. Repair & Maintenance

ABOUT ICTC



The Information and Communications Technology Council (ICTC) is a leading not-for-profit national centre of expertise conducting research, policy development, and creating talent solutions for the digital economy.

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