METROPOLITAN ECONOMIC MOVEMENT

RELAUNCH MTL

ENHANCED ACTION PLAN TO STRENGTHEN THE INFORMATION AND COMMUNICATIONS TECHNOLOGY SECTOR

Co-developed by

CCMM

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Catalyseur d'écosystèmes technologiques

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Michel Leblanc

President and CEO

– Chamber of Commerce of Metropolitan Montreal

As part of the Relaunch MTL initiative, we have implemented a series of action plans to guide the city in regaining the remarkable momentum it had achieved prior to the COVID-19 crisis. One of the things that connects these sector diagnostics is the growing need for an agile and efficient information technology sector.

Examples abound. Telework and distance teaching have tested network robustness and reliability, Highlighting the need for high-performance infrastructures in both Montréal and the regions. Fields such as telemedicine and cybersecurity have acquired a new dimension and will need to grow rapidly in the coming years.

Striking at the very heart of our business operations, health restrictions and the slowdown in some activities have demonstrated the need to accelerate the shift to e-commerce. Sectors such as aerospace, clean technologies and transportation and logistics will need to support their development even further with cutting-edge digital technologies, including the new opportunities offered by artificial intelligence.

The leveraging effect of ICTs and their role in the economy have thus become key success factors and sources of increased productivity. The potential for growth is there, both for our businesses that act as industry leaders and the pool of innovative smaller players.

However, to harness the full potential of ICTs and seize the many business opportunities, we must overcome several challenges. The most compelling of these challenges, which has been exacerbated by the pandemic, involves the workforce. Our educational institutions are, of course, central to this, but further collaboration with the community is needed to develop the required critical mass of talent. We must also ensure that the performance of our infrastructures—both physical and digital—meets our ambitions by demanding major investments. All this will be necessary to capitalize on the strong potential of this sector, which, in the long run, will enable all sectors of the city to benefit from its leading expertise in order to grow and contribute to the recovery.

François Borrelli

President and CEO

– Numana

The year 2020 will always be remembered by entrepreneurs, workers and the general public. We have all been affected, whether directly or indirectly, and some more than others. Whole value chains have been severely disrupted. Never in history has the world changed so quickly.

The information and communications technology (ICT) sector was also affected, although due to its cross-cutting nature, the impacts varied greatly from one area of activity to another. COVID-19 has shown us that while ICT is unable to solve every problem, they can significantly help businesses adapt quickly to new realities, and that for some entrepreneurs, the digital shift will be essential.

Amidst this turmoil, our ecosystem has successfully demonstrated its ability to react quickly in many areas of our lives, including health and work. We learned about existing innovations and the ability to innovate when needed. Against this backdrop, Numana has created a “wall of technological innovations in Quebec” to raise awareness of our local tech firms and make it easier for all businesses to find solutions to their issues and problems.

We aren’t out of the woods yet, however: Challenges remain and are becoming increasingly difficult. Consider the competition for talent. With so many vacant positions waiting to be filled, it’s one of the major issues facing our sector and has challenged the growth of many companies, forcing them to refuse projects because they are unable to deliver projects in a timely manner.

The future is nevertheless very promising for the Quebec ICT sector, as more and more companies transform and go digital. Some of them, including small retailers and restaurants, have been hit hard and are increasingly seeking help to facilitate their operations, minimize their expenditures and enhance their customer service. There is still much to be done to develop Quebec’s innovation sector, but one thing is certain: To make it a success, we must keep in mind first that human beings are essential to technological success and at the heart of digital technologies. Numana intends to act as a catalyst for these innovation ecosystems.

Enjoy the forum,

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The agility of the ICT sector has been key to keeping it on a growth path. In the context of the recovery, it has the potential to create value across the economy and we must see it as a strategic lever.

SUMMARY

The sector has been shocked by the crisis, but it has repositioned itself quickly

Because of its cross-sector importance to the economy, the information and communications technology (ICT) sector plays a strategic role in the development of industries in the Greater Montréal Area. In particular, it helps make other industries more productive by supporting the digital transformation needs of businesses, as well as enhance the city's international influence through the reputation it has strengthened in the sector in recent years. It includes one of the largest concentrations of high-growth firms, which are a significant driver of innovation in the metropolitan economy.

The sector was facing challenges that were impeding its growth before the pandemic, including access to talent, visibility in certain subsectors such as artificial intelligence, a fragmented innovation ecosystem, and data security challenges that pose problems for the adoption of new technologies.

The pandemic has exacerbated some of these challenges, including access to labour and data security issues. It has also had a significant impact on business investments in new technologies, leading to increased demand and competition in the sector.

At the same time, the crisis has highlighted the importance of democratizing digital infrastructure, as well as ensuring that venture capital is available for startups.

Concerning the support measures put in place by governments, few firms within the sector have used them as they are rarely eligible. However, the Government of Canada has announced a $2-billion structuring investment to develop Canada's digital infrastructure that will help advance the digital economy in underserved regions. In other words, most government sector support is provided through programs that aim to transform industry digitally.

The ICT sector plays a vital role in the knowledge economy and is one of the key pillars of economic growth in the Greater Montréal Area.

SUMMARY

Ensuring the sector fully plays its role in the recovery

The ICT sector has a bright future ahead of it. Despite the uncertainty overshadowing the economy, it has remained on a growth path and has the potential to play a key role in the recovery of Greater Montréal. To do this, it is crucial that companies, entrepreneurship support and economic development organizations, and all levels of government come together to overcome the current challenges and bring about the recovery.

Some key themes have emerged in the recommendations:

For businesses

- Adopt an effective and faster talent training strategy
- Ensure better alignment between startups and big business

For entrepreneurship support and economic development organizations

- Implement local and international marketing initiatives

For governments

- Attract specific talent from abroad to meet domestic needs
- Promote local expertise in promising and in-demand subsectors
- Increase funding for digitization initiatives in non-ICT sectors
- Strengthen the financing chain
- Strengthen the technology innovation ecosystem
- Build digital infrastructure to support the economic recovery and growth

Highlights of the priorities identified during the Strategic Forum on Information and Communications Technology (1/2)

On December 7, 2020, the Strategic Forum on Information Technology, organized by the Chamber of Commerce of Metropolitan Montreal and its partners, highlighted the issues facing businesses in the sector.

The Forum brought together nearly 350 participants to discuss the action plan's highlights and reflect on the sector's post-COVID future.

An interactive working session was held during the forum to prioritize issues and courses of action. These were the key findings:

1) **Pre-COVID challenges**: Respondents identified **access to a skilled workforce** as the most important pre-COVID challenge, followed by a **fragmented Quebec innovation ecosystem.**

2) **The long-term impacts of the current crisis**: **Difficulty in accessing labour** was also identified as the impact of the crisis that will affect the sector in the long term, and this impact is amplified by the **increased importance of an efficient and secure technological infrastructure**.

3) **Courses of action for industry**: The respondents would like industry and the milieu to establish mechanisms that **better align technology startups with big business** to drive innovation and accelerate the digital shift. They would also like to see **easier access to marketing support initiatives and more such initiatives**.

4) **Courses of government action**: We invited the Forum participants to put themselves in the shoes of governments in order to prioritize courses of government action in the sector. The three priority courses of action are: (1) **improve the technological innovation ecosystem**; (2) **build digital infrastructure to support the economic relaunch and growth**; and (3) **promote local expertise in promising subsectors that are in demand**.

The combination of the collaborative session highlights and the action plan that follows resulted in the roadmap proposed by Relaunch MTL for a stronger sector. The various stakeholders can implement the roadmap to ensure the recovery of the sector.

Highlights of the priorities identified during the Strategic Forum on Information and Communications Technology (1/2)

5) Other reactions: Forum panelists raised the fact that **the pandemic has accelerated the digital shift by several years** – in terms of both online demand and procurement and cloud computing. In addition, as information technologies are cross-cutting in nature and involve all industries, **investment in post-pandemic technology structures** remains a priority. **Training remains key for a successful digital shift**, both for businesses within the sector and outside it.

Finally, participants had an opportunity to share other ideas in an open-ended question period, which led to the identification of additional courses of recovery action.

Among these, specific to the industry:

- *"Increasing IT training programs [and] further educating youth on the importance of IT for their future."*
- *"Promoting the attraction and retention of international talent."*
- *"Facilitating the promotion of products and services of Quebec IT firms to potential customers in Quebec and internationally, such as with an interactive map based on the offer and region."*
- *"Don't neglect the role of startups and scaleups in the recovery. They are major innovation drivers, and we really need them now and in the future."*

... and specific to governments:

- *"Support innovation zones quickly, accelerate the digital transformation of government itself, allow colleges greater flexibility to change programs and adapt to the tech market."*
- *"Streamline SR&ED applications for businesses."*
- *"Increase financing for tech SMEs [and not just startups], as well as build bridges with large international companies for scaleup purposes."*

INTRODUCTION

Relaunch MTL: An initiative to mobilize key stakeholders in Greater Montréal's economy

The COVID-19 crisis is having a significant impact on society as a whole. Out of this health crisis, an unprecedented economic crisis emerged. Its impacts on the metropolitan economy have varied significantly from one industry to another. While some sectors are experiencing significant losses and must reinvent their business models, others are experiencing growth and facing labour shortages. Despite the significant challenges faced by businesses and industries, there are still many opportunities and the shift to a lower-carbon economy remains a priority.

The current crisis is mobilizing all Montréal stakeholders. The provincial and federal governments, along with the Communauté métropolitaine de Montréal (CMM) and its 82 municipalities, are making considerable efforts to help relaunch their economies on a sustainable basis.

Adding to these efforts, the Chamber of Commerce of Metropolitan Montreal and some 20 partners have introduced Relaunch MTL, which is supported by the Government of Canada, the Government of Quebec, the Communauté métropolitaine de Montréal and the Ville de Montréal, in association with Investissement Québec and in collaboration with the Palais des congrès de Montréal. The goal of this movement is to mobilize all stakeholders in the Greater Montréal economic ecosystem to revive the city's major strategic sectors.

With the help of real-time data and strategy information, each sector will be subject to an issue-specific diagnostic.

The movement seeks to acquire a detailed understanding of the issues facing these sectors, find solutions and assist in decision-making with businesses and the different levels of government. The common goal of these efforts is to successfully relaunch Montréal's economy.

The development of ten sector action plans and a plan for downtown Montréal is part of the movement. The action plans will be enhanced through a series of virtual events that will give us an opportunity to start thinking and take action to propel the long-term recovery of the city's economy and businesses.

This document represents the recovery plan for the information and communications technology (ICT) sector

This action plan for the recovery of the information and communications technology (ICT) sector was developed as part of Relaunch MTL. The analyses, findings and courses of action follow a rigorous and accelerated approach that takes into account the impacts of the current crisis. They rely primarily on:

- A sustained contribution from Numana, a catalyst for technology ecosystems (formerly known as TechnoMontréal, the Montréal technology cluster), including studies, data, diagnostics, papers, and approaches to the crisis
- A review of the literature on the consequences of COVID-19, both local and international, and the measures put in place to address them
- Secondary data and supplementary information searches
- Interviews with key stakeholders (see the Appendix for a list)
- KPMG's analytical framework and sector expertise

This sector plan provides governments and industry stakeholders with priority courses of short-term action, as well as other actions that are part of a sustainable recovery over the longer term. Its scope is metropolitan and therefore covers the territory within the Montréal Census Metropolitan Area (CMA).

It is understood that the courses of action will be further developed at a Strategic Forum on December 7, 2020, through a participatory exercise with ecosystem members.

TEN SECTORS OF INTEREST:

- Aerospace and air transport
- Retail trade
- Construction and infrastructure
- Creative industries
- Life sciences and health technology
- Financial services
- Information and communications technology
- Clean technology
- Tourism
- Transportation and logistics

Greater Montréal: solid economic performance before COVID-19

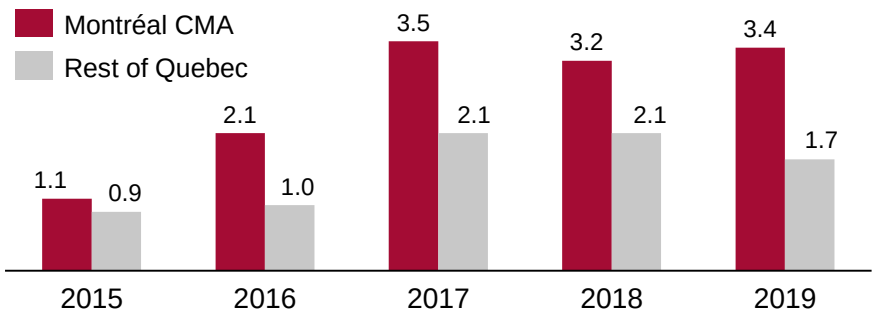
Greater Montréal was at the heart of Quebec's economic growth in the years prior to COVID-19, acting as a true driver for the provincial economy:

- From 2016 to 2019, economic growth rates in the Montréal CMA were well above those in the rest of Quebec. In 2019, the city's GDP actually grew at twice the rate recorded in the rest of Quebec (3.4% versus 1.7%), outpacing the growth rates of other major Canadian CMAs.

The Greater Montréal economy benefits from:

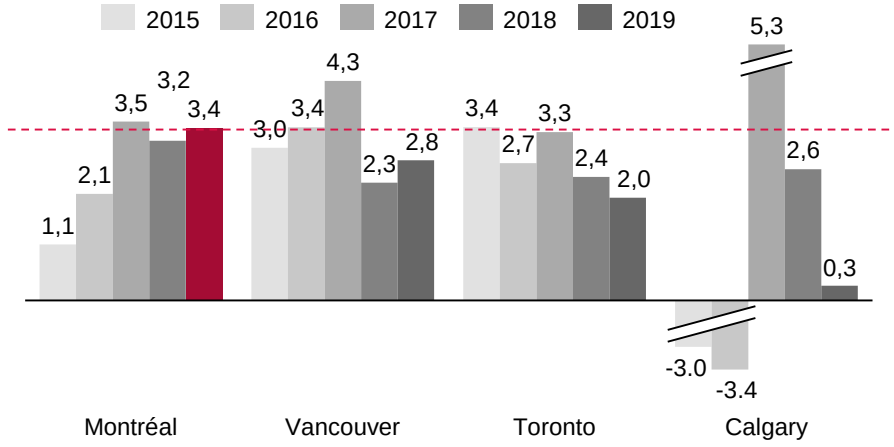
- A critical mass of businesses and jobs in a number of promising sectors, which helps make the city a thriving and innovative metropolis (all sectors are the focus of recovery action plans)
- The contributions of leading knowledge institutions such as our CEGEPs, universities, and private and public research centres
- Massive infrastructure investments, including the Turcot Interchange, the Champlain Bridge and the Réseau express métropolitain (REM)
- A dynamic real estate sector across Greater Montréal

Annual real GDP growth rates for the Montréal CMA and the rest of Quebec
2015 to 2019, as a %



Source: Conference Board of Canada

Annual real GDP growth rates for selected CMAs
2015 to 2019, as a %



Unprecedented impact and impressive rebound

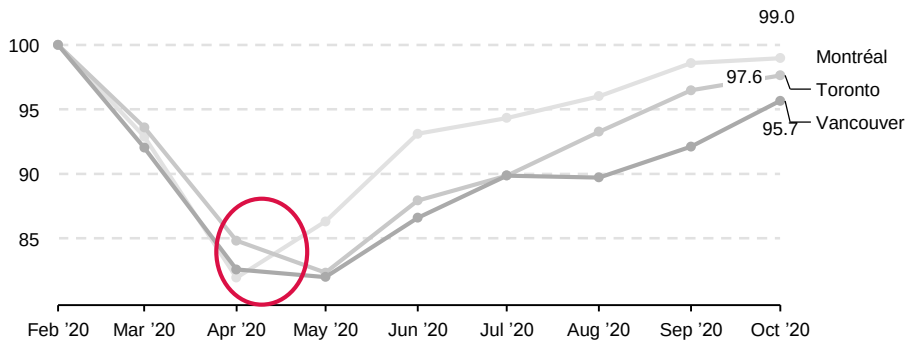
From February to April 2020, employment in the Montréal CMA fell 18 points before rebounding in May and the ensuing months.

- In October, employment remained 1% below its February level, but a decline is possible with the current partial lockdown.

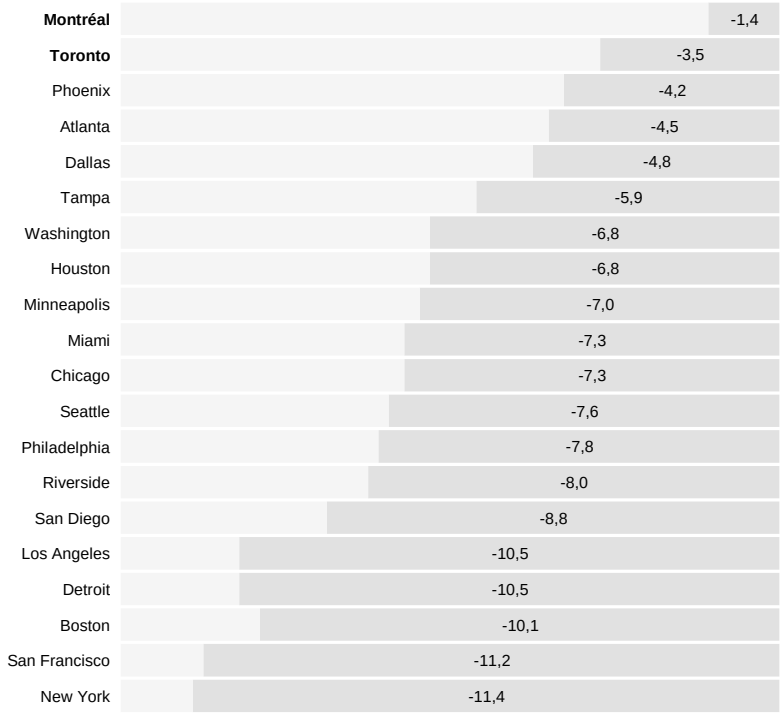
Montréal's rebound is the biggest of the 20 largest major North American cities.

- Strong government intervention, including unprecedented household income support, has limited job losses, and disposable personal income has actually increased.
- The management of the health crisis has also enabled a quicker reopening than what we have seen south of the border.

Change in employment, selected census metropolitan areas
February 2020 to October 2020, February 2020 = 100



Change in employment in the 20 largest cities in Canada and the United States
February to September 2020, as a %



Sources: Statistics Canada, Table 14-10-0295-01; Brookings, Metro Recovery Index, 2020.

Consumer and business confidence remains shaken, some health measures are still in place, and the economy's production capacity has been reduced.

The downtown area remains hard hit

The Greater Montréal Area has been hard hit by the COVID-19 crisis, as the lockdown has lasted longer in th city than elsewhere in Quebec. Downtown Montréal has been—and remains—one of the hardest hit areas.

- With its high concentration of jobs that can be done remotely, downtown Montréal was abandoned by its many workers. They are gradually returning, as offices are being allowed to reopen at a maximum 25% capacity. It is estimated that by the end of September, just over one third of employers had reached or exceeded the 20% mark.
- With the closing of Canada's borders, international tourists are no longer visiting the city. Vacancy rates in downtown Montréal hotels dropped 83% from summer 2019 to summer 2020, compared to a 25% drop outside of the city core.
- The downtown shows, festivals and other events were virtually all cancelled from mid-March to early August, while theatres, concert halls and museums were put on pause. Following the relaxation of health measures in August and September, when the Greater Montréal Area became a red zone on October 1, a return to the ban on both indoor and outdoor gatherings was imposed.

Change in number of jobs, in selected sectors

Quebec, selected periods, seasonally adjusted data

	Change February to April 2020	Change February to September 2020
Accommodation and food services	-36%	-10%
Information, culture and recreation	-36%	-11%
Overall economy	**-23%**	**0%**

Sources: La Presse, "Les bureaux du centre-ville de Montréal toujours presque vides," 2020; Montreal Gazette, "Bleak summer seen for Montréal hotels, but outlook is better in regions like Charlevoix," 2020; Statistics Canada, Table 14-10-0022-01.

The accommodation and food service sectors, along with the information, culture and recreation sectors, remain the hardest hit to date.

A recovery that varies in speed and intensity depending on the sector and location

Most businesses in the metropolitan area will proceed through four phases in their return to growth.

- While the initial crisis response phase is behind us, some companies in the hardest hit sectors are navigating the resilience phase, while others have started transitioning to the recovery phase, which aims to bring their operations back to pre-crisis levels.

Not all businesses and economic sectors will pass through the different growth recovery stages at the same speed, and some fear setbacks during the second wave. The scope of the changes needed to adapt business models to the new reality will vary by sector.

The four phases of the return to growth

Most companies have begun to reflect on the new reality that will emerge in the coming months and even years. The long-term impacts of COVID-19 on business strategies and models are the focal point of current concerns.

An action plan structured around five components

This action plan is structured as follows:

1. **The situation before COVID-19**
2. **Impacts of the crisis on the sector**
3. **Assessing the usefulness of support measures**
4. **Business opportunities in the sector**
5. **Courses of action for relaunching the sector**

1

THE SITUATION BEFORE COVID-19

- The sector’s strategic importance to the metropolitan economy
- Key development issues prior to COVID-19

The information and communications technology sector: subsectors and study focus

By its very nature, ICT is a cross-cutting economic sector. Its innovations, solutions and influences impact many sectors of the economy. Its makeup includes of a significant proportion of young and small businesses that offer technology solutions primarily to other, larger companies.

ICT SECTOR

Manufacturing

Manufacture of computer equipment (computers, peripherals, etc.), communications equipment, audio and video equipment (cameras, televisions, etc.), semiconductors, etc.

Telecommunications

Telecommunications, video and entertainment service providers, satellite infrastructure owners, etc.

Computer services and software publishing

Design, supply and delivery of services related to software purchases. This group also includes data processing and hosting, technology consulting, digital intelligence, and electronic hardware repair and maintenance.

Wholesale trade

Wholesale of computers, peripherals and off-the-shelf software.

Source: Statistics Canada.

Greater Montréal is the heart of the Quebec ICT industry

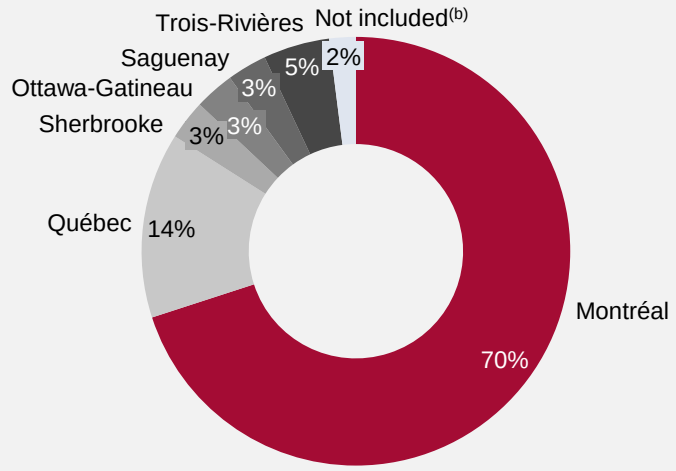
The ICT sector[(a)] as a whole contributes 4% of Quebec's total jobs and 5% of its GDP (about $17 billion).

In 2020, the industry included nearly 9,800 companies in all regions of Quebec, including 400 international subsidiaries in Greater Montréal.

The Montréal CMA is the most important region in Quebec for the ICT sector, home to nearly 73% of its jobs and 70% of its businesses.

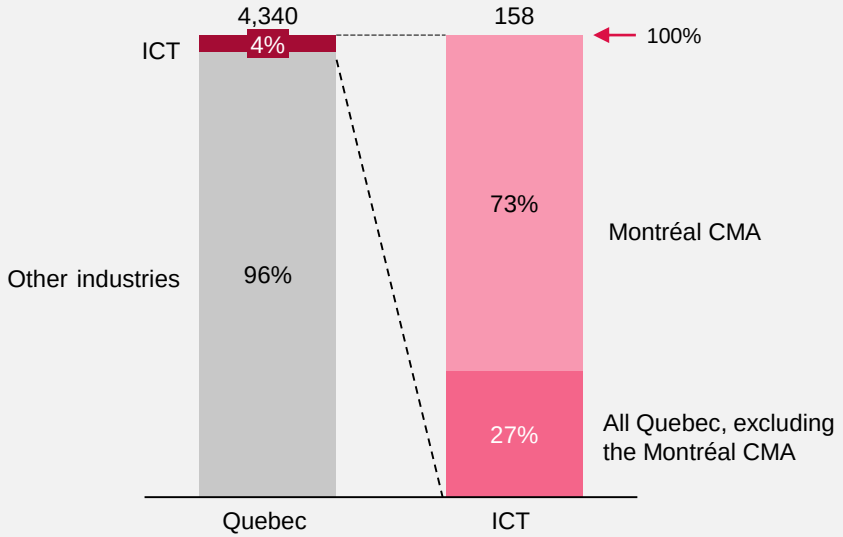
Distribution of ICT firms, Quebec and the Montréal CMA

2016; as a %



ICT jobs, Quebec and the Montréal CMA

2019; in thousands of jobs



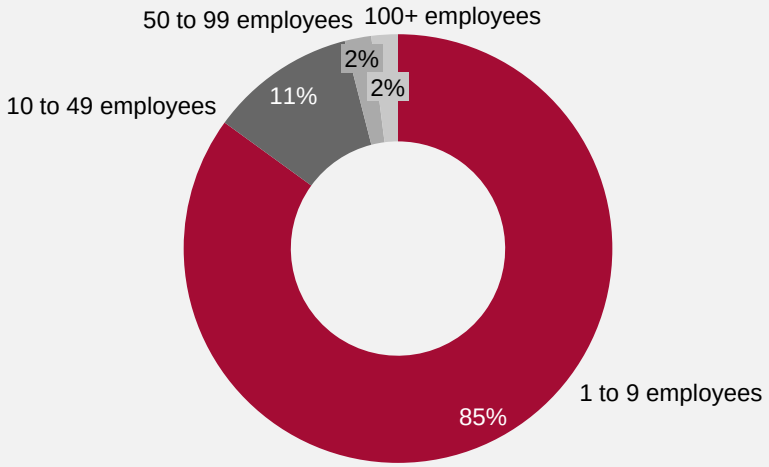
Notes: (a) NAICS 4173, 5112, 517, 518, 5415, 8112, and 334, except 3345.
(b) This category includes the administrative regions of Abitibi-Témiscamingue and Bas-St-Laurent.
Sources: Statistics Canada, Labour Force Survey; TECHNOCompétences, *Diagnostic Sectoriel*, 2018.

A sector with a high number of small businesses in the computer software and services subsector

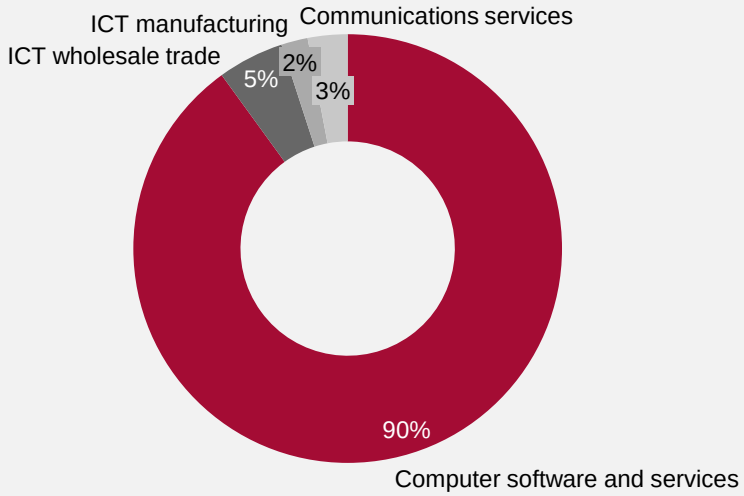
85% of ICT-sector businesses are small firms with fewer than 10 employees.

The vast majority of these businesses, some 90% of them, are in the computer software and services subsector.

Distribution of ICT business sizes, across Canada
2018; as a %



Businesses by ICT subsector, across Canada
2018; as a %



Sources: Innovation, Science and Economic Development Canada, "2018 Canadian ICT Sector Profile," 2018; TECHNOCompétences, *Diagnostic sectoriel*, 2018.

A large and growing employer for the city

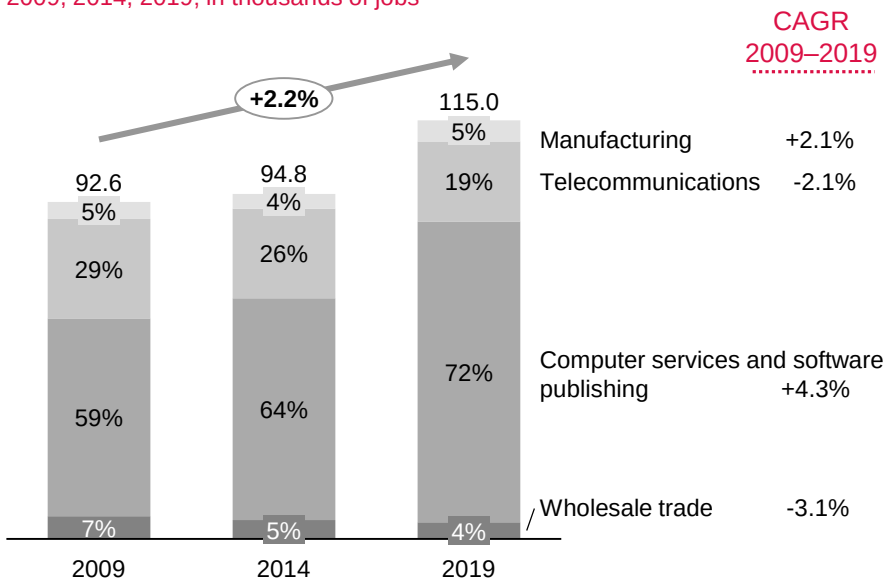
The four ICT industries employ 115,000 people in Montréal, representing 5.2% of employment in the city.

- Computer and software publishing services employ 72% of the CMA's ICT professionals.

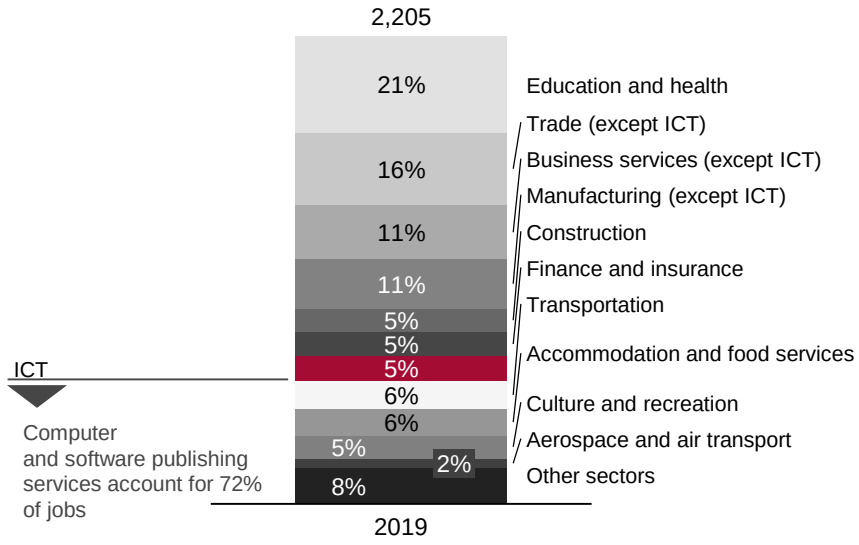
Overall, jobs in the ICT sector have grown by 2.2% per year since 2009.

- Employment growth in the CMA follows the same trends as at the provincial level, with a decrease in telecommunications (-2.1%) offset by an increase in services and software development (+4.3%).

ICT jobs, by Montréal CMA sector
2009, 2014, 2019; in thousands of jobs



Employment distribution by sector, Montréal CMA
2019; as a % of total jobs and in thousands of jobs



Sources: Statistics Canada, Labour Force Survey; TECHNOCompétences, *Diagnostic sectoriel*, 2018.

Better-paying jobs compared to industries overall

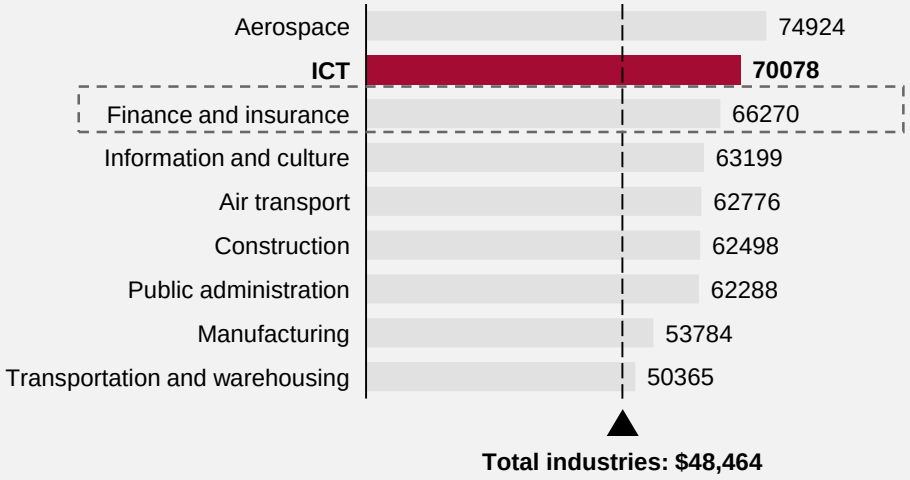
Greater Montréal can rely on a highly skilled ICT workforce.

In 2018–2019, nearly 17,000 students were enrolled in ICT-related programs at a Greater Montréal university. In addition, the level of completion of bachelor's and graduate degrees is significantly higher in the ICT sector compared to all industries, a difference of 14 basis points.

- The difference is even more pronounced in the computer services and software publishing sector, where 59% of employees hold at least a bachelor's degree, compared to 37% for industries overall.

In line with the sector's generally higher level of education, annual compensation in the ICT sector ($70,000 in 2018) is 40% higher than the Quebec average of $48,000.

Annual compensation by industry, Quebec
2018, in $



Sources: Statistics Canada, Labour Force Survey; Montréal International.

Montréal CMA education degree levels
2018, as a %

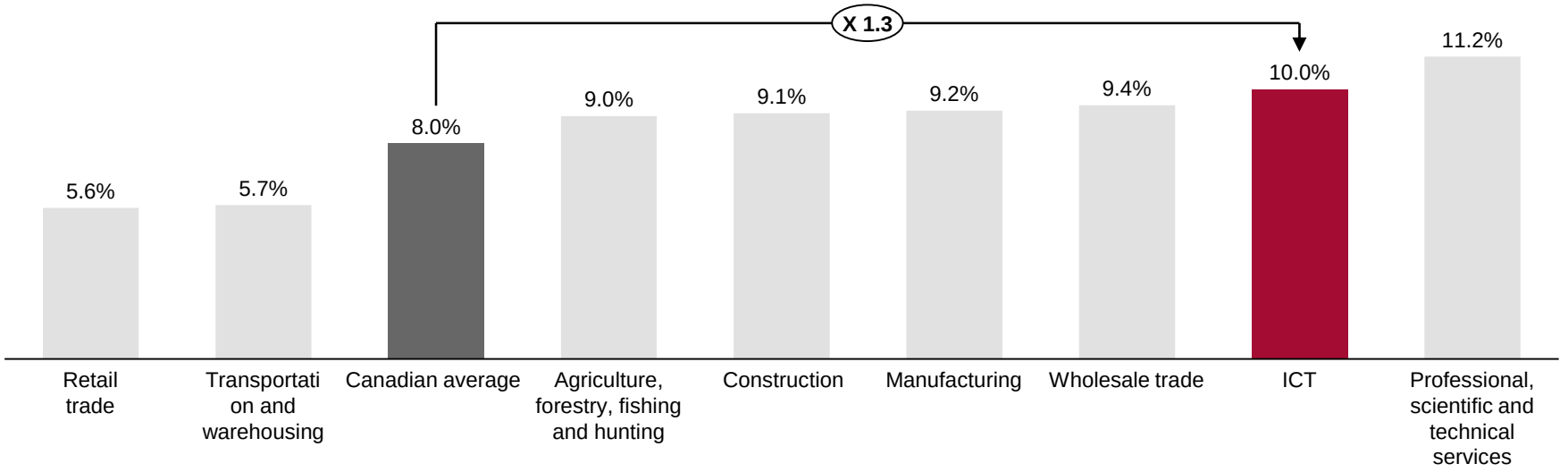
	ICT – Total	ICT software services and publishing	All industries
No certificate, diploma or degree	2%	2%	7%
High school diploma	13%	8%	18%
Apprenticeship, trade school, college or CEGEP diploma	29%	27%	33%
University degree below bachelor level	5%	5%	5%
Bachelor's degree or higher	**51%**	**59%**	**37%**

Sector vitality manifested in a concentration of high-growth firms

Between 2014 and 2017, **10% of all ICT firms across Canada were considered to be "high-growth,"**[(a)] which is higher than in all other sectors, with the exception of "Professional, Scientific and Technical Services" category.

- Between 2014 and 2017, the percentage of high-growth SMEs in the ICT sector was about 1.3 times the Canadian average.
- As the digital shift accelerates, demand for technological goods and services will increase, as will the proportion of high-growth firms in the technology sector.

Percentage of high-growth SMEs over the past three years, Canada
% of total firms for selected industries; 2014–2017



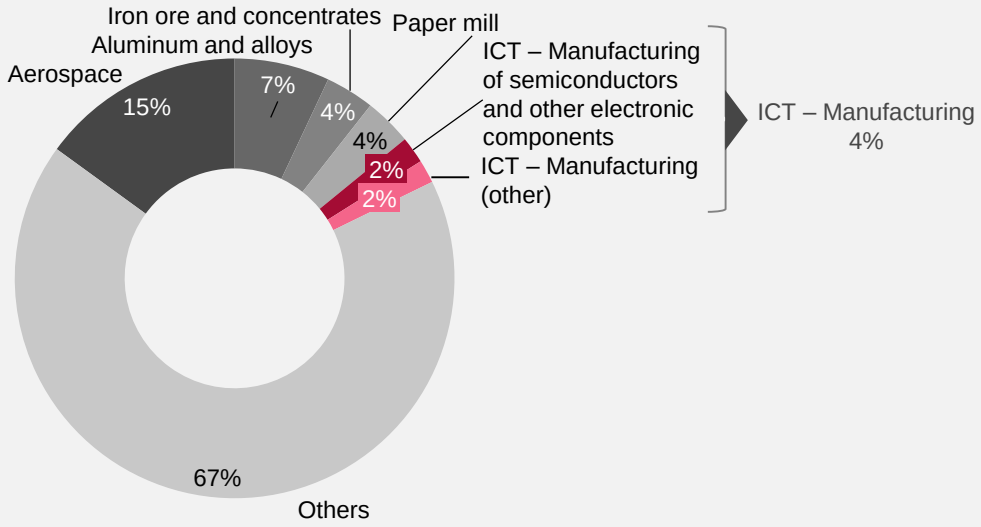
Note: (a) "High-growth" businesses are defined as those with revenues that have increased by more than 20% per year for at least three consecutive years.
Source: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2017.

Exports up sharply

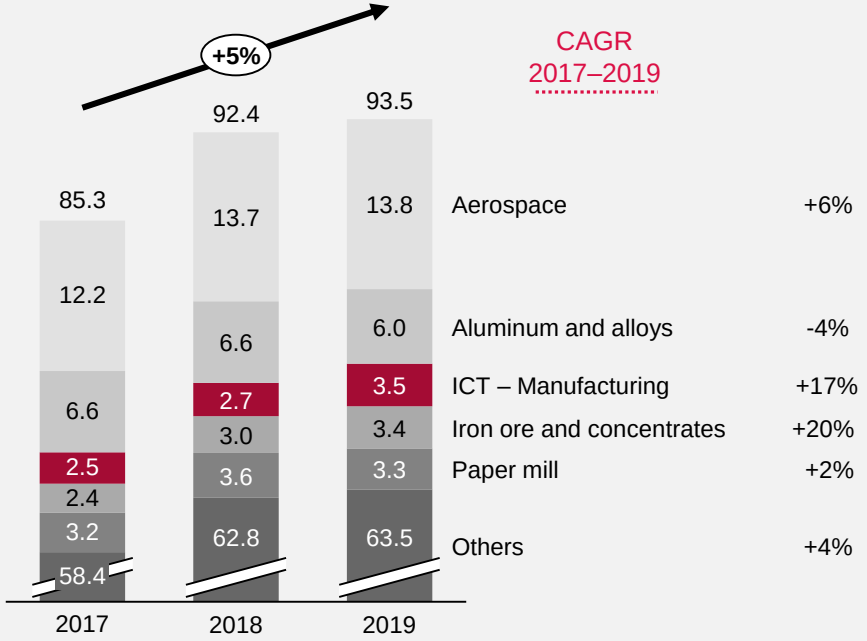
Exports of ICT products (ICT – Manufacturing) account for 4% of Quebec's major exports and **grew 17% annually between 2017 and 2019**, **reaching $3.5 billion in 2019**.

- The growth rate of ICT product exports is three times the Quebec average. The sector is a major contributor to Quebec's export growth.

Quebec's top exports
2019; as a %



Export developments, manufacturing sector, Quebec
2017 to 2019; as a % and in billions of $



Sources: Statistics Canada; ISQ, International Trade Data Online (ITDO) tool.

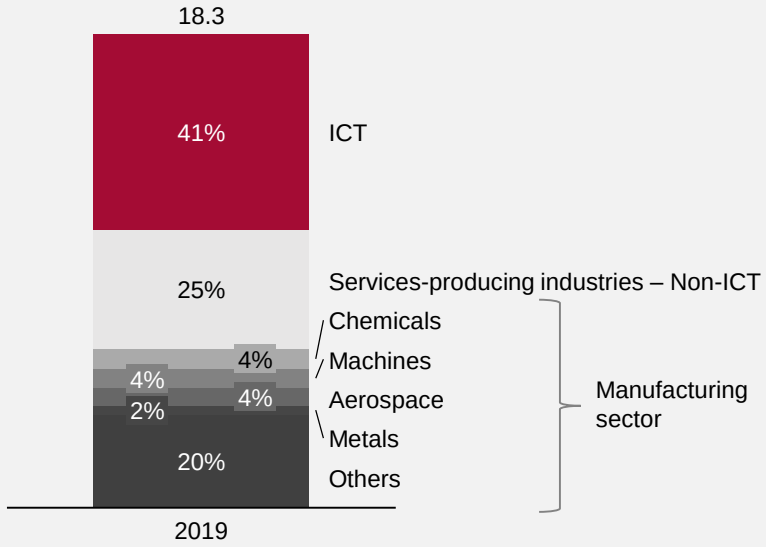
Largest private R&D performer

Innovation drives the technology industry. In 2019, the ICT sector accounted for **41% of all Canadian private sector R&D spending, or $7.5 billion**.

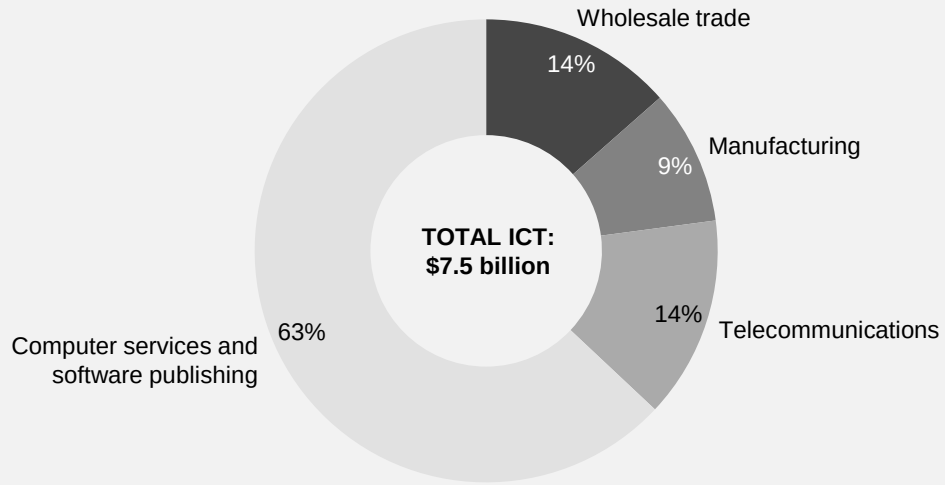
- The computer services and software publishing industry accounts for almost two thirds of the sector's R&D expenditures.

The Montréal CMA is home to several major innovation centres, eight of which are linked to leading ICT companies: SAP, Microsoft, IBM, Ericsson, Fujitsu, CGI, Element AI and Alten. These companies have all made major investments to support innovation.

Business enterprise expenditure on research and development (BERD), Canada
2019; in billions of $ and as a %



BERD distribution in the ICT sector, Canada
2019; in billions of $ and as a %



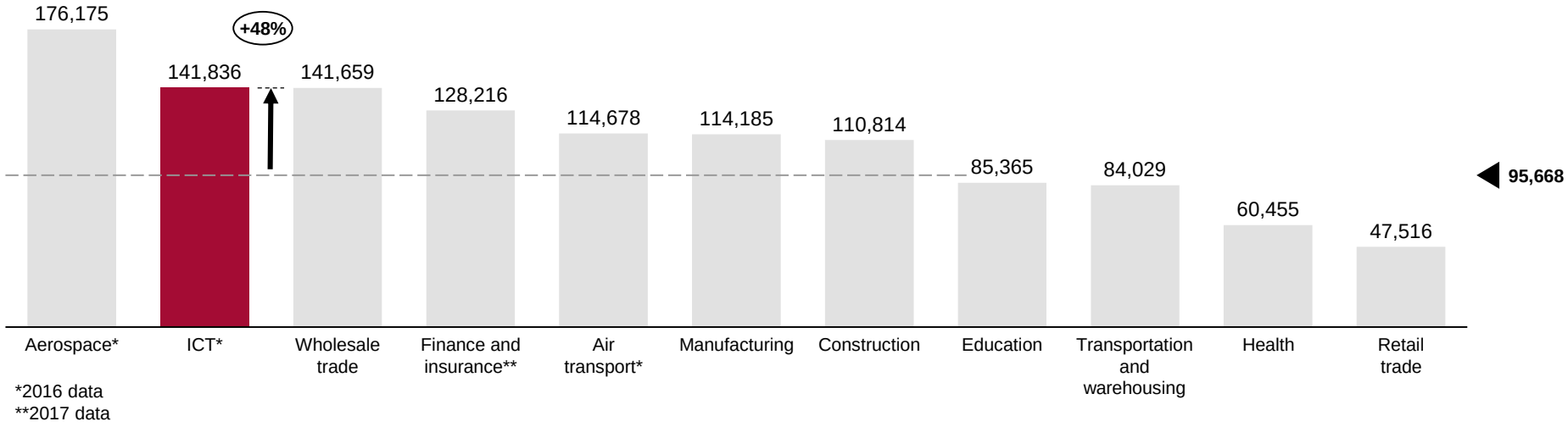
Sources: Statistics Canada; Montréal International.

A leading contributor to improving the overall productivity of Quebec and its metropolis

Productivity in the ICT sector, with a GDP per job of $141,836, is about 50% higher than the Quebec average of $95,668.

Beyond the productivity of the sector itself, the integration of ICTs by firms in different sectors contributes to increased productivity across the economy.

GDP per job for selected sectors, Quebec
2018, unless otherwise noted; in $ per job

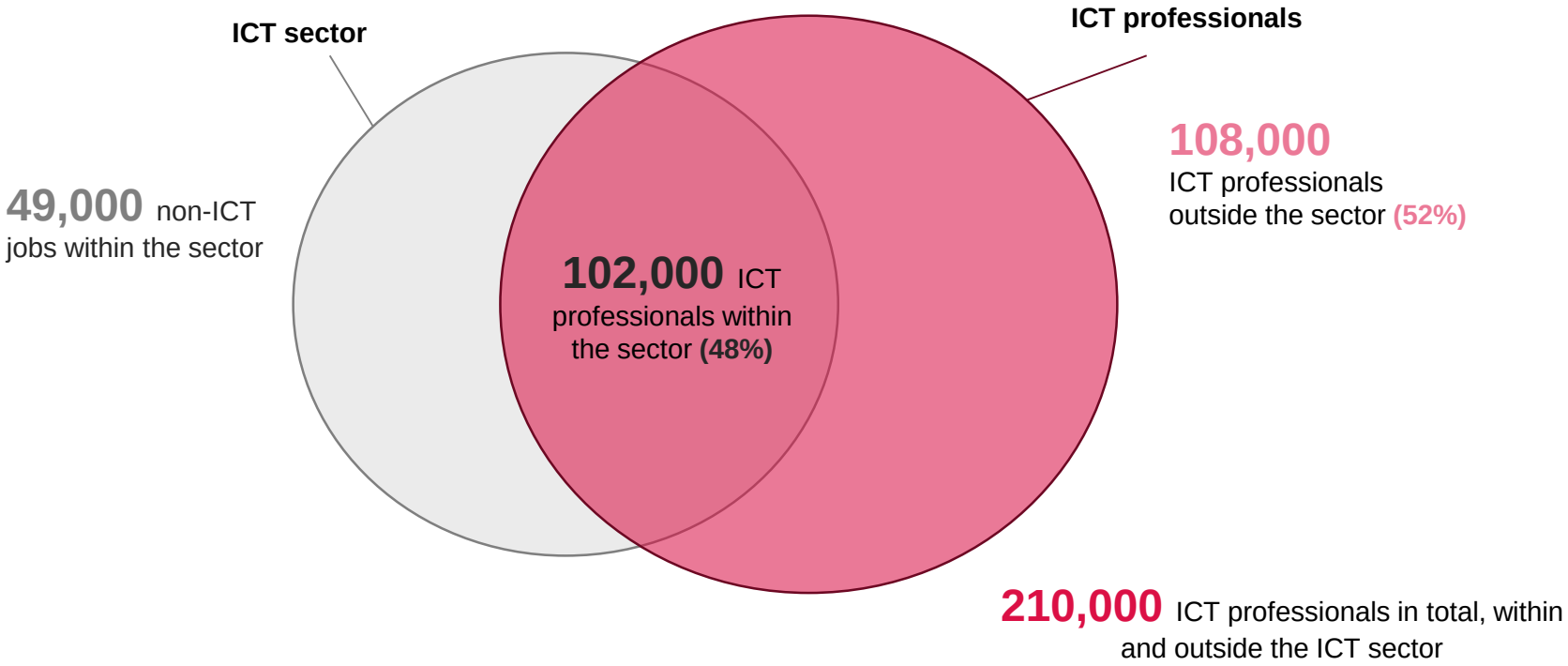


Recovery plans should harness the potential for improving ICT sector productivity in other industries in the city.

Source: Statistics Canada.

A cross-cutting pillar and major economic player

Distribution of ICT jobs and ICT professionals, Quebec
2016; number of employees and as a %



With 52% of its workforce outside the industry, the ICT sector has a major cross-cutting impact

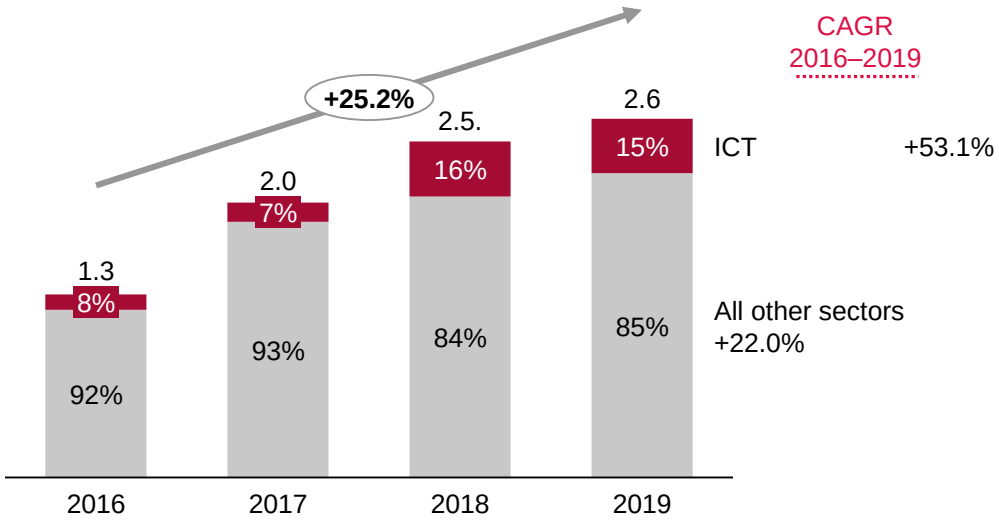
Source: TECHNOCompétences, *Diagnostic sectoriel*, 2018.

A sector that stands out for its attractiveness

Greater Montréal attracted $400 million in ICT investments, which represents 15% of total foreign direct investment (FDI) in the region in 2019. The injection of foreign capital is often accompanied by a transfer of knowledge and technologies that enhances productivity and, as a result, the standard of living in the city. These investments are an essential contribution to Quebec's economy.

FDI in this sector has grown dramatically over the past three years, with a compound annual growth rate (CAGR) of 53%, compared to an average of 22% for all other sectors.

Foreign direct investment, Montréal CMA
2016 to 2019; as a % and in billions of dollars



Source: Montréal International, annual *Activity Reports*.

Examples of investments in the ICT sector since 2016

ORACLE
2020 opening of a new Gen 2 Cloud region in Greater Montréal

IBM
2018 opening of an innovation centre in Montréal, creating 100 skilled jobs

Microsoft
$7 million investment in AI research in 2017

amazon web services
2016 opening of a data centre in Montréal

The sector is strengthening the entire Montréal and Quebec economy

Lever for economic growth through innovation and productivity gains	Lever for influence	Cross-sector lever for solutions to social and environmental issues
The ICT sector is central to Quebec business growth and competitiveness • The ICT sector drives growth, innovation and increased productivity in Quebec and its metropolis. • Since ICT are employed in nearly all sectors, they help increase Quebec's productivity as a whole.	**The potential influence of the ICT sector is international in scope** • The work of the innovation centres established in Greater Montréal is international in scope, especially in artificial intelligence and digital sciences. • The increased presence of several large international companies based in Montréal and foreign direct investment helps improve the sector's position on the world stage.	**The positive impacts that ICT can bring are significant** • Solutions developed by the ICT sector are increasing energy efficiency and GHG emissions in various sectors: – For example, they can reduce electricity and heating service costs with smart meters that reduce energy waste. – They also pave the way for the development of a number of companies in the electric and smart vehicle industry in Greater Montréal. • Digital infrastructures also help democratize knowledge and foster employment opportunities through online training.

Sources: TechnoMontréal, *Le livre blanc des technologies du Québec*, 2019.

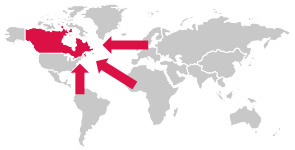
… and making the metropolis shine internationally through its dynamic innovations in digital intelligence

Montréal is a leader in the fields of digital intelligence (AI, analytics, etc.) and has attracted major technology companies (Amazon, Microsoft, etc.) that have strengthened its developing hub with its many research centres, organizations and universities.

- The Global Partnership on AI to foster international, multi-stakeholder collaboration for the responsible development and use of AI (hosted by the OECD) has selected Montréal as one of two cities that will be home to its centres of expertise.
- fDi Intelligence ranks the city second in the world, after San Francisco, among future cities attractive to foreign investors in the "Tier 2 Cities of the Future" category.

Research centres with international reach

- **Publications by the research centres and their digital intelligence scientists promote Montréal abroad**: For example, researchers Yoshua Bengio and Gilbert Laporte are among the world's most cited computer science authors (5th and 30th respectively). Their publications promote Montréal research centres including Mila, IVADO, GERAD and the CRCDM.
- **Montréal universities are also driving technological advances for the city**. In the fields of computer science and policy science, McGill University and Université de Montréal are leaders in knowledge creation. With ETS and Polytechnique Montréal, they are helping attract international technology talent and promote Montréal.



Foreign companies choosing Montréal

- **Many technology firms chose Montréal long ago for their international expansion** and have established major subsidiaries here.
- Over the past few years, Silicon Valley giants have been attracted by the central position Montréal holds in AI and computer technologies and have joined the technology hubs in Mile-Ex, Mile-End and the Cité du Multimedia. Facebook, Google, Microsoft have set up their AI research labs here.

Sources: fDi Intelligence, "San Francisco takes inaugural Tier 2 Cities of the Future crown," 2020; websites of Ubisoft, EA, Morgan Stanley, Facebook, Google and Amazon; Google Scholars; Montréal International, "Official launch of the International Centre of Expertise in Montréal for the advancement of Artificial Intelligence," 2020.

1

THE SITUATION BEFORE COVID-19

- The sector’s strategic importance to the metropolitan economy
- Key development issues prior to COVID-19

Pre-COVID development challenges in the Montréal ICT sector

ACCESS TO A QUALIFIED WORKFORCE. While labour shortages are a problem faced by many industries, they are particularly felt in the technology sector, where 61% of firms report challenges in recruiting and retaining talent. This scarcity of technology talent is also seen outside the sector.

REPUTATION OF THE SECTOR. Despite Greater Montréal's success in recent years (in digital intelligence, for example), a failure to recognize the calibre of the other technology subsectors (such as electronics) is hindering its appeal to international talent. In addition, we have seen a lack of recognition of local production and promotional capacity across the province.

FRAGMENTED INNOVATION ECOSYSTEM. Despite the progress of many initiatives and key players promoting innovation in the city in recent years, the innovation ecosystem must be strengthened and we have yet to achieve a critical mass within support organizations.

DATA SECURITY ISSUES. In an economic sector where the pace of innovation and growth is particularly rapid, data security issues are becoming increasingly important. It is essential that industry and governments work together to create a safe and responsible environment for adopting technologies.

Source: TechnoMontréal, *Le livre blanc des technologies du Québec*, 2019.

The most important issue that the ICT sector has been facing for several years is the scarcity of skilled labour

It is estimated that on average, 6,500 technology positions need to be filled annually in Quebec, both in large businesses and in SMEs and startups. This scarcity is evident in both the ICT sector and other industries where technological talent is in high demand.

- Despite an increase in the number of tech program graduates (vocational, college and university), the available talent remains insufficient to meet the needs of this rapidly growing industry.
  - In addition to succession challenges, the sector is seeing a shortage of experienced professionals (with seven or more years in the field).
- The pace of innovation is causing its share of difficulties in the speed of the need to upgrade technical skills, which increases the need to upskill workers in the sector.
- 27% of ICT professionals (within and outside the sector) are immigrants. The ability to attract international talent remains paramount for Greater Montréal.
  - There is also strong international competition to attract talent to the sector, hence the importance of strengthening the appeal of Greater Montréal and Quebec.

Shortage of labour (professional level) in the ICT sector, Quebec
2018

- **Computer engineers**
- **Computer programmers and interactive media developers**
- **Analysts and consultants**
- **Web designers and developers**
- **Software engineers and designers**
- **Electronics and electrical engineering technologists and technicians**

Share of ICT professionals who are immigrants

27%

56,700 professionals

The share of immigrant ICT professionals is twice the average seen in the general economy

Demand for technology expertise is expected to grow significantly around the world, increasing competition to attract and retain top talent.

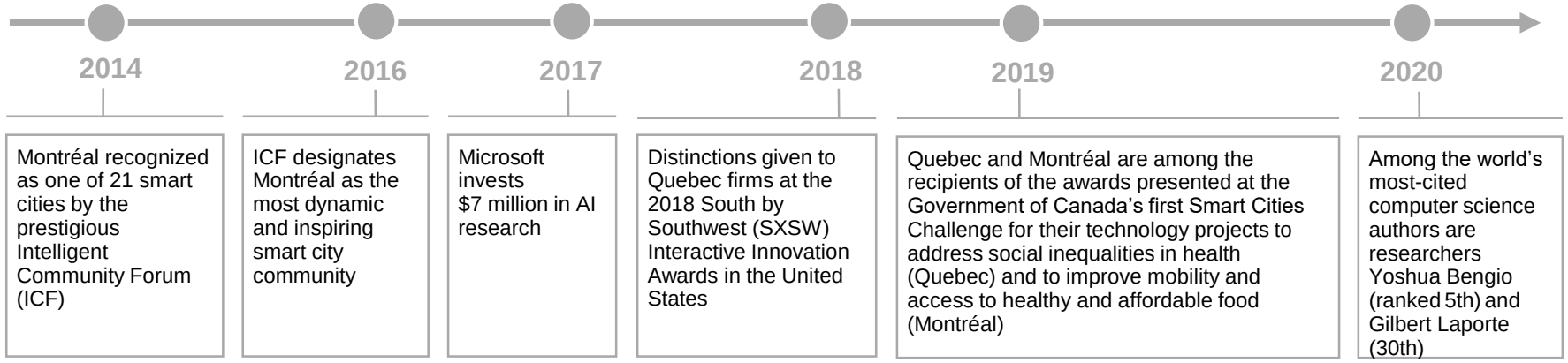
Sources: TECHNOCompétences, *Diagnostic sectoriel*, 2018; TechnoMontréal, *Le livre blanc des technologies du Québec*, 2019

Despite strong recognition in some niches, awareness of the various ICT subsectors remains low

Beyond the AI sector, limited recognition of the calibre of Quebec's other tech industry subsectors has been a factor in recent years.

- A survey conducted by TechnoMontréal, now Numana, found that more than half of industry respondents believe that awareness of technologies in Quebec is "moderate," and that 20% of respondents even describe it as "low." This dynamic can have a number of negative impacts on the sector, mainly involving industry competitiveness.
  - Nearly one-third (31%) of survey respondents indicated that the lack of awareness of technology opportunities in Quebec is a limiting factor affecting the integration of international workers into the industry.
- For example, the electronics subsector is experiencing a problem with recognition of local production and promotional capacity throughout the province. Companies that could be potential customers in the sector (in transportation, health, telecommunications, etc.) turn to companies based abroad (for example, in Asia), when locally available products and services are highly competitive.

SOME EXAMPLES OF THE INFLUENCE OF QUEBEC INNOVATION



Source: TechnoMontréal, *Le livre blanc des technologies du Québec*, 2019.

Montréal's innovation ecosystem has grown in recent years but remains fragmented

A significant number of incubators and accelerators have appeared in the last few years, most of them in Montréal.

- However, they are struggling to replicate the drawing power of some entrepreneurial support organizations elsewhere in the country (such as Communitech in Ontario), as they often operate in isolation, and the links between accelerators, large corporations, research communities and investors should be strengthened.
- We also see a lack of critical mass and insufficient financial means. Efforts are spread across a large number of smaller organizations.

To address this issue, Bonjour Startup Montréal was created to play a leadership role in the innovation technology ecosystem and assist efforts to coordinate and consolidate Montréal initiatives.

Incubators and accelerators in Quebec
2016, by city

	Incubators		Accelerators	
City	**Number**	**% of total in Quebec**	**Number**	**% of total in Quebec**
Montréal	24	40%	19	70%
Québec	5	8%	4	15%
Sherbrooke	2	3%	4	15%
Rest of Quebec	29	48%	–	0%
Total	**60**	**100%**	**27**	**100%**

Bonjour Startup Montréal has implemented economic recovery initiatives that take into account the sector's needs

Open innovation:

- Inno Startup platform: Local solutions to the new challenges faced by SMEs and corporations
- Support project: In partnership with five Montréal accelerators

Scaleups: An initiative by the Invincible Collective to develop unicorns/scaleups and increase exports

Labour force: Requalification of labour to develop hypergrowth skills

International outreach: Development and deployment of an international outreach strategy for Montréal as a startup ecosystem in collaboration with the Ville de Montréal, the Government of Quebec and Montréal International

Sources: MAIN Québec, Survol de l'écosystème startup du Québec (virtual presentation), 2020; La Presse, "Les incubateurs à la croisée des chemins," 2020; KPMG, *Le capital d'investissement au Québec – Évolution récente et nouveaux défis*, 2018; interviews.

Data security is a major concern affecting technology development

Data offer strong growth potential when well valued and protected, and can be used to increase business productivity across all industries.

With the cases of data being stolen from large corporations and public bodies seen in recent years, the concerns of consumers and businesses are an important issue in technological development.

Cybersecurity remains one of the top growth risks identified by Canadian business leaders, and will continue to grow in importance in the years ahead.

The ICT sector has an opportunity to play a key role with businesses to facilitate secure digital deployment and strengthen cybersecurity.

The top growth risks identified by Canadian business leaders

Main risks
1. Environment/climate
2. Cybersecurity
3. Return to territorialism
4. Disruptive technologies
5. Operational
5. Interest rates

Note: Operational and interest rate risks are tied in fifth place.

Source: KPMG 2020 Global CEO Outlook.

Cybersecurity has strong growth potential in the coming years and will play a key role in the development of secure technologies

Sources: TechnoMontréal, *Le livre blanc des technologies du Québec*, 2019; KPMG, 2020 Global CEO Outlook, 2020.

2

IMPACTS OF THE CRISIS ON THE SECTOR

The main impacts of the crisis on ICT firms

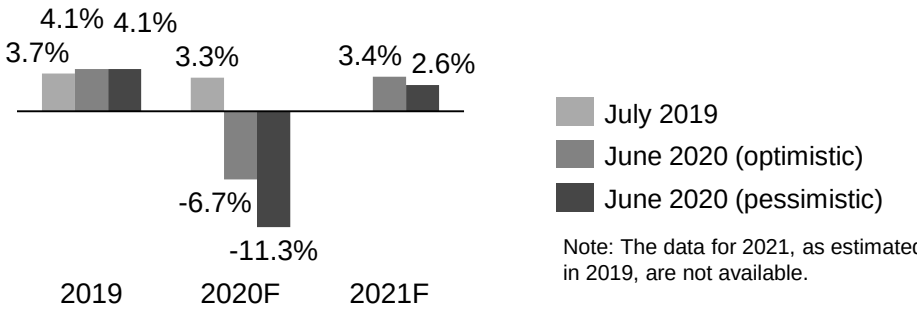
1. The sector has remained on the growth path and will emerge from the crisis stronger.
2. The challenge of access to skilled labour, which existed before the pandemic, has been heightened.
3. Direct and indirect competition between firms has intensified, putting downward pressure on revenues.
4. Accelerated digitization driven by the pandemic has highlighted the importance of having an efficient and secure digital infrastructure.
5. Shifting venture capital to less risky companies may curb innovation in the sector.

The sector has remained on a growth path and will emerge from the crisis stronger

The impact of the pandemic on the sector has manifested itself in a number of ways:

- **Decreased short-term demand:** The economic shock to businesses in the province has brought its share of instability. Some sectors hit hard by the crisis have sought to protect their liquidity and halted purchases of ICT products and services (electronic equipment, digital transformation consulting services, etc.).
- **Sector liquidity impacted:** This same instability has also impacted the liquidity and working capital of technology companies hit by the crisis (adjustments to customer payment terms, declining sales, difficulty accessing government subsidies, etc.).
- **Some subsectors have been driven forward by the pandemic:** The ICT sector has benefited from the growth of specific subsectors such as health technologies, automation, cybersecurity, digital customer experience, e-commerce, digital transformation, etc. Studies estimate that over eight weeks, society sped its adoption of technologies by five years.
- **Strong long-term growth prospects, but uncertainty remains:** The sector is well positioned to benefit over the longer term from increased demand due to the accelerated adoption of technological solutions and private and public investment. Firms may nevertheless be reluctant to invest significantly in ICT due to economic uncertainty (avoiding long-term contracts, for example), leading to a slowdown in some subsectors.

Canadian technology purchase forecast
2019 to 2021, as a %



Note: The data for 2021, as estimated in 2019, are not available.

While **59% of executives recognize** the need to accelerate their digital transformation due to COVID-19, only **13% plan to significantly increase** their investments in **emerging technologies** due to the pandemic.

Sources: Forrester, *Canadian Tech Budget Outlooks in a COVID-19 Recession*, 2020; KPMG, *Enterprise reboot: Scale digital technologies to grow and thrive in the new reality*, 2020; McKinsey & Company, "The COVID-19 recovery will be digital: A plan for the first 90 days," 2020; interviews.

The challenge of access to skilled labour, which was in the news before the pandemic, has intensified

This intensification is the result of:

- **Temporary easing of labour scarcity for some companies:** The economic shock to sectors resulted in many professionals being laid off, helping make a pool of available skilled labour in the Greater Montréal Area.
  - This had the effect of temporarily reducing the labour shortage in the ICT sector, particularly for high-profile firms that have succeeded in attracting these talents because of their reputation (startups, large and reputable companies).
- **Increasing labour scarcity for lower-paying jobs:** The Canada Emergency Response Benefit may have complicated recruitment for lower-paying positions. The effects of the program on labour availability have been reported by various key players in the sector.
- **Consequences for access to international talent:** The border closing may have acted as a counterweight.
  - On one hand, closing the borders may have had a negative impact on talent recruitment, both in French-speaking countries (France, Maghreb, etc.) and elsewhere (more specifically the United States, whose borders are still closed).
  - On the other, the pandemic may have encouraged the shift to telework. Some Montréal companies have indeed started to recruit more employees located in other parts of the world to meet their labour needs.
  - With this kind of dynamic, Quebec may also lose talent to companies based abroad.
- **Challenges in developing talent to keep up with industry development:** In a growing sector, new training needs are emerging in step with innovation. The industry is facing a double challenge: a lack of professionals, and the need to speed up technical training to keep pace with the industry.
- **The gap is widening**: As digitization needs accelerate, the challenge of labour scarcity will be felt in the ICT sector while having a negative impact on non-ICT sectors.

As companies invest in technologies to remake themselves, one of the key challenges will be to find the required workforce.

Sources: BNN Bloomberg, “COVID-19 jobs tracker: Layoffs, furloughs and hiring during the pandemic,” 2020; TECHNOCompétences, *Diagnostic sectoriel*, 2018.

Direct and indirect competition between firms has intensified, creating downward pressure on revenues

DIRECT COMPETITION FOR NEW CUSTOMERS AND CONTRACTS

- At the start of the pandemic, the telecommunications sector was in a price freeze period and had to undertake significant cost reduction efforts (limiting advertising, sponsorships, consultants, investments, etc.).
  - The sector has established policies to ease some of the limits in their service offerings (eliminating Internet data caps, for example).
- As the sector recovered, companies focused on aggressive customer acquisition strategies.
  - Consulting firms have sometimes reduced their margins in order to secure contracts.
  - Telecommunications players had to review their pricing strategies in order to reach the largest customer base.

INDIRECT COMPETITION FROM GROWING RANKS OF FREELANCE WORKERS

- The economic crisis has put a lot of pressure on the sector and led to a wave of major layoffs across industries. Some non-ICT industries have had to dismiss a significant number of contractors and consultants with ICT expertise, which has had a direct impact on competition in ICT consulting.
- This has put downward pressure on revenues and reduced business profitability in the sector.
  - Consultants and contractors often have specific expertise that makes them very competitive in niche sectors, and they benefit from lower fixed costs.

The pandemic reinforced the need for efficient and secure digital infrastructure

Infrastructure was tested during the health crisis

The Greater Montréal Area infrastructure is strong and fast

- **The importance of networks during COVID-19**: The need for stable networks in people's homes has been heightened by the pandemic.
- **The source of the demand is migrating to the outskirts of urban centres**: Pressure on networks has evolved with telework—decreasing in the downtown core and increasing in the suburbs.
- **The networks have been able to support demand**: Canadian networks are calibrated for peak periods, allowing demand to be met without additional investments.

New technologies will only increase pressure on networks

Future innovations will increase the demand for digital infrastructure

- **The need for power**: Telework and the growth in power required by computer systems require greater throughput.
- **Innovation**: The rise of self-driving vehicles, robotics and the automation of connected devices, for example, highlight the need to quickly process a lot of information at once.
- **5G technology**: Expanding broadband network access remains an economic priority. The shift to 5G will facilitate development of the above-mentioned innovations.

The acceleration of digital transformations has increased cybersecurity risks

The pandemic has heightened the need for digital transformations and made data security considerations even more significant

- **All in the same boat**: 92% of Canadian CEOs have significantly accelerated their company's digital transformation since the pandemic started.
- **Increased risk due to:**
  - Adoption of telework, because employees are farther from IT departments
  - Significant increase in phishing attacks
  - Acceleration of e-commerce that is increasing business vulnerability
- **Companies with limited tools**: Less than half of Canadian executives (47%) feel well-equipped to counter a cyberattack, down 12% from 2019.

Digital infrastructure investments will be critical to the success of the ICT sector and other technology-based sectors

Sources: University of Calgary, "The Digital Divide and the Lack of Broadband Access During COVID-19," 2020; La Presse, "L'exode vers les banlieues et au-delà s'accélère," 2020; Radio-Canada, "Ottawa lance un plan d'infrastructure de 10 milliards de dollars," 2020; Intel, Understanding the Advantages of 5G; CNN, "What is 5G."

Shifting venture capital to less risky firms could stifle innovation in the sector

Financing has been increasing since the start of the crisis

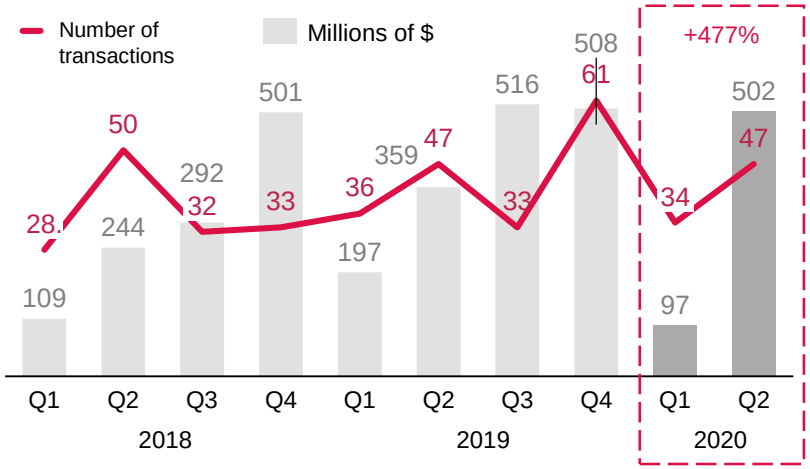
- More transactions have been made (47 in Q2 compared to 34 in Q1).
- $502 million was invested in the second quarter of 2020, up 40% from the same quarter in 2019 ($359 million), and more than four times the investments compared to the first quarter of 2020 ($818 million).

Investors, on the other hand, prioritize less risky investments, and at a more advanced stage of development

- “Post-startup” companies received 71% of the financing for the first half of 2020, compared to 23% in 2019.

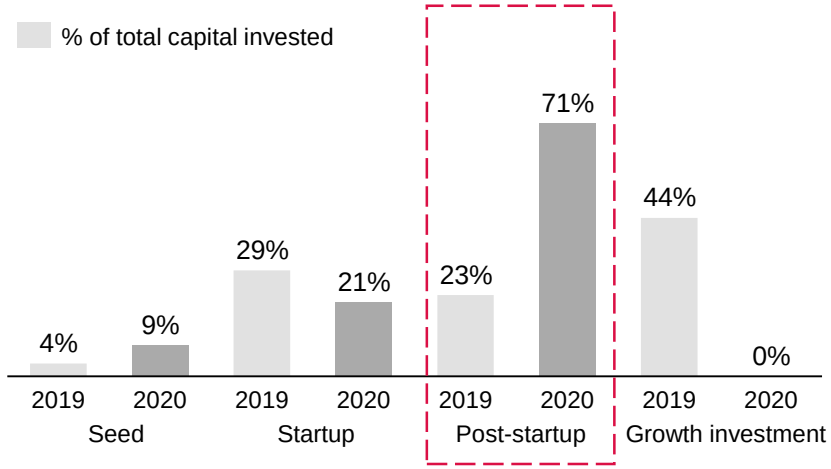
Venture capital investments in Quebec, by quarter

2018 Q1 to 2020, in millions (CA$) invested and number of transactions



Venture capital distribution in Quebec, by stages

2019 Q1 to 2020, as a % of total investments



This disincentive to invest in innovative startups will also impact other sectors of the economy

Source: Canada Venture Capital Association, *VC & PE Canadian Market Overview*, 2020.

3

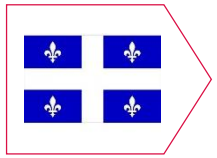
SECTOR ASSISTANCE MEASURES

Cross-sector measures: little support for ICT

The sector has been unable to benefit from the cross-sector support offered by different levels of government because it generally doesn't meet the access criteria.

FEW ICT FIRMS REQUESTING CANADIAN GOVERNMENT ASSISTANCE

- ICT companies have received little benefit from general government support programs (for example, 66% of growth firms did not have access to the Canada Emergency Wage Subsidy [CEWS]).



QUEBEC GOVERNMENT TRAINING PROGRAM BENEFICIAL FOR THE SECTOR

- The provincial training program responds to the upskilling issue and supports industry firms in training their employees. Multi-sector support measures covering business spending on training (including digital training) have benefited the ICT sector.
- However, due to eligibility criteria relating to revenue declines, the ICT sector still has difficulty accessing most other provincial programs (such as PACTE).

SUPPORT BY LIQUIDITY RELIEF MEASURES AND SUPPORT FOR DIGITAL SHIFT OUTSIDE THE SECTOR

- The Ville de Montréal has set up programs to help liquidity in the ICT sector, including (1) the enhancement of PACTE, (2) the extension of the deadline for paying property taxes, and (3) the automatic moratorium on capital and interest on loans granted by PME Montréal.
- The city has also provided assistance to finance the digital transformation of non-ICT SMEs with the Temporary Retail Business Consolidation Fund and free support for an accelerated digital shift.

The most beneficial assistance for the ICT sector is for digitization initiatives in non-sector companies.

Sources: AQT, "Recommandations pour la relance," 2020; interviews.

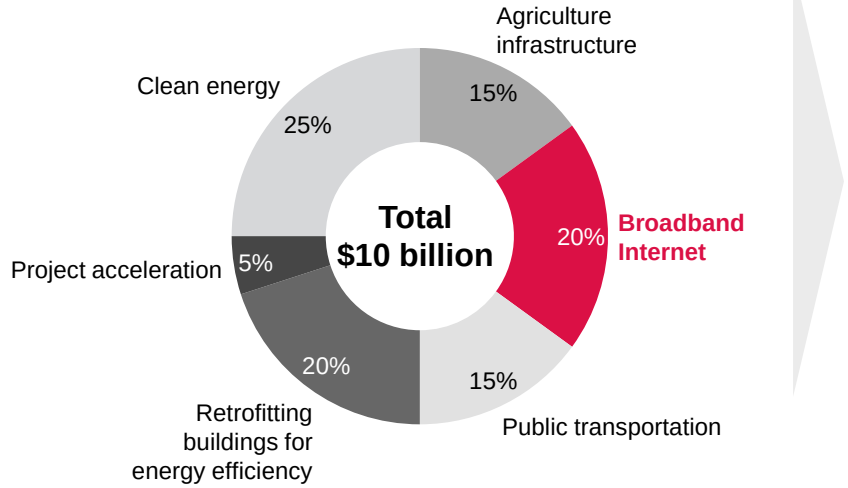
Note: A detailed analysis of cross-sector measures is provided in the Appendix.

Canada Infrastructure Bank to provide $2 billion for broadband sector

On October 1, the Canada Infrastructure Bank (CIB) announced a three-year, $10 billion growth plan to create jobs and support growth through infrastructure investments.

- The plan proposes investments of $2 billion to accelerate connectivity in Canada, which must meet the growing need to digitize the economy.
- Even though Montréal is already relatively well served, the sector will benefit from these investments since it will be able to play a key role in developing and digitizing these economies.

Distribution of the Canada Infrastructure Bank investment plan
2020, in billions of dollars and as a %



Broadband Internet to support economic recovery

Objective:

- Connect 750,000 households and businesses in underserved communities, as the pandemic has heightened the need for broadband connectivity.

Terms and conditions:

- CIB will bridge the financial gap between the high costs of these projects and their lack of profitability due to low population density in underserved areas.
- The CIB will first align with federal and provincial programs (such as broadband programs). Investments will also be made in partnership with the service providers.

A program similar to the Quebec broadband program[1]

- The Quebec government plans to invest $400 million between 2019 and 2026 to develop broadband telecommunications infrastructure in the regions, affecting 110,000 households.

[1] This program is a successor to the Québec branché initiative implemented in 2016.

Sources: Infrastructure Bank of Canada; Government of Quebec.

BDC has helped innovative businesses during the pandemic with its Bridge Financing Program

In response to the pandemic, the Business Development Bank of Canada (BDC) has launched a program to ensure that venture capital investments reach innovative businesses during the crisis.

Bridge Financing Program

Objective:

- Support companies that are affected by the pandemic but **ineligible** for **government support programs.**

Terms and conditions:

- Support is for companies hard hit by the pandemic that have already been supported by a **venture capital fund** and have previously raised over $500,000.
- Open to **all venture capital funds** of more than $10 million with an **investment strategy dedicated to Canada**.

Statistics:

- **63%** of investments were in the **ICT sector**.
- **$116 million** was invested in 56 companies.
- **50 transactions** were completed within **60 days** through an expedited due diligence process.
- **75%** of the investments were in companies in the **seed or startup** phase, hence the importance of such programs to support innovation funding.

Source: Betakit, “BDC Capital Reveals More Details on Investment Matching Program for VC-Backed Companies,” April 24, 2020; BDC, “50 Deals in 60 Days: Impact of BDC Capital’s Bridge Financing Program,” October 7, 2020.

EDC will also help sector SMEs grow with its new investment Matching Program

Launched in April 2020 in response to the COVID-19 pandemic, the Business Credit Availability Program (BCAP) helps Canadian businesses carry out their growth and marketing plans and get through the crisis.

- One component of the BCAP is the investment Matching Program, through which EDC commits to matching venture capital from private companies (venture capital, private investment and corporations).
  - Up to $5 million.
- In response to the pandemic and after two months of testing, EDC has committed to deploying $250 million through the program and revised its eligibility criteria **to include non-exporting Canadian businesses.**

A PROGRAM THAT RESPONDS TO ICT SECTOR NEEDS:

- **Eligibility criteria expanded to include non-exporting firms**, thus making more ICT firms eligible for funding
- **Service companies eligible** for the program
- Like the BDC Bridge Financing Program, **one of its main targets is the ICT sector**

RESULTS (as at August 13, 2020):

> **39** approved transactions, as well as

> **12** transactions at the due diligence stage, for a total of

> **$128.8 million** in additional investments.

Source: EDC, EDC's investment Matching Program supports cleantech companies during the COVID-19 pandemic, 2020.

ESSOR: Support for major investment projects benefiting ICT sector and non-ICT companies

ESSOR is a program administered by Investissement Québec and the Ministère de l'Économie et de l'Innovation (MEI) to support businesses in their investments with a view to increasing competitiveness, productivity, job creation and sustainable development.

- The program's innovation component provides support that helps the ICT sector and industries with their digitization needs.
- ESSOR investments cover **15% to 50% of eligible expenses** for projects costing **$250,000** or more ($100,000 for the manufacturing sector) through loans or loan guarantees.

Non-ICT sectors	The investment component is primarily for **fast-growing companies** in the manufacturing, retail and wholesale sectors. This component provides financing for the purchase of digital equipment and software. **Key industries covered:** **Manufacturing** · **Retail trade** · **Wholesale trade**
ICT sector	In the ICT sector, it targets **high value-added companies** (special effects, data centres, software publishers, environmental services, etc.). This component provides assistance for capital projects and supports the marketing of Quebec innovations. **Key industries covered:** **Special effects** · **Data centres** · **Software publishers**

Source: Investissement Québec, ESSOR Program.

The Industry 4.0 Audit Program supports the implementation of a digital plan for non-ICT sectors

The Industry 4.0 Audit Program is a direct assistance program administered by Investissement Québec and intended for all sectors. Its objective is to encourage as many Quebec businesses as possible to make the digital shift.

- The program consists of two consecutive phases: creation of a diagnostic and digital plan, followed by the development of an implementation plan.
- The Industry 4.0 Audit Program can be combined with ESSOR: companies can base themselves on the digital plan and then make a digital transformation in an eligible sector (manufacturing, retail, etc.).

Component 1: diagnostic and digital plan

- Validation of strategic and operational directions, description of business processes, assessment of digital maturity, diagnostic, digital plan, etc.
- The maximum assistance rate is 50%, for a maximum subsidized amount of **$20,000**.

Interview comments suggest that this assistance could be enhanced to reflect the real costs of such support.

Component 2: implementation plan

- Selection of solutions and change management planning for prioritized digital projects (following Phase 1).
- During this phase, projects are prioritized, the digital plan is adjusted, a functional analysis is done, change management is planned, etc.
- The maximum assistance rate is 50%, for a maximum subsidized amount of **$10,000**.

Businesses are supported by technology consulting firms, benefiting both the ICT sector and other industries.

Sources: Investissement Québec, Industry 4.0 Audit program; Les affaires, “Faites un audit, pardi,” 2020.

Investissement Québec's Productivité innovation program provides financial support to non-ICT businesses

In September 2020, Investissement Québec launched its Productivité innovation program. It represents an investment of $2.4 billion over four years (2020–2024) and aims to boost competitiveness and accelerate business growth through productivity and innovation.

- The initiative encourages entrepreneurs to capitalize on innovation and adopt technologies and processes such as digitization, automation, robotization and artificial intelligence.
- Coverage was expanded to include mining, construction, wholesale trade, retail trade, transportation and warehousing, professional, scientific and technical services, as well as waste management and sanitation services.

REDESIGNED TOOLS

- The *Productivité innovation* labs, which are both showcases and virtual forums for entrepreneurs and business leaders
- Strategic events such as the *Productivité innovation* forum (fall 2020)
- Personalized technological support by Investissement Québec – CRIQ to increase the ability of businesses to carry out projects autonomously
- Content and advice on the microsite *productiviteinnovation.com*

ADAPTED FINANCING SOLUTIONS

> Minimum loan of **$50,000**

> Beneficial terms, including a capital repayment moratorium (up to **48 months**)

> **Applicable to projects that may involve the adoption of new technologies, acquisition of equipment and software, development of new ways to market products, adoption of new processes, etc.**

The decision to extend the original program to other industry sectors will benefit ICT, which will benefit from additional investments.

Source: Investissement Québec, "L'initiative Productivité Innovation propulse la compétitivité des entreprises québécoises," 2020.

4

BUSINESS OPPORTUNITIES

Three opportunities to relaunch the sector

1

Accelerating **DIGITAL TRANSFORMATION** and **AUTOMATION** needs

2

Opportunity to develop **DIGITAL INFRASTRUCTURES** and **INNOVATIVE NEW SOLUTIONS** to facilitate **DIGITIZATION** of the economy

3

Sectors experiencing **HYPERGROWTH** since the start of the pandemic

Montréal has an opportunity to position itself as a digital transformation leader

1 Accelerating DIGITAL TRANSFORMATION and AUTOMATION needs

- The pandemic will **accelerate the digital shift** for many businesses and we can expect an increase in support needs, especially for:
  - **Cloud computing** technologies
  - Assessment and implementation of solutions to maintain **performance** and build IT **infrastructure** capacity
  - Increased transformation needs to accelerate **e-commerce** (customer journey, digital experience, web infrastructure to support e-commerce, etc.)
- Pressure on sales and the supply chain from the pandemic have also driven demand for **automation** and **robotics** projects (such as Industry 4.0 Audit, procurement and logistics, etc.).
- Governments have developed programs to support digital transformation needs (such as ESSOR, Industry 4.0 Audit) and automation (such as Productivité innovation). The Greater Montréal ICT sector **can play a key role in shaping** this economic transformation.

Digital infrastructure will enable Montréal to build on its ambitions

2

Opportunity to develop DIGITAL INFRASTRUCTURES and INNOVATIVE NEW SOLUTIONS to facilitate the DIGITIZATION of the economy

- COVID-19 has forced companies to adopt **telework** in order to continue operating. This trend, combined with the acceleration of **digitization** throughout the economy (online commerce, digital transformation, etc.), increases the importance of infrastructure quality in supporting development of the Greater Montréal economy.
  - More specifically, telework has opened the sector up to opportunities for developing innovative solutions, such as:
    - Development of integrated products and services with enhanced virtual security
    - Development of interactive conference solutions, building on Montréal's expertise in artificial intelligence, virtual reality and video games
- In addition, Montréal can invest in technologies such as **5G** that will enable the development of **future technologies** (Internet of Things, smart self-driving vehicles, etc.) and keep the city competitive with the major cities in industrialized countries.

Montréal can benefit from two sectors that have grown quickly through the pandemic: cybersecurity and telemedicine

3 **Sectors seeing HYPERGROWTH since the start of the pandemic**

- Health measures and social distancing requirements led to the rise in **telemedicine** and health technologies during the pandemic. They have been growing rapidly and have the potential to significantly impact the health sector, as well as remarkably improve the quality of life of Montrealers (during and after the crisis).

- COVID-19 has also forced businesses to rush through their digital transformations, leaving significant gaps that threaten **IT security**:

  - The rapid adoption of telework has led to computer breaches.
  - Phishing attacks have increased significantly.
  - The acceleration of online commerce has left businesses that are less well equipped to orchestrate such a transformation more vulnerable.

- With this in mind, Montréal has an opportunity to position itself as a **cybersecurity** leader while also developing an economy that is better protected against cybercrime.

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5

COURSES OF ACTION FOR RELAUNCHING THE SECTOR

Courses of action for the ICT Sector

The courses of action set out here involve four categories of actors (or “targets”):

Target 1

Industry (private sector)

Target 2

Educational institutions

Target 3

Entrepreneurship support and economic development organizations

Target 4

Governments

The identified courses of action have the following objectives:

Alleviate labour shortages

Drive growth in demand

Invest in digital technologies and infrastructure

Ensure adequate financing for businesses in the sector

In Quebec, as in the rest of the world, the ICT sector is one of the foundations for enhancing productivity and creating wealth. As a result, actions to strengthen the ICT sector are a cross-sector stimulus for relaunching the Greater Montréal economy.

Courses of action

TARGET: INDUSTRY AND EDUCATIONAL INSTITUTIONS

	Stakeholders	Recommendation
1	**Businesses** **Educational institutions** **Incubators** **Provincial government support**	**Strengthen existing mechanisms to ensure alignment of technical training with market needs** Rapid evolution of the technical skills required by the sector is increasing the need for training and calls for: Enhancement of the initial technical training offering to increase the pool of ICT workers. **a) Develop accelerated online and in-person training programs to enhance technical skills in the ICT sector (e.g. software development). This can be done by:** - **Drawing inspiration from training offered in other regions with condensed content and accelerated learning** - **Calling on incubators, industry and educational institutions to ensure that training is well aligned with community needs** Increase business investment in the professional development of employees to update the skills of sector workers. **b) Invest more in employee professional development to ensure greater mastery and integration of new technologies. These investments will ultimately improve business productivity.**

Objectives: Address labour shortages; Drive growth in demand; Invest in digital technologies and infrastructure; Ensure adequate financing for businesses in the sector

Courses of action

TARGET: INDUSTRY

	Stakeholders	Recommendation
2	Big business Startups	**Better align SMEs, technology startups and big business to drive innovation and accelerate the digital shift** Big business should take advantage of technology startup expertise to benefit from their innovations. In turn, big business can play a leading role in the marketing of solutions developed in Quebec by showcasing the technologies and introducing the startups to their local and international networks. In times of crisis, companies may tend to cut back on their investments to prepare for even more uncertain times, but investments such as these will help them restart on a more solid footing. **To foster this mutually beneficial dynamic, <u>big business should</u>:** **a) Work with sector startups and SMEs to implement innovative solutions that increase their competitiveness. One way to do that is through mechanisms that foster open innovation.** **b) Establish mentoring and coaching programs to support the development of startups and SMEs This includes introducing startups and SMEs to their local and foreign networks.**

Objectives: Address labour shortages; Drive growth in demand; Invest in digital technologies and infrastructure; Ensure adequate financing for businesses in the sector

Courses of action

TARGETS: GOVERNMENTS, ENTREPRENEURSHIP SUPPORT AND ECONOMIC DEVELOPMENT ORGANIZATIONS

	Stakeholders	Recommendation
3	Technology ecosystem catalysts Chambers of commerce Business groups Big business Federal and provincial governments	**Strengthen and improve access to marketing and internationalization support initiatives** **a) Support the growth of startups and SMEs by strengthening export and marketing support organizations that have established expertise and critical mass.** **b) Develop and support initiatives that enable the creation of strategic partnerships between SMEs and big business that SMEs can rely on to market new products and services, as well as develop foreign markets.** **c) Implement a Quebec-wide scaleup platform (similar to that financed by FedDev Ontario). These collaborative platforms aim to strengthen existing services and create new avenues of support, especially internationally, for high-potential startups.**

Objectives: Address labour shortages; Drive growth in demand; Invest in digital technologies and infrastructure; Ensure adequate financing for businesses in the sector

Courses of action

TARGET: GOVERNMENTS

	Stakeholders	Recommendation
4	Federal government Provincial government Private sector participation and economic development organizations	**Strengthen the attraction and retention of international talent to grow businesses in the sector** a) **Assess performance and enhance strategic international talent sourcing programs (such as a pilot program for workers in the AI, IT and visual effects sectors to recruit 550 individuals). Involve the private sector in these initiatives to identify skills that are in demand.** b) **Enhance (by allocating more resources) international student recruitment initiatives in the ICT sector to attract more students to Montréal and retain them.** c) **Better discuss Montréal's know-how in key ICT strength areas in order to attract and retain talent in these fields.**

Objectives: Address labour shortages; Drive growth in demand; Invest in digital technologies and infrastructure; Ensure adequate financing for businesses in the sector

Courses of action

TARGET: GOVERNMENTS

	Stakeholders	Recommendation
5	Municipal government Provincial government Federal government	**Promote local expertise in high-demand and promising ICT subsectors:** a) **Implement a *panier bleu* technology initiative including both products and services.** b) **Further promote the Techno du Québec directory, a tool that provides access to B to B solutions from nearly 500 Quebec companies.** c) **Invite governments to leverage local technology solutions through government procurement.**

Objectives: Address labour shortages; Drive growth in demand; Invest in digital technologies and infrastructure; Ensure adequate financing for businesses in the sector

Courses of action

TARGET: GOVERNMENTS

	Stakeholders	Recommendation
6	Federal government Provincial government	**Increase financing for digitization initiatives in non-ICT sectors to improve economic productivity and stimulate demand in the ICT sector** The financial resources of many businesses in the ICT client sectors have been negatively impacted by the current crisis. For example, many companies want to go digital, but lack sufficient financial resources. At the same time, technology firms that specialize in digital transformation are reluctant to sign long-term contracts because of the current uncertainty. Investissement Québec's Productivité innovation program is an important step in accelerating the digital transformation of Quebec businesses. However, the program, which provides financial support in the form of a loan, is hard to access for companies whose financial health has been weakened by the pandemic and cannot take on more debt. To give impetus to the digital transformation of Quebec businesses, governments should consider, in addition to existing initiatives: a) **Enhancing subsidy programs that support digital transformations to cover a greater share of these important business investments (such programs include the Industry 4.0 Audit program in Quebec and the Canadian Innovation Assistance Program).**

Objectives: Address labour shortages; Drive growth in demand; Invest in digital technologies and infrastructure; Ensure adequate financing for businesses in the sector

Courses of action

TARGET: GOVERNMENTS

	Stakeholders	Recommendation
7	**Federal government** **Provincial government**	**Strengthen the funding chain in a time of significant economic uncertainty** Recent economic downturns in Canada have resulted in sharp declines in venture capital investment during the seed and startup phases. To ensure the survival and growth of startups and SMEs in the sector, but especially to support a sector able to catalyze innovation, the governments of Quebec and Canada must: **a) Assess and recapitalize technology seed funds on a regular basis to prevent a shortage of necessary financing at this stage.** **b) Refinance "funds of funds," which will in turn finance private funds. This is a proven model that will provide a framework for financing by experienced and specialized private managers, while maximizing the leveraging effect on private investors. This involves renewing federal programs (Venture Capital Action Plan, Venture Capital Catalyst Initiative) and, for Quebec, maximizing its assistance to ensure the presence of host structures for these investments.** **c) Assess the possibility of introducing tax measures to stimulate investment by angels (such as the proposed British Columbia tax credit for equity capital investments in startups).** **d) Promote crowdfunding platforms (like La Ruche) to encourage investment during the seed phase.**

Objectives: Address labour shortages; Drive growth in demand; Invest in digital technologies and infrastructure; Ensure adequate financing for businesses in the sector

Courses of action

TARGET: GOVERNMENTS

	Stakeholders	Recommendation
8	Federal government Provincial government Municipal government Technology ecosystem catalysts	**Strengthen the technology innovation ecosystem** **a) Continue government efforts to streamline and facilitate access to technology entrepreneurship support programs. Key measures in this regard include strengthening the support ecosystem and increasing support for the most effective vehicles (incubators, accelerators, future innovation areas) in order to achieve significant sizes.** **b) Financially support sector structuring initiatives, in accordance with best practices:** - Avoid scattering - Support some larger platforms and initiatives - Build on experienced teams with networks in the Quebec innovation ecosystem and outside Quebec in order to foster greater professionalization and better support businesses while fostering a desire to “internationalize” innovations - Pay particular attention to initiatives that promote networking between ecosystem players (such as support for competitions and open innovation or networking programs specific to the technology sector) **c) Leverage ICT expertise to support innovation zone projects in Montréal.**

Objectives: Address labour shortages; Drive growth in demand; Invest in digital technologies and infrastructure; Ensure adequate financing for businesses in the sector

Courses of action

TARGET: GOVERNMENTS

	Stakeholders	Recommendation
9	Federal government Provincial government	**Building digital infrastructure to support economic recovery and growth** Provincial and federal governments have announced significant investments to accelerate connectivity across the country and support the growing need to digitize the economy ($2 billion from the Canada Infrastructure Bank and $400 million from the Quebec broadband program). To maximize the effectiveness of these investments, it will be important to verify that the amounts are: • Sufficient to ensure state-of-the-art infrastructure • Quickly directed to structuring projects

Objectives: Address labour shortages; Drive growth in demand; Invest in digital technologies and infrastructure; Ensure adequate financing for businesses in the sector

APPENDICES

Government of Canada cross-sector measures

		Lead agencies	Program access conditions	Relevant for the ICT sector?	Comments
Government of Canada	Canada Emergency Wage Subsidy (CEWS)	CRA via online portal	• Minimum 30% decrease in revenue • All private organizations (for temporary wage subsidy, SMEs only)	⊖	**Inadequate response to sector reality**: Very few players have experienced a revenue decline of more than 30% (the sector is marked by strong growth, so stagnating revenue is akin to a decline). 66% of growth firms prior to COVID-19 did not have access to the CEWS.
	Temporary Wage Subsidy	No request required		⊖	**Inadequate response to sector needs**: Accessible program with no decrease in revenue (unlike the CEWS), but the maximum amount per employer of $25,000 is often too low.
	CECRA for small businesses	CMHC	• Significant decrease in revenue (about 70%) and eligible for rent reduction • Monthly rent up to $50,000 • Maximum annual revenue of $20 million	✗	**Does not address the reality of sector SMEs**: Mainly focused on retail trade, tourism, food service, etc.
	Large Employer Emergency Financing Facility (LEEFF)	CDEV	• Minimum annual revenue of $300,000	✗	**Does not meet the needs of big business in the sector**: Few Montréal ICT firms generate more than $300 million in revenue, and none are in a position critical enough to agree to the loan's binding terms and conditions (control of executive salaries, relatively high interest rate, disclosure of financial structure to government, etc.).

Note: List is non-exhaustive and includes a relevant selection of programs for the ICT sector.

Legend: ✓ Measure relevant ⊖ Measure not very relevant ✗ Measure not relevant

Sources: La Presse; AQT, "Recommandations pour la relance."

Provincial cross-sector measures

		Lead agencies	Program access conditions	Relevant for the ICT sector?	Comments
Government of Quebec	PACTE	**Clients:** Investissement Québec (IQ) **Non-clients**: Financial institution	• Liquidity affected by the impact of COVID-19 • Need more than $50,000 for working capital	⊖	**Does little to meet the needs of businesses in the sector**: No revenue drop required: A temporary impact on cash flows is sufficient. However, the aid is in the form of a loan and therefore requires repayment with interest, which does not remedy the lack of subsidies for the ICT sector.
	PACTE	**Clients:** Investissement Québec (IQ) **Non-clients**: Financial institution	• Liquidity affected by the impact of COVID-19 • Need less than $50,000 for working capital	⊖	**Does little to meet the needs of businesses in the sector**: No revenue drop required: A temporary impact on cash flows is sufficient. However, the aid is in the form of a loan and therefore requires repayment with interest, which is not ideal for many businesses experiencing financial difficulties.
	PACME	Emploi Québec (MTESS)	• Subsidy of up to $100,000 to provide staff training	✓	**Meets the sector's needs**: Program is consistent with employee skills development issues. Many players in the sector benefited from the measure and used it to upgrade the knowledge of their workforces (upskilling).

Note: List is non-exhaustive and includes a relevant selection of programs for the ICT sector. Caption: ✓ Measure relevant ⊖ Measure not very relevant ✗ Measure not relevant

Municipal cross-sector measures

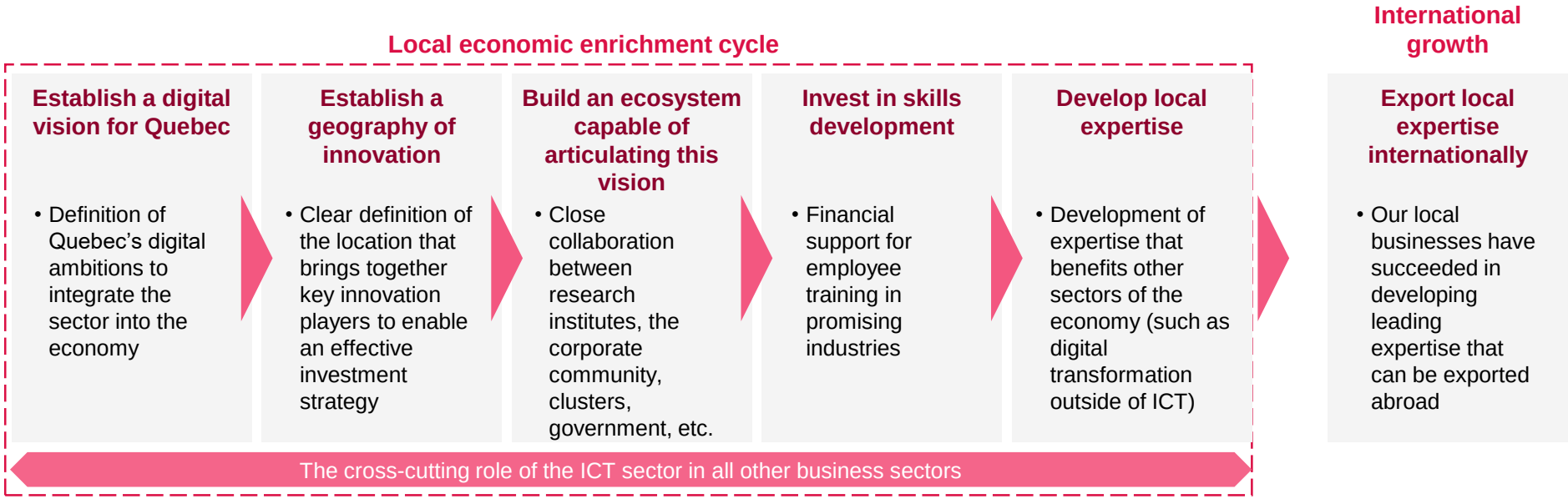
		Lead agencies	Program access conditions	Relevant for the ICT sector?	Comments
Municipal	Enhancement of the Emergency Assistance for Small and Medium-Sized Businesses program	PME MTL	• Liquidity affected by the impact of COVID-19 • Need less than $50,000 for working capital • Montréal SMEs	⊖	**Does little to meet the needs of businesses in the sector**: No revenue drop required: A temporary impact on cash flows is sufficient. However, the assistance comes in the form of a loan (on terms set by PME Montréal) and therefore requires repayment with interest, which is not ideal for many businesses in financial difficulty.
	Extension of deadline for paying the second municipal tax remittance	Ville de Montréal	• Ownership of commercial premises in Montréal	⊖	**Does little to meet the needs of businesses in the sector**: This program offers some respite for company cash flows, but applies only to owners of premises in Montréal, which is not necessarily the case for ICT firms that are often located in central neighbourhoods where they rent out their premises.
	Automatic moratorium on capital and interest	PME MTL	• Be a borrower with a loan provided by PME Montréal under the PME MTL fund, Fonds Locaux de Solidarité and Fonds de commercialisation des innovations	✓	**Meets the needs of businesses in the sector**: Offers an automatic moratorium on capital and interest without requiring companies to prove how COVID-19 has impacted their finances.
	Temporary Retail Business Consolidation Fund	PME MTL	• Targeting sectors that need help to carry out their digital transformation • Maximum grant of $10,000 and up to 75% of total project cost	⊖	**Indirectly responds to the reality of businesses in the sector**: Funds cannot be used by technology companies that support other sectors in carrying out their digital transformation. This fund thus has an impact on ICT firms. However, the amount is rarely sufficient for these projects.
	Free support to undertake an accelerate digital transition	Ville de Montréal	• Any type of business that needs support from digital marketing advisors	⊖	**Indirectly responds to the reality of businesses in the sector**: Non-monetary assistance does not apply to the sector but supports other sectors in their digital transformation.

Note: List is non-exhaustive and includes a relevant selection of programs for the ICT sector. Caption: ✓ Measure relevant ⊖ Measure not very relevant ✗ Measure not relevant

Let's develop a vision to make Quebec a technology leader: *A digital James Bay*

The ICT sector is built on a solid foundation (143,000 employees, about 8,000 firms representing 5% of Quebec's GDP) that offers Quebec the potential to become a technology leader.

The James Bay project was structuring for the Quebec economy and could be replicated with significant investments in the ICT sector. The initiative would address several challenges (such as labour shortages) while **creating a digital economy** (i.e., integrating the value chain to facilitate local collaboration across the sector) and **developing exportable expertise** over the long term.



The James Bay project has been benefiting the economy for decades. The government has an opportunity to do the same for the ICT sector and position the CMA as a global leader and benefit the local economy.

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List of Interviewees

ORGANIZATION	NAME	TITLE
Association québécoise des technologies	Nicole Martel	Chief Executive Officer
BDC	Karl Reckziegel	Senior Vice President, Venture Capital
Bonjour Startup Montréal	Liette Lamonde	Chief Executive Officer
C2MI	Normand Bourbonnais	Chief Executive Officer
CGI	Serge Godin Julie Godin Benoit Dubé	Founder and President Executive Vice-President of Strategic Planning and Corporate Development Executive Vice-President, Chief Legal Officer and Corporate Secretary
Dialogue	Max Leca Jean-Christophe de La Rue	Vice-President, Operations Director, Public & Government Relations
Groupe Larochelle	Eric Larochelle	President
IVADO	Gilles Savard	Chief Executive Officer
Talsom	Olivier Laquinte	President and Chief Executive Officer
Telus	Benoit Simard Nadia Paquet	Vice-President Director, Communications
Teralys Capital	Jacques Bernier	Managing Partner
Videotron	Jean-François Pruneau	President and Chief Executive Officer
Voxco	Sumit Aneja	Chief Executive Officer

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