

ECONOMIC RESILIENCY IN THE FACE OF ADVERSITY

FROM SURVIVING TO PROSPERING

An ICTC Whitepaper



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ECONOMIC RESILIENCY IN THE FACE OF ADVERSITY

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Preface:

ICTC is a national centre of expertise on the digital economy. With over 25 years of experience in research and program development related to technology, ICTC has the vision of strengthening Canada's digital advantage in the global economy. Through forward-looking research, evidence-based policy advice, and creative capacity building programs, ICTC fosters innovative and globally competitive Canadian industries, empowered by a talented and diverse workforce.

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INTRODUCTION

Over the last few months, we have seen the devastating human toll of the novel coronavirus (COVID-19) as well as its impact on Canadian and global financial markets. To date, some of the hardest-hit sectors include retail, manufacturing, oil and gas, tourism, food, and accommodation. Along with the colossal economic slowdown, international supply chain crunches persist, and the global economy is likely to feel the reverberating effects of this pandemic for some time. With global output projections shifting rapidly and frequently, our current economic situation remains in a state of flux, and uncertainty about the broad and lasting impacts of the health crisis continue to fuel volatility in financial markets and upend corporate decision making.

COVID-19 emerged against a backdrop of a global and Canadian economy that was already struggling with shifting dynamics, falling commodity and energy prices, slow overall employment growth, and global economic uncertainty. To weather this multi-faceted storm, many businesses moved to carefully managing expenditures and discretionary spending. Although these approaches are pragmatic from the point of view of the business owner, these decisions also affect market liquidity. Responding to these shifts, the Government of Canada has recently implemented several rescue packages assisted by the Bank of Canada to expand lending facilities and offer liquidity to financial markets and businesses that face the very real possibility of insolvency.

The impacts in Canada—and especially on small- to medium-sized enterprises (SMEs)—have been nothing short of dire. Many are now navigating the prospects of shrinking demand, dwindling supply chains, reduced revenues, and an overly indebted financial landscape. Business continuity, financial sustenance, alternative supply chains, and operational resiliency are much-debated topics for many of these firms. At the same time, the market balance of digital industries is also shifting. Once lucrative retail electronics and hardware manufacturers are feeling the brunt, as consumers prioritize their finances, spending more on essential products and services, while businesses seek to preserve critical business lines and staff. In fact, even before the novel coronavirus was officially declared a global pandemic, supply chain crunches in China and warnings of a rapid international spread of the infection in February 2020 caused Apple to adjust its sales targets for Q1, a decision that caused Apple stock to subsequently drop by 4%.

Lockdowns, remote work, and social distancing have cast the digital economy into the spotlight. eCommerce, telemedicine use, and video game consumption have

all gone up, and eLearning platforms, fintech solutions, and telecommunication services also saw a substantial surge in demand. Overnight, these changes have already highlighted the importance of digital adoption for many businesses. They have also tested the limitations of our academic institutions and underlined some of the shortcomings of the gig economy. Forecasting the course of this pandemic is far from certain, but recent ICTC research points to an expected double-digit percentage decline in Canadian economic output in 2020, followed by an expected rebound in 2021. Although such forecasts are based on several assumptions—including a second wave of the infection in the fall, the availability of a vaccine in 2021 or a move to universal testing in Canada—one thing is clear: the digital economy will become more important than ever.

This new reality is undoubtedly prompting businesses to innovate and rethink their value chains. An increased adoption of cloud computing, advancements in data analytics, and machine learning can generate efficiencies and boost productivity in a post-COVID economy. Many companies are considering the deployment of autonomous systems and even lights-out manufacturing to drive intelligent supply chains, along with opportunities for large-scale use of telemedicine and carbon-neutral energy generation.

While such jolts to our global economy are proving challenging, they also test our resolve, responsiveness, and ingenuity in the face of adversity. Larger questions about the efficacy and preparedness of our communication systems, health systems, education institutions, and trade and transportation networks will come to light, as will our ability to shape sustainable communities and a truly eco-friendly future. These are a few of the elements that will require an exceptional policy response in the coming months, paving the way for a robust economic recovery in Canada. The Government of Canada's aid and stimulus packages have been a welcome relief for many businesses, and they are indeed needed to weather the storm in the short-term. Supporting long-term goals requires a reflection on lessons learned from the past few months and a focus on a recovery strategy that can help Canada emerge from COVID-19 in a clear and resilient direction.

This white paper highlights and addresses following topics as key pillars of Canada's post-COVID economic future.

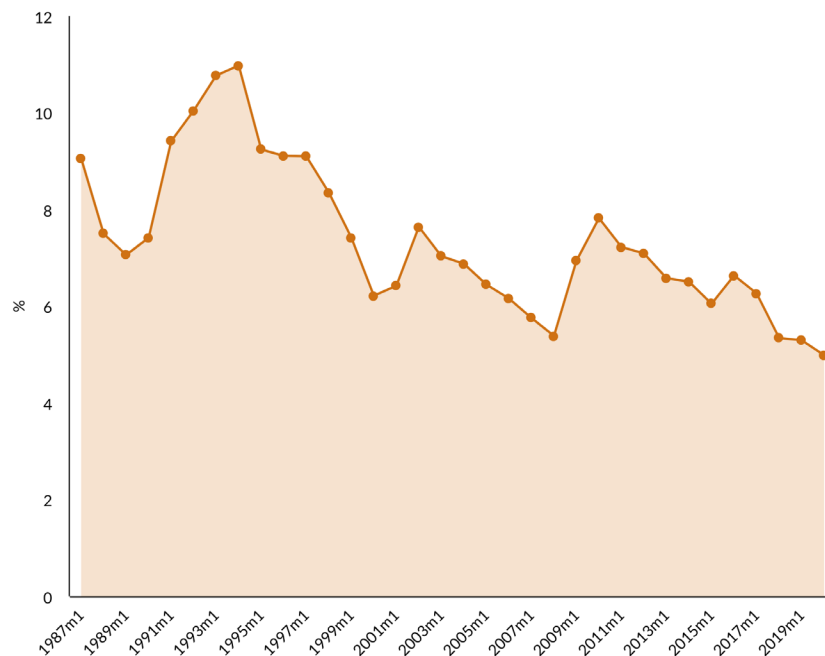
- I. Digital adoption and acceleration for Canadian SMEs
- II. Workforce development and preparedness
- III. Building resilient supply chains and focusing on trade
- IV. Enabling a connected health system
- V. Building cyber resiliency
- VI. Supporting a sustainable and carbon-neutral economy

BACKGROUND: AN OVERVIEW OF THE CANADIAN ECONOMY PRE-COVID

The Good

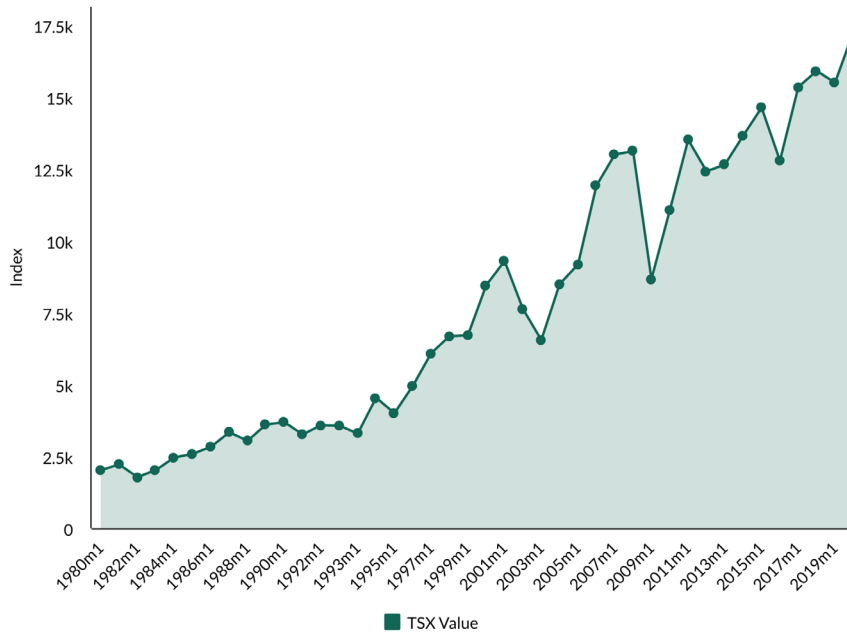
COVID-19 is believed to be the largest shock to the global economy since the Second World War.¹ Economists around the world suggest that its impacts will reverberate for years, the most pessimistic believing the economic downturn may even last a decade.² In the months prior to the declaration of a global pandemic, the Canadian economy was forecast to grow by almost 2% in 2020,³ despite lingering trade tensions and worries of rising household debt.⁴ Pre-COVID, the Canadian economy contained both very positive as well as troubling elements. Many of the positive characteristics of the pre-COVID Canadian economy are worth recognizing as unusually good. In some ways, the pre-crisis Canadian economy was in an unprecedented sweet spot. Figure 1 shows that the unemployment rate in early 2020 was the lowest it had been in decades; Figure 2 highlights that market capitalization of publicly traded Canadian firms was at an all-time high.

Figure 1: Unemployment Rate in the Canadian Economy



Source: Statistics Canada, Analysis by ICTC, 2020.

Figure 2: Toronto Stock Exchange Index

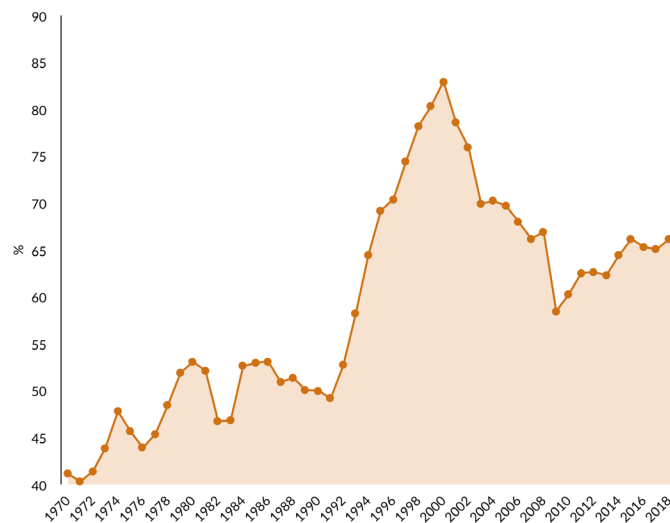


Source: Toronto Stock Exchange Composite Index, Analysis by ICTC, 2020.

Note: The S&P/TSX Composite Index is the benchmark Canadian index, representing roughly 70% of the total market capitalization on the TSX with about 250 companies included in it. Last value is January 2020.

Other positive aspects included a relatively manageable government deficit and a declining debt-to-GDP ratio, the trending down of crime rates, low and stable inflation and, despite trade tensions with key countries such as the US and China, an overall long-term upward trend for trade as a portion of GDP (Figure 3). In short, Canada was gradually and steadily becoming richer and rising in prestige among the nations of the world.

Figure 3: Cumulative Trade as a Percent of GDP

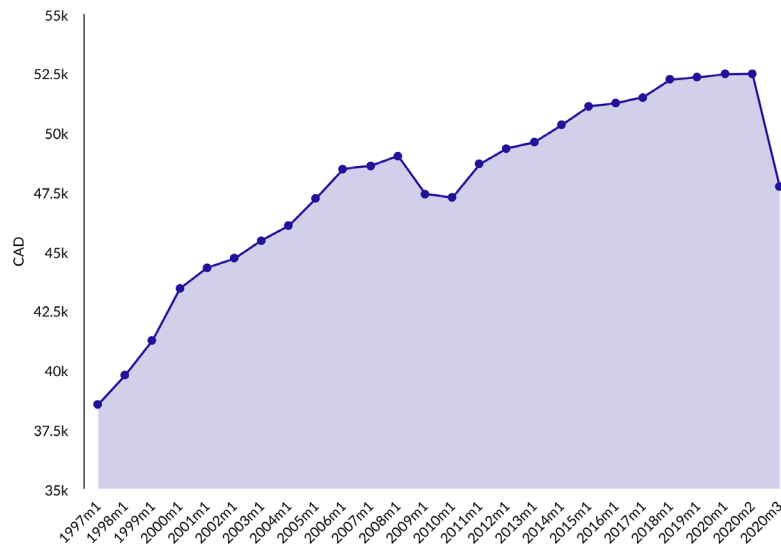


Source: Statistics Canada, Analysis by ICTC, 2020.

The Bad and the Ugly

While record-low unemployment alongside stable inflation and modest GDP growth (sometimes referred to as the Great Moderation) is an undeniable accomplishment, certain lapses in Canada’s economic performance were becoming increasingly apparent even before the arrival of COVID-19. Real GDP per capita (Figure 4), for example, was already of significant concern. Real GDP per Canadian was still growing but at a slower and slower rate. Prior to COVID-19, growth in this important indicator was nearly zero, after decades of sluggish movement. Put simply, even prior to the economic damage inflicted by COVID-19 quarantines and other measures, on average, Canadians were not becoming as prosperous as quickly as they used to, and income inequality also continued to rise.⁵

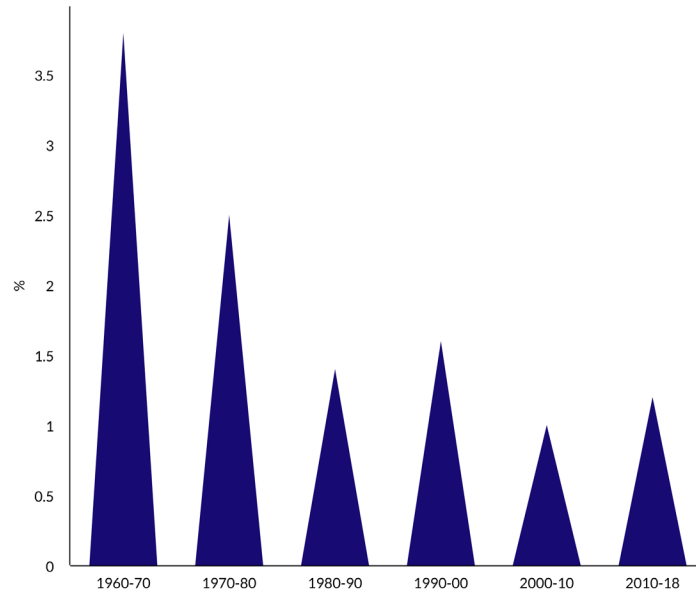
Figure 4: Real (inflation-adjusted) GDP Per Capita



Source: Statistics Canada, Analysis by ICTC, 2020. Note: Inflation-adjusted CAD are chained (2012) dollars.

In the long run—with certain caveats and critiques granted—inflation-adjusted GDP per capita remains a reasonable proxy for societal prosperity. As a result, it is important to understand why growth in real GDP per capita was slowing. A related element to this is displayed in Figure 5, which shows average annual labour productivity growth by decade (labour productivity is defined as average output per hour worked). When the labour productivity growth slows—as it has since its peak in the 1960s and 1970s—then workers are not able to generate as much value per hour worked. The causes of this decline are not well understood, but a resilient economic recovery will require boosting labour productivity. Technology, capital investment, and education are certain to play key roles.

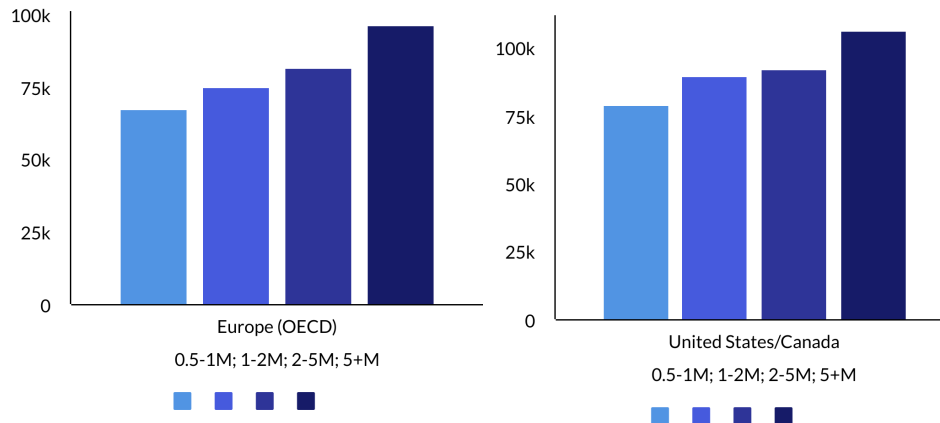
Figure 5: Average Labour Productivity Growth by Decade; Canadian Economy, Business Sector



Source: Statistics Canada Productivity Table: 36-10-0208-01. Analysis by ICTC, 2020.

Another important trend is related to the global movement of workers from low productivity, low capital-intensity regions, to high productivity, high capital-intensity regions. As workers migrate to high-productivity regions, their productivity increases, which raises Canadian GDP per capita. Figure 6 shows the strong, positive relationship between GDP per capita and metropolitan populations in Europe, the US, and Canada. This means that, on average, a worker who relocates from Windsor to Toronto will generate more GDP and raise Canada’s overall labour productivity (while contributing toward “brain drain”⁶ from the home city).

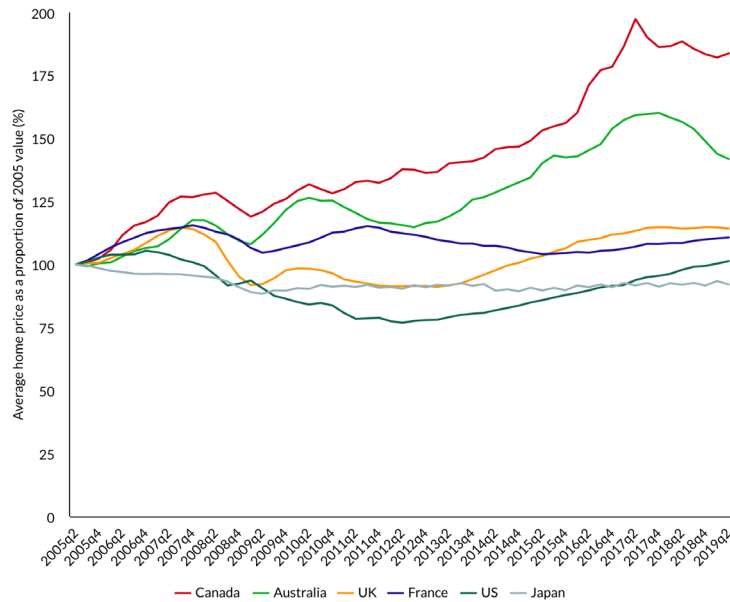
Figure 6: Labour Productivity by City Size: Europe (L), United States and Canada (R)⁷, GDP (USD) per Capita



Source: OECD, 2014.

Given the importance of labour mobility, Figure 7 is an even greater cause for concern. Unlike many other countries that experienced housing bubbles, Canadian home prices did not deflate after the 2007-08 Great Recession. The Federal Reserve Bank of Dallas assembles datasets containing inflation-adjusted Home Price Indices (HPI) for various countries around the world, including Canada and the US. The data reveals that while home prices in many countries, including the US and the UK, have seen only moderate growth following the recession, Canadian home prices have rapidly increased.

Figure 7: Real Home Price Index by Country: Proportional Growth Since 2005

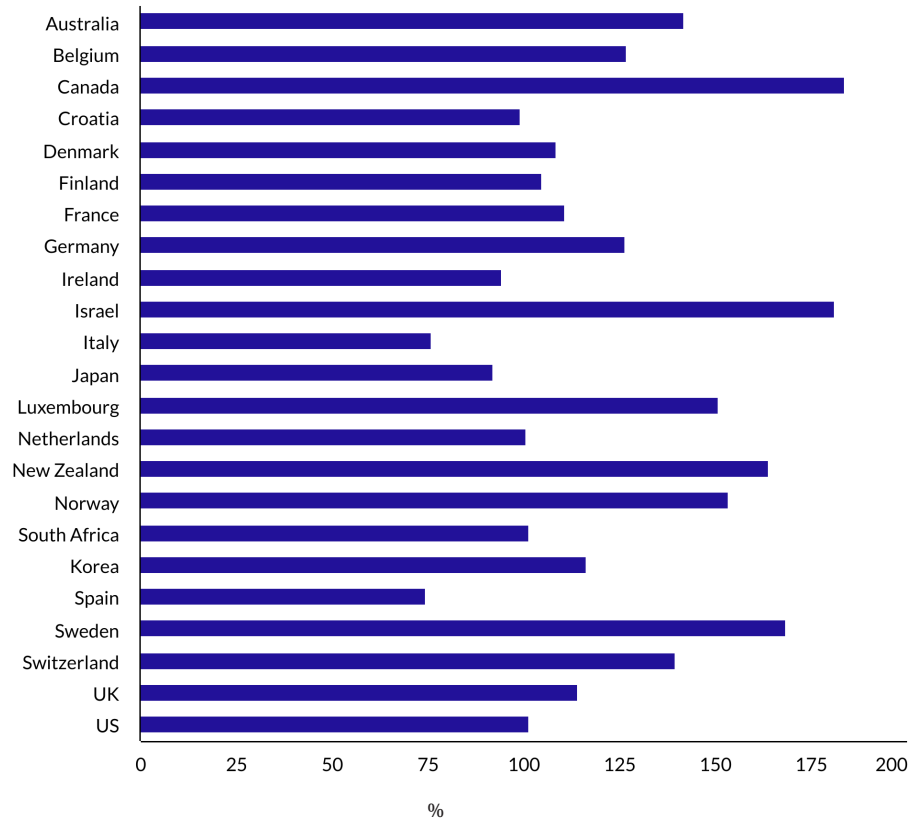


Source: Federal Reserve Bank of Dallas, Analysis by ICTC, 2020. Note: Index measures home prices adjusted for inflation as proportion of 2005 series value.

Rapid growth in home prices is risky for many reasons. First, they can cause home values to “bubble,” which can endanger the overall stability of the economy when that bubble bursts. Second, rapidly rising home prices (and rents) in Canada’s most populous cities increase wealth inequality and stall labour growth. They reward existing homeowners and potentially lock buyers out of the market or cause them to over-leverage their resources to enter it.⁸ When many Canadians are priced out of these dynamic markets, labour shortages can occur, and productivity can suffer as workers choose to accept lower-salary positions in lower-cost cities, rather than accept a high-salary job in a costly city. In this scenario, high costs constrain individual income while reducing Canada’s GDP and productivity.

Canada's inflation-adjusted home prices have risen more rapidly than any other developed country since 2005. Figure 8 shows that in less than 15 years, homes in Canada have nearly doubled in price.

Figure 8: Inflation-adjusted Home Prices, 2019 as percent of 2005 value



Source: Federal Reserve Bank of Dallas, Analysis by ICTC, 2020.

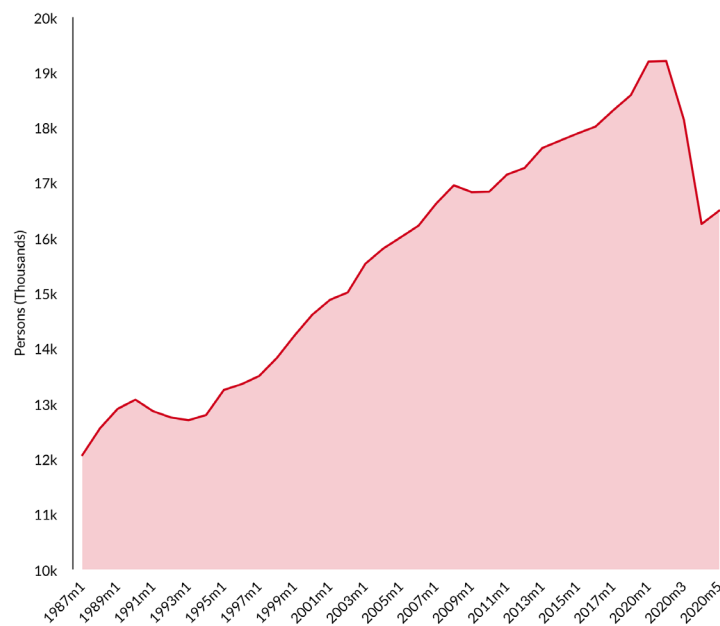
Other sources of concern for the Canadian pre-COVID economy include high corporate and consumer debt, high provincial debt and unfunded liabilities, rising inequality, and low total fertility rates.

THE CANADIAN ECONOMY DURING AND POST-COVID

Impacts So Far

The COVID-19-inspired crunch of the Canadian economy is an unprecedented experiment that is both alarming and fascinating. It is unclear what the eventual consequences of these developments will be, or if they will be deemed successful in the long run. As of June 7th, more than 8.4 million Canadians have claimed the Canadian Emergency Response Benefit (CERB),⁹ and Statistics Canada estimates that about 15% (or 3 million) jobs were lost in March and April (Figure 9).

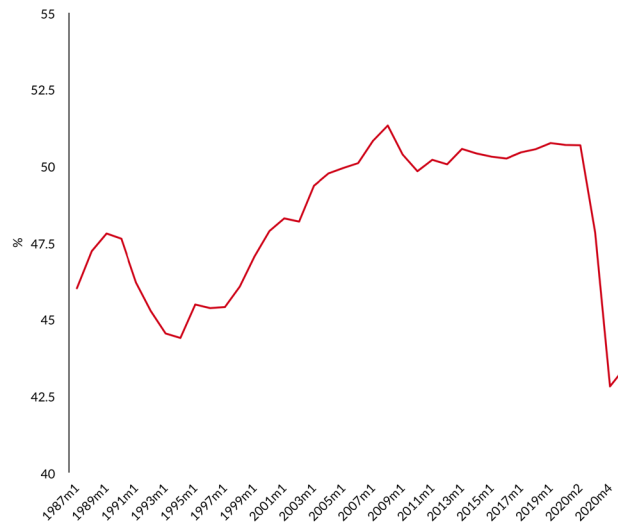
Figure 9: Canadian Employment



Source: Statistics Canada Labour Force Survey, Analysis by ICTC, 2020.

Proportionally and in absolute terms, both months individually appear to have been the largest one-month drops since Statistics Canada's modern version of the Labour Force Survey began in 1976.¹⁰ Figure 10 shows that Canada's employment rate (employment as a portion of total population) has plunged from about 51% to 41%. This is a level not seen even during the austerity of the 1990s.

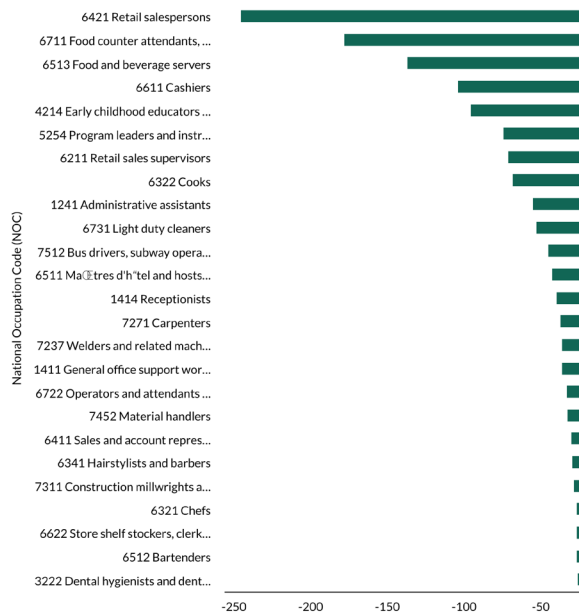
Figure 10: Canada Employment Rate (as a percentage of population)



Source: Statistics Canada Labour Force Survey, Analysis by ICTC, 2020.

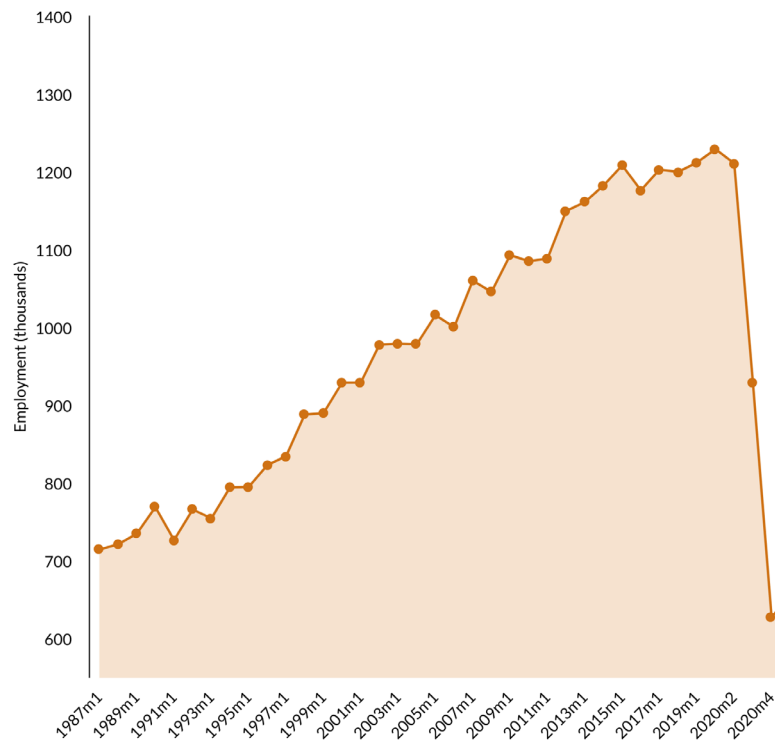
Examining the source of the decline in terms of occupations, in March and April, employment drops were concentrated among retail salespersons, food and beverage occupations, and early childhood education teachers and instructors. The most-affected sector—Accommodation and Food Service—fell by nearly half since February (Figure 12).

Figure 11: Employment by Occupation (February to April Change)



Source: Statistics Canada Labour Force Survey, Analysis by ICTC, 2020.

Figure 12: Canada Employment (Accommodation & Food Services Sector)



Source: Statistics Canada Labour Force Survey, Analysis by ICTC, 2020.

Recent ICTC research also identified that the greatest job loss is concentrated among the third of lowest-income occupations, followed by mid-income occupations. The third of highest-income occupations was substantially less affected to date. While CERB may be temporarily effective in softening the blow for many of laid-off workers, there is already evidence of longer-term cascading economic impacts. The following section examines these potential future effects.

Anticipated Impacts

The question on every policymaker’s mind is “*What’s next for Canada’s economy?*” The recovery may be V-Shaped, U-Shaped, L-shaped, or otherwise (perhaps W-shaped if there is a second wave of infections in the fall). It is impossible to anticipate how everything will unfold. The effects of COVID-19 are not only a function of economics but also of epistemology, virology, psychology, politics, and other natural and social forces. However, it is possible to consider the evidence and gauge which scenarios appear more likely at this stage.

Well-regarded institutions such as the International Monetary Fund predict that Canadian GDP could shrink by 6.2% in 2020. Recently, the organization’s managing director announced that it is “very likely” that global growth forecasts—and by association, those of Canadian growth—will drop further in the coming months.¹¹

A guiding framework, Table 1, showcases the current forecast, along with a series of other forecasts.

Table 1: Canadian GDP Forecasts

ORGANIZATION	FORECAST DATE	CANADA GDP GROWTH FORECAST	
		2020	2021
IMF ¹²	6-Apr-20	-6.226%	4.246%
RBC ¹³	9-Apr-20	-4.9%	3.4%
TD ¹⁴	20-Apr-20	-7.49%	7.26%
PARLIAMENTARY BUDGET OFFICE ¹⁵	27-Mar-20	-5.13%	
PARLIAMENTARY BUDGET OFFICE ¹⁶	30-Apr-20	-11.96%	
CONFERENCE BOARD OF CANADA ¹⁷	1-Apr-20	-4.3%	6%
OECD ¹⁸	2-Mar-20	1.3%	1.9%

Source: See Endnotes 12-18.

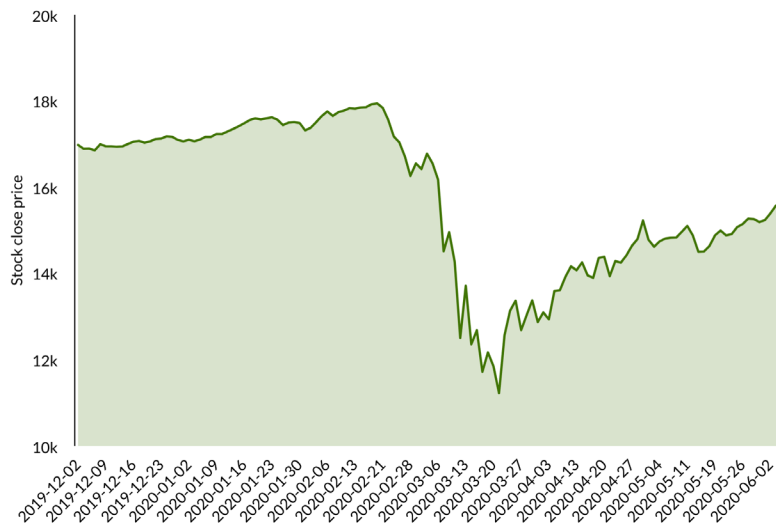
Most of these forecasts predict steep declines in 2020—particularly the more recent ones—with recovery anticipated in 2021. Given how quickly the crisis is unfolding, these forecasts are highly time-sensitive: for instance, in one month, Canada’s Parliamentary Budget Office forecast dropped to -11.96% from -5.13%.

The Optimists

There is evidence for taking both a more optimistic and pessimistic position on post-COVID recovery. The optimists cite the declining growth in active COVID-19 cases and a declining COVID-19 mortality rate in Canada.¹⁹

On the financial front, the Canadian TSX Index maintains a certain degree of stability. Since hitting its low over a month ago, it has trended upward and is now just 20% shy of its peak. By comparison, it took two years—from 2008 to 2010—for the TSX to recover to 80% of its value after the last global financial crisis. If one believes in “efficient markets” (where asset prices accurately reflect all available information), perhaps this is a sign that a recovery is not as far-off as many fear.²⁰ That said, the efficient markets hypothesis appeared flawed when stocks held their ground until late February, despite what seems, in retrospect, like ample evidence of risk prior to that date.

Figure 13: TSX Index



Source: TSX, May 15, 2020.

Other causes for optimism include apparent progress in a race for treatments and a vaccine,²¹ the fact that China has thus far avoided a mass resurgence of COVID cases,²² cautious re-openings across Canada²³ and Europe, and the current lack of overwhelmed hospital resources in most countries, along with continual improvements in understanding the virus itself.

The Pessimists

While some antibody studies have highlighted that the virus may have a mortality rate lower than originally estimated,²⁴ others have criticized these studies, claiming testing errors were incorrectly accounted for.²⁵ Even in an optimistic scenario, a 0.7% mortality rate is still seven times the mortality rate of the conventional flu virus, and there may be long-term lung damage even among those who recover. As of mid-June, roughly 2 million Canadians were tested for COVID-19²⁶, less than 6% of the population.

If the pessimists are right and the virus is not yet widespread, then we may face a deeper, longer downturn. If only a small proportion of the population has developed immunity to the virus, additional waves of infections, and therefore additional lockdowns, seem likely, especially if international trade and travel is resumed.

Yet, the current policy of enforced lockdowns with emergency financial intervention are unlikely to remain feasible for an extended period. Long-term public spending can bring on economic and social challenges associated with a debt crisis, which threatens to potentially undo the benefits incurred by these

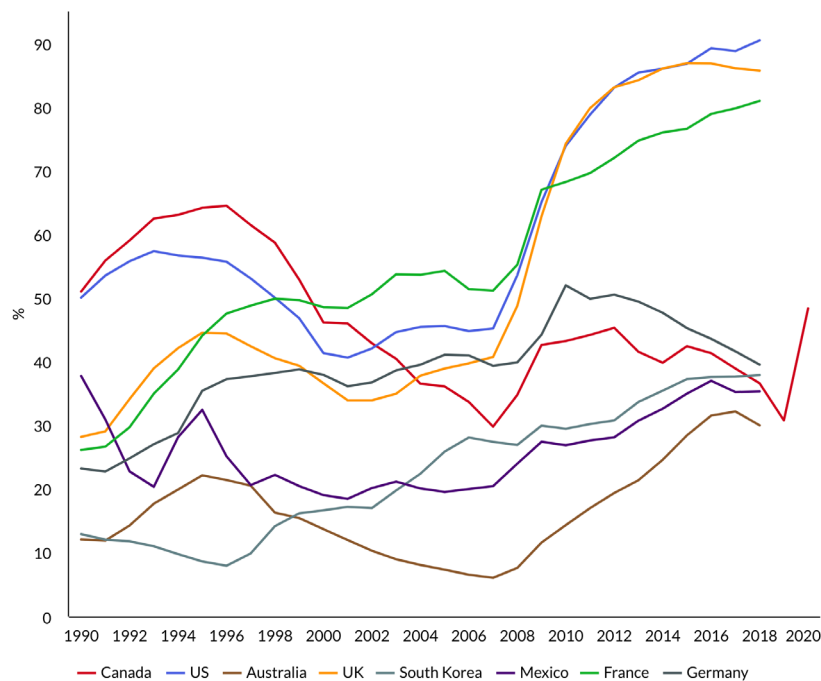
emergency measures in the first place. Canada’s future pathway for a resilient post-COVID economy must focus on key influencing factors that can attract investment and spur trade. At the same time, they must support and nourish small business digitization and growth, a resilient healthcare system, enhance supply chains, and ensure that workers have the tools they need to succeed.

Debt to GDP

On April 30th, the Canadian Parliamentary Budget Office estimated that direct COVID-19-related expenditures will reach \$147 billion CAD by March 31st, 2021. These costs are on top of the regular drop in revenue and rise in expenditures associated with a sharp economic contraction (the PBO estimates an inflation-adjusted GDP contraction of nearly 12% in the 2020-21 fiscal year). Combined, this pushes the 2020-21 fiscal year budget shortfall to \$260 billion, more than 10 times last year’s deficit.²⁷

With pre-crisis federal debt (excluding provincial debt) at approximately \$700 billion, PBO’s Yves Giroux said that it is “not unthinkable” to assume that federal debt could exceed \$1 trillion this year. These deficits push Canada’s federal debt-to-GDP ratio upwards. The fiscal year 2020-21 will see this ratio change course from 31% (and falling) to 48% and rising. Such a leap in the debt ratio throws Canada’s fiscal position back to the late 1990s when austerity measures paid down unsustainable debts accumulated from the 1970s.

Figure 14: Federal Government Debt to GDP Ratio



Source: OECD, Parliamentary Budget Office (PBO), Analysis by ICTC, 2020.

Despite growing debt, however, Canada’s debt-to-GDP ratio is still comparable to other similar countries and it is conceivable, in the short-term, to continue raising funds from bond markets to finance additional debt. Interest rates are at record lows, partially as a result of global monetary policy like “Quantitative Easing,”²⁸ (aimed at encouraging spending) coupled with the supply-demand dynamics of global savers and lenders. Financial crises also tend to have the effect of pushing investors toward lower-volatility assets like government debt, which drives up bond prices. Although far from ideal, Canada’s short-term fiscal position is relatively manageable. Yet, debts must be repaid, necessitating a long-term strategy.

The first “green bond,” defined as securities to raise capital for eco-friendly projects, was issued by the World Bank in 2008.²⁹ In 2014, Export Development Canada (EDC) issued its first green bond, with the proceeds going to projects that mitigate climate change, invest in clean technology, or spur energy efficiency.³⁰

Global economic recovery cannot be decoupled from the need to mitigate climate change and support carbon-neutral processes. The development of a Green Recovery Bond—fixed-rate or asset-backed—may be one effective measure to drive sustainable GDP growth in a post-COVID economy.

After World War Two, governments essentially “grew their way” out of debt. They reduced their debt-to-GDP ratio by increasing their GDP, making the debts comparably manageable to service. Less desirable approaches include austerity as in the 1990s (tax raises and spending cuts), inflation (which indirectly taxes savers through “seigniorage”³¹), or debt-restructuring (which penalizes savers and permanently raises future lending costs).

Spearheading GDP growth is the most desirable approach, and critical supports must be developed to help Canada recover on this pathway. This journey must prioritize finding methods of unlocking economic growth—so that Canadians can “grow out” of the debt—and developing innovative investment strategies that align with future economic and societal goals.

PILLARS FOR A RESILIENT POST-COVID CANADIAN ECONOMY

I Supporting Digital-Ready Small Businesses

Small businesses are a cornerstone of the Canadian economy. As of 2019, nearly 98% of businesses in Canada were small³² (employing under 100 people). Although roughly 87% survive their first two years of operation,³³ the chances of survival decrease significantly each year following. Only 64% of all Canadian small businesses survive to five years, 44% to 10 years.³⁴ This reality and the hurdles to growth that perpetuate it exist under typical or “normal” economic circumstances. During the current mass economic upheaval, Canadian small businesses face even greater barriers to scaling up.

Since the novel coronavirus became a global pandemic in early March 2020, Canadian businesses have been faced with numerous and mounting challenges. Sectors like food and accommodation, retail, and manufacturing are facing some of the biggest hurdles, but businesses in general are struggling to survive and adapt. Many are experiencing cash flow challenges. Although the federal government announced emergency financial aid measures in response to COVID-19 (including wage subsidies and tax deferrals) cash flow has been a stumbling point for Canadian small businesses for years.

Cash Flow and Digital Infrastructure

Canadian small businesses, on average, have roughly eight weeks of cash on hand in case of business slowdown or interruption. Already in 2017, a survey of Canadian small business owners found that cash flow was a top concern. Across all industries, 64% of small businesses admitted to facing challenges around cash flow.³⁵ Since this two-month cushion is often allotted to cover payroll or other key necessities, it can limit the business’ ability to make essential investments in tools or technology,³⁶ even if they are critically needed. Even investments that are as simple as developing websites or acquiring access to payment platforms can be viewed as a secondary concern, especially during periods of economic crisis.

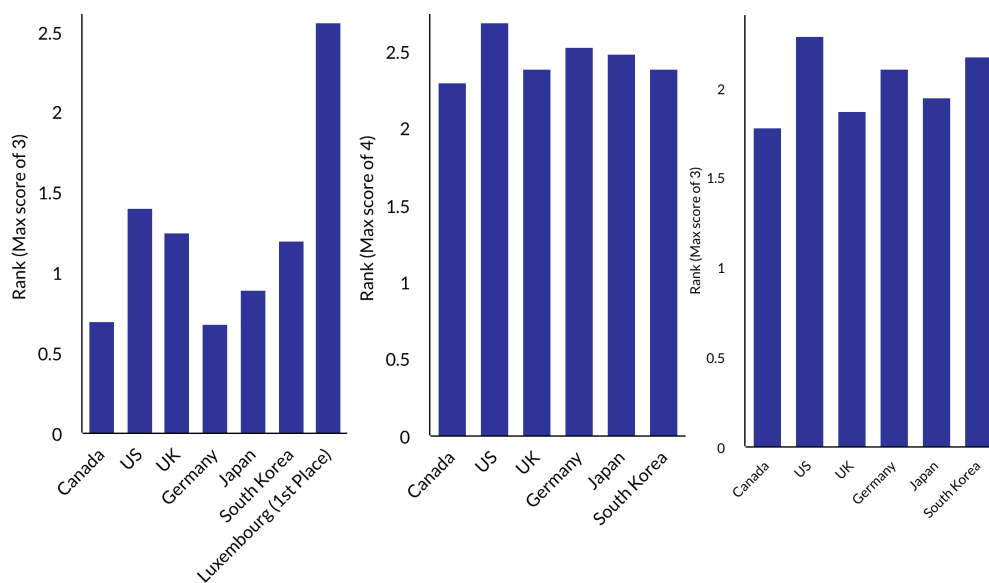
In 2017, the OECD found that an average of 81% of small and medium-sized businesses in Canada (employing 10 to 249 people) had websites, and only 35% of these websites had payment capabilities.³⁷ While this represented a growth of 10% over 10 years, even three years ago, Canada lagged behind many other OECD

countries in this metric. During this period, 88% of British, 89% of German, and 93% of Swedish small businesses³⁸ all had websites, with a significant portion integrating payment platforms.

Accelerating Digital Adoption

Cisco’s recently developed *2019 Digital Readiness Index* ranked Canada well below its peers on metrics such as “start-up environment” (new business density, patents granted and trademarks registered, and venture capital investment and availability); “technology infrastructure” (mobile and fixed broadband subscriptions, secure internet services, household internet access); and “business and government investment” (FDI, R&D expenditure, investment freedom). In these three categories, Canada placed 26th,³⁹ 18th,⁴⁰ and 20th⁴¹ in the world, respectively.

Figure 15a: Start-up Environment Figure 15b: Technology Infrastructure Figure 15c: Business & Government Investment



Source: Cisco, 2019 Digital Readiness Index.

In early 2020, a survey by CIBC found that more than 80% of Canadian small businesses have been negatively impacted by the coronavirus pandemic. Of these businesses, over 50% saw a drop in sales, and 32% worry about their ability to stay solvent over the next year.⁴² While digital adoption may be a distant concern as these businesses struggle to stay afloat, **ICTC’s recent research on the COVID-19 pandemic found that companies in the digital economy are more insulated from the impacts of long-running quarantines and economic slowdown.** Strong digital infrastructure and know-how is key, and

many jurisdictions around the world are looking to digitization as a method of building future resiliency. In Germany, the coronavirus has acted as a “wake up call” for many small businesses, and many are responding by accelerating their digital adoption journey. This includes exploring cloud integration, fintech solutions, and automation processes.⁴³ In fintech, Canada received an “average” score, according to EY’s 2019 *Fintech Adoption Index* (50% adoption).⁴⁴ Although this rating increased dramatically from only 8% in 2015, a global comparison still puts Canada far behind fintech leaders such as China (87%), Russia, (82%), the Netherlands (73%), and the UK (71%).⁴⁵

Digital adoption is quickly becoming mission critical for Canadian small businesses. Focusing on investment in critical infrastructure like cloud technology or fintech applications will be essential for small businesses to survive the current challenges and thrive in a post-COVID economy. Canadian SMEs must accelerate digital adoption, today. The following incentives can assist Canadian SMEs accelerate their digital adoption journey.

Tax incentives can help small businesses invest in key digital applications and services. Small businesses can benefit from tax credits to help them acquire key technology solutions like cloud computing services (in 2017, only 56% of Canadian SMEs used cloud services)⁴⁶ or even essential financial technologies and platforms that can enhance and/or enable online business operations.

In January 2019, Italy announced a significant change to their Budget Law, introducing a tax amortization regime for businesses that incur cloud computing service fees. Businesses making such investments can now benefit from a 40% increase in depreciation, which is then deducted from the business’ income.⁴⁷ By essentially “frontloading” the depreciation of the service (i.e., allowing the asset to be depreciated over a shorter period), an incentive is generated for SMEs to purchase cloud software, knowing that they can claim a bigger deduction for it right away (rather than having to depreciate the asset over a longer period of time, earning a smaller deduction up front). A similar incentive program can also be developed for small businesses that secure tools or services to help them integrate platforms for digital payments or enhance the security of existing systems.

Grants can allow small businesses to obtain consulting or advisory services for digital transformation. Small businesses and start-ups can benefit substantially from consulting services to help them digitize and/or adopt key digital technology to help them grow. However, Canadian businesses increasingly find themselves having to forego such services in order to focus on more immediate operational needs such as payroll, rental payments, or other key functions.

Italy's revised Budget Law also proposes the development of a voucher (or grant) for innovation advisory services. Specifically, businesses that engage the services of qualified external consultants to assist with digitization and implementation in the areas of big data, cloud computing, cybersecurity, advanced robotics, virtual reality, human machine interface (HMI), or IoT are eligible for a non-repayable grant that will cover between 30% and 50% of expenses, up to a maximum of between EUR 25,000 to 80,000, depending on the business.⁴⁸ A similar program geared toward Canadian small businesses can prove critical in scaling up small business digitization, while yielding numerous other benefits across the economy.

Pairing struggling SMEs and high school “digital natives.” While businesses are struggling to adapt to the new reality brought on by COVID-19, students across Canada have moved their learning to digital platforms. By no means is virtual education less demanding than a traditional classroom education, but some of the practical knowledge and experience gained in person are now limited. In Ontario, COVID-19 has resulted in school boards waiving the 40-hour community service requirements for high school students graduating in the summer of 2020.⁴⁹ However, today's secondary students are digital natives capable of sourcing virtual means of completing their community service.

Today's students come equipped with a roster of key digital skills that can benefit Canadian SMEs. Providing community service credits to secondary students that help Canada's struggling SMEs can be an innovative and mutually beneficial initiative. Students can work with Canadian SMEs to problem solve and find solutions to critical digitization challenges. This includes building and maintaining websites, developing social media marketing campaigns, running social media platforms, setting up online payment systems, and managing customer service lines. Such a program would provide students with important hands-on business experience while simultaneously assisting constrained Canadian small businesses achieve critical milestones and accelerate digital adoption.

II Digital Adoption, Automation, and the Labour Force

A Focus on Adult and Ongoing Education

Along with the benefits that automation and digital adoption can confer to small businesses, it is important to consider potential labour-market impacts and develop proactive strategies to ensure that employment recovers to (and remains at) high, pre-COVID-19 levels. Just as many companies increased digital adoption following the last economic recession,⁵⁰ so too may this pandemic result in greater automation as companies search for more efficient models. Accordingly, Canada must ensure access to high quality, fulfilling jobs. Balancing these two priorities—labour and efficiency—may seem challenging, but there are several strategies from around the world that Canada can look to and adapt.

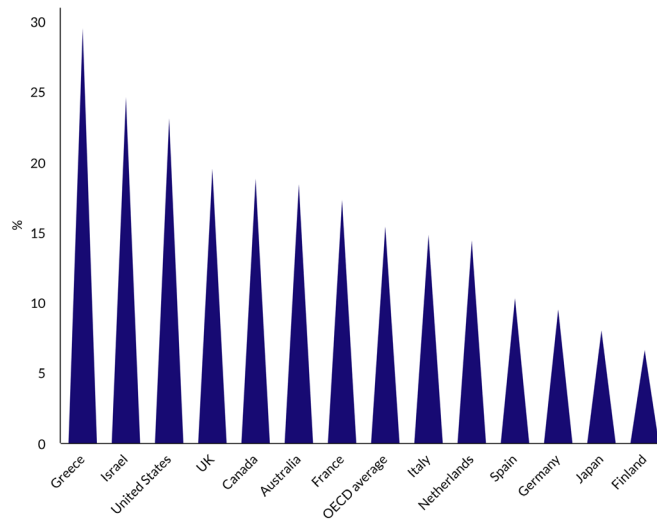
A 2016 study commissioned by the German Federal Ministry of Labour and Social Affairs assessed the labour market impact of “accelerated digitalization” (a systematic pursuit of digital adoption aligned with strong and intentional education and infrastructure policies). It found that accelerated digitalization may cause significant job loss in sectors such as retail and public administration, but that this will be entirely offset by growth in sectors such as IT services and research and development.⁵¹ Overall, the study concludes that the German labour force could “grow by around a quarter of a million people by 2030, with a corresponding fall in unemployment.”⁵²

While the impact of automation varies greatly by region, the core message of the German study is that **automation and digital adoption must be paired with proactive policies to monitor and improve labour market impacts—including adult and ongoing education.** Indeed, Canada already invests in a variety of programs geared to youth, post-secondary (such as the Student Work-Integrated Learning Program or Student Work Placement Program⁵³), and adult education. But a renewed focus on adult education will be critical in the coming years. In order to both embrace the competitive advantages of digital adoption and ensure that fulfilling work is an alternative for all Canadians, we have the opportunity now to implement strategic investments in lifelong learning and adult education similar to the European model.

Responsive adult education and reskilling is a frequently cited policy objective that is challenging to achieve, but a number of concrete strategies have been trialled around the world. Many of these policies are centred around the premise that **to support a mid-career adult through a career transition by retraining or upskilling, we need to make the transition less risky, less expensive, and**

less stressful. The OECD recently noted that Canada’s share of workers who did not participate in training because it was too expensive was slightly above the OECD average in 2018 (18.8% vs. 15.4%; see Figure 16).⁵⁴

Figure 16: Share of workers aged 25-64 years who did not participate in training because it was too expensive (select OECD nations)⁵⁵



Source: OECD Skills Strategy Flanders, 2019.

The question then becomes, how do we best support “innovation risk,” or creative risk-taking in career training? To incentivize and support adult workers through career transitions, Canada can take key steps that build upon its existing policy strategies.

First, Canada can incentivize continued training for individuals (employed and unemployed) and employers, particularly in digital skills.

One method gaining increasing international attention is to **extend the reach of Individual Learning Accounts or Personal Training Accounts**, which attach rights and means for upskilling to people, rather than to jobs. This approach was piloted by France in 2015,⁵⁶ where “Personal Training Accounts” (Compte Personnel de Formation, CFP) are primarily employer funded and provide an annual, cumulative €500 for education that follows an individual through life until they exercise pension rights.⁵⁷ Across OECD countries, higher-skilled workers are more likely to receive employer support for upskilling.⁵⁸ Accordingly, Personal Training Accounts seek to ensure that any worker who needs it can access education programs.

The Budget 2019 Canada Training Benefit adopts a similar approach to France’s Personal Training Accounts, however, the annual allotment is lower (CAD

\$250), it can only be applied to 50% of tuition, and it is government-funded rather than employer funded.⁵⁹ While a positive step, this policy has other limitations. For example, a student who wishes to take a \$10,000 programming “bootcamp” would need to wait 20 years to accrue 50% of the tuition and might not receive guaranteed time off from their employment. Developing additional and more extensive support for adults in transition, possibly through joint-employer funding, may be essential to help this policy effect real change. Other policies intended to support job training include incentives for SMEs to invest in employee skills development. Belgium, for example, offers an “SME Wallet” that covers 30% to 40% of the costs of a training program⁶⁰ and mandatory minimum rights to ongoing education (minimum standards of Paid Education Leave, like parental leave, are being trialled in Europe).⁶¹ Regardless of the form that ongoing education incentives take, it is important they include the following characteristics:

Ease of access—The policy must reach the most vulnerable, possibly by making it a universal standard rather than an application-based program.

Shared-cost—Individuals already carry much of the cost of education, however, this burden could be spread between individuals, employers, and governments.⁶² The bottom line is that students must feel capable of making the financial leap to change their career without putting their livelihood, or their family’s livelihood, at risk.

Flexibility—The fund or incentive needs to apply to a wide range of high-quality approved programs, with flexibility to include new program offerings in a timely manner.⁶³ Previous adult-training efforts suggest programs that are either unaligned with labour demand or not of interest to students are likely to have disappointing outcomes.⁶⁴

Broad awareness and social acceptability—Many mid-career adults are unlikely to consider and seek retraining opportunities alone. Public awareness campaigns or well-known, trusted, and easily found sources of guidance (e.g., a national database or advise program) can facilitate participation in an ongoing education program.⁶⁵

Canada could provide adults pursuing upskilling opportunities ongoing guidance on labour market needs through **vocational counselling, including comprehensive and affordable skills assessments**.⁶⁶ Several examples of skills-training programs that provide real-world employment upskilling opportunities include EDGE UP in Calgary, AB,⁶⁷ (a program that maps displaced oil sector professionals to training and digital economy employment), and other programs under the ICTC iAdvance⁶⁸ umbrella. In addition, governments can **subsidize employment and job-finding services for adults in career transition**.

Canada could begin implementing education-related initiatives immediately, in ways that are tied to existing responses to the COVID-19 pandemic. Canada was very responsive to the pandemic with widely accessible emergency measures such as CERB. As this response evolves, Canada could consider strategies to help unemployed Canadians find new opportunities. For example, a program that offers an alternative to CERB—such as \$1500/month plus \$1000 for tuition, contingent on enrolment and success—could motivate many recipients to take an extra step to upgrade their skills, while allowing those who may not have the time (such as parents) to retain CERB’s original \$2000 condition-free. Currently, as jobs are difficult to find, there are likely many Canadians who feel the need to move forward with their lives by taking a class or pursuing personal and professional development.

More challenges to come: A second essential labour-related consideration is the recent shift to online workspaces. The coronavirus pandemic has sparked a massive shift to remote work, forcing organizations and their employees to adapt quickly. New considerations around personal/professional cybersecurity and cyber hygiene (to be discussed in a subsequent section) as well as training, policies, opportunities, equipment, and opportunities for day-to-day collaboration, will begin emerging with great speed. This challenge for Canadian workforces is addressed in ICTC’s upcoming paper, *The Future of Work*.

III Strengthening Supply Chains in Canada

The spread of COVID-19 has impacted many industries, and in so doing, highlighted existing challenges and weaknesses of global supply chains. Citing a recent Deloitte report on COVID-19 and supply chain disruption, “When China, the world’s factory, is impacted, global supply chains are impacted.”⁶⁹ The report notes that Wuhan—ground zero of the coronavirus outbreak—is particularly important for global supply chains, as it has been a traditional base for manufacturing for decades. Today, over 200 Fortune Global 500 companies have direct presence in Wuhan.⁷⁰

Undoubtedly, the most critical supply chains impacted in this health crisis are those that provide Canada with PPE ranging from masks to ventilators. Shortage of this supply was a critical challenge during the initial rapid spread of the virus in several Canadian provinces. It remains a central concern as social distancing restrictions are loosened, and provinces brace for a second wave of infections in the fall. Many hospitals are now allowing elective surgeries, and other healthcare services like dentists, dermatologists, or eye doctors, have re-opened. Ensuring that necessary PPE is available for these services as well as any future surges of COVID cases⁷¹ will prove challenging. Although the federal government recently announced the creation of the COVID-19 Supply Council, tasked with supplying Canada with medical equipment and Personal Protective Equipment,⁷² **securing our supply chains today and in a post-COVID economy must extend beyond PPE and become a key priority.**

Creating Strong Investment-Backed Supply Chains

With large-scale disruptions in supply chains brought on by COVID-19, many businesses around the world are shifting their focus to Tier 1 suppliers. At the same time, protectionist sentiments, anti-globalization and calls to “bring manufacturing home”⁷³ are growing.

The desire to embolden local supply chains in the wake of a crisis is nothing new. Events such as the 2011 tsunami in Japan, the 2011 floods in Thailand, and the 2010 volcanic eruption in Iceland all caused ripples in global supply chains. They impacted automobile manufacturing, the availability of semiconductors, and the sending of supplies to and from Europe.⁷⁴ These events led many countries around the world to think about localizing their supply chains out of a desire to become less susceptible to international disruptions. However, the devil is in the details: it matters substantially how local supply chains are developed and sustained.

Snapshot: Manufacturing Supply Chains

Bringing manufacturing “home” from low-cost jurisdictions like China would drastically increase manufacturing costs, and by association, raise prices for consumers. It is estimated that currently, manufacturing labour in China costs roughly \$8 per hour⁷⁵; in Canada, average hourly wages in manufacturing are more than three times that figure (over \$27 per hour).⁷⁶ **The only way that it becomes feasible to “bring manufacturing home” is if it is coupled with large-scale automation and digitization of manufacturing plants.** The progressive automation of manufacturing processes can eventually lead to “lights out manufacturing,”⁷⁷ where the manufacturing process is highly—and almost entirely—automated. In Japan, Fanuc has been running highly automated manufacturing plants since 2001. In the process, it has created and opened new markets for the robots manufactured by Fanuc’s robots.⁷⁸ Of course, such solutions lend themselves to significant labour market implications. High-skilled labour will still be needed to run these factories, but it will not result in an overall surge of employment. Highly automated manufacturing plants will not bring manufacturing employment back to what it was in the 1990s before globalization-inspired offshoring became common among OECD countries.

Snapshot: Food Supply Chain

Canadians are accustomed to a large variety of fresh food. Prior to COVID-19 and “panic buying,” which led to rapidly depleted inventories of toilet paper, cleaning products, canned goods, meat, and eggs,⁷⁹ grocery shelves were typically fully stocked. Full shelves stand on supply chains that involve domestic and foreign workers, transportation—both national and international—and relatively stable estimates of consumer demand.

Disruptions like COVID-19 create monumental implications for the food supply chain. For some products—like pork, or beef—shutdowns of meat processing plants due to COVID-19 create shortages;⁸⁰ for other products—like potatoes—the closing of restaurants have led to a significant surplus, enough to cause the Canadian Potato Council to request emergency support from the federal government.⁸¹ When it comes to crop farming—including vegetables, fruits, and mixed crops—temporary foreign workers (TFWs) make up more than 30% of all workers on Canadian farms.⁸² The current disruptions to international travel and movement of workers means further impacts on these critical supply chains. As a result, one of the most basic principles of modern economics applies: high consumer demand mixed with insufficient supply yields higher costs. Canadians have already been told to brace themselves for higher food costs⁸³ by the summer.

Developing effective, efficient, and modern food supply chains is in the interest of Canadian consumers and agricultural workers alike. Automation plays a key role in meat production. While Canada, the US, and many other jurisdictions around the world faced COVID-19 outbreaks in meat-processing plants, causing shut down, in Denmark, business carried on as usual. The Danish Crown's Horsens facility is one of the world's largest pig slaughterhouses, and one of the most modern and heavily automated. Out of the 8,000 employees working at Danish Crown, roughly 10 have tested positive for COVID-19.⁸⁴ **Automating meat production plants could prove essential to securing stable supply and production while simultaneously reducing waste and protecting the health of workers. Crop production and related supply chains can also be made more effective with digitization. Access to near real-time environmental data, including precipitation levels, soil quality, humidity, and even pest activity could help farmers make more informed decisions to improve the quality and quantity of crops.**⁸⁵ These technology advances could ensure consumers have access to fresh food, while also helping small farms producers better compete.⁸⁶

In a post-COVID world that focuses on ecologically friendly practices and carbon-neutral processes, it is not unreasonable to suspect that overall consumer demand may eventually shift away from industrial farming to small local farms that employ ethical and sustainable practices.

Building effective supply chains and ensuring access to critical products and services is key, but this goal must be grounded in clear strategies for automation and digitization, mitigating labour market consequences while attracting investment. Foreign direct investment (FDI) can be critical in securing the influx of capital needed to achieve these multi-faceted goals without adding to the federal deficit. Building these foundational blocks in Canada requires disrupting business-as-usual but doing so in a way that is, as much as possible, economical and socially responsible.

Balancing Free Trade and National Security

COVID-19 has raised questions about the nature of free trade and national security. Some of these issues were already being raised prior to the pandemic in connection with US steel tariffs or debates about the use of Huawei's telecommunications equipment, semiconductors, or 5G hardware. However, **global trade has a staggering capacity to increase the wealth of nations and is especially critical for (relatively) small nations like Canada.**

Historically, most wealthy societies were rooted in mercantilism. While trade, urbanization, and globalization are strongly associated with economic growth, they also increase the risk of pandemics, and raise concerns over national security.

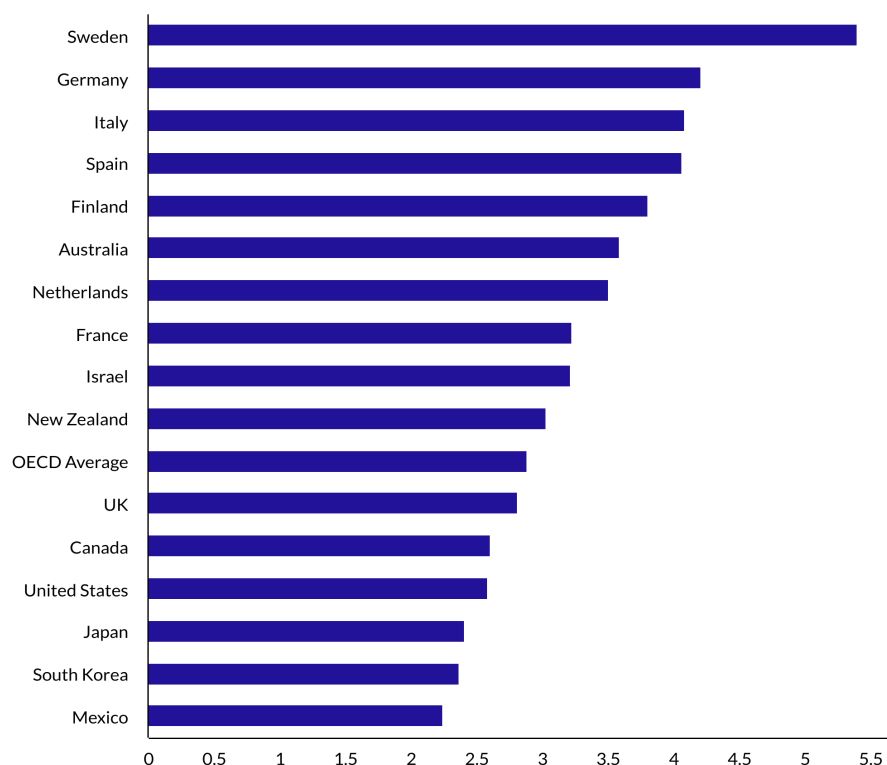
In principle, most free trade proponents themselves recognize that there are practical limits to international trade in relation to issues of national security. COVID-19 drew attention to at least one industry that is underappreciated for its national security implications: medical equipment, including Personal Protective Equipment (PPE). In “normal” times, offshoring production can drive costs down, and firms competing in the free market will seek out the most cost-effective supply of equipment or manufacturing, usually found in low-cost jurisdictions. However, in times of crisis, free trade relationships can come into conflict with concerns of national interest and security. Even within the European Union, ostensibly a free-trading block of like-minded countries seeking an “ever closer union,” core nations like Germany enacted export bans on PPE to avoid domestic shortages.⁸⁷ In North America, the US administration considered legislation to prevent firms like 3M from exporting PPE to Canada and Mexico.

For some observers, this experience has demonstrated the importance of maintaining a domestic PPE industry or bringing some critical forms of manufacturing home and finding efficiencies via automation. However, **while “onshoring” certain industries may be of national interest, it is not feasible or desirable for the entire economy. Free trade agreements, like CUSMA, CETA, and CPTPP will remain key to prosperity in the future where possible and reasonable.** The Canadian marketplace is not one that can run effectively on its own. **Trade relationships are critical to Canada’s ability to efficiently import necessary supplies, while also enabling Canadian businesses to flourish and reach new markets.**

IV Enabling a Resilient and Connected Health System

The novel coronavirus crisis has tested our healthcare system and caused considerable human suffering. However, the pandemic has also raised the opportunity to restructure our healthcare system for the better. In 2019, the World Bank estimates that Canada had fewer doctors per capita than the OECD average and fewer than Commonwealth nations like the United Kingdom and Australia. Indeed, Australia has about 38% more physicians per capita than Canada, whereas Sweden has more than double. While Canadians take great pride in their healthcare system relative to the United States, it is the nation with the closest number of physicians per capita.

Figure 17: Physicians per 1,000 Residents (Sample of OECD Nations, 2019).



Source: World Bank, Analysis by ICTC, 2020.

Although the number of Canadians graduating from medical studies each year has increased over the past decade, as Canadians age, the demand for doctors and healthcare services is expected to grow. Funding new medical schools in Canada or more seats in existing schools, raising hourly wages for doctors, or allowing nurses to provision more healthcare services are all obvious ways to increase the supply of critical medical professionals. While technology cannot create more

physicians, for the meantime, recent developments have shown that it can make them more accessible.

COVID-19 has spurred innovation that until now has been impeded by policy hurdles. Telemedicine in recent years has represented just 0.15% of all billable services in the Canadian healthcare system,⁸⁸ but state-imposed quarantines during the health crisis have effectively forced the loosening of existing restrictions and allow the provision of this necessary service. In Ontario, for instance, the Ministry of Health announced in March that doctors could conduct patient visits by video or phone, which opens the door to widespread use of telemedicine for the first time.⁸⁹ While telemedicine was technologically feasible for a long time, COVID-19 provided the impetus to restructure policies that make it legally feasible.

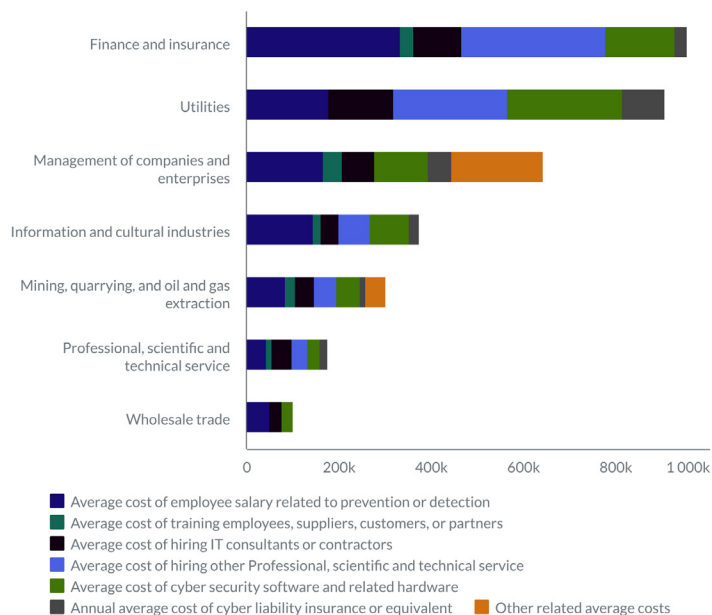
The benefits of telemedicine extend beyond patient services. It can be a critical instrument that helps prevent healthcare worker exposure to COVID-19 or other dangerous pathogens. Telemedicine can also help prevent patients from infecting one another, improve access for Canadians with disabilities or those living in remote communities or others who struggle to physically visit a doctor’s office or hospital. Waiting in one’s own bed as a “virtual waiting room” is surely safer and more comfortable than in a hospital room or doctor’s office waiting room, where the chance of contagion can be high. Canadian tech firms such as Vancouver-based Medeo Virtual Care, owned by QHR Technologies, are ready to meet the latent demand for such services. In the US, policies are also being loosened for telehealth⁹⁰ to make it more widely available and effective. Telemedicine’s time may have finally arrived—and strangely, on the heels of a global pandemic.

V Creating Cyber-Resilient Canadian Businesses

In 2017, just over one-fifth (21%) of all Canadian businesses were impacted by a cybersecurity incident.⁹¹ Canada ranked third worldwide for the number of data breaches in the country, next to the United States, and the United Kingdom.⁹² Previous findings have outlined the growing number of attacks on particularly vulnerable organizations such as SMEs.⁹³ The Canadian Internet Registration Authority (CIRA) reported in 2018 that four in 10 Canadian SMEs experienced phishing and virus attacks: of these, about a third had been targeted by Trojans and spyware while 27% had been attacked by ransomware.⁹⁴ In a subsequent survey, the CIRA found that even though 96% of respondents said that cybersecurity awareness training was “at least somewhat effective in reducing incidents,” only 22% of organizations were conducting training monthly or more frequently.⁹⁵

In addition to the growing exposure of SMEs to cybersecurity, several sectors in Canada are more likely to experience cybersecurity incidents and prepare for them, as illustrated by Figure 18 below.

Figure 18: Industries with cybersecurity expenses near or above the private sector average (CAD).



Source: Statistics Canada, Canadian Survey of Cybersecurity and Cybercrime, 2017

Despite the investments many Canadian companies have made protecting themselves from cyber attacks, COVID-19 has increased the vulnerability of numerous organizations. In particular, the sudden move to remote work has created new opportunities for cyber attacks as employees may be working on personal devices outside of firewalls and virus protections or utilizing unsecured Wi-Fi networks. Furthermore, COVID-19 has created additional opportunities for “social engineering.” Cyber attackers may prey upon pandemic-related anxieties, as illustrated by the increase in phishing scams pretending to come from health practitioners. In response to the COVID-19 pandemic, Interpol has noted that Business Email Compromise (BEC)—using supplier or client email addresses or near-matches—is currently one of the most common schemes used by cyber criminals.⁹⁶

A variety of organizations are seen as particularly vulnerable and attractive to cyber criminals currently. For example, denial-of-service (DDos) attacks to critical infrastructure organizations⁹⁷ and hospitals⁹⁸ are on the rise. In addition, organizations such as the International Chamber of Commerce (ICC) have noted the dual vulnerability of SMEs—financial and cybersecurity-related—and are issuing several recommendations to help small organizations protect business continuity.⁹⁹

Yet, according to the OECD, only 14% of all Canadian small and medium sized businesses have a formal business policy to manage cybersecurity risks,¹⁰⁰ including risks associated with data breaches and privacy. Compared to other OECD countries like Switzerland or South Korea, this figure jumps to 32% and 63%, respectively.¹⁰¹

Creating cyber resilient Canadian businesses is a key priority and must be accelerated. The pandemic has pushed the global community into the world’s largest remote working experiment,¹⁰² and a post-COVID future may very well be one where remote work is no longer an exception, but a standard process. Recent ICTC research highlighted that senior IT representatives are experiencing growing concerns about their own ability to install enough cyber safeguards for a largely remote workforce. COVID-19 has effectively forced all businesses to accelerate investment in cyber infrastructure, but like other important digital infrastructure, small businesses struggling with cash flow issues may be limited in their capacity to attend to this need. Once again, **with 98% of Canadian businesses being small, creating the mechanisms to equip them with the necessary tools and infrastructure to secure their online operations is mission critical.** The following initiatives can assist Canadian SMEs improve their cyber hygiene.

Tax credits to offset cybersecurity software. Canadian SMEs can benefit from credits that allow them to deduct the cost of cybersecurity software on their annual tax returns. On average, network solutions offering protection from cyber attacks cost businesses roughly \$1,400, but these costs can go up to \$6,000 for higher-end services. These expenses may seem like unnecessary luxuries when cash flow is constrained, and businesses need to weigh options against their payroll obligations. Offsetting the cost of such services can help small companies implement the security infrastructure needed to support their businesses.

Wage subsidies can help SMEs hire key cybersecurity professionals. Recent research by Mercer found that wages for key cybersecurity occupations in Canada averaged around \$96,000 per year. For cybersecurity roles that are high in demand—like penetration testers—average annual salaries are about \$110,000. For many SMEs, these salaries are not affordable. Providing wage subsidies for SMEs to recruit key cybersecurity talent at all levels can be a critical initiative to help them safely maintain their online operations.

Cyber hygiene toolkits for SMEs. Recent research by the Ponemon Institute in the US found that the majority of cybersecurity incidents targeting US firms were the result of human error.¹⁰³ Cyber hygiene is important for all businesses but especially so for small businesses that are only at the beginning of their digital adoption journey. With COVID-19 accelerating the reliance on networks, communications platforms, and other digital applications, it is critical that Canadian SMEs are up to date on essential “dos and don’ts” and practice good cyber hygiene. Providing all Canadian SMEs with standardized toolkits that are equipped with best practices and online learning materials can help them achieve these goals.

VI Anchoring a Robust Recovery on Sustainable and Carbon-Neutral Processes

As robust economic recovery becomes a priority for Canadian policymakers, it is essential to think about policy goals in the long term. Ever since the landmark Cambridge University Press report, *The Economics of Climate Change* (2007), it has been widely known that the eventual costs of unfettered climate change far exceed the short-term losses incurred by mitigating them.¹⁰⁴ Compounding the question of long-term prosperity is a more urgent question of preventing future health crises. An environmentally friendly recovery is not only essential for our long-term future, but many thought leaders have already begun to link a more sustainable economy to improved resilience during this health crisis and future pandemics. From studies linking higher COVID-19 death rates to air pollution and fine particulate matter,¹⁰⁵ to correlations between reduced biodiversity and an increase in zoonotic viruses,¹⁰⁶ it is increasingly clear that a robust recovery from COVID-19 must be environmentally sustainable to weather potential economic shutdowns. In Canada, the discussion around climate change has been highly polarizing and focused on the influence of the oil and gas sector, but this need not be the case. The current economic shutdown and the low oil prices that have accompanied it are a prime opportunity for us to begin thinking about diversification, planning for sustainable futures, and developing policies and opportunities that benefit Canadians, businesses, and the planet.

Creating Economic Recovery Plans that Integrate Both Environmental Limits and Social Prosperity Standards: A Look at International Policy Goals

The UN,¹⁰⁷ the OECD,¹⁰⁸ and other international bodies are calling for countries to ensure that their recovery plans are aligned with long-term economic, social, and environmental objectives and commitments. Increasingly, international economic policy that integrates environmental goals is beginning to take seriously the upper limits of metrics such as average surface temperature, biodiversity loss, and air pollution.¹⁰⁹ As one example of a widely cited model, Oxford economist Kate Raworth combines an “ecological ceiling” of nine planetary boundaries (including climate change, ozone depletion, ocean acidification, and others) that must not be exceeded to prevent extreme environmental change and a “social floor” of minimum standards of human wellbeing (based on the 2015 Sustainable Development Goals). Raworth’s model suggests that economic policies must neither destroy the environment

nor compromise a basic standard of living.¹¹⁰ Jurisdictions such as the city of Amsterdam have adopted this model as a planning device to set specific targets for emerging from COVID-19,¹¹¹ and the international community is calling for similar actions to align economic recovery with clean and socially responsible goals.

First, as a baseline, nations are asked to **avoid rolling back existing environmental standards as a part of recovery plans.**¹¹² While the economic shutdowns caused by COVID-19 may produce temporary reductions in greenhouse gas emissions, organizations such as the World Meteorological Organization (WMO) have emphasized that CO₂ concentrations are still at record levels and further emissions caused by injudicious stimulus packages or deregulation must be avoided.¹¹³

Second, **stimulus packages should include requirements to invest in carbon-neutral processes.** If subsidies are delivered to polluting industries, they should not be unconditional: now is the time to ensure that government funding comes with obligations to transition, diversify, and offset carbon impacts.¹¹⁴

Third, **infrastructure spending should be directed at green and clean energy production and technologies.** Infrastructure spending is a core, age-old part of economic recovery policy, and thought leaders around the world concur that this is one of the biggest opportunities to invest in environmentally responsible infrastructure and technology. Compared to the 2008–2009 recession, economic diversification is currently at the forefront of many minds given the current oil price crisis, and significant leaps in the efficiency of renewable energy technologies have been made during the last decade.¹¹⁵ Investments in clean energy technologies (solar, wind, geothermal, tidal, biomass, and hydro-electric energy; smart grids and metres; or carbon capture and storage, for example) should comprise a core part of Canada's recovery strategy. The province of Alberta's innovative cleantech sector¹¹⁶ has the opportunity now to take a leading role in the region's economic recovery, create jobs for transitioning oil-sector workers, and redefine the province's legacy.

Fourth, countries should consider investing in **job creation in areas of conservation, biodiversity, and reforestation.** Beyond Cleantech and Greentech, Canada is blessed with extensive natural carbon sinks—protected terrestrial and marine areas—often under the governance of Indigenous peoples.¹¹⁷ Complementing the international call for conservation efforts, several Canadian organizations have identified a key opportunity in expanding programs

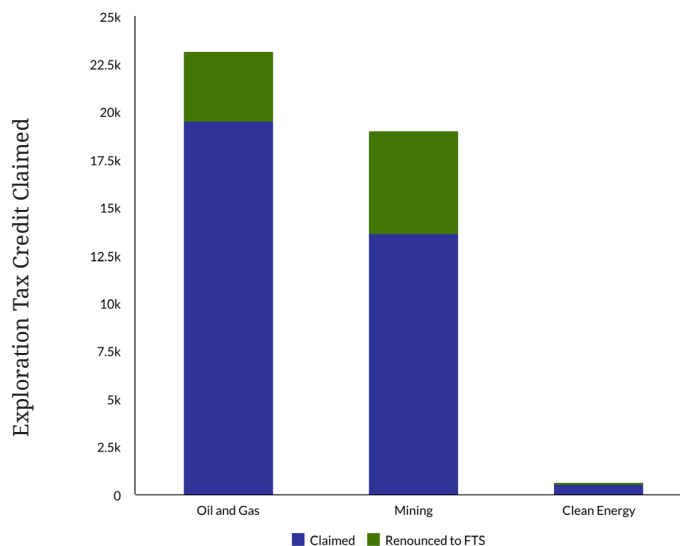
such as British Columbia’s Forest Carbon Emission Offset Areas and creating new jobs in conservation, ecosystem protection, and green infrastructure.¹¹⁸

Policies to Support Private Investment in Clean Energy

In addition to making direct investments in cleantech, green infrastructure, and Canadian ecosystems, governments have an opportunity to create policies that incentivize private investor and citizen support for a clean energy transition.

Support consumers and homeowners to make climate-friendly choices. Many Canadians will be financially stretched in the coming months, and although many people desire to make greener consumption choices, they may not feel able to invest money to do so.¹¹⁹ Accordingly, consumer support may be needed in the form of education, transparency about the carbon impacts of various products, and targeted financial programs. Some of the choices facing Canadians will involve up-front spending for long-term payoffs: for example, the Canada Energy Regulator found that installing solar panels and a smart metre would allow the average household to pay less for electricity than the current average in all but four Canadian provinces and territories (BC, MB, QC, and NB), with costs falling to as low as 14% of what they currently in Nunavut and 39% of that in NWT.¹²⁰ Fulfilling the election promise of providing interest-free loans for Canadians wishing to install clean energy projects and similar policies would comprise an important step toward helping consumers manage the up-front costs of achieving long-term goals.¹²¹

Figure 19: Flow-through share use in exploration (2007-2012)¹²²



Source: Smart Prosperity Institute, 2016.

Incentivize private investment in clean innovation. Canada’s cleantech sector requires additional support to scale up and commercialize many products. Several Canadian organizations have identified key opportunities to incentivize investment. The first of these is **investor tax credits** for the cleantech sector, much like existing incentives for investing in SMEs in British Columbia and Alberta.¹²³ A second policy option is the use of **flow-through shares**, a unique initiative that has traditionally been applied to the resource exploration sector in Canada. A flow-through share allows an individual taxpayer and equity investor to receive tax deductions from a company for costs incurred via exploration and development. While the Canadian model currently includes some eligible clean energy companies, it has primarily been used for oil and gas exploration. Accordingly, Canadian organizations such as the Smart Prosperity Institute have contended that the scope of eligible flow-through share expenses should be expanded to include additional renewable energy research and development activities, as the current criteria are better designed for extractives than for cleantech.¹²⁴ A significant opportunity exists to redesign this policy to improve its viability for Canada’s cleantech sector.

Incentivize FDI in Canada’s Cleantech Sector. ICTC’s recent investigation of Canada’s attractiveness as an FDI destination for cleantech investors found that there was still significant work to be done.¹²⁵ Existing efforts from Invest in Canada¹²⁶ and other national organizations to promote the clean technology sector should be monitored and expanded along with the international investor-friendly strategies discussed in this report’s section on FDI, targeting the renewable energy and cleantech sector.

Policies that Secure a Sustainable Future for Transit and Mobility

In the wake of the COVID-19 pandemic, Canadians may be more wary of public transit alternatives. Early data suggests that many riders would like to see passenger limits,¹²⁷ while passenger-funded transit services around the country are seeing significant cuts to revenue, and consequently to services.¹²⁸ The duration of low ridership and public uncertainty may vary by jurisdiction, as may the eventual impact on transit services. Should ridership decline upon reopening of the economy, the alternate transportation choices that Canadians make may have impacts that last even beyond the resuscitation of public transit, such as the purchase of a vehicle by someone who did not previously find it necessary to own a car. Canadian cities are beginning to make more space for active transportation choices, both in response to lower public transit rates and to enable social distancing, including Edmonton¹²⁹ and Toronto.¹³⁰ Looking to a post-COVID-19 state of affairs and considering the potential impact of decreased mass

transit usage, Canadian jurisdictions face pressing environmental policy and infrastructure planning questions in the face of maintaining or decreasing the number of gas-powered vehicles. Policy options include the following:

Incentivizing active or “micro” transport alternatives. Cities may choose to re-designate existing infrastructure and space for active transport options (e.g., adding bike lanes) or use smart mobility options (technologies that support active transport such as bike and e-bike sharing systems).

Improving the conditions for smart mobility, including connected, autonomous, shared, and electric (CASE)¹³¹ vehicles. Many Canadians are familiar with the concept of connected autonomous vehicles (CAVs), electric vehicles (EVs), and ridesharing, but the confluence of these variables has real potential to enable lower-carbon and lower-congestion individual mobility (certainly when compared with the alternative proliferation of single-owner, gas-powered vehicles).¹³² These technologies are rapidly progressing and are expected to be launched on a commercial scale within the next decade.¹³³ Investments in infrastructure today, including telecommunications and EV charging stations, will help provide Canadians with safe transportation alternatives—including last-mile delivery of medication and food—that does not compromise the country’s environmental goals.

CONCLUSION: SHAPING THE NEXT NORMAL

As the COVID-19 health crisis in Canada appears to be tapering from its most critical phase, many economists have predicted a “V-shaped” economic recovery or potentially a “W-shaped” recovery as the most plausible scenario, compared to the widely anticipated “U-shaped” recovery. We are now living in a world of high unemployment levels due to the virus and subsequent lockdown measures, and the economic toll has thus far been significant. Many industry verticals are facing the full brunt of this pandemic, while others found solace in being more digitally prepared and able to adapt to the new normal. Many firms are now seeing the merit of transitioning their business to a “Digital First” delivery model to maintain operational resiliency in the face of such adversity.

Government rescue packages in Canada and around the world have been a welcome relief for many people and businesses especially hard hit by this economic turmoil. Depending on the trajectory of the virus, other stimulus measures may also be necessary to halt this financial hemorrhaging. The reality is that some industries may thrive in this landscape, others may take longer to recover, while many may not survive at all.

The question remains, however, how best to finance the aftermath of this crisis and where should we be hedging our bets as a nation to pave the way for a swift and resilient economic recovery. Our strategic choices today will shape our future at a time when Canada’s economy continues to face structural transformation brought on by changing trade dynamics, environmental trends, and geopolitical inflections.

While global pressures for austerity measures to offset the cost of this pandemic mount, our best response should be firmly anchored in supporting economic growth and expansionary monetary policies. Despite increasing debt projections, Canada has one of the lowest debt-to-GDP ratios amongst peer countries. It enjoys a stable fiscal and political landscape and boasts a strong academic and talent base. Such accolades put Canada in a privileged position to attract investment, expand trade, and foster greater economic growth and sustainable industries.

The range of policy measures highlighted in this white paper are aimed at fostering two distinct actions: Industrial Transformation and Economic Growth.

Industrial Transformation measures includes shortening and diversifying global supply chains, including ones for sustainable food production and personal protective equipment; enabling digitization, including among SMEs; building a strong digitally skilled talent supply; and expanding the range of investments in large-scale renewables, sustainable industries, smart mobility, digital talent, cyber resiliency, and telehealth.

Economic Growth measures include expanding international trade partnerships and exports; reducing regulations where appropriate; increasing the availability of tax credits, grants, and private investments; attracting Foreign Direct Investment (FDI) and even the introduction of a Green Recovery Bond.

The world of tomorrow is still in the making, and the opportunity to shape it for Canada has never been greater. This is the time for bold and strategic choices to build on the existing fabric of our economy and set the stage for a green, equitable, and robust future.

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