



Edmonton
Global 

Road to Recovery: Resiliency

**Part 1 of Policy Proposal to Government of
Alberta in Response to COVID-19 and Oil Price
Crises**

April 8, 2020

Executive Summary

In light of the impacts to the regional, provincial, national and global economy as a result of the COVID-19 pandemic and oil price crash, Edmonton Global has conducted research, and worked with businesses and stakeholders to develop a set of suggested measures the Government of Alberta can take to put our province on the Road to Recovery.

These recommendations will come in two parts:

Part 1: Resiliency

Measures to be implemented immediately and spanning the next 3-6 months in order to address the near-term issues to shorten the duration of the economic shock and influence the depth and geometry of the shock.

Part 2: Recovery (forthcoming)

Measures to expedite and strengthen the recovery period over the next 12-18 months once the immediate public health threat has passed.

Economic Impacts and Strategic Considerations

- **Trade & Exports** will be severely disrupted for 2020 but are expected to resume in 2021. Protecting trade and export capacity over the short-term will be key to a strong economic recovery over the medium- to long-term.
- **Supply Chains** are being disrupted around the globe causing shortages in critical products for healthcare delivery and containing the spread of the virus amidst increasing demand. Focusing on development of local supply chains for critical products will help meet immediate demand and stabilize businesses in the short-term.
- **Labour Force Retention and Attraction** are at risk. Supporting businesses' ability to retain as much workforce as possible and retraining and reskilling latent workforce will improve our competitiveness and viability for investment and trade.
- **Foreign Direct Investment** and greenfield investments are declining significantly (-40%). Capital flow coming out of the pandemic will likely be looking for safe landing spots – both in terms of jurisdictions and projects (i.e. mergers, acquisitions, infrastructure).
- **Market and Sector Trends** are shifting as a result of COVID-19. Demand for healthcare delivery products has increased but supply is limited, driving up costs. Energy, automotive and tourism/airline industries have been hardest hit, while consumer demand has increased for technology services and applications which is resulting in increased eCommerce activity.
- **5G and Internet of Things** are at the epicenter of the increases in consumer demand and activity, including delivery of government services (i.e. virtual healthcare). Those who have invested early in 5G will see larger economic benefits sooner than other jurisdictions.

- **Economic Shock Geometry** – whether jurisdictions experience a V-, U- or L-shaped curve – will depend upon early and effective policy intervention. Innovation will be key to keeping the economic shock closer to a deep V or U-shape.

Approach

Policy measures should use the following principles as guidance:

- Speed & agility of government bodies - if there ever were a time that government needs to move at the speed of business, it's now
- Scope and scale of stimulus measures need to be sufficient to have the desired impact
- Harness entrepreneurial capital for Made-in-Alberta solutions
- Foster and invest in private sector innovation and productivity
- Support existing businesses who can help lead the economic recovery
- Make strategic investments to increase our competitiveness for the recovery period
- Monitor leading indicators of how and where the pandemic is evolving and conduct scenario planning on that basis

Recommendations

1. STABILIZE CRITICAL SUPPLY CHAINS

Invest in a local pharmaceutical manufacturing supply chain to meet critical needs and create manufacturing jobs and export opportunities

- 1.1. Allocate \$6.5 million to Applied Pharmaceutical Innovation to coordinate a network of Alberta chemical labs and suppliers in scaling up to manufacture high priority drugs identified by Alberta Health

Support local companies in pivoting to meet domestic manufacturing and supply needs during the crisis period

- 1.2. Leverage the Bits and Pieces program to Identify critical supplies that are in (or at risk of) shortage and identify local entities that could pivot operations to produce them during the crisis period.
 - 1.2.1. Provide interest-free bridge loans to companies to finance short-term production.
 - 1.2.2. Enable flexibility in government procurement to on a temporary basis to support local companies.

Work with post-secondary institutions and associations to ensure training of critical supply chain labour force continues

1.3. Develop an immediate student funding strategy for new Class 1 Drivers entering Mandatory Entry Level Training (MELT).

- 1.3.1. Work with recognized and licensed education providers and associations to prioritize and financially support the education of critical supply chain occupations, including training from a future skills perspective.

2. MAKE WIN-WIN INVESTMENTS NOW

Invest in digital infrastructure to create immediate jobs, training opportunities and to improve our competitiveness in a digitally-focused economy

- 2.1. Work with municipalities and private sector to invest in mass improvements to the province's telecommunications network infrastructure, through a combination of 5G and expansion of broadband network.

Invest in the talent that will be required for recovery

- 2.2. Provide funding for post-secondary programs associated with digital infrastructure installation and maintenance as well as technology-related programs for attracting and growing tech-enabled companies in Alberta.

3. ENHANCE RESILIENCY OF EXPORTING (AND EXPORT-CAPABLE) SMES

Finance technology adoption and productivity improvements

- 3.1. Allocate \$40 million toward one-time temporary grants to assist small and medium enterprises in Alberta who are exporting or export-capable in adopting technology to improve productivity. Make increased amounts available for SMEs who partner with a local tech company or purchase a local product.
- 3.2. Top up the Canada Alberta Job Grant for companies or employees who require training to implement new technology or increase productivity to ensure training can be acquired without impacting company cash flow.

Table of Contents

Executive Summary	2
Detailed Analysis	6
Economic Impacts and Strategic Considerations	6
TRADE & EXPORTS	6
SUPPLY CHAIN	6
LABOUR FORCE RETENTION AND ATTRACTION	7
FOREIGN DIRECT INVESTMENT (FDI)	7
MARKET AND SECTOR TRENDS	8
5G AND THE INTERNET OF THINGS	10
Economic Shock Geometry	10
Approach	13
Recommendations	14
1. Stabilize Critical Supply Chains	14
Recommendation 1.1	15
Recommendation 1.2	16
Recommendation 1.2.1	16
Recommendation 1.2.2	16
Recommendation 1.3	17
Recommendation 1.3.1	17
2. Make Win-Win Investments Now	18
Recommendation 2.1:	19
Recommendation 2.2	20
3. Enhance Resiliency of Exporting (or Export-Capable) SMEs	20
Recommendation 3.1:	21
Recommendation 3.2	21
Authors & Contributors	22
Sources	23

Detailed Analysis

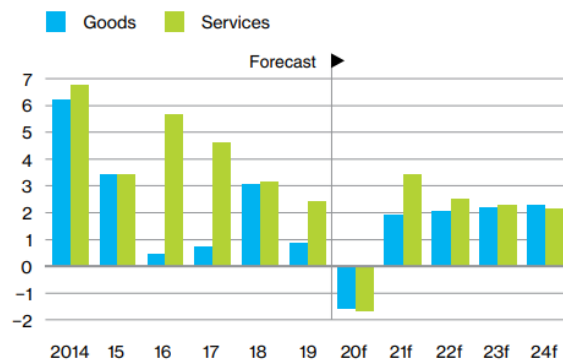
Economic Impacts and Strategic Considerations

TRADE & EXPORTS

Canada’s trade flows are expected to be severely disrupted for a good part of 2020. The prevailing assumption is that COVID-19 will largely be contained by the end of the third quarter of 2020, but until that point is reached, disruptions to the global supply chains, declining business confidence and investment, and a major contraction in U.S. economic growth will impact trade flows and the growth prospects for Canada’s export sector this year.

However, a resurgence of trade activity is expected next year (2021) as the pandemic and its effects start to subside. Overall, export volumes are forecast to contract by 1.6 per cent in 2020 before rebounding with 2.2. per cent growth in 2021.ⁱ

Exports falter as slower global growth reduces demand for Canadian goods and services
(Canadian exports, percentage change)



f = forecast
Sources: The Conference Board of Canada; Statistics Canada.

SUPPLY CHAIN

The increase of globalization has shifted the structure of the economy over time to a point where long-distance travel, face-to-face interactions, cross-border commuting, and geographically expansive supply chains are commonplace. This shift has also made the global economy highly vulnerable to supply chain disruptions. As countries around the world experience the spread of the COVID-19 virus at different times and differing rates of intensity, the global supply chain will be in a constant state of flux.

- China was the first country struck by COVID-19 and in February 2020, more than 3,000 companies invoked “force majeure” clauses, allowing them to terminate a contract or avoid certain contractual obligations.ⁱⁱ China is Alberta’s second largest trading partner: Alberta exports to China totalled \$5.3 billion in 2018 and imports from China totalled \$1.9 trillion in 2017.ⁱⁱⁱ

- Italy shut down virtually all manufacturing in late March as the virus struck there, disrupting globally influential sectors in textile and clothing production.^{iv}
- India is reporting factory shutdowns in everything from pharmaceuticals to smartphones^v, instituted a 21-day lockdown on March 24 and declared force majeure on incoming shipments.

LABOUR FORCE RETENTION AND ATTRACTION

As existing businesses try to manage cash flow, temporary closure and plummeting sales figures as a result of social distancing measures, labour force retention becomes the biggest risk not only to the business but also to government and the broader economy.

- Layoffs and diminished job prospects and lack of training opportunities, may increase the demand for social services in the form of income support programs and/or mental health supports
- There is a strong correlation between young males not in the labour force (NEET: “not in employment, education or training”) and demand for social services (mental health, domestic violence, illicit drug abuse, potential homelessness)
- The annual cost to the provincial government of supporting a person without a fixed address is up to \$400,000^{vi}

The ability of businesses to retain as much of their workforce as possible will not only minimize the ultimate cost to government, but it will enable businesses to ramp up operations quicker and more cost efficiently once the economy begins to recover.

The other challenge presented by the spread of the virus and the resultant containment measures, is the impact on our ability to attract foreign talent and students. Alberta and Canada were already projecting labour shortages in various sectors pre-COVID.^{vii} The impacts of COVID-19 on the existing labour force are not yet fully known, but there will be labour shortages resulting from the pandemic. With looming labour shortages and hampered ability to import talent, jurisdictions whose labour forces can pivot quickly to meet the needs of the new normal will recover faster.

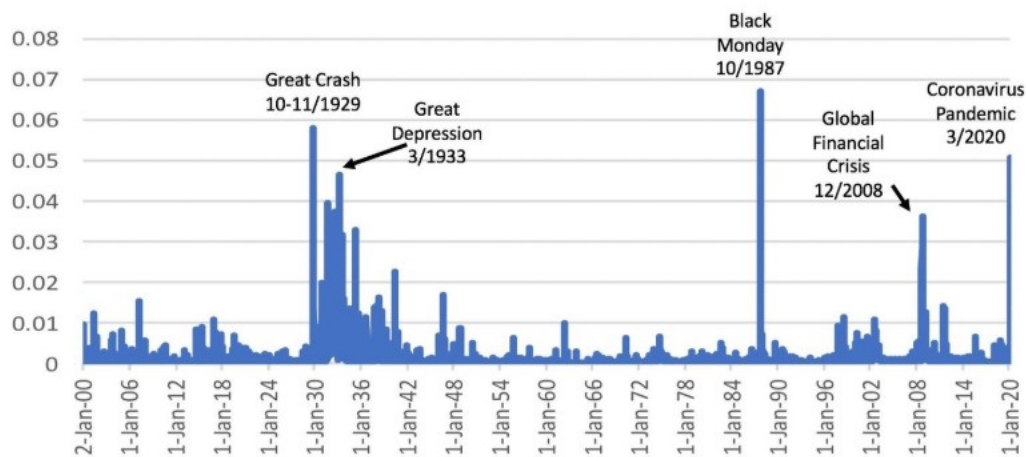
FOREIGN DIRECT INVESTMENT (FDI)

The outbreak and spread of COVID-19 has caused a dramatic drop in global foreign direct investment (FDI) and capital flows. According to the United Nations Conference on Trade and Development, economic impact estimates and earnings revisions of the largest multinational enterprises (MNEs) now suggest that the downward pressure on FDI could be -30% to -40% during 2020-2021.^{viii}

MARKET AND SECTOR TRENDS

Spending by consumers drives so much of our economic activity and as a result of the containment measures taken to prevent further spread of the COVID-19 virus, consumer demand has been mostly stunted across the board and economic activity is nearly halted globally.

Per the Kellogg School of Management at Northwestern University: “Compared with other outbreaks and financial crises over the past 120 years, COVID-19 is having an unprecedented impact on markets.”^{ix} The volatility, when measured in absolute terms, is not the single greatest of all time, but is among the most severe:



U.S. Stock Market Volatility (over 10-Day Trading Periods)

All sectors have taken a hit, however, not all sectors are impacted equally. Hardest hit are the energy and basic materials industries (-208% for energy, with the additional shock caused by plummeted oil prices), airlines (-116%) and the automotive industry (-47%).^x

WAVTEQ compiled the following sector risk assessment of coronavirus over the short term:

Major decline in FDI	Minimal decline in FDI	Growth in FDI
Tourism	Agri-business	eCommerce
Entertainment	Consumer goods	Digital technology
Retail	IT	Cybersecurity
Luxury goods	Automotive	Biotechnology
Aviation	Logistics	Healthcare
Real estate	Pharmaceuticals	Mobility
Coal, oil & gas	Medical devices	Research & Development (R&D)
	Financial services	Renewable energy

The following is a sector risk assessment if coronavirus triggers a global recession, based on the last two global recessions (2001-02 and 2008-09).

High Risk	Medium Risk	Low Risk
<i>20%+ decline in capital investment and job creation from FDI</i>	<i>5-20% decline in capital investment and job creation from FDI</i>	<i>Growth or minimal decline</i>
Real Estate Mining Building Materials Metals Hotels & Tourism Auto Components Electronic Components Transportation Aerospace	Industrial Equipment Financial Services Software & IT Business Services Chemicals Coal, Oil, Natural Gas Consumer Products Automotive OEM	Pharma Medical Devices Telecom Food & Beverages R&D Leisure/Entertainment Textiles Renewable Energy

Listed below are some examples of how the above-noted trends are playing out in real-time:

- Though the automotive industry has been negatively impacted, the virus outbreak is not expected to hit spending on research into advanced technologies, such as autonomous driving and electric cars
- Videoconferencing platform Zoom doubled in value in March 2020 to \$35 billion – currently, Zoom is worth 3 times more than FiatChrysler
- Amazon is ramping up employment to meet soaring demand from consumers
- Social media companies such as Facebook report spikes in activity
- Netflix is thriving as people shun theatres to watch movies and shows at home
- Video game makers are posting record sales
- Internet usage among home and business users has never been greater which is a boon for companies such as Microsoft and Apple

5G AND THE INTERNET OF THINGS

At the epicenter of the trends are the Internet of Things (IoT) and 5G technology. IoT is a seamless system whereby everyday objects are integrated into a data-sharing network.

IoT devices exchange information with each other via a central server, without a human intermediary being necessary. They use sensors to communicate actionable data, such as fuel levels, inventory capacities or room temperatures, through a wired or wireless network to a software application.

IoT is giving birth to driverless cars, self-calibrating medical devices, and smart homes, among other things. IoT also automates the delivery of services and billing, supply chains, and warehouses. The use of IoT in our traditional sectors, supply chain logistics and day-to-day operations could significantly increase productivity and accelerate the path to economic recovery. There is also significant growth estimated in Health IoT. The global IoT in healthcare market is forecasted to reach \$410 billion by 2022.^{xi}

Driving IoT will be 5G (“fifth generation”) technology, the latest iteration of wireless capabilities. 5G provides faster and broader bandwidth than 4G. 5G broadband (aka 5G Fixed Wireless Access, or FWA) will replace that ‘final mile’ physical connection of fibre broadband with a wireless 5G network connection. The vast majority of these 5G networks will use largely the same kind of physical fibre connections as standard fixed broadband.

Economic Shock Geometry

Economic shock geometry are a series of shapes - most commonly V, U, W and L – used by economists to describe the depth and length of an economic shock or recession and recovery period. The shapes take their name from the approximate shape economic data make in graphs.

- **V-Shape:** Economy suffers a sharp but brief period of economic decline, followed by a strong recovery.
- **U-Shape:** Longer period of economic decline where GDP may shrink for several quarters and only slowly return to trend growth.
- **W-Shape:** Known as a double-dip recession where the economy falls into recession, recovers with a short period of growth, then falls back into recession before finally recovering fully.
- **L-Shape:** Occurs when an economy has a severe recession and does not return to trend line growth for many years, if ever.

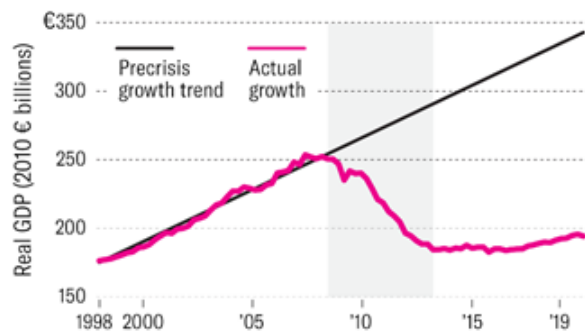
Lessons from the 2008 Global Financial Crisis

The 2008 Global Financial Crisis led to recessions with vastly different progressions and recoveries in Canada, the United States and Greece.

Economic Shock: 3 Examples

The concept of a recession is binary and blunt. The bigger-scenario question revolves around the shape of the shock and its structural legacy. To illustrate, consider how the 2008 global financial crisis delivered recessions in three sample countries, yet followed vastly different shapes in terms of shock progression and recovery.

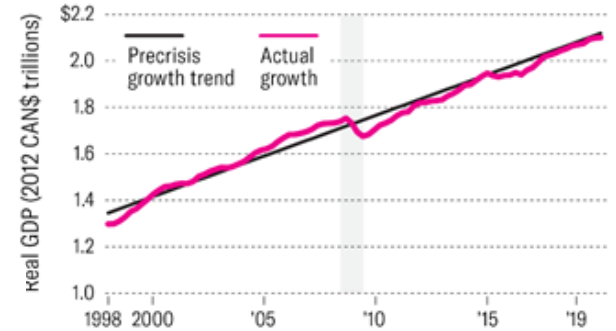
L-shaped (Greece)



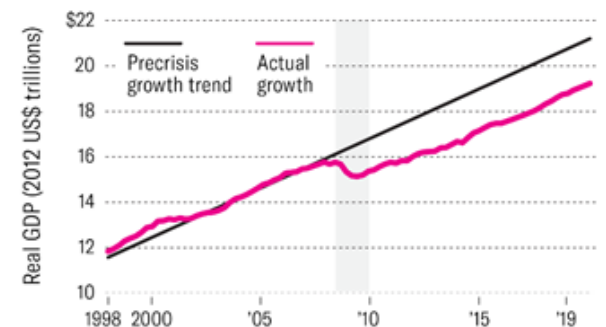
Source: Statistics Canada, NBER, BEA, Hellenic Statistical Authority, BCG Center for Macroeconomics Analysis



V-shaped (Canada)



U-shaped (United States)



Canada experienced a V-shaped shock in 2008 primarily by avoiding a banking crisis. Because of effective government policy intervention, “credit continued to flow and capital formation was not as significantly disrupted. Avoiding a deeper collapse helped keep labour in place and prevented skill atrophy.”^{xii}

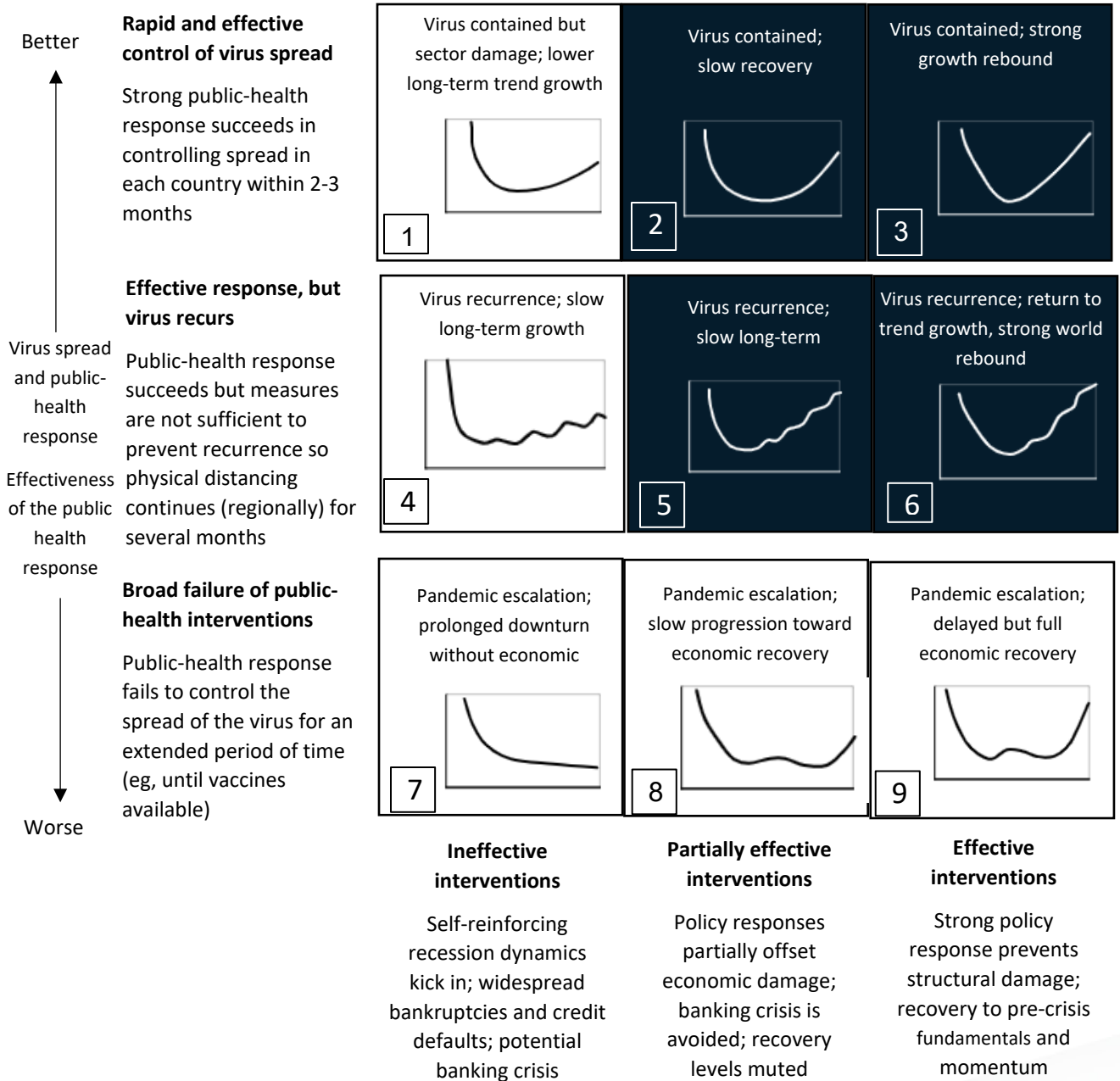
However, the current crisis is unique. Whereas most financial crises or “shocks” are driven by damage to an economy’s supply side, more specifically, capital formation, the COVID-19 pandemic is driving both supply and demand side damage, which is why the economic shock has been so severe and immediate.

The shape of the economic shock resulting from the COVID-19 pandemic will be dependent upon two key variables: 1) Rapid and effective control of virus spread; and 2) Effective economic policy interventions.

“While there is a policy playbook for dealing with financial crises, no such thing exists for a large-scale real economy freeze” such as we are experiencing.^{xiii} However, as with the previous financial crisis, policy intervention can influence the shock geometry – whether we experience a V, U or L-shape shock. – McKinsey and Company

Scenarios for the economic impact of the COVID-19 crisis

GDP Impact of COVID-19 spread, public-health response, and economic policies



Many leaders currently expect one of scenarios 2, 3, 5 or 6 to materialize as a global average. However, the scenario in each jurisdiction will vary and depend upon its ability to control the spread of the virus and implement policies to mitigate the economic impact.

Approach

“Future stimulus should focus on smarter government — both better infrastructure and improved education and health-care capacities.”

- Dr. Jack Mintz

Months of social distancing will disrupt capital formation and, ultimately, labour participation and productivity growth upturning established industry structures and fundamentally resetting competitive positions. However, a two-pronged approach of early and effective public health measures and policy intervention can help mitigate damage to our economy’s supply side, particularly capital formation.

The Government of Alberta has already taken immediate and appropriate containment measures to ensure rapid and effective control of the spread of the virus. The approach below is focused on implementing a strong policy response to prevent structural damage and create resiliency in our economy to withstand the severity and duration of the economic shock posed by both the COVID-19 pandemic and the collapse of oil prices.

Policy measures should use the following principles as guidance:

- Speed & agility of government bodies - if there ever were a time that government needs to move at the speed of business, it’s now
- Scope and scale of stimulus measures need to be sufficient to have the desired impact
- Harness entrepreneurial capital for Made-in-Alberta solutions
- Foster and invest in private sector innovation and productivity
- Support existing businesses who can help lead the economic recovery
- Make strategic investments to increase our competitiveness for the recovery period
- Monitor leading indicators of how and where the pandemic is evolving and conduct scenario planning on that basis.

Recommendations

1. Stabilize Critical Supply Chains

Invest in a local pharmaceutical manufacturing supply chain to meet critical needs

Drugs get manufactured from component parts made all over the world – much like cars. Very few of the drugs sold and used in Canada are made in Canada. Canada is not only the world's 13th largest importer of pharmaceutical products, but most of Canada's pharmaceutical imports (31%) come from the United States. Though the drugs are assembled in North America, the raw materials come in large proportion from China and India.^{1xiv} Additionally, Indian pharma companies get almost 70% of the active pharmaceutical ingredients for their medicines from China.^{xv} While Canada currently has more than 2,000 ongoing drug shortages,^{xvi} none of them are related to COVID-19...yet.

Supply chains from China have already been disrupted due to the COVID-19 outbreak and India is just beginning to experience the spread and experts predict they could face an epidemic worse than Iran or Italy's.^{xvii} In response to early COVID-19 spread in India, the country has already restricted the export of 26 pharmaceutical ingredients and drugs made from them, amounting to 10% of all pharmaceutical exports. This poses serious risks to the ability of Albertans to access certain critical drugs as well as our ability to access a COVID-19 vaccine or treatment once it is developed. Dinesh Dua, chairman, Pharmaceuticals Export Promotion Council of India (pharmexcil), told Reuters: "If coronavirus is not contained, then in that case there could be acute shortages."^{xviii}

There is a possible Made-in-Alberta near-term solution if government and industry act quickly. Alberta has a strong, but fragmented, ecosystem of chemical labs and suppliers that could pivot operations to develop components (mid-level pharmaceutical ingredients) of critical drugs (including a COVID-19 vaccine once developed) and Applied Pharmaceutical Innovation out of the University of Alberta has the capability and the Health Canada license to conduct the final stages of the pharmaceutical manufacturing process.

It would take approximately eight weeks for companies to scale up and begin manufacturing a drug, so if Government acts now, we can fill the gap locally before India's supply chain is seriously disrupted. Not only will this measure bridge a critical supply chain gap for our healthcare system, but it will support existing companies, create jobs, provide a new revenue stream and possible export opportunities.

¹ In 2019, 28% facilities making active ingredients for the U.S. market were located in the U.S., with China accounting for 13%, India 19%, and the European Union 26%.

Recommendation 1.1: That the Government of Alberta allocate \$6.5 million to Applied Pharmaceutical Innovation for the purpose of coordinating a network of Alberta chemical labs and suppliers in scaling up to manufacture drugs that are highest priority as identified by Alberta Health.

The economic potential of the pharmaceutical sector is significant. A \$1M expenditure (demand, sales revenue) from the pharmaceutical sector in Alberta supports up to 3.7 jobs directly and 6.3 jobs from industry supply chains and income effects. For every \$1M in spending increase in the sector, spending within the economy increases by an additional \$500,000^{xix}

The Edmonton metro region is uniquely positioned to take a leading role in the global pharmaceutical supply chain and its evolving complexities. As a unique asset, Edmonton International Airport (EIA) is the first airport in Canada to successfully complete the highest standard in the world for handling pharmaceutical goods, through the International Air Transportation Association (IATA) global pharmaceutical handling certification, called Centre Excellence Independent Validators (CEIV). This globally recognized community certification has the potential to connect local pharmaceutical, biopharmaceutical and logistics companies in our province, with other global pharmaceutical communities throughout the supply chain.

In addition, our airport's strategic geographic northern position for aircraft entering North America will further strengthen our position in western Canada to become an entry point and logistical hub for these delicate temperature-controlled products. As pharmaceutical products are recognized as the fastest growing sector in air cargo market globally (IATA Source), it provides our province with the opportunity to help fill those supply chain gaps the air cargo transportation sector continues to manage.

Support local companies in pivoting to meet domestic manufacturing and supply needs during the crisis period

Across Canada, companies and post-secondary institutions are shifting their focus to produce medical equipment and supplies that are in high demand and short supply. Engineering faculty and students at McMaster University are making medical masks.^{xx} Auto parts manufacturers Martinrea International and Linamar, along with General Motors Canada, are in talks with Ontario's health minister to produce face masks, ventilators and other medical equipment during the pandemic.^{xxi}

Many Alberta companies have already taken it upon themselves to pivot their operations in order to produce critical supplies for essential services where there is a shortage or supply chains have been disrupted. Distilleries, longstanding experts in alcohol production, have pivoted to creating hand sanitizer and alcohol-based cleaning products. Red Deer's Troubled Monk Brewery, St. Albert's Black Diamond Distillery, and Edmonton's Strathcona Spirits have all begun manufacturing these products. Many are donating the sanitizers or cleaners to hospitals, food banks, or other critical hubs. St. Albert's Quantum Chemical has received site and product licences for sanitizer and has begun producing 2,000 litres per day.

Alberta, and particularly the Edmonton Region, are a hub of manufacturing, health and agricultural expertise.

- There were over 164,000 businesses in Alberta in 2019;
- There were over 16,000 businesses in agriculture, forestry, oil and gas, and manufacturing; and
- There were over 4,900 manufacturing businesses.

More local companies and institutions have the capacity and willingness to help during the crisis, and the Government of Alberta has recognized this through the announcement of the Bits and Pieces program to compile an inventory of such companies. However, pivoting or scaling up operations to meet these needs requires additional financial resources in many cases.

Karma Manufacturing has created an ATB BoostR campaign to help raise funds to 3D print shields for people self-isolating or laid off. There are two GoFundMe campaigns – one in Edmonton and one in Calgary – to donate 3D print shields and other supplies. If more funds were made available, more supplies can be manufactured to assist Albertans and healthcare workers as well as keeping manufacturing workers in jobs.

Recommendation 1.2: That the Government of Alberta leverage the Bits and Pieces program to identify supplies that are in shortage or subject to supply chain disruptions and work through local intermediaries to identify companies that can pivot operations to supply these products.

Recommendation 1.2.1: That the Government of Alberta provide interest-free bridge loans for these companies to support financing this activity in the short-term.

Recommendation 1.2.2: That the Government of Alberta empower and encourage AHS (and other government bodies) to procure goods and services that have been impacted by shortages and supply chain disruptions locally during the crisis period.

Work with post-secondary institutions and associations to ensure training of critical supply chain labour force continues

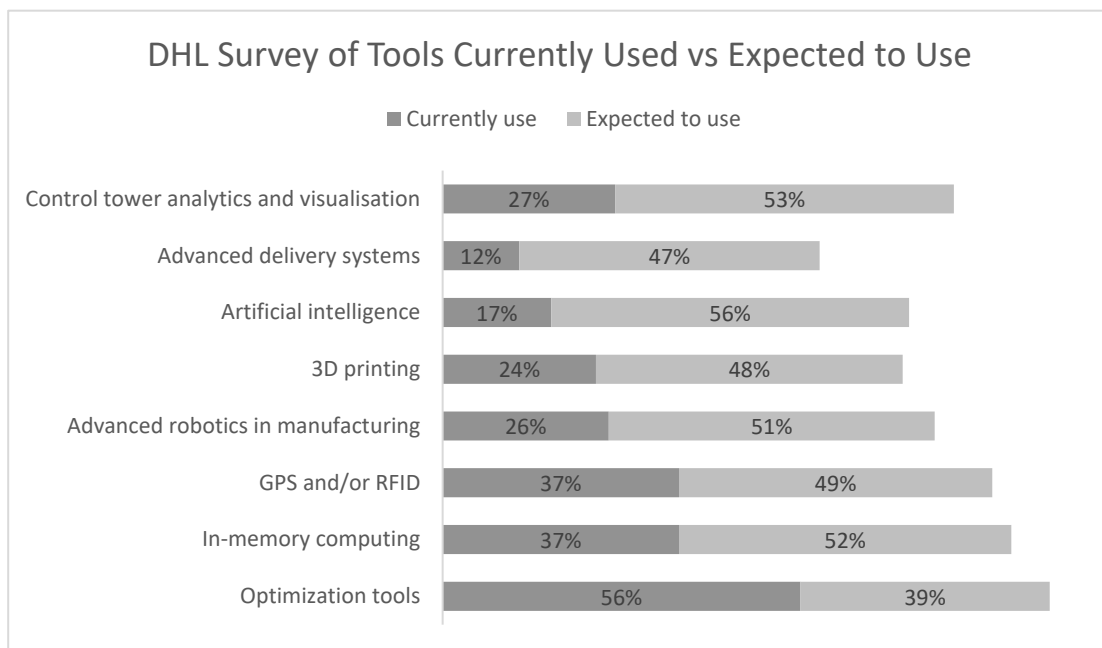
Effective supply chain management underpins our ability to not only continue trading globally, but also to ensure movement of essential goods and services to our communities here at home such as food, healthcare, and mechanical products. All of this is dependent upon keeping a trained and skilled workforce in place. This includes professionals working in logistics information systems, warehousing and distribution, and transportation.

Alberta's air transportation and truck transportation are key facilitators to trade: the two sectors supplied goods worth over \$11 billion in 2018 through direct international linkages. Interprovincially the truck and air transportation sector connected Alberta's manufacturers to key markets (through ports and interprovincial connectors). In 2018, the mode of merchandise export from Alberta was pipelines (\$72.4 billion), Rail (\$20.8 billion), Water (\$14.3 billion) (leaving ports), Road (\$9.5 billion), and Air (\$1.9 billion).^{xxii}

There is already a projected labour shortage across the supply chain sector. Overall, supply chain occupations are expected to lose 30% or more of the initial labour force (through retirement and worker turnover) by the end of 2021.^{xxiii} Alberta has a significant projected shortage in transport truck drivers,^{xxiv} which puts our supply chains at further risk of disruption.

The factor with the greatest impact on the talent shortage is changing job requirements, which may only be expedited from the impacts of the current global economic situation. The advent of IoT, big data analytics, robotics and blockchain are changing supply chain management rapidly as the global adoption rate for these technologies is within the next one to five years^{xxv}.

It is anticipated that these will be widely adopted – they will become the way we do business, sooner rather than later. Industry leaders believe adoption of these technologies will have a moderate to very high impact on our labour force. From a future skills perspective, Supply Chain Canada’s research has found that there are specific areas of focus required for development as we prepare our workforce for future supply chains.



Recommendation 1.3: That the Government of Alberta develop an immediate student funding strategy for new Class 1 Drivers entering Mandatory Entry Level Training (MELT).

Recommendation 1.3.1: That the Government of Alberta work with recognized and licensed education providers and associations to prioritize and financially support the education of critical supply chain occupations, including training from a future skills perspective.

2. Make Win-Win Investments Now

Invest in digital infrastructure to create immediate jobs, training opportunities and to improve our competitiveness in a digitally focused economy

As COVID-19 began to spread across Canada and necessary public health containment measures were enacted, Albertans worked quickly to transition operations online and personnel to work virtually. However, Canada, and specifically Alberta, were at more of a disadvantage than the rest of the world because we lacked the requisite infrastructure to make a seamless and effective transition.

As of March 2020, Canada is ranked 17th out of 25 countries for fixed broadband download speed, according to the Speedtest Global Index.^{xxvi} Closer to home, across rural and northern Alberta 35% of communities do not meet the Canadian Radio-Television and Telecommunications Commission's (CRTC) standards.^{xxvii}

Digital technology and tools such as cloud computing, IoT, big data and data analytics are primary sources of competitiveness and major creators of economic wealth for businesses in today's economy.

The CRTC notes that in order for Canadians to take advantage of these types of technologies and services offered online (i.e. telehealth and business support), they must have access to internet at speeds of at least 50 Mbps.^{xxviii} But such tools and services are out of reach for many Alberta businesses and entrepreneurs in Smaller Central and Northern Alberta communities where coverage averages 5 Mbps for download speeds and 1 Mbps upload speeds.^{xxix}

A cost-benefit analysis study of Alberta Rural broadband deployment^{xxx} found that based on an estimate of 23,000 kilometers of broadband network to be built across rural Alberta, and assuming it would take five years to complete, the present value of total cost of capital over that five-year period is approximately \$3.97 billion. The study found that investing in a build-out of the broadband network across rural Alberta could result in a cost-benefit ratio between 2.97-3.47 for every dollar invested. Overall, such a project could result in \$200 million added to GDP annually.^{xxxi}

The Hudson Institute reviewed similar projects conducted in the United States and found^{xxxii}:

- ~70,000 jobs were directly supported by rural broadband companies in the US;
- Broadband companies contributed to \$24 billion to the economies of the states they operated in; and
- Rural broadband supported over \$100 billion worth of eCommerce in the US.

For communities already equipped with broadband or long-term evolution (LTE), such as Edmonton and Calgary, investing in 5G technology could unlock economic potential and increase productivity across sectors, enhance emergency response communications and lead to consumer savings:

- Emergency services could have a dedicated communications structure, unaffected by surges in use. In times of crisis, such as wildfires or floods, 5G would ensure a continuity of communication between emergency response teams across Alberta.^{xxxiii}
- Supporting 5G-connected “smart grids” integrated into power grids can enable reductions in household energy consumption by up to 12% saving families money with no reduction in quality or shortages.^{xxxiv}

5G is more physical-infrastructure intensive than its 4G predecessor, requiring hundreds of thousands of towers to support the communications infrastructure. This investment, along with a broadband build out across rural Alberta would support many high-paying construction, trades and technology jobs as the network is built in the near-term and as the network is maintained over the long-term.

Recommendation 2.1: *That the Government of Alberta work with municipalities and the private sector to invest in mass improvements to the province’s telecommunications network infrastructure, through a combination of 5G and expansion of the broadband network.*

Invest in the talent that will be required for recovery

Many sectors across the global and domestic economy have been hard hit by the combination of the oil price collapse and COVID-19 pandemic and will continue to be for some time. However, there are opportunities in certain sectors that can help our province bridge to economic recovery once the immediate crisis has subsided.

Talent development for 5G infrastructure building is not yet offered and investing in this programming now as well as committing funds to the build out of 5G and broadband across the province would net a rapid return on investment.

Potentially an education program conducted as a public–private partnership (P3), the province could partner with different post-secondary institutions, international experts in 5G, and existing telecommunications companies in Alberta seeking to launch 5G networks. With seed funding, these partners could develop online and in-field training ready for deployment this year.

Existing technicians in the telecommunications industry will require additional training^{xxxv}, such as:

- small cell antenna installation,
- 5G equipment specifications,
- 5G construction best practices,
- 5G infrastructure design, and
- distributed antenna systems and fiber work.

In the USA, where 5G rollout is far ahead of Canada, post-secondary institutions are already beginning to offer programs that support 5G training. Aiken Technical College, in South Carolina, offers a 12-week program in Tower Installation.^{xxxvi} As the 5G rollout accelerates across the USA, the program boasts an impressive 100% in-field employment rate.

Alberta's polytechnics and regional colleges would be well-situated to deliver similar programming. Investing in the initial development of courses, perhaps to be shared among all Alberta technical colleges, would quickly pay dividends for both getting Albertans back to work, improving Alberta's telecommunication infrastructure and attracting students from across Canada and North America.

Recommendation 2.2: That the Government of Alberta monitor leading indicators on workforce gaps and latent labour pools and work with post-secondary institutions to ensure training is available for the highest need programs (such as oil and gas reclamation and 5G installation).

That the Government of Alberta temporarily direct all Canada Job Grant funding towards applicants who are unemployed or underemployed as a result of the COVID-19 pandemic and oil price crash and dedicate the funds to re-training and upskilling.

3. Enhance Resiliency of Exporting (or Export-Capable) SMEs

Finance technology adoption and productivity improvements

Competition for trade and investment between jurisdictions was already fierce prior to the COVID-19 outbreak. Once the world's economy begins to recover, there will be increased competition between trade-dependent jurisdictions (such as Alberta) for market share as domestic economies across the world suffer contractions that may take years to regain, if ever. Additionally, the competitive positions of jurisdictions will be fundamentally changed by the impacts of containment measures and how effectively their government policy interventions were in shoring up economic resiliency.

There is already a productivity gap between Canadian small and medium-sized enterprises (SMEs) and SMEs in other countries, so now is the time to close the gap before it becomes an insurmountable chasm in the new normal. Adoption of digital technology in exporting (or export-capable) small and medium enterprises is one way to narrow the gap.

Businesses who increase their use of technology substantially (specifically digital technology and apps) are nearly twice as likely as other businesses to see strong growth and optimism about the future. In fact, a BDC study found that, over the past three years, digitally advanced companies were more likely to have:

- High sales growth (62%)
- High profit growth (52%)
- Exported (70%)
- Innovated (329%)

Properly deployed, Information and Communication Technology (ICT) helps firms build new products, services, and processes, and it enables better communication with customers and suppliers. A study of businesses in the Organisation for Economic Co-operation and Development (OECD) found that a 10% increase in the number of staff using computers improved productivity by 1.3%, and companies that made a series of ICT investments had 12%.^{xxxvii} [OBJ]. However, through roundtable discussions and interviews, Alberta companies across sectors identified several barriers holding them back from technology adoption and digitization in their businesses, including cost, skills and education.^{xxxviii}

In 2011, the Government of Canada launched the Digital Technology Adoption Pilot Program to accelerate the adoption of digital technologies in small- and medium-sized enterprises operating in Canada so they could boost productivity and create economic growth and opportunity. This pilot program was delivered by the National Research Council's (NRC) Industrial Research Assistance Program (IRAP) between November 14, 2011 to March 31, 2014.

The evaluation found the program was relevant, successful in reaching businesses (59 firms in the West; 62 projects funded), reported positive outcomes, and was economic and efficient in delivery.^{xxxix} However, this program was not continued and Canadian (and Albertan) businesses continued to fall farther behind the rest of the world in productivity growth. As of 2018, Canada's productivity rate was 12% below the G7 average.^{xl}

Recommendation 3.1: That the Government of Alberta allocate \$40 million toward one-time grants on a temporary (six month) basis to assist small and medium enterprises in Alberta who are exporting or export-capable (i.e., are enrolled or have recently completed the Trade Accelerator Program) in adopting technology to improve productivity, including an additional stipend if they use a local technology company or product.

The grants should be focused on commercial enterprises that are looking to expand, modernize, innovate and/or improve their competitiveness. Eligible projects could include:

- Projects which Expand capacity;
- Improvements to technology or equipment;
- Improvements to the productivity and competitiveness of a business;
- Provide access to new markets or market intelligence;
- Innovations to products or services; and
- The commercialization of innovations.

As indicated above, businesses will likely also need to upskill in order to adopt and implement some of these projects.

Recommendation 3.2: That the Government of Alberta top up the Canada Alberta Job Grant for companies or employees who require training to implement new technology or increase productivity to ensure training can be acquired without impacting company cash flow.

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Sources

ⁱ Conference Board of Canada, Canadian Outlook Summary: the Road to Recovery. (2020, Spring.) Retrieved April 6.

ⁱⁱ Coronavirus in the Chinese Law Context: Force Majeure and Material Adverse Change. Retrieved April 6, 2020, from <https://www.pillsburylaw.com/en/news-and-insights/coronavirus-in-the-chinese-law-context-force-majeure-and-material-adverse-change.html>

ⁱⁱⁱ Market Profiles: China. (Government of Alberta: Export Alberta, 2020). Retrieved April 6, 2020, from <https://export.alberta.ca/market-profiles/china/>

^{iv} Migliaccio, A. (2020, March 23). Italy to Start Production Shutdown as Deeper Recession Looms. Retrieved April 6, 2020, from <https://www.bloomberg.com/news/articles/2020-03-23/italy-to-start-production-shutdown-as-deeper-recession-looms>

^v S., A. (2020, March 23). Samsung to temporarily shut down smartphone factory in India over COVID-19 outbreak. Retrieved April 6, 2020, from <https://www.sammobile.com/news/samsung-temporarily-shut-down-smartphone-factory-india-covid-19/>

^{vi} Job market forecasts. Retrieved April 8, 2020, from <https://www.alberta.ca/job-market-forecasts.aspx>

^{vii} Alberta's short-term employment forecast. (2016, October 26). Retrieved April 6, 2020, from <https://open.alberta.ca/publications/2368-1039>

^{viii} UNCTAD: Global Investment Monitor. Impact of the COVID-19 Pandemic on Global FDI and GVCs, Updated Analysis. (2020, March.) Retrieved April 4, 2020. https://unctad.org/en/PublicationsLibrary/diaeiainf2020d3_en.pdf

^{ix} Scott R. Baker (2020, April 1). The Unprecedented Stock-Market Reaction to COVID-19. Retrieved April 4, 2020, from <https://insight.kellogg.northwestern.edu/article/what-explains-the-unprecedented-stock-market-reaction-to-covid-19>

^x UNCTAD: Global Investment Monitor. Impact of the COVID-19 Pandemic on Global FDI and GVCs, Updated Analysis. (2020, March.) Retrieved April 4, 2020. https://unctad.org/en/PublicationsLibrary/diaeiainf2020d3_en.pdf

^{xi} IoT connected medical devices promise a better tomorrow. (2018, February 8). Retrieved April 6, 2020, from <https://www.biospectrumasia.com/analysis/27/10292/iot-connected-medical-devices-promise-a-better-tomorrow.html>

^{xii} Carlsson-Szlezak, P., Reeves, M., & Swartz, P. (2020, April 3). Understanding the Economic Shock of Coronavirus. Retrieved April 6, 2020, from <https://hbr.org/2020/03/understanding-the-economic-shock-of-coronavirus>

^{xiii} Ibid.

-
- ^{xiv} Commissioner of the Food and Drug Administration: United States of America. Retrieved April 8, 2020, from <https://www.fda.gov/home>
- ^{xv} Reuters. (2020, March 3). World pharma supplier India restricts export of some ingredients, drugs. Retrieved April 6, 2020, from <https://beta.canada.com/pmn/business-pmn/world-pharma-supplier-india-restricts-export-of-some-ingredients-drugs/wcm/bb192642-becb-4700-8cf9-ca4e48c80d00/>
- ^{xvi} Young, L. (2020, February 19). COVID-19 hasn't affected Canada's drug supply yet, but experts are watching. Retrieved April 6, 2020, from <https://globalnews.ca/news/6570411/covid-19-drug-shortage-worry-canada/>
- ^{xvii} Bloomberg. (2020, April 1). Doctors say it is only a matter of time before Covid sweeps India. Retrieved April 6, 2020, from <https://economictimes.indiatimes.com/news/politics-and-nation/doctors-say-its-only-a-matter-of-time-before-covid-sweeps-india/articleshow/74883111.cms>
- ^{xviii} Reuters. (2020, March 3). World pharma supplier India restricts export of some ingredients, drugs. Retrieved April 6, 2020, from <https://beta.canada.com/pmn/business-pmn/world-pharma-supplier-india-restricts-export-of-some-ingredients-drugs/wcm/bb192642-becb-4700-8cf9-ca4e48c80d00/>
- ^{xix} Statistics Canada table no. [36-10-0595-01](#). Note: the multipliers refer to the Pharmaceutical and medicine manufacturing [BS325400], Alberta impacts only, in 2016 current dollars.
- ^{xx} Powell, N. (2020, April 3). 'Brutal education': Inside the mad rush to make masks to battle COVID-19. Retrieved April 6, 2020, from <https://business.financialpost.com/news/economy/brutal-education-inside-the-mad-rush-to-make-masks-to-battle-covid-19>
- ^{xxi} Perez, D. C. Canada Auto Manufacturers Shifting Production to Make Medical Equipment. Retrieved April 6, 2020, from <https://www.engineering.com/AdvancedManufacturing/ArticleID/20063/Canada-Auto-Manufacturers-Shifting-Production-to-Make-Medical-Equipment.aspx>
- ^{xxii} Government of Alberta: Export Tool. Retrieved April 6, 2020, from <https://export.alberta.ca/export-tool/>
- ^{xxiii} Canadian Supply Chain Sector Council. (2011). The Accelerator Project: A Call to Action, p 24. Retrieved from http://apgst.ca/projects/pdfs/accelerator_hr_full_report_reduced.pdf.
- ^{xxiv} Government of Alberta: Job market forecasts. Retrieved April 6, 2020, from <https://www.alberta.ca/job-market-forecasts.aspx>
- ^{xxv} The Digital Supply Chain: Creating skills for the future. (2018, January). Retrieved April 8, 2020 from https://www.supplychaincanada.com/media/reports/The_Digital_Supply_Chain_Final_Report.pdf
- ^{xxvi} Monthly comparisons of internet speeds from around the world. Retrieved April 8, 2020, from <https://www.speedtest.net/global-index>
- ^{xxvii} Service Alberta Provides Provincial Broadband Strategy Update. (2018, September 28). Retrieved April 6, 2020, from <https://rmaalberta.com/news/service-alberta-provides-provincial-broadband-strategy-update/>

^{xxxviii} Digital Transformation Service. (2019, July 16). High-Speed Access for All: Canada's Connectivity Strategy. Retrieved April 6, 2020, from https://www.ic.gc.ca/eic/site/139.nsf/eng/h_00002.html

^{xxxix} Ibid.

^{xxx} Southgrow Regional Development. A Cost-Benefit Analysis of Alberta Rural Broadband Deployment. (2019, November.) Retrieved April 8, 2020, from https://8027113f-922d-49f1-8cab-0a74f30812a1.filesusr.com/ugd/a556b1_d4f116fe94904d519321a3d15ff22240.pdf?fbclid=IwAR1XMdHf_vAh3nsJPexrpl9mpTd4p7GaQIbPmvNe4aNqbUOiNkVocfuuKh4

^{xxxvi} Accenture. (2019). Accelerating 5G in Canada: Benefits for Cities and Rural Communities. Retrieved from https://www.accenture.com/_acnmedia/PDF-112/Accenture-Accelerating-5G-in-Canada-PoV-2019.pdf#zoom=50

^{xxxvii} Kuttner, H. The Economic Impact of Rural Broadband. Retrieved April 8, 2020, from <https://www.hudson.org/research/12428-the-economic-impact-of-rural-broadband>

^{xxxviii} Advantages of 5G and How It Will Benefit IOT: IOT Solutions World Congress: DIGITALIZING INDUSTRIES. (2019, July 10). Retrieved April 6, 2020, from <https://www.iotsworldcongress.com/advantatges-of-5g-and-how-will-benefit-iot>

^{xxxix} Accenture. (2019). Accelerating 5G in Canada: Benefits for Cities and Rural Communities. Retrieved from https://www.accenture.com/_acnmedia/PDF-112/Accenture-Accelerating-5G-in-Canada-PoV-2019.pdf#zoom=50

^{xxx} Maurer, R. (2020, February 28). The 5G Workforce Needs a Big Boost. Retrieved April 6, 2020, from <https://www.shrm.org/resourcesandtools/hr-topics/talent-acquisition/pages/5g-workforce-labor-shortage.aspx>

^{xxxi} Programs of Study: Tower Installation. Retrieved April 6, 2020, from <https://www.atc.edu/Study/Programs-of-Study/Technical-Education/Tower-Installation>

^{xxxii} Roger L. Martin and James B. Milway, Enhancing the Productivity of Small and Medium Enterprises Through Greater Adoption of Information and Communication Technology (Toronto: Institute for Competitiveness and Prosperity, 2007).

^{xxxiii} Accelerator 2.0: a Call to Action. (2018, June). Retrieved from https://www.supplychaincanada.com/media/reports/Accelerator_2.0-Call_to_Action_Report.pdf

^{xxxiv} National Research Council Canada. (2019, March 19). Evaluation of the Digital Technology Adoption Pilot Program. Retrieved April 6, 2020, from <https://nrc.canada.ca/en/corporate/planning-reporting/evaluation-digital-technology-adoption-pilot-program>

^{xxv} Kaplan, M. (2018, February 16). Canada is lagging on innovation-and the Liberals aren't helping - Canadian Business. Retrieved April 6, 2020, from <https://www.canadianbusiness.com/business-news/canada-is-lagging-on-innovation-and-the-liberals-arent-helping/>