

BUILDING A NATION OF INNOVATORS



Innovation, Science and
Economic Development Canada

Innovation, Sciences et
Développement économique Canada

Canada

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EXECUTIVE SUMMARY



Canadians are at the core of innovation whose ideas and inspirations will guide the future success of our economy. Countries around the world are making large investments to unlock the benefits of technological transformation for their economies and peoples. In order for Canadians to reap the same benefits, we require a new approach that builds on our strong fundamentals, such as sound public finances, a low inflation environment, and the lowest unemployment rates in a generation.

Innovation is the key to competitiveness, productivity, economic growth, creating good jobs, and overall making life better for all Canadians. To become one of the most innovative countries in the world, Canada must build a culture of innovation, where Canadians can embrace change and have the right skill sets and tools to leverage emerging opportunities to compete in the global economy.

The multi-year Innovation and Skills Plan is Canada's response to this new reality, redefining the innovation

ecosystem. The Plan builds on Canada's innovation strengths and addresses areas of weakness along the innovation continuum: from people and skills, through to fundamental and applied research, building innovation ecosystems, commercializing ideas and starting-up companies, to exporting and scaling-up globally competitive companies across all sectors of the economy. At its very core, the Innovation and Skills Plan builds around Canada's competitive advantage: its people.

A New Approach to Innovation Policy in Canada

The Innovation and Skills Plan is a major redesign of the innovation policy landscape in Canada. It is a new approach to drive growth and create good jobs — one that aims to succeed by building a culture of innovation and a globally recognized brand for Canada as one of the most innovative and competitive countries in the world.

The Plan's integrated approach supports firms at all points along the innovation continuum and Canadians at every stage of their lives. Emphasizing partnerships, it brings together stakeholders from across the innovation system. It embraces inclusivity and fosters the participation of traditionally underrepresented groups in the innovation economy. It strengthens Canadian leadership in key sectors by removing barriers to growth and fostering innovation in potential high-growth areas.

Targeting challenges and opportunities at every stage of the innovation continuum, the Innovation and Skills Plan is firmly rooted in four interconnected and mutually reinforcing pillars.



People & Skills

Ensuring businesses have the right pipeline of talent to succeed and equipping Canadians with the tools, skills, and experience they need to succeed throughout their lifetimes

Canada has one of the most educated populations in the world, but important skill gaps remain. As the nature of work continues to evolve and technological change accelerates, many employers have difficulty in identifying the specific skills their employees will need as automation continues to accelerate.

Canadians must possess the right skills and the flexibility to meet the demands of the workplace in the face of changing business models. To grow and scale-up, firms must be able to fill skills gaps. They need better access to global talent and to recruit from a broader pool of

Canadians with strong science, technology, engineering and mathematics (STEM), business, creative, and digital skills. All Canadians, particularly youth, women, and Indigenous people, must have more opportunities to develop key skills and upskill. They must also be connected to high-speed internet to participate in the digital world.

A new suite of programs is needed to ensure that Canadians, from all walks of life and throughout their entire working years can succeed in this new reality. Under the Innovation and Skills Plan, CanCode is delivering new digital skills and coding training to youth and their teachers. A greater number of work-integrated learning placements are giving young Canadians the hands-on skills and experiences they need to get good jobs. The new Global Skills Strategy is helping to fill skills gaps by providing businesses with a quick and reliable process to access global talent.

The Plan also addresses digital divides by making new investments in broadband infrastructure through Connect to Innovate. Connecting Families, in partnership with the private sector, provides low-cost internet and computers to lower-income Canadians.

What's new about this approach:

- › Supports Canadians at every stage of their lives.
- › Takes a partnership-driven approach, working with industry, post-secondary institutions, not-for-profits, and provinces and territories.

EXPECTED IMPACTS AND EARLY RESULTS

1 MILLION STUDENTS & 53,000 TEACHERS

CanCode has reached 1 million students and 53,000 teachers, doubling its initial target of 500,000 students by March 2019.

1 MILLION YOUTH A YEAR

PromoScience encourages 1 million youth a year to pursue interests and careers in STEM.

11,500 PLACEMENTS

The Student Work Placement Program will provide 11,500 quality work-integrated learning opportunities by 2021 for post-secondary education students in STEM and business fields.

8,000 PLACEMENTS

Mitacs has increased its work-integrated learning placements for post-secondary students and graduates from 2,450 in 2014–2015 to 8,000 in 2017–2018, and is on track to reach 10,000 a year by 2021–2022.

600 INTERNSHIPS

Digital Skills for Youth aims to provide 600 internships to under-employed post-secondary graduates by March 2019.

900 COMMUNITIES

Connect to Innovate has announced 180 projects that will connect rural and remote communities to the internet, and is on track to reach 900 communities.

\$10 INTERNET PACKAGES

Connecting Families is working with the private sector to provide low-income families with \$10 internet packages.

50,000 COMPUTERS

Computers for schools is providing 50,000 computers over five years to eligible households.

40,833 JOBS

Global Skills Strategy, Global Talent Stream: as of November 2018, 3,265 applications have been approved for high-skilled immigrants, creating 40,833 jobs and 9,732 paid co-op positions.



Building Ecosystems: Science, Technology, and Superclusters

Building innovation ecosystems through new partnerships, bridging the gap from idea, to commercialization, to growing globally-minded firms

Canada's existing research strengths have not translated into sufficient applied research, technology, or innovation outcomes. Investment in fundamental science has declined over the past decade, along with business investment in applied research and development (R&D). Aging science infrastructure across the country has also prevented our researchers from being the best in the world. Early-career and women researchers interested in pursuing careers in science face many barriers. Canada's rate of collaboration in innovation ecosystems between industry, academia and other innovation actors lags that of other leading countries, with a low density of networks and clusters.

The Government engaged leaders from the research community to conduct the Fundamental Science Review. In response to the Review's findings, the Government has made historic investments in fundamental research, science and infrastructure that will underpin innovation, competitiveness, and economic growth for years to come.

The Innovation and Skills Plan is also creating the right partnerships for developing new innovation ecosystems that bridge the gaps from science, to

commercialization, to investment and scale-up. To accomplish this, the Innovation Superclusters Initiative is investing up to \$950 million in five industry-led superclusters to accelerate the growth and development of large-scale business-led innovation. Superclusters encourage industry-driven R&D activities, pool access to cutting-edge research and highly skilled talent, link larger firms with innovative SMEs to help them scale up, attract investment, and create hubs of global competitive advantage for advanced industries.

The Government alone cannot create a culture of innovation; it requires partnerships with firms of all sizes, both with large anchor firms and with smaller firms that are striving to grow and become globally competitive.

What's new about this approach:

- › Takes an experimental, transformational approach that aims to build superclusters—world-class, large-scale innovation ecosystems—to strengthen Canadian competitiveness.
- › Places a stronger emphasis on science and evidence-based decision-making through investments in fundamental research and a new focus on multidisciplinary, international research.
- › Helps Canadian businesses better understand IP so that they can unlock its benefits and scale-up their innovations.

EXPECTED IMPACTS AND EARLY RESULTS

50,000 JOBS

The Innovation Superclusters Initiative is spurring growth, and is expected to create 50,000 good middle-class jobs across Canada.

\$50 BILLION

The Innovation Superclusters Initiative is expected to grow Canada's economy by \$50 billion over the next 10 years.

\$950 MILLION

The five superclusters represent more than 450 businesses, 60 post-secondary institutions, and 180 other participants who will match targeted investments, dollar for dollar, of up to \$950 million over five years.

\$4 BILLION FOR SCIENCE

Budget 2018 allocated \$4 billion to support the work of researchers and provide them access to the state-of-the-art tools and facilities they need.



Investment, Scale-up, and Growing Companies

Attracting investment, supporting the growth of leading Canadian companies and start-ups, and exporting

Despite Canada's strong record in starting businesses, relatively few companies scale-up into globally competitive companies, exporting and operating at the cutting edge of innovation. The importance of such large firms is clear: they make large investments in R&D; they are more productive; they pay higher wages; they are more cyber secure; they have more diverse workforces; they export more; and they provide employees with greater job security and benefits. However, only 2 percent of mid sized businesses in Canada actually succeed in growing into large businesses.

EXPECTED IMPACTS AND EARLY RESULTS

\$50,000 JOBS

SIF investments to date are expected to secure 50,000 jobs.

\$795 MILLION

As of January 2019, SIF has announced 31 agreements, totalling \$795 million in SIF contributions, which will leverage a total investment of \$8.1 billion.

\$1.5 BILLION

With funds leveraged from the private sector, the Venture Capital Catalyst Initiative is expected to inject \$1.5 billion into Canada's risk capital market.

\$2.3 BILLION

The Government has announced more than \$2.3 billion to support clean technology, including the growth of Canadian firms and clean technology exports.

8,000 COMPANIES

IRAP supports more than 8,000 high-potential firms a year in bringing their products and services to the global marketplace.

Canada needs a clear path to growing more companies. Smaller firms are not taking full advantage of productivity-enhancing technologies (e.g., artificial intelligence (AI), advanced manufacturing, the Internet of Things, cloud computing); attracting late-stage capital; and exporting to markets around the world.

The Innovation and Skills Plan responds by encouraging the growth of Canadian businesses so they can integrate into value chains, export, and compete globally. Through Innovative Solutions Canada, a new procurement program, the Government is acting as a first customer for innovative small and medium-sized enterprises (SMEs) by releasing grand challenges and inviting innovators to solve them. This approach supports the development of early-stage, pre-commercial innovations with great global commercialization potential.

Through the Strategic Innovation Fund (SIF), the National Research Council- Industrial Research Assistance Program (NRC-IRAP), Regional Development Agencies (RDAs), and Business Development Bank of Canada (BDC), the Plan takes a client-centric approach to working with firms at every stage of growth. It increases the availability of late-stage capital through the Venture Capital Catalyst Initiative, and patient capital through new clean technology financing. Canadian start-ups and SMEs require this type of support to scale their businesses.

The Plan also helps Canadian firms export and expand to new markets through increased support from the Trade Commissioner Service (TCS) and Export Development Canada (EDC).

What's new about this approach:

- › Provides both direct and indirect support for firms.
- › Uses the Government as a first customer to support innovative SMEs.
- › Provides an integrated approach to support firms at all stages of growth.
- › Makes advice and capital available to firms looking to go global and export.



Program Simplification and Reorganization

Offering a timely, client-centric single window in the delivery of business innovation programs in every region

Traditionally, the suite of federal government programs for supporting innovation in Canada was difficult to navigate. Other programs were too narrowly focused for today's economy. In addition, many Canadians simply did not know where to go to get government support, preventing them from capitalizing on opportunities to grow their businesses and compete.

Canadian firms want a 'one-stop shop' to find government programs that meet their specific needs along the innovation continuum—whether they are looking for funding, tax credits, expert advice, or wage subsidies, or forming new partnerships. It is clear that indirect support alone is not sufficient for supporting Canada's innovation system across all sectors of the economy. At the same time, programs need to be responsive to firms' needs, and all levels of government need to operate at the speed of business, and with better access and coordination.

To address these challenges, a whole-of-government review of business innovation programs redefined business innovation support to make it more demand-driven and targeted to real-world business needs. Through program consolidation, increased levels of direct support, and a whole-of-government approach, more potential high-growth companies are able to achieve their ambitions for scaling-up and becoming globally competitive.

The new Innovation Canada digital platform simplifies access to programming through a single window that matches businesses with programs and services. The new approach adds value by saving companies time and money. It allows them to focus on what matters, and provides better access to financial support geared to their individual needs and circumstances as they grow over time.

To help high-growth firms reach their full potential, the Accelerated Growth Service (AGS) provides support and guidance in accessing key government services, such as financing, exporting, innovation, and business advice.

What's new about this approach:

- › Provides a single window for firms to access tailored support, with special access for clean technology firms.
- › Reduces the number of programs by two-thirds and increases overall funding.
- › Offers a simplified suite of programs, featuring four flagship programs that correspond to different firm growth stages.
- › Addresses challenges and identifies opportunities through six business-led Economic Strategy Tables that focus on areas of high-growth potential.

EXPECTED IMPACTS AND EARLY RESULTS

420,000+ VISITS

Since its launch in January 2018, the Innovation Canada digital single window has received 420,000+ visits, helping to match businesses with the best fitting programs and services—all in under three minutes.

450 HIGH-GROWTH FIRMS

Over 450 high-potential firms have enrolled in the AGS and accessed \$350+ million in funding.

776 CLIENTS MET

The Clean Growth Hub has met 776 clients since its inception in January 2018.

FEWER PROGRAMS WITH GREATER IMPACT

Budget 2018 announced the results of the horizontal review of business innovation and clean technology programs, increasing funding for innovation while reducing the number of separate programs by two-thirds.

Moving Forward

While the Innovation and Skills Plan has taken major steps and made significant progress, more work must be done to maintain Canada's competitiveness, strengthen regional ecosystems, and reinforce leadership in areas of high-growth. Technology is not only accelerating changes in the workplace, but also increasing the integration and convergence of industry sectors. New technologies, such as AI, are transforming existing industries and creating new business models. They are offering new sources of growth, while presenting new challenges related to issues of trust and privacy. These opportunities raise the risk of creating new digital divides without strong connectivity for all Canadians. The insights shared by Canadians in the Digital and Data Consultations will help guide the Plan going forward.

In addition, the Government is developing new regional growth strategies to support clean growth, inclusiveness, the scaling-up of Canadian firms, and innovators in every part of the country.

The recommendations of six industry-driven, sector-specific Economic Strategy Tables have already begun to be implemented, and will inform the Plan's next steps on how to remove innovation bottlenecks and embrace new opportunities.

In early 2019, we are seeing positive signs emerge: in 2018 Canada's venture capital market broke records (raising between \$4.3B–\$4.6B), marking a nearly two-decade high in dollar flows, with a bigger proportion of late stage financing, signaling an upward trend in scale-up activity. Canada is also seeing an increasing pace of investment in young technology companies that have the potential to become successful on the world stage. Canada remains one of the top ranked countries in the world for talent attraction.

The Innovation and Skills Plan is a long-term plan for Canada's future which puts people at its centre. It builds a solid foundation for success and global competitiveness. With strong business leadership, enabled by strategic government support, the removal of barriers to success will continue, investments will be made, experimentation will flourish, and strong partnerships will bolster and reinforce Canada's important role on the world stage. Through continued determination and support across the innovation continuum, Canadians are embracing a new culture of innovation that champions ingenuity and embraces change and disruption—propelling Canada to become one of the most innovative countries in the world. Together, we will create good jobs for today and for future generations in tomorrow's digital economy.



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INTRODUCTION: A TIME FOR CHANGE



Image credit: Canadian Space Agency

Powerful global forces, such as technical disruption and new applications of data and digital technologies, are driving rapid change in economies and societies around the world. Seizing this moment of change, and transforming it into new opportunities and competitive advantages for Canada, calls for bold and urgent action.

Other countries recognize the importance of innovation in driving long-term growth and in creating a resilient workforce for the future. They are investing heavily in innovation systems that support successful, competitive firms. To keep up and thrive in this global innovation race, Canada must build a culture of innovation.

What is innovation and why is building a culture of innovation so critical to securing Canada's future? At its core, *innovation* is about change. It is about doing old things in new ways, doing new things in unexpected ways, solving old problems with new solutions, and utilizing technology to improve economic and societal outcomes (Lynch, 2010). A culture of

innovation is a mindset that creatively embraces change as an opportunity. It deems agility, speed, and competitiveness as prerequisites for capturing the moment at hand for inclusive economic and social benefit. It is being ready, willing, and determined to play a long game to achieve sustainable economic and social success.

In 2015, it was evident that past innovation support mechanisms were no longer sufficient drivers of growth. Firms were experiencing skill gaps. There were too many hurdles to attract global talent. Young people did not have enough access to the coding and digital skills required for the future of work. The gender gap was

not narrowing. Investments in research and development (R&D) were continuing to decline. Relatively few companies were scaling into globally competitive anchor firms. In addition, firms found it difficult to navigate the government support system for innovation.

In response, in 2017 the Government launched a bold, multi-year *Innovation and Skills Plan*—a major redesign of the innovation policy landscape in Canada. The Plan features a brand new microeconomic framework for supporting innovation, novel ways of thinking about how to grow Canada’s economy, and experimental first-of-their-kind initiatives to Canada. It aims to establish a culture of innovation and a globally recognized brand for Canada as one of the most innovative countries in the world.

This approach emphasizes partnerships, collaboration, and the development of innovation ecosystems. This means greater connectivity between firms, researchers,

educators, venture capitalists, incubators, all levels of government, non-profits, and other innovation actors. It embraces Canada’s diversity, and fosters the participation of traditionally underrepresented groups, such as women and Indigenous people, in the innovation economy.

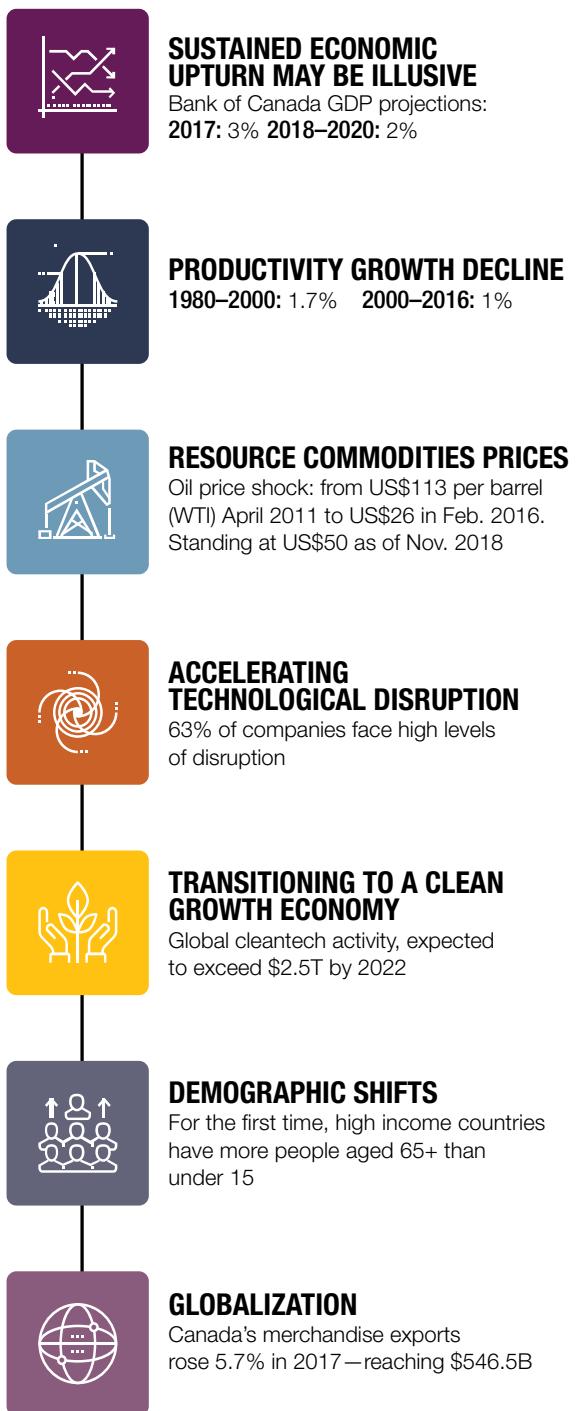
The Plan targets investments at all points along the innovation continuum, starting with people and skills and extending to fundamental science, to commercial applications and new technology adoption, and to accessing markets at home and abroad. It seeks to support firms of all sizes and sectors, from manufacturing, to clean technology to oil and gas, to agri-food, helping them to scale, grow, and export. And, it supports Canadians at every stage of their working lives. From coast to coast to coast, Canadians are working together to make this nation an innovation leader, a globally competitive business powerhouse, and a strong and inclusive society that generates better and more well-paying jobs today and into the future.

DISRUPTION IN A GLOBAL CONTEXT



Image credit: North

To succeed and lead in the economy of the future, nations must understand, navigate, and respond to powerful and pervasive global trends. Past drivers of economic growth have become insufficient, and Canada cannot solely depend on them to generate a high standard of living and quality of life. Disruptive technologies are rapidly changing the nature of work and the skills required for the future, transforming industries, creating new business models, and supporting the rise of new world-leading firms.



Weakening of Past Drivers of Growth



Global Economic Demand

In Canada and other developed countries, economic recovery following the 2007 financial crisis has been slow. In contrast to previous periods, the current global growth rate of nearly 4 percent is not solely due to rising productivity gains or sweeping structural change. Instead, it is bolstered by monetary and fiscal policy support. In general, these types of interventions cannot sustain expansion without a rise in productivity.



Productivity Growth

In most countries, productivity growth—the key long-term driver of living standards—has stalled, remaining well below historic averages.

It has slowed down among advanced economies since the early 2000s, with particular sluggishness following the 2007 global financial crisis. Canada is no exception. Annual productivity growth declined from 1.7 percent per year between 1980 and 2000 to 1 percent between 2000 and 2017 (Statistics Canada, 2018h).



Resource Commodity Prices

Global commodity prices entered a period of strong and sustained uptrend in the early 2000s due to rising global demand. By the peak in mid-2008, the prices of almost all classes of commodities had risen substantially. For many, the pace of price increase accelerated between January 2006 and July 2008 with the price of crude oil more than doubling (Devlin et al., 2011). Over the next four years, resource commodity prices dropped significantly, which has continued to affect Canada's oil and gas and mining sectors in particular.



Technological Disruption

Scientific and technological advances are disrupting businesses across all sectors, including in areas such as artificial intelligence (AI), quantum computing, nanotechnology, genomics, the Internet of Things, and advanced robotics. One recent assessment of more than 3,600 companies in 82 countries highlighted that 63 percent currently face

high levels of disruption in their respective industries (Accenture, 2018). Canadian businesses are not immune from technological disruption and many are responding by introducing new methods in business practices, workspace organization, or partnerships with other organizations (Statistics Canada, 2018). However, technology adoption remains a challenge. For example, 16 percent of Canadian companies surveyed by Deloitte (2018) use AI technologies—a number that has remained stagnant over the last four years.



Climate Change and Clean Growth

The global focus on tackling climate change and investing in clean growth and energy is creating a range of economic opportunities and challenges. In December 2015, Parties to the United Nations Framework Convention on Climate Change adopted the Paris Agreement to strengthen the global response to the threat of climate change. Climate change could cost Canada an estimated \$21 to \$43 billion per year by 2050 (National Round Table on the Environment and the Economy, 2011). A growing interest in clean growth and technology also presents new economic benefits, with the global clean technology market expected to exceed \$2.5 trillion by 2022 (SmartProsperity, 2018). In 2017, Canada's clean technology industry contributed \$28.4 billion to Canada's gross domestic product (GDP) and generated \$9 billion in exports (Statistics Canada, 2018g).



Demographic Trends

A combination of an aging population and low birth rate constrains the economic growth prospects of many advanced economies.

The majority of the world's population lives in nations with fertility rates below replacement and gradually aging populations, leading to declining labour force participation (Canada, 2017b). Canadians are living longer than ever and now have one of the highest life expectancies in the world. Combined with falling fertility rates, these positive developments in longevity have resulted in Canada's overall population gradually growing older. There are now more seniors aged 65 and over than there are children under the age of 15, a trend that began in 2015 (Canada, 2018b). The withdrawal of baby boomers from the workforce can lead to slower potential output growth (CBoC, 2018).



Globalization

A more connected world—through trade and movements in capital, people, technology, and data—has been associated with economic growth as well as with the halving of the global poverty rate between 1990 and 2010 (The Economist, 2013; Kenny, 2017). The removal of trade barriers boosts productivity by lowering the costs of production and lifts wages through increased market access and demand. Canada significantly benefits from globalization, with exports representing 31 percent of GDP in 2017 (Statistics Canada, 2018d). However, globally, the gains from trade have been unevenly spread, challenging an open and rules-based system for international trade and investment in some countries, making it more difficult to secure and build on globalization's positive aspects (OECD, 2017d, 2018c). New tariffs implemented by some countries are disrupting supply chains and eroding economic growth potential. The Bank of Canada reports that trade disputes and geopolitical tensions are weighing on global demand, which is expected to reduce the level of global GDP in the short term (Bank of Canada, 2019).

The Changing Dynamics of Business

The nature of competitive advantage and the business models of firms are evolving. They are influenced by the future of work; the presence of global value chains for production and distribution; the increasing importance of innovative and competitive advanced industries; changing markets and the rise of new digitally-led business models; the role of the consumer and the power of data as business disrupters; and the proliferation of clean technology affecting almost every sector. To be ready to compete and respond to the new dynamics, Canadian businesses must create and seize new market opportunities, generate new commercial value from intellectual property (IP), and successfully compete in the data-driven digital economy.

The Future of Work

Job skill requirements continue to change. On average, 14 percent of jobs across the OECD are estimated to be at high risk of automation in the next 15 to 20 years and half of all jobs will experience significant change (OECD, 2018h). The McKinsey Global Institute (2017) estimates that

8 to 9 percent of labour demand in 2030 will be in jobs that do not yet exist today. Not surprisingly, many employers have difficulty in identifying the specific skills their employees will need as automation continues to accelerate.

The OECD (2018i) reports that digital-intensive industries reward workers with relatively high levels of self-organization and advanced numeracy skills. Those with strong numeracy skills receive an additional wage premium if they also show high levels of self-organization or management and communication skills. In this context, Canada has the opportunity to prepare its citizens and businesses for the future of work through building on its highly educated workforce, world-class post-secondary institutions, and a strong science foundation. For example, the growing use of new technologies in business increases demand for digital skills and STEM knowledge, and encourages their development in workplace and formal educational settings (UNESCO, 2017).

Global Value Chains (GVCs)

It is rare for a good or a service today to be entirely produced at one location and then exported to a final consumer. Falling trade and investment barriers, the revolution in logistics technologies driven by information and communications technologies, and other features of globalization have resulted in the development of complex supply chains and value webs. Data-intensive supply chain technologies such as advanced analytics, AI, robotics, and blockchain are increasingly powering and shaping these GVCs. Joining GVCs involves demonstrating advanced technology adoption, providing leading-edge products and services, and operating at scale to compete with the best.

Stronger participation of Canadian small and medium-sized enterprises (SMEs) in global markets and supply chains creates opportunities to scale-up, accelerate innovation, facilitate spillovers of technology and managerial expertise, broaden and deepen skill sets, and improve productivity performance (OECD, 2017b, 2018b). Canadian firms that export and participate in GVCs tend to create higher-quality jobs at home.

The Importance of Advanced Industries

Advanced industries anchor high-value economies and represent opportunities for global leadership. The Martin Prosperity Institute and Brookings (2018) identify 50 such industries in Canada according to two criteria: (i) R&D

spending exceeds \$450 per worker, above the 80th percentile of U.S. industry intensity; and (ii) STEM worker share of industry exceeds U.S. industry averages. They include energy industries, such as oil and gas extraction and electric power generation; advanced manufacturing industries, such as pharmaceuticals, motor vehicles, aerospace, and machinery; and services, such as software design, telecommunications, and scientific and technical services. Advanced industries account for at least 17 percent of Canada's GDP, 61 percent of exports, and 78 percent of R&D expenditures. The annual wage of an average worker in these industries is nearly 50 percent higher than that of other Canadian workers (MPI and Brookings, 2018).

In advanced industries across all OECD economies, new business models that feature product customization for multiple local markets are emerging (D'Aveni, 2018; Öberg et al., 2018). They are enabled by flexible manufacturing systems and capabilities, powered by technologies such as advanced sensors, robotics, AI, and 3D printing (OECD, 2017f). Coordinating and standardizing digital technologies for the next production revolution within advanced industries is proving to be complex. To successfully improve competitiveness and grow into large global champions, Canadian advanced industries must master the technological complexity of the modern economy (MPI and Brookings, 2018).

New Markets and Business Models

Technology is changing the way people and businesses access information, produce and buy goods and services, and interact with one another. The Internet of Things, autonomous vehicles, 3D printing, clean technologies, advanced robotics, and promising areas, such as AI, regenerative medicine, blockchain, and quantum computing, are reshaping the economy, our cities, our jobs, and our lives. New products and markets are being created and new business models are upending existing markets.

In today's digital world, strategic advantages are often competed away more quickly in all but the most innovative firms, and even new business models have shorter life spans than ever before (see Kiechel, 2010; Atkinson, 2017). Disruptive technologies may also be creating more differentiation between the largest, most successful firms and the rest of the market, fuelling a winner-takes-all environment (Frank, 2017; Wilkins, 2018; Calligaris et al., 2018).

Changing markets and business models are placing a new premium on IP and, in many countries, businesses aggressively protect what they rightfully own through asserting their IP rights. Fostering a sophisticated domestic IP capability in Canada helps businesses improve the commercialization of ideas globally and innovators reach commercial success (Balsillie, 2018). It also furthers discovery and creates middle-class jobs by protecting Canadian ideas and ensuring Canadians reap the full rewards of their inventions and creations.

Consumers and the Power of Data as Business Disrupters

Digital technologies are creating and drawing on vast quantities of data. The global datasphere is estimated to grow to 163 zettabytes (ZB; a trillion gigabytes) by 2025, or 10 times the 16.1ZB of data generated in 2016 (IDC, 2017). These data can unlock tremendous new opportunities for economic, social, and environmental advancement. This data-intensive economy, however, presents new and complex challenges, such as how to ensure an effective balance between supporting innovation, protecting privacy interests, and promoting trust.

Consumers and data are redefining the direction, shape, and pace of business in many industries. Consumers access large data repositories to compare market prices and product availability. This is a positive development from a competition perspective, forcing businesses to become more agile to respond and compete successfully. According to Harrington (2013), rapidly changing and often unpredictable consumer buying behaviour, enabled by the internet, mobile communications, and growing spending power, is making volatility and complexity the norm rather than the exception in retail. It is fragmenting sales channels, escalating service demands, shortening product lifecycles, ratcheting up cost and margin pressures, and creating production challenges.

Canada has a competitive advantage as a trusted data repository. The economic importance of its reputation for prioritizing privacy protection cannot be understated. This advantage, combined with affordable and clean

energy options, has made cities such as Montréal destinations for global cloud operators. In addition, Canada is a top choice for European organizations needing a North American footprint due to its standing in the European Union as having an “adequate” privacy regime.

Clean Technology

By developing and adopting clean technology, companies and industry can better control costs, meet new regulatory requirements, and become more competitive globally (Canada, 2018). Today, clean technology is a megatrend that will affect most sectors at varying speeds. In recent years, the focus of clean technology has shifted from a small, limited number of incremental innovations to new and disruptive innovations that rely on data, machine learning, and AI. One example of the new wave of disruptive clean technologies is the emergence of smart and energy-efficient home environments controlled through mobile phones. For businesses, the Internet of Things tied with clean technology will be a game changer (e.g., allowing for better management of energy consumption and costs in real time). These and many other disruptive applications will increasingly depend on access to consumer and business data, and will likely require new approaches to data governance.

Other leading innovative countries that recognize the size of the clean technology opportunity are making big bets to help grow their companies. For example, the U.S. Department of Energy’s Advanced Research Projects Agency-Energy (ARPA-E) invests US\$300 million a year in high-potential, high-impact energy technologies. The U.K. is investing £162 million in innovation for low-carbon industry and developing a new strategy for the bio-economy. France has committed €20 billion to accelerating its ecological transition in 2018–2022. In 2017 alone, China invested US\$126.6 billion in renewable energy and related infrastructure. To successfully scale-up and capture the growing global clean technology market, Canadian companies need access to risk capital, robust domestic innovation ecosystems, and many other competitive advantages, including a well-developed internal capacity to protect and leverage IP.

CANADA'S INNOVATION PERFORMANCE

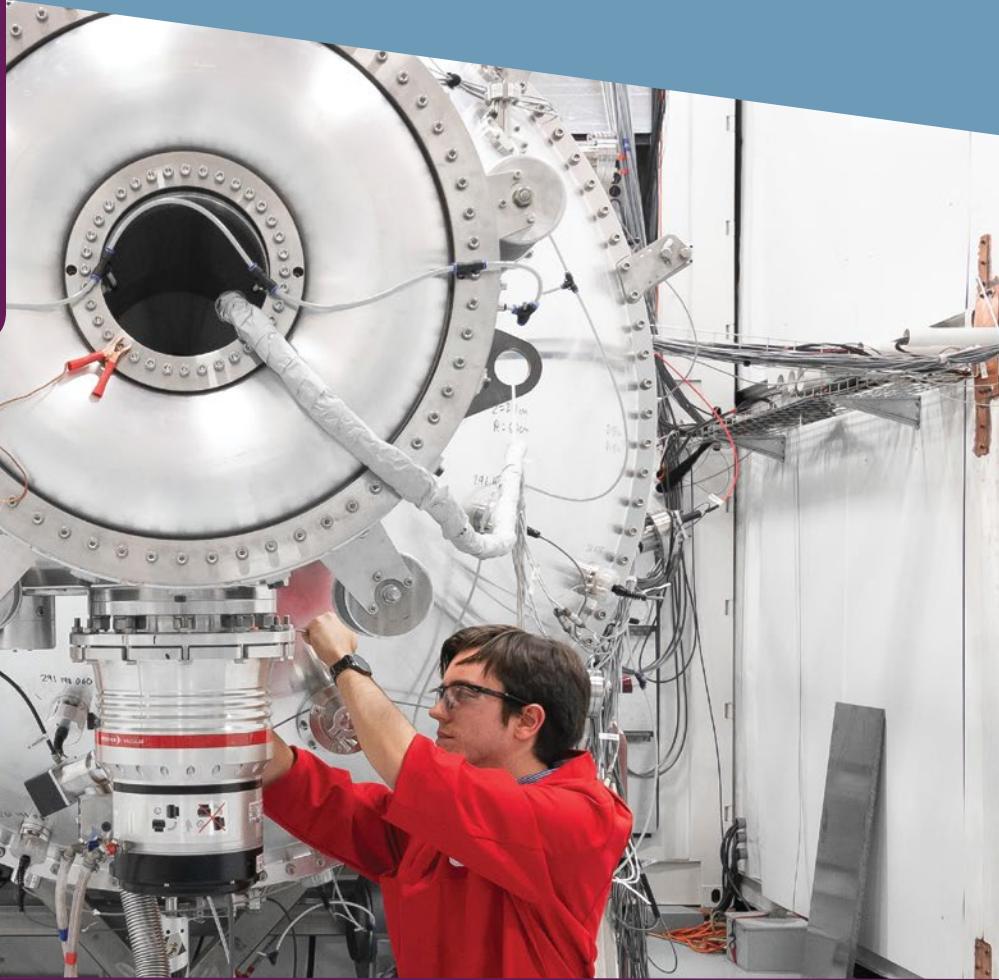


Image credit: General Fusion

Canadians are living in an era of accelerated change. In the face of global forces that are reshaping the economic landscape and rendering past drivers of growth insufficient, new strategies and models are needed to boost productivity and competitiveness. Global leaders have arrived at the same conclusion about how to respond: investing in innovation is crucial.

Investing wisely and strategically in innovation requires a clear understanding of Canada's current innovation performance to determine approaches that are right for the times in which Canadians are currently living. Past science, technology, and innovation policies have created a well-educated population, successfully supported fundamental science, and provided broad-based indirect support through tax incentives. However, Canada has not kept pace with competitors in transforming itself into an innovation leader.

Why Innovation Matters

Innovation drives productivity; it drives growth; and it drives living standards. It is through innovation that businesses find ways to generate more value from existing resources. As a result, innovation is, directly or indirectly, the main driver of productivity growth, and is the principal source of national prosperity (Nicholson, 2009).

Innovation can be manifested in four distinct areas. First, product innovation is the capacity of a firm to introduce new products and services ahead of competitors, to anticipate consumer needs or even to create them. Second, market innovation is the capacity of a firm to decide to change its market geographically, virtually, or creatively. Third, process innovation is the capacity to change how goods and services are produced and delivered to reduce cost, improve efficiency, and increase convenience for customers. Finally, organizational innovation is the capacity to convert creativity, market and customer knowledge, and technology into marketable innovations (Lynch and Sheikh, 2011).

Innovation contributes to economic growth through several channels, such as:

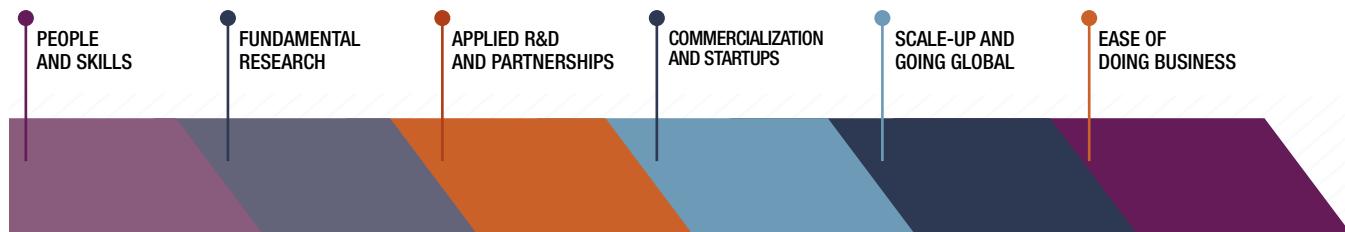
- › Technological progress embodied in physical capital, including machines, computers, and software;
- › Investments in knowledge, including R&D, IP, and skills;
- › Increasing efficiency in the use of labour and capital; and
- › Increasing competitive pressure on incumbent firms.

Considering the various ways that innovation affects the economy, the OECD (2015) estimates that innovation accounts for a substantial share of economic growth, often around 50 percent of total GDP growth, depending on the country.

Canada's Strengths and Weaknesses Along the Innovation Continuum

Innovation exists along a continuum (Figure 1). People are at the very beginning: their creative ideas and resourcefulness drive the world-first discoveries, new business start-ups, commercialization of innovative new products and services, and creation of good middle-class jobs. They are the pipeline of talent that enables every stage of the innovation continuum. Next, fundamental research leads to new scientific discoveries that can change our understanding of the universe, and puts in place the building blocks for future experimentation. Applied research requires partnerships between businesses and researchers who apply their ingenuity and fundamental research concepts to create potential products and services for commercialization, leading to the creation of new companies. If successful, these companies scale-up and export to markets around the world. The Government facilitates the ease of doing business through advice, direct and indirect support, and a regulatory environment that protects Canadians but is also conducive to innovation.

FIGURE 1
The Innovation Continuum



People and Skills

People and skills drive progress along the innovation continuum, and are the pipeline that enables every aspect of innovation and growth.

Strengths:

- › Canada has a well-educated workforce with 56.7 percent of 25–64 year olds holding a tertiary degree—the highest percentage among all OECD countries in 2017 (OECD, 2018). In 2015, Canada continued to rank among the top five countries in the OECD for youth's competencies in reading (first), science (fourth), and math (fifth) (OECD, 2018f).
- › Canada has a well-educated female population, with the highest share in the OECD of women with post-secondary degrees. Women made up 55.9 percent of all tertiary degree holders in 2017 (OECD, 2018), and 66 percent of degree holders aged 25–34 in non-STEM subjects in 2011 (Statistics Canada, 2016).
- › Canada is an open and accepting multicultural society that views diversity as an asset. In 2018, it had the most diverse workforce in the world (WEF, 2018). Among OECD countries, Canada ranked fifth in the number of international PhD students in STEM in 2015 (OECD, 2017e), and sixth in the number of international students in higher education (OECD, 2017a). Immigrants held 37 percent of all ICT jobs in 2017 (ICTC, 2018).

Weaknesses:

- › Canada has gaps in STEM, business, creative, and digital skills. ICTC (2018) predicts that Canada will need to fill 216,000 positions for digitally skilled workers by 2021, but domestic supply alone will not be able to meet this demand. In 2017, 37 percent of SMEs said that either recruiting and retaining skilled employees or shortage of labour was the biggest obstacle to growth (ISED, 2018a). In 2018, 41 percent of employers had a talent shortage, particularly in skilled trades, sales, engineers, and professionals (ManpowerGroup, 2018). In 2015, 53 percent of Canadian technology firms identified an insufficient supply of executive and managerial talent as the primary impediment to scaling-up (Lazaridis Institute, 2016). In 2015, Canada was 18th in the OECD for STEM PhDs per capita and 14th for business graduates per capita (OECD, 2018g). According to Actua (2018), at least 36 percent of Canadian schools did not offer coding classes in 2018, and 59 percent of boys and 72 percent of girls are not confident in coding.

- › Canada has a connectivity divide. Rural communities have access to lower internet service speeds: nearly 98 percent of urban residents had access to internet speeds of 100+ Mbps compared with 37 percent of rural residents in 2016 (CRTC, 2017).
- › Canada is not arming underrepresented groups with the knowledge and skills to create, succeed, and take advantage of opportunities in the innovation economy. This is a long-standing problem, with only a 0.6 percent growth from 2007 to 2017 in women's share of ICT jobs (ICTC, 2018). Indigenous people are also underrepresented in the digital economy. They held an estimated 1.2 percent of ICT jobs in 2016 (ICTC, 2017), but represented 3 percent of the total workforce (Statistics Canada, 2018b).

Fundamental Research

Fundamental R&D underpins the innovation system.

Strengths:

- › Canada has a world-class post-secondary education sector. Ranking fourth in the world on citation impact from 1996 to 2017 (SJR, 2018), Canada ranked sixth in the OECD both on most highly cited publications in 2009–2014 (CCA, 2018) and on most highly cited researchers in 2018 (Clarivate Analytics, 2017). It ranked seventh in both the number of publications and most cited scientific publications in 2015 (OECD, 2017e).
- › Canada leads in areas of strategic importance. It ranked fourth in the world and the OECD on the Cleantech Innovation Index in 2017 (WWF, 2018). In the OECD, Canada ranked sixth on the number of AI patents in 2010–2015 (OECD, 2017e), and Canadian AI researchers had the third highest citation impact in 1996–2017, despite producing the eighth most publications (SJR, 2018). In the OECD, Canada produced the fifth most neuroscience publications with the fourth most impact in 1996–2017 (SJR, 2018). As of 2016, Canada ranked fifth in the world in quantum with the fifth most quantum patent applications and sixth most publications (UK, 2016).
- › Canada is home to world-class research universities, with the University of Toronto (22nd), University of British Columbia (34th), McGill University (42nd), and McMaster University (78th) ranking among the top 100 worldwide in 2018 (Times Higher Education, 2018). Canada was also eighth in the OECD for the quality of research

institutions in 2018 (WEF, 2018). A number of Canadians have received international recognition for their research excellence.

Weaknesses:

- › Canadian expenditures on fundamental and applied research have not kept pace with competitors in recent years (Figure 2). While other countries have intensified their R&D efforts, Canadian gross domestic expenditure on R&D (GERD) as a percentage of GDP has fallen consistently since the tech bubble burst in 2000—dropping from 2.03 percent of GDP in 2001 to 1.53 percent in 2017. At the same time, higher education expenditure on R&D (HERD) has been flat over the past 15 years, at around 0.66 percent of GDP, while other countries have accelerated their investments.
- › Canada's research community lacks diversity. Canada was 15th in the OECD for the share of STEM graduates who were women in 2015 (OECD, 2017e). Over the last 10 years, on average, 31 percent of all Canada Research Chairs were women, with 37 percent of Tier 2 Chairs but only 17 percent of Tier 1 Chairs. Of Canada Research Chair awards in 2012–2014, visible minorities represented 13 percent, people with a disability 2 percent, and Indigenous people 1 percent (SSHRC, 2018).
- › Canada's aging research infrastructure is an obstacle to performing world-leading science, with much of the post-secondary research infrastructure over 25 years old. Of the approximately 195 federal science facilities, many are in critical or poor condition and nearing the end of their life expectancy (Canada, 2016).

Applied R&D and Partnerships

Applied R&D and partnerships between businesses and research institutions transform fundamental science into commercial products and services.

Strengths:

- › In 2017, Canada was home to some of the world's top tech hubs. Toronto (9th), Vancouver (14th), and Montréal (18th) were ranked among the 20 most high-tech cities in the world (WEF, 2017). The Toronto-Waterloo corridor is often referred to as Silicon Valley North.
- › Canada has a number of successful innovation partnerships, including the Consortium for Research and Innovation in Aerospace in Québec, Innovacorp in Nova Scotia, Canada's Oil Sands Innovation Alliance in Western Canada, Centre for Drug Research and Development in British Columbia, MaRS Innovation District in Toronto, and Communitech in Waterloo.

Weaknesses:

- › Canadian business investment in research has decreased, with business expenditure on R&D (BERD) falling from 1.25 percent of GDP in 2001 to 0.82 percent of GDP in 2016; by 2016, Canada ranked 22nd in the OECD on BERD as a percentage of GDP. Although the number of researchers per 100,000 employment has increased over the last decade, from about 800 in 2004 to about 900 in 2014, other countries have increased their investments in STEM and overtaken

CANADA IS A LEADING PRODUCER OF TOP TALENT



Donna Strickland

Optical physics
2018 Nobel Prize
in Physics



Gilles Brassard

Quantum computing
2018 Wolf Prize
in Physics



Arthur McDonald

Astrophysics 2015
Nobel Prize in Physics

Image credit:
Queen's University



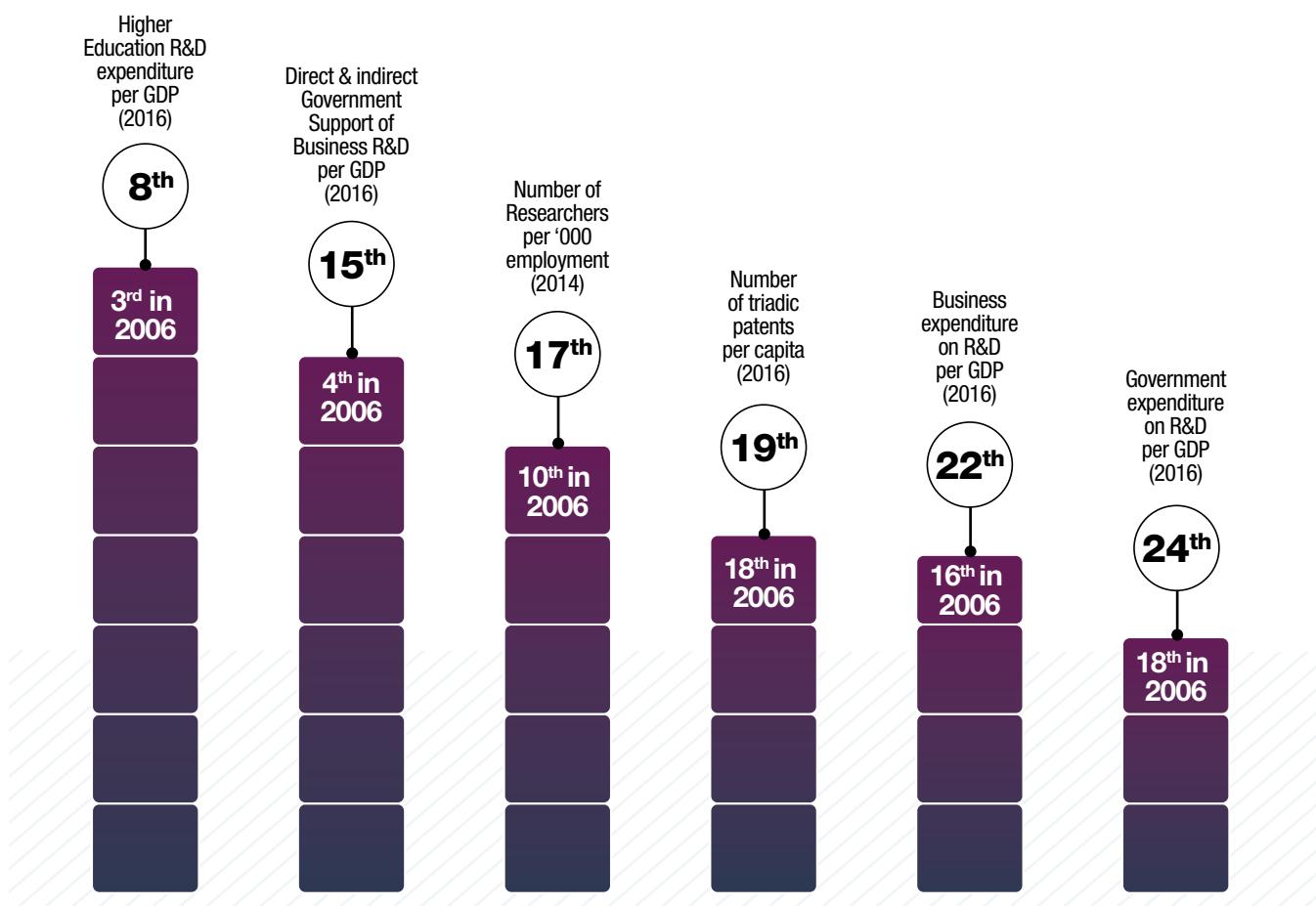
Janet Rossant

Biology 2015
Canada Gairdner
Wightman Award

Image credit:
The Hospital for Sick Children

Image credit:
University of Waterloo

FIGURE 2
Canada's ranking on science and technology indicators among 36 OECD Countries



SOURCES: OECD, 2018d; OECD, 2017e.

Canada. Canada was 17th in the OECD in 2014 on this measure compared with 8th in 2004 (OECD, 2018d).

- › Canada has a low density of networks and clusters. It ranks 15th in the OECD for university-industry collaboration in R&D, 16th for the state of cluster development, and 19th for collaboration between companies (WEF, 2018).
- › In 2017, 26.9 percent of Canadian SMEs held formal IP (ISED, 2018a) and only 4.2 percent had an IP strategy in place in 2011. When asked in 2011 why they were not seeking IP rights, 82.6 percent of SMEs indicated that IP was not relevant to their business (Industry Canada, 2013).

Commercialization and Start-up

Commercialization is the process of turning an idea or invention into a product or service that can be sold and grown into a company.

Strengths:

- › Canada ranked second in the OECD for early-stage entrepreneurial activity and seventh for entrepreneurial spirit in 2018 (GEM, 2018).
- › In 2018, Canada was home to 3 of the top 20 incubators in the world: Ryerson's DMZ (tied for 1st), University of Toronto Entrepreneurship (4th), and McGill Dobson Centre for Entrepreneurship (8th) (UBI, 2018).

Weaknesses:

- › Canada is not sufficiently competitive in commercializing new products and services. Canada ranked 19th in the OECD for triadic patent families per capita in 2016 (OECD, 2018d) and 31st for trademark applications per capita in 2017 (WEF, 2018). Despite an upward trend in the number of licenses executed and start-ups formed since the 1990s, Canada's universities and non-profit research institutions continue to lag behind their U.S. counterparts. Some individual institutions in the U.S. launched nearly as many start-ups and raised more than double the licensing revenue in 2017 as all of those in Canada combined (AUTM, 2018).
- › Women and Indigenous entrepreneurs face barriers in starting and growing their businesses. For instance, in 2017, 63.5 percent of SMEs were majority male-owned while only 15.6 percent were majority female-owned; 20.9 percent were owned equally by men and women. In 2017, 90.9 percent of majority female-owned SMEs and 86 percent of majority male-owned SMEs had fewer than 20 employees (ISED, 2018a). Firms with at least one female founder receive less than 16 percent of all venture capital (VC) funding; this share drops to less than 8 percent for companies with only female founders (Canada-United States Council for Advancement of Women Entrepreneurs and Business Leaders, 2018). In 2016, 40 percent of Indigenous-owned businesses had no internet or an unreliable connection, 45 percent struggled to meet the requirements for receiving financing, and 39 percent struggled to attract qualified employees (CCAB, 2016).

Scale-up and Going Global

Companies scale-up and go global when they grow and export their products or services to markets around the world.

Strengths:

- › Access to risk capital has grown in Canada in recent years. Canada ranked third in the OECD for VC investment as a percentage of GDP in 2016, lagging only the U.S. and Israel (OECD, 2017e). VC investment increased from \$1.9 billion over 365 deals in 2013 to \$3.5 billion over 592 deals in 2017 (CVCA, 2018). In addition, Canada's angel capital investment increased from \$89 million over 199 deals in 2013 to around \$163 million over 505 deals in 2017 (NACO, 2018).

- › Canada has had some scale-up successes. Fortune's 2018 list of the 500 largest non-U.S. companies features 12 Canadian companies while Forbes' 2018 list of the world's 500 largest public companies contains 17 Canadian companies (Fortune, 2018; Forbes, 2018). One Canadian company was considered a unicorn start-up in 2018, a private company with a valuation of over \$1 billion as of August 2018 (CBINSIGHTS, 2018).

Weaknesses:

- › Technology adoption continues to hamper the competitiveness of many Canadian firms. Canadian firms invested only 56.3 percent of the U.S. level in ICT per worker in 2014 (CSLS, 2016) and, in 2016, ranked 22nd in the OECD for firm-level technology absorption (WEF, 2016). In 2018, only 16 percent of firms used AI, a level that remains unchanged from 2014 (Deloitte, 2018). In 2015, Canadian firms ranked 20th in the OECD for robots per worker and 21st for use of e-commerce; in 2016, they ranked 23rd for use of enterprise resource planning software and 28th for use of radio-frequency identification (OECD, 2017e).
- › Canada remains a nation of small firms and struggles to create high-growth firms and large anchor firms. Measured by employment, 99.7 percent of firms are small or medium-sized, with just 0.3 percent classified as large (ISED, 2016). Even though the number of mid-sized businesses has increased significantly over the past few years, they account for a smaller proportion of all businesses. From 2001 to 2013, only 2 percent of mid-sized businesses grew into large businesses; the others remained mid-sized (82 percent of the cases), became small again (13 percent), or simply ceased operations (3 percent) (BDC, 2016). Canada ranked 16th in the OECD for growth of innovative companies in 2018 (WEF, 2018). Canadian firms are less likely than U.S. firms to experience rapid growth, and more likely to experience little growth (NESTA, 2009). Canadian firms also raise less funding than their U.S. counterparts and wait longer to raise subsequent investments (Impact Centre, 2017).
- › There has been limited availability of late-stage capital to help Canadian firms scale-up, as government funding diminishes for later-stage firms. Government innovation programs have focused more on supporting SMEs over large firms. Prior to the Innovation and Skills Plan, more than two-thirds of support for late-stage firms was done through Innovation, Science and Economic Development Canada (ISED) programs and targeted the aerospace, defence, and automotive sectors.

- › Few Canadian firms are exporting, while the majority of those who do export to the U.S. Operating in a relatively small domestic market, Canadian firms must export if they hope to scale-up and become globally competitive. Despite the free-trade agreements with Europe and Asia, 75 percent of Canadian domestic exports went to the U.S. in 2018 (Statistics Canada, 2018c). The top 100 firms in Canada accounted for 61 percent of national exports in 2014—the fifth most concentrated in the OECD (OECD, 2017). In 2017, only 12 percent of SMEs exported. Of those who did not export, 94 percent cited the local nature of their businesses as the reason for not exporting (ISED, 2018a). Canada ranked 32nd in the world for high-tech exports in 2018 (GII, 2018).

Ease of Doing Business

The Government supports the innovation system by making it easier for firms to do business.

Strengths:

- › Canada ranked second in the OECD in 2017 for the time it takes to start a business (World Bank, 2018).

Weaknesses:

- › Canadian businesses find it difficult to interact with government, with 47 percent of SMEs requesting external financing and 4 percent of SMEs requesting government financing in 2017. Government regulations are a major obstacle to growth, according to 19 percent of SMEs in 2017 (ISED, 2018a). In 2017, Canada ranked 13th in the OECD for overall ease of doing business (World Bank, 2018).
- › Firms that receive both direct and indirect government support outperform those that receive only indirect support in terms of employment, sales, and profit growth. However, the mix of direct and indirect support for businesses has traditionally been more weighted towards indirect support in Canada than in other OECD countries. Government support for business R&D has recently shifted towards direct support: \$9.44 in 2007 versus \$2.90 in 2017 in tax credits (indirect support) for every dollar in direct support of R&D (primarily through the Scientific Research and Experimental Development (SR&ED) tax incentive program). The level of indirect support, however, is still much higher than in leading innovation countries, including the U.S., which often

channels over 70 percent of government support for business R&D through direct means, and Germany, which almost exclusively focuses on direct funding (ISED, 2018).

The Global Innovation Race

Canada has the foundation to be one of the top five most innovative nations in the world. Canada has excellent economic fundamentals and is one of the strongest economies in the G7. Canada led G7 countries in long-term GDP growth over the 2008–2017 period, with employment performance since 2007 only exceeded by Germany. Between 2016 and 2017, total employment rose by 336,500 or 1.9 percent, the fastest annual rate of growth in a decade. Most of this growth was in full-time work. Canada's unemployment rate fell to a record low of 5.6 percent in December 2018—the lowest since comparable data became available in 1976 (Statistics Canada, 2018g). Canada has enjoyed relatively low inflation and, in 2016, the Bank of Canada renewed the inflation-control target for a further five-year period, ending December 31, 2021 (Bank of Canada, 2018). Canada's geography gives it access to the world's most prosperous markets, including through highly efficient transportation linkages and comprehensive trade agreements with the U.S., Mexico, the Asia-Pacific region, and the European Union.

Despite this strong foundation, Canada is competing in a global innovation race and cannot afford to be complacent. Many countries, such as the U.S., China, U.K., France, Israel, and India, are significantly increasing support for their innovation systems, making large investments to unlock the benefits of the data-driven digital economy. They are firmly backing leading industries and businesses, making strategic investments in STEM and digital skills, building industrial and technological capabilities, supporting the development and adoption of digital innovation, intensifying research collaborations, and helping their companies grow faster. These countries are accelerating past Canada in terms of innovation performance.

Without immediate and targeted action that builds upon existing strengths, addresses key gaps and weaknesses along the innovation continuum, and drives growth, Canada will fall even further behind, putting its high quality of life at risk.

FIGURE 3
The Global Innovation Race

CHINA	U.S.	INDIA
Made in China 2025	Office of American Innovation	Develop 100 smart cities US\$7B/5 years
AI Strategy to grow domestic AI industry to US\$150B	Manufacturing USA institutes US\$3B	Creating a fund of funds US\$1B/4years
Quantum Lab US\$10B	DARPA US\$3B/year including US\$2B/5 years in AI	Entrepreneurship development US\$400M/year
Adv. Manufacturing Fund US\$3B	ARPA-E US\$300M/year	Starting 7 new research parks US\$95M
Thousand Talents Program		
		
UNITED KINGDOM	ISRAEL	FRANCE
United Kingdom Research and Innovation £6B/year	Israel Innovation Authority \$450M/year	Big Investment Plan €57B: Building a skilled society €15B/4 years
Industrial Strategy Challenge Fund £725M/3 years	Yozma Group US\$220M	Business innovation €4.6B/4 years
STEM skills £406M/5 years	Unit 8200 — training tech leaders	Scientific excellence €3.5B/4 years
The Newton Fund £735M/5 years	Technological Incubators Program — C\$730M since 1991 + C\$4B private investments	AI Strategy €1.5 billion/4 years
		

A NEW APPROACH TO INNOVATION



Image credit: Adam Scotti

Since Canada cannot depend on past drivers of growth to drive productivity and prosperity, it is time to take a different approach to making Canada a global innovation leader. The Innovation and Skills Plan reflects a new microeconomic framework for supporting innovation—one that aims to succeed by establishing a culture of innovation and a globally recognized brand for Canada as one of the most innovative countries in the world.



ENGAGING CANADIANS

Intellectual Property Strategy consultations with the Honourable Navdeep Bains, Minister of Innovation, Science and Economic Development Canada

2016: MOBILIZING CANADIANS FOR AN INCLUSIVE INNOVATION APPROACH

canada.ca/innovation

+118,000 visits/interactions

+1,700 ideas

10 Innovation Leaders

28 roundtables across the country

+400 participants

2018: DIGITAL AND DATA ENGAGEMENT

6 Digital innovation leaders

30 roundtables across the country

+550 participants

+1,900 online interactions

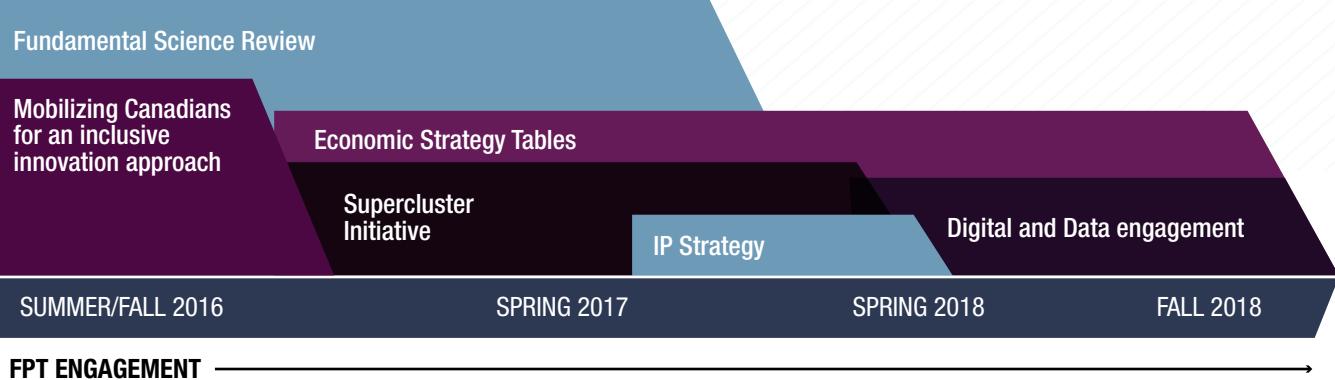
The Plan advances a suite of bold initiatives and programs to build on Canada's strengths, address its weaknesses, and compete in an era defined by accelerating technological, economic, and social change. Targeting challenges and opportunities at every stage of the innovation continuum, the Plan is firmly rooted in people, research and technology, companies, and programs.

Engagement

The Innovation and Skills Plan is based on the premise that success and the achievement of common goals depend on establishing and maintaining partnerships with stakeholders across the innovation system and the whole of the economy. This is why the Government has encouraged, and is continuing to encourage, conversations between Canadians and partner groups on the challenges, opportunities, and issues at hand—and those on the horizon. Business leaders, innovators and entrepreneurs, provincial and territorial governments, civil society, women, youth, Indigenous people, and other traditionally underrepresented groups helped shape the Plan. These groups participated in roundtables across the country in 2016, led by 10 respected external Innovation Leaders. An online portal solicited the public's ideas and opinions, and a number of social media platforms offered other opportunities to participate.

FIGURE 4
Ongoing engagement with Canadians on innovation and skills

MINISTERIAL ENGAGEMENTS WITH CANADIANS



The recommendations of other initiatives and groups also informed the Plan, including the Advisory Council on Economic Growth, the Fundamental Science Review, and targeted engagement with Canadians and Canadian businesses on initiatives such as the Intellectual Property Strategy and the Venture Capital Catalyst Initiative.

Moving forward, the Innovation and Skills Plan will continue to take a partnership-driven approach in understanding the challenges that innovators face and in developing the next steps to address them. As part of this, the Government has formed six industry-led, sector-specific Economic Strategy Tables that have issued recommendations on how to address innovation and regulatory bottlenecks, promote competitiveness, and seize opportunities. The Government has already begun to implement these recommendations, as demonstrated by some of the announcements in the 2018 Fall Economic Statement. In addition, the Government held Digital and Data Consultations over Summer 2018, led by six respected external innovation leaders, which will help position Canada as a leader in the data-driven digital economy.

FIGURE 5
Partnerships for Driving Change



Solutions-oriented Approach

The Plan sets out an integrated, whole-of-government approach. Through the work of all levels of government, including multiple federal departments and agencies, as well as provinces and territories, it supports Canadian firms across the innovation continuum. A review and consolidation of business innovation programs has simplified government support, and made the new streamlined suite of programs accessible through a new single window platform. Similarly, on the delivery of skills programming, the Plan supports Canadians throughout every stage of their lives, promoting lifelong learning with tailored programs for youth, post-secondary students and recent graduates, and those in mid-career.

To succeed, the Innovation and Skills Plan is dependent on building leadership from businesses and other stakeholders from across the innovation system. It requires industry to invest in innovation, and non-profits and post-secondary institutions to participate in partnerships that will reinforce innovation ecosystems.

The Government recognizes that a reliance on indirect support has not improved Canada's innovation performance and incentivized business investment in R&D to scale. As a result, the Plan's targeted, solutions-oriented programs aim to encourage more business investment in R&D through increased direct support, and not just through tax incentives. Investments made through the Plan so far are significant. However, the financial and in-kind contributions that these investments are attracting from other levels of government, businesses, and not-for-profits are increasing their value tremendously. The Innovation Superclusters Initiative illustrates effectively the power of partnerships and collaboration in driving innovation and competitiveness by bringing together a long list of businesses, post-secondary institutions, and other participants.

Experimentation and Grand Challenges

The Plan reflects a novel, experimental approach to supporting innovation that emphasizes risk taking in a number of first-of-their-kind programs and initiatives in Canada: the Innovation Superclusters Initiative, Innovative Solutions Canada, the Strategic Innovation Fund, and Innovation Canada. The grand challenges approach repositions the Government and innovators as partners in thinking beyond what is possible today to develop novel solutions to cross-cutting challenges with broad commercial potential. Modelled on an international best practice of competitive countries, this approach enables Canadians to be bold and creative, and imagine and deliver new innovations that can change the world.

Business-led Sectoral Support

As a small country, Canada must focus on developing its potential high-growth areas. As a result, the Plan introduces six industry-led, sector-specific Economic Strategy Tables that focus on areas in which Canada can become a global leader: advanced manufacturing, agri-food, clean technology, digital industries, health/bio-sciences, and resources of the future. In addition to the six Tables, work is underway in other sectors such as space and

tourism. Moreover, the development of regional growth strategies builds on all the elements of the Plan to ensure that programs take into account regional priorities and needs. Overall, through this sectoral approach, the Government and the private sector are working together to remove barriers and embrace opportunities to enhance Canadian leadership.

Inclusivity

For Canada to become a leading nation of innovators with a healthy innovation culture, all Canadians must be able to participate fully in the economy of the future, including members of underrepresented groups, such as youth, women, Indigenous people, seniors, Canadians with disabilities, newcomers, and residents of rural and remote communities. The Innovation and Skills Plan is implementing targeted initiatives to give these groups access to the skills, technologies, funding, and other resources that they need to seize new economic and social opportunities. This is not only the right thing to do, but it also provides new sources of innovative ideas that have the potential to change the world and bolster Canada's leadership as a nation of innovators.

Bold and Ambitious Targets

The Innovation and Skills Plan includes bold and ambitious targets that are impressive and large scale by design. Achieving these goals will require action and commitment from all involved stakeholders, including coordination and engagement across all levels of government, encouragement of action from Canadian businesses, engagement by academia, and the involvement of all Canadians. This is how Canada will become one of the most innovative countries in the world.

The Government has launched a new online, interactive results [portal](#) for reporting and tracking progress achieved on targets identified through the Innovation and Skills Plan. The targets are important from the perspective of providing guidance and direction, and allowing Canadian governments and citizens to measure and evaluate progress—making course corrections if and when necessary.

BUILDING A NATION OF INNOVATORS



Image credit: Actua

Announced in Budget 2017, the Innovation and Skills Plan advances a suite of targeted initiatives and programs to tackle the strategic challenges of the time. The Plan is based on four interconnected and mutually reinforcing pillars that support innovation along the innovation continuum.



Image credit: Adam Scotti



Image credit: General Fusion



People and Skills:

Ensuring businesses have the right pipeline of talent to succeed and equipping Canadians with the tools, skills and experience they need to succeed throughout their lifetimes

People are the pipeline for innovation, as their ingenuity and imagination bring new innovations to life; they fuel businesses with the human power needed to grow and be competitive.



Image credit: Kids Code Jeunesse

Building Ecosystems: Science, Technology, and Superclusters:

Building innovation ecosystems through shared risk taking and partnerships, and investing in the next generation of Canadian research and researchers

Innovation ecosystems that bring together businesses, academics, and other innovation actors are essential to creating a culture of innovation and driving improvements in research and technology performance. Canada must leverage areas of strength to become one of the most innovative countries in the world. Science underpins the innovation system, leading to new discoveries that can



be commercialized and boost the competitiveness of Canadian firms. Without renewed investments in science, Canada will be unable to support the innovation continuum.



Investment, Scale-up, and Growing Companies:

Attracting investment, supporting the growth of leading Canadian companies and start-ups, and exporting

To win the innovation race, Canada must produce more export-oriented, globally competitive large firms. These firms drive economic growth, create good jobs for Canadians, and maintain Canadians' high quality of life.



Program Simplification and Reorganization:

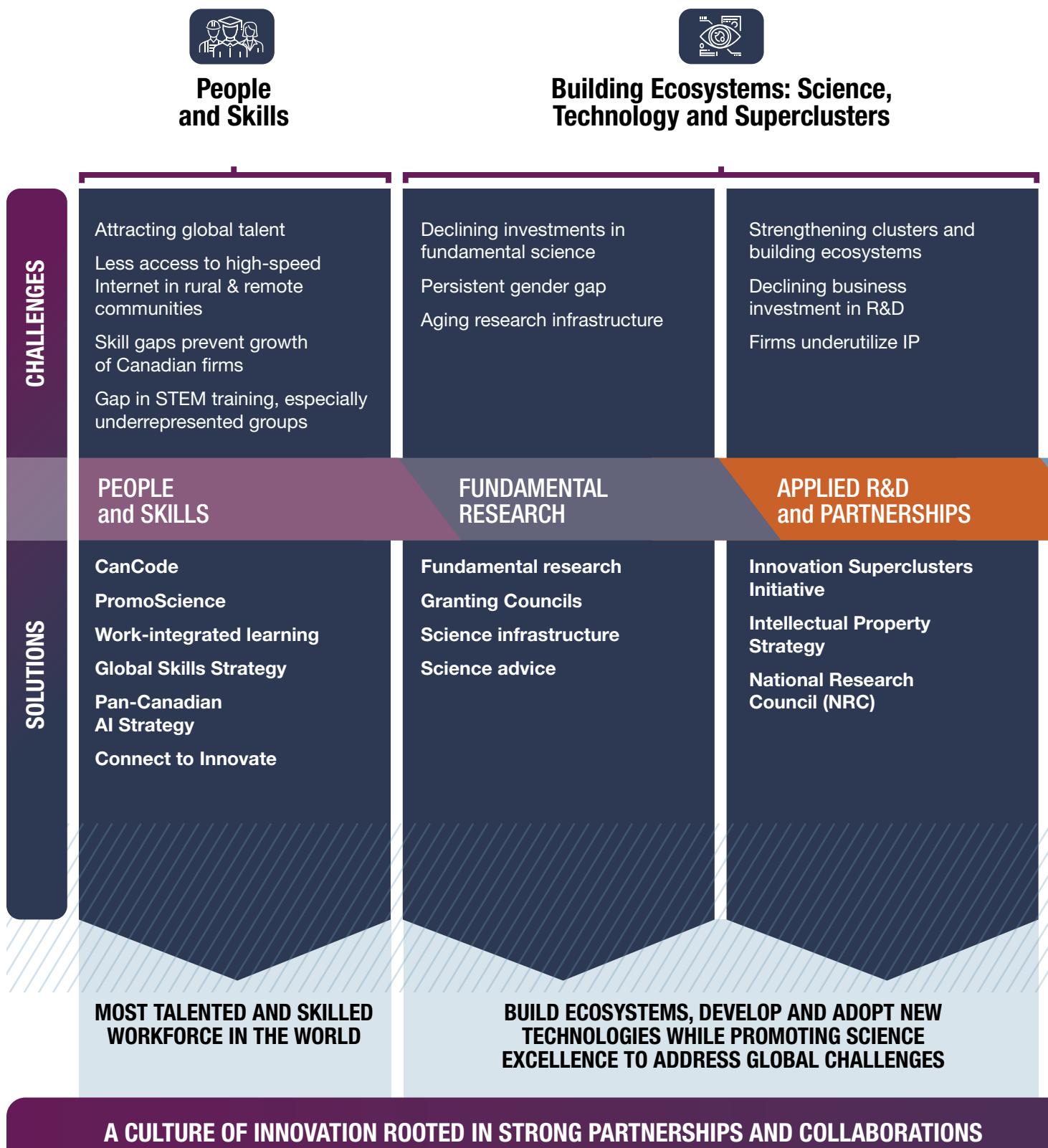
Offering a timely, client-centric and single window in the delivery of business innovation programs in every region

Firms need effective and efficient support to grow and help Canada become a nation of innovators. Government support programs must be accessible and easy to understand, and target firms at all stages along the innovation continuum.

Figure 6 maps the four pillars of the Plan onto the innovation continuum. It highlights the main challenges that drove the development of the Innovation and Skills Plan, along with the targeted programs and initiatives aimed at addressing these challenges and, collectively, building a culture of innovation in Canada. The next four sections focus on each of the Plan's pillars in turn.



FIGURE 6
Our approach to supporting the innovation continuum





Investment, scale-up and Growing Companies

Innovators struggle to find a first customer
Not sufficiently commercializing research
Low number of firms owned by underrepresented groups

Low levels of technology adoption
Not enough Canadian firms scale-up
Low availability of late-stage capital
Few Canadian firms export



Program Simplification and Reorganization

Overlapping innovation programming
Access to programming is difficult to navigate
Lack of alignment with industry needs

COMMERCIALIZATION and STARTUPS

Innovative Solutions Canada
Women Entrepreneurship Strategy
Indigenous Entrepreneurs
NRC-IRAP

SCALE-UP and GOING GLOBAL

Regional Growth Strategies
Strategic Innovation Fund
Trade Commissioner Service
Business Development Bank of Canada
Export Development Canada

EASE OF DOING BUSINESSES

Horizontal review of innovation and cleantech programs
Innovation Canada
Digital single-window
Accelerated Growth Service
Clean Growth Hub
Economic Strategy Tables

STIMULATE NEW INVESTMENTS TO GROW WORLD-CLASS COMPANIES AND CREATE MIDDLE-CLASS JOBS

SIMPLIFIED SUITE OF GOVERNMENT INNOVATION PROGRAMS



PEOPLE AND SKILLS



Image credit: Canadian Space Agency

Ensuring businesses have the right pipeline of talent to succeed and equipping Canadians with the tools, skills, and experience they need to succeed throughout their lifetimes

OUR APPROACH

The Innovation and Skills Plan is supporting Canadians at every stage of their lives, ensuring that firms have the talent they need to grow. The Plan's interconnected suite of programs includes support for hands-on learning to inspire youth to pursue careers in coding and STEM. It offers young Canadians more work-integrated-learning placements so that they can learn the soft and technical skills they need to get their first jobs. The Plan also offers new support to encourage lifelong learning and skills development at all stages of Canadians' careers, providing targeted support to increase the labour force participation rate for women and other underrepresented groups. It also establishes faster processing times for the entry of highly skilled workers into Canada to benefit businesses that require access to a deep and wide pool of talent to grow and compete.

WHAT'S NEW ABOUT THIS APPROACH:

- › Supports Canadians at every stage of their lives.
- › Takes a partnership-driven approach, working with industry, post-secondary institutions, not-for-profits, and provinces and territories.

Expected outcomes:

- › Building a resilient and skilled workforce with the necessary soft and technical skills to prepare it for disruptions and the future of work throughout their lifetimes.

Key programs:

- › [CanCode](#)
- › [PromoScience](#)
- › [Work-integrated learning](#)
- › [Global Skills Strategy](#)
- › [Pan-Canadian AI Strategy](#)
- › [Connect to Innovate](#)

Image credit: Kids Code Jeunesse



The world is in a time of unprecedented transformation, moving at a pace and scale that has never been experienced before. In the face of changing business models, Canadians must be equipped with the right competencies and provided the flexibility to meet the evolving demands of the workplace. To grow and scale-up, firms must be able to fill skills gaps, by gaining better access to global talent and recruiting from a broader, deeper pool of Canadians with strong STEM, business, creative, and digital skills. All Canadians, including youth, women, Indigenous people, and other underrepresented groups, must continually train and upskill, and have more opportunities to develop key skills. They must also be connected to high-speed internet to participate in the digital economy.

“Teaching kids to code is incredibly important. It goes way beyond the basics of telling a computer what to do. It is about creative thinking, problem solving, and collaboration. Students who are proficient coders will have a better understanding how our world works now and have a say in their future.”

– Nick Baskwill, Grade 5 teacher, Kingston Elementary, NS

All levels of government have a role to play in creating the workforce for the future. Multiple departments and agencies are involved, including ISED, ESDC, IRCC, and ISC. Through a horizontal approach, the Government can more effectively support Canadians throughout their lifetime and across society. The federal government has a critical role to play in helping equip Canadians with the skills and experiences they need, but it cannot act alone. Partnerships—with other levels of government, the private sector, educational institutions, and third-party education delivery agents and foundations—are required to create a more resilient workforce that responds to what businesses need to scale-up and grow.

Initiatives in this area of the Plan focus on:

- › Attracting global talent to Canada;
- › Equipping Canadians with skills for the future;
- › Bridging digital divides, particularly for rural and remote communities;
- › Providing on-the job learning opportunities in response to industry demand; and
- › Supporting lifelong learning.

Equipping Canadians with Skills for the Future

Strengthening the digital skills and literacy of Canadians, and providing them with the tools they need, is key to maximizing economic and social benefits for all in a digital and data-driven world.

That is why the Innovation and Skills Plan includes programs such as [CanCode](#) to prepare youth for jobs for the future. Learning to code at a young age can help develop analytical thinking and foster problem-solving techniques important in in-demand STEM fields. It prepares youth for opportunities in the workplace of the future, and creates a high-quality talent pool for Canadian businesses. Although 7 in 10 young Canadians express an interest in careers related to coding or programming, only one-third say they actually have opportunities to learn coding (Actua, 2018).

“Coding is a great way to actively engage all learners in problem solving techniques that get immediate feedback. Breaking a problem down through code opens the possibility of applying this learning strategy to all subject areas. Learning to code is effective when it transforms into coding to learn!”

– Ashley Hallihan, High School Teacher, Blackville, NB

[Translated] “I think coding helps our youth to develop their problem solving, collaboration, resilience, creativity and digital skills. It gives young Canadians the freedom to create, and not just consume. They are creating things that they feel are their own and not something that someone else has created for them. In general, we are creating a culture of creators, not consumers. They are developing their problem solving skills, not just for programming, but for other aspects of their lives.”

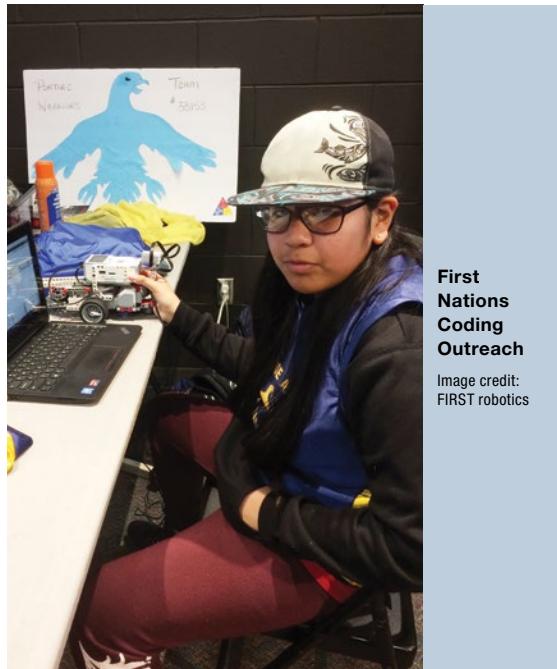
– Cédric McGraw, Grade 11 and 12 teacher,
École l’Odyssée, Moncton, NB

CanCode – Improving digital and coding skills for students and teachers



Code MTL

Image credit:
Kids Code
Jeunesse



**First
Nations
Coding
Outreach**

Image credit:
FIRST robotics



**All-girls CanCode
workshop**

Image credit: Actua



Image credit:
Kids Code
Jeunesse



Ms. Kelso pre-sents Evey and Coco CanCode certificates at a coding camp in Whitehorse

Image credit:
FIRST robotics



Hour of Code at Shopify with the Right Honourable Justin Trudeau, Prime Minister of Canada and the Honourable Kirsty Duncan, Minister of Science and Sport

Image credit: Adam Scotti



**Teaching
teachers how
to code in
Nunavut**

Image credit: Actua

CanCode works through 21 national, regional, and local not-for-profit organizations to support school-age opportunities for coding and digital skills development. It targets underrepresented groups, such as girls and Indigenous youth. CanCode supports partner organizations in providing K-12 students and their teachers with training to introduce digital skills, coding, and related concepts into the classroom.

CanCode has provided coding training to 1 million students, of which more than 40 percent are girls, 8.5 percent are Indigenous, and 17 percent live in rural, remote, and Northern communities. Over 53,000 teachers have participated so far in CanCode initiatives. Not only has the program surpassed its target of reaching 500,000 by March 2019, but it has already doubled its target, providing students with the digital skills needed to succeed in today's economy.



Challenge: Increasing the supply of digital and coding skills for the jobs of the future

Description: Equips K-12 students and their teachers across the country with coding and digital skills – \$50M/2 years

Achievements: Reached 1 million students and 53,000 teachers, doubling its initial target of 500,000 students by March 2019.

SUPPORTING THE DEVELOPMENT OF STEM SKILLS

As the impact of technology continues to grow, the ability of individuals to participate meaningfully in all spheres of life will depend more heavily on the foundations of STEM learning and associated competencies, including an understanding of scientific methods, numeracy, digital literacy, and problem-solving (Let's Talk Science, 2017). The Government has been a strong supporter of STEM skills development through the federal granting councils: the Natural Sciences and Engineering Research Council of Canada (NSERC), the Social Sciences and Humanities Research Council of Canada, and the Canadian Institutes of Health Research (CIHR). The Innovation and Skills Plan features a number of initiatives through the granting councils to support STEM skills for Canadians throughout their lifetimes:

- **PromoScience** supports organizations that have used hands-on learning experiences, such as space camps, to inspire one million young Canadians a year, particularly girls, to pursue STEM. This includes Let's Talk Science, which has provided STEM programs to more than 1,700 communities and more than 40 percent of all schools in Canada.



Let's Talk Science Tomatosphere™ initiative

Image credit: Let's Talk Science

- A suite of funding programs supports the research of post-secondary students, particularly in STEM fields (e.g., Connect Grants, Research Graduate Supplements, Undergraduate Student Research Awards, and Experience Awards).

- The **Canada Research Chairs Program** attracts and retains world-leading researchers.

In addition, the **Prime Minister's Awards for Teaching Excellence** now include 17 new STEM-themed awards and a gold Medal to recognize scientific excellence to honour outstanding elementary and secondary teachers.

Providing On-the-job Learning Opportunities

Work-integrated learning combines classroom and hands-on workplace learning, benefiting young Canadians, employers and post-secondary institutions. Workplace experiences and mentoring help young Canadians develop the technical, analytical, and soft skills needed to compete for high-quality jobs and to contribute to the creation of breakthrough technologies and high-growth firms. Employers gain access to qualified employees, assess work-ready hires, and help sensitize post-secondary institutions to the labour force needs of firms. Post-secondary institutions increase recruitment potential, stimulate innovation through commercially relevant projects, and gain stronger insights into industry skills requirements.

Mitacs Research Internships provide support for work-integrated learning experiences. Mitacs, a national, not-for-profit organization, has designed and delivered research and training programs in Canada and abroad for 18 years. Through increased funding, Mitacs aims to provide 10,000 placements annually by 2021–2022. Provinces have provided supplementary funding to Mitacs to create thousands of additional Mitacs internships.

MITACS INTERN WORKING WITH WOMEN IN FIRST NATIONS COMMUNITIES

Mitacs intern Brianne Wood, a PhD student from the University of Ottawa's School of Epidemiology and Public Health, is working with Toronto-based Eve Medical to collaborate with Ontario First Nations communities to deploy HPV self-testing using a product called HerSwab.

Women in First Nations communities, particularly those that are remote, often do not access regular cervical cancer screening. HerSwab makes self-testing for cervical cancer comfortable and convenient, allowing First Nations women to participate in cervical cancer screening regardless of their location.



Mitacs intern
Brianne Wood.

Image credit: Mitacs

NEW BUSINESS-HIGHER EDUCATION PARTNERSHIPS

To continue meeting industry demand, post-secondary institutions and some of Canada's largest companies came together to launch the Business/Higher Education Roundtable. The Roundtable harnesses the strengths of some of Canada's top businesses, universities, and colleges to deepen collaboration and improve opportunities for young Canadians. This includes releasing guides on how businesses can best leverage relationships with colleges and universities.

WORK-INTEGRATED LEARNING

Challenge: Young Canadians learning industry-demanded skills

Description: Creating new work-integrated learning placements through Mitacs, Digital Skills for Youth, and the Student Work Placement Program

Achievements: Mitacs placements increased 300%—from 2,450 in 2014–2015 to 8,000 in 2017–2018; the Student Work Placement Program created over 1,100 new placements in its first year; Digital Skills for Youth delivered 630 internships in its first year

10,000

PAID INTERNSHIPS ✪ STAGES RÉMUNÉRÉS



HELPING YOUNG CANADIANS FIND THEIR FIRST GOOD JOB

Other initiatives that help young Canadians find jobs and start businesses include the following:

- › **Student Work Placement Program** is expected to create up to 11,500 quality work-integrated learning opportunities by 2021 for post-secondary education students in STEM and business fields. 1,500 placements will support cyber security and AI.
- › **Digital Skills for Youth** program connects young people with career-oriented work experience along with digital and/or soft skills training. Interns are employed by

small businesses or not-for-profit organizations, who cost-share their salary and provide meaningful work experience and skills training to facilitate the transition to career-oriented employment.

- › **Futurpreneur Canada**, a national not-for-profit organization, provides aspiring young entrepreneurs with mentorships, learning resources, and startup financing. To date, it has helped launch over 9,500 Canadian businesses, 40 percent of which are majority-owned by women.



Image credit: Futurpreneur Canada

[Futurpreneur] was really critical for getting us going and getting us on our path and from there we were able to continue to build”

– Nicole Verkindt,
Founder and President, OMX

Supporting Lifelong Learning

Canadians are increasingly changing their careers multiple times throughout their lifetimes. To support these transitions and equip Canadians with the industry-demanded skills for the jobs of the future, a number of initiatives support lifelong learning and upskilling.

The **Future Skills** initiative brings together expertise from all sectors and leverages experience from partners across the country to identify the skills sought and required by employers, explore new and innovative approaches to skills development, and share information to inform future investments and programming. It includes a **Future Skills Council**, representing the private, labour, education and training, academic, and not-for-profit sectors, to advise on emerging skills and workforce trends. The **Future Skills Centre** focuses on developing and testing new approaches to skills assessment and development.

The **Skills Boost** initiative provides additional measures to increase student access to financial assistance by:

- › Increasing eligibility thresholds for **Canada Student Grants** (CSGs) for students with dependent children, helping an additional 13,000 students;
- › Increasing eligibility thresholds for part-time students, helping an additional 10,000 part-time students;

- › Promoting and **expanding the use of existing Employment Insurance (EI) flexibilities** that allow eligible claimants to take training and continue receiving EI benefits; and
- › Introducing a **three-year pilot project targeted at adult learners** to provide around 43,000 adults per year with an additional \$1,600 top-up funding to the CSGs for full-time students, and allow flexibility to base CSGs eligibility on current year's income.

A horizontal review of skills programs is also underway across the federal government to maximize effectiveness.

WORKING WITH THE PROVINCES AND TERRITORIES

The Government is helping provincial and territorial governments prepare their residents for the future of work. For example, federal investment in Labour Market Development Agreements and new Workforce Development Agreements has significantly increased. This investment provides employment assistance, skills training and the flexibility to respond to the diverse needs of residents. The amended Employment Insurance Act broadens eligibility for skills training and employment supports under the Labour Market Development Agreements, a change that came into effect in April 2018.

Developing Skills of Indigenous People

Indigenous people have historically faced many barriers to success, including a lack of opportunity to access skills programs focused on their unique circumstances. Among young adults aged 20–24, 9 out of 10 non-Indigenous people have at least a high school diploma, as do 8 of 10 Métis and 7 of 10 First Nation living off-reserve. In contrast, only 4 out of 10 First Nation young adults living on-reserve graduate from high school (Anderson and Richards, 2016).

ISC, ESDC, and ISED offer a number of initiatives that seek to narrow the skills divide and close the employment and earnings gap between Indigenous people and other segments of the population.

Bridging Digital Divides

The internet is integrated into virtually all facets of life with more applications, devices, and users included every day. Without internet access, Canadians cannot fully participate in the economy. The internet allows Canadians to connect with family and friends across the country, access global markets, and use a wide range of government supports and services, including those offered by the Innovation and Skills Plan.

The Connect to Innovate program aims to provide rural and remote regions across Canada with high-speed, broadband internet access. The program invests in rural and remote communities by providing the backbone infrastructure needed for Canadians to fully participate in, and benefit from, the digital economy. Working in partnership with provincial, territorial, and municipal

HELPING INDIGENOUS PEOPLES GET THE SKILLS AND EXPERIENCE TO FIND GOOD JOBS

- **Post-Secondary Student Support Program** provides First Nations and eligible Inuit students with funding to access education and skills development opportunities at the post-secondary level.
- **Indspire**, a non-profit organization funded by the Government, offers scholarships and bursaries to First Nation and Inuit students to pursue post-secondary education.
- **The Indigenous Skills and Employment Training Program (ISET)** has replaced the Aboriginal Skills and Employment Training Strategy. ISET takes a renewed focus on training for higher-quality, better-paying jobs, rather than rapid re-employment, through a number of programs and services, including: training for skills development; training for employment; mentoring for high-demand jobs; targeted job coaching (including Indigenous people with disabilities); and child care support.
- **The Skills and Partnership Fund** supports innovative projects that prepare and train Indigenous people for the in-demand careers of the Canadian labour market. These demand-driven projects are required to leverage private-sector funding.
- **The First Nations and Inuit Youth Employment Strategy** has two streams offering valuable work experience:
 - | **Skills Link** helps young people, including Indigenous people, who face barriers to employment develop basic employability skills and gain valuable job experience, so they can successfully transition into the labour market or return to school.
 - | **The Summer Work Experience Program** enables First Nations and Inuit youth to acquire employability and job-related skills, prepare for full-time employment, and earn income to support post-secondary education.

governments, Indigenous communities, and private-sector partners, connected communities will be able to overcome capacity bottlenecks and enable future growth to faster speeds. Investment in quality broadband networks will help extend access to innovative services that improve education, healthcare, productivity, and local quality of life. Moving forward, the Government will continue to address digital divides from coast to coast to coast, striving to connect all Canadians.



Challenge: Enabling Canadians to participate in the digital economy

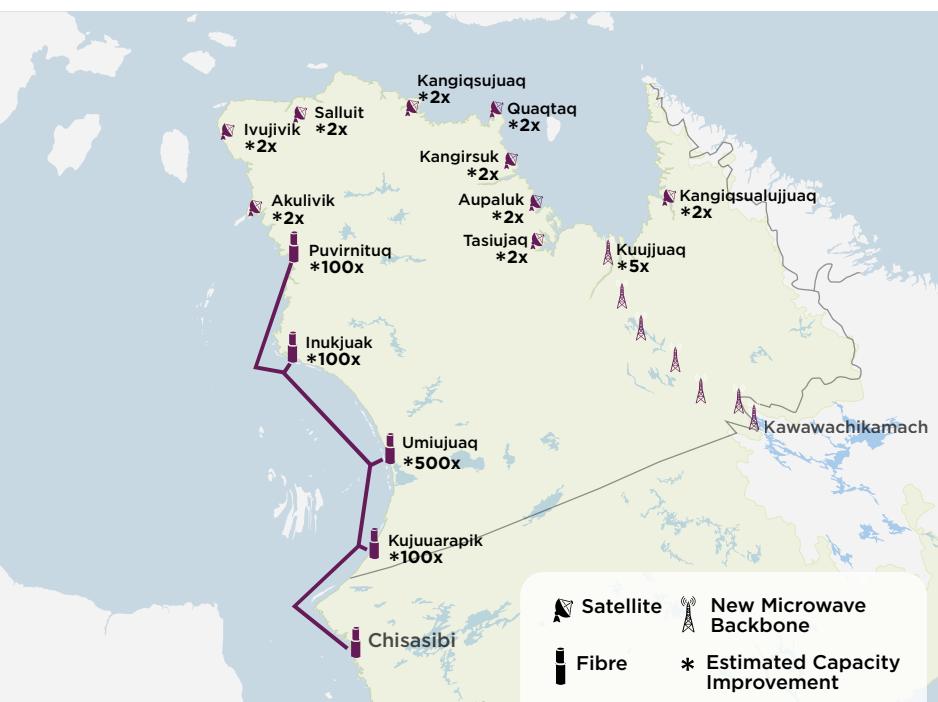
Description: Connecting rural and remote communities to the Internet – \$500M/5 years

Achievements: Announced 180 projects to date, connecting more than 900 rural and remote communities in Canada, of which 190 are Indigenous communities; will improve Internet connections across 19,500 km of Canada's most rugged, remote and challenging terrain, in every province and territory.

PREPARING FOR THE FUTURE OF BROADBAND IN CANADA

The Canadian Radio-television and Telecommunications Commission (CRTC), Canada's telecommunications regulator, declared in December 2016 that broadband is now a basic service. Since then, the Government has worked with the CRTC on data sharing and broadband mapping to ensure a shared understanding of the state of broadband deployment in Canada, and on implementation of its new \$750 million rural broadband fund. In October 2018, federal, provincial, and territorial Ministers agreed to the principles of a Canadian broadband strategy that will work towards universal access to high-speed internet at speeds of 50 Megabits per second download /10 Megabits per second upload and the latest mobile wireless services along major roads.

The Government is ensuring Canada has world-class telecommunications infrastructure and promoting innovation by making spectrum available to support the development of new wireless technologies, such as 5G. The Spectrum Outlook 2018–2022 supports investment by providing stakeholders with a transparent and predictable roadmap of the Government's approach to making appropriate spectrum resources available to meet demand.



CONNECT TO INNOVATE— KATIVIK REGIONAL GOVERNMENT

Connect to Innovate contributed \$62.6M to the Kativik Regional Government in Nunavik for their broadband project. The project will bring new or improved high-speed internet access to all of Nunavik's 14 Inuit communities and to a total of 28 institutions. It is the first ultra-fast fibre optic connection between Nunavik and southern Canada.

ENSURING ALL CANADIANS CAN PARTICIPATE IN THE DIGITAL ECONOMY

Other programs aimed at improving access to digital skills and technologies include the following:

- › **Connecting Families initiative** addresses accessibility and affordability issues by providing eligible low-income families with \$10 home internet packages. Participating Service Providers volunteer their support at no cost to taxpayers or the federal government.
- › **Computers for Schools** provides computers to schools, libraries, not-for-profit organizations, Indigenous communities, and eligible low-income Canadians. The program helps remove affordability barriers and ensures everyone has access to digital technology.
- › **Digital Literacy Exchange Program** teaches fundamental digital skills to those most affected by digital divides, including Indigenous people, residents of rural and remote communities, language minorities, lower-income individuals, seniors, individuals who have not completed high school, and newcomers to Canada.
- › **Accessible Technology Program** co-funds innovative projects led by the private sector, not-for-profit organizations, and research institutes to develop new assistive and adaptive digital devices and technologies to ensure that Canadians who live with a disability can participate in the digital economy.

Attracting Global Talent to Canada

The Global Skills Strategy gives Canadian companies a faster and more predictable route to bring top talent and new skills from around the world to Canada. IRCC and ESDC offer dedicated and expedited service delivery in the following areas:

- › Faster processing times for bringing highly skilled workers to Canada, in as little as 14 days.
- › Work permit exemptions for short-duration work for highly skilled talent coming to Canada for 30 days or less, and for researchers coming for 120 days or less.

“The implementation of the Global Skills Strategy has positively impacted Ubisoft Toronto in many ways. We are now able to quickly bring top talent to our studio, which allows our studio to remain a key player in our industry. In addition, the customer service experience through the Dedicated Service Channel is impeccable. Our account manager always goes above and beyond to provide us with the right information on a program or the status of a file.”

— Ubisoft Toronto



Image credit: Kids Code Jeunesse

- › A new Dedicated Service Channel providing specialized and direct immigration support and services to companies seeking to make a significant, job-creating investment in Canada. Since June 2017, over 115 companies have been referred to the service.
- › A 24-month Global Talent Stream pilot under the Temporary Foreign Worker Program. Eligible employers seeking to hire unique and highly skilled foreign workers can get their applications for Labour Market Impact Assessments, including development of Labour Market Benefits Plans, processed by ESDC in 10 business days. Eligible foreign workers with employer-approved applications through the pilot can receive work permits from IRCC in two weeks. Successful employers under the program have come from a range of industries, such as information and communications technology, visual effects and animation, video-gaming and entertainment, advanced manufacturing, financial services, and clean technology.



GLOBAL TALENT STREAM

Challenge: Companies accessing in-demand talent from around the world quickly and predictably

Description: Provides a faster and more predictable route to bring top talent from around the world to Canada

Achievements: 3,265 applications approved for over 900 unique employers under the Global Talent Stream as of November 2018—with commitments to creating 40,833 jobs and 9,732 paid co-op positions, leveraging \$87.9M in training.

RECRUITING TOP RESEARCH TALENT TO CANADA THROUGH THE CANADA 150 RESEARCH CHAIRS

Other global research talent attraction initiatives such as the [Canada 150 Research Chairs](#) program complement the Global Skills Strategy. The program has recruited leading researchers from Harvard University, University College London, and the U.S. National Aeronautics and Space Administration (NASA). Of the 25 chairs, 15 are women and 10 are Canadian expatriates returning to Canada to carry out ambitious research programs. Current chairs include:



Margo Seltzer
University of BC
Canada 150 Research Chair in Computer Systems



Julianne Christine Stroeve
University of Manitoba
Canada 150 Research Chair in Climate Sea Ice Coupling



Alán Aspuru-Guzik
University of Toronto
Canada 150 Research Chair in Theoretical and Quantum Chemistry



Anita Tam Layton
University of Waterloo
Canada 150 Research Chair in Mathematical Biology and Medicine



Jonathan L. Sievers
University of McGill
Canada 150 Research Chair in Theoretical and Observational Cosmology

REAFFIRMING CANADA'S LEADERSHIP IN AI

Canada has been at the forefront of the AI revolution due to sustained investments it has made since the 1980s—attracting the world's best minds in AI. Since then, it has developed top-ranked educational institutions, world-class researchers, and market-leading technology companies. The creation and flourishing of the AI ecosystem is due to the research conducted here by some of the greatest minds in the field, including Geoffrey Hinton (University of Toronto), Yoshua Bengio (University of Montréal), and Richard Sutton (University of Alberta). Today, a new generation of women researchers and entrepreneurs are also making important contributions.

The Pan-Canadian Artificial Intelligence Strategy aims to provide the talent, support, and resources required to maintain Canada's leadership position. The AI strategy, led by the Canadian Institute for Advanced Research (CIFAR), working in partnership with the Alberta Machine Intelligence Institute (AMII) in Edmonton, Vector Institute in Toronto, and Montréal Institute for Learning Algorithms (MILA), has four major goals:

- To increase the number of outstanding AI researchers and skilled graduates in Canada;
- To establish interconnected nodes of scientific excellence in the three major AI centres—Edmonton, Montréal, and Toronto;
- To develop global thought leadership on the economic, ethical, policy and legal implications of AI advances; and
- To support a national AI research community.

In December 2018, CIFAR announced 29 Canada CIFAR AI Chairs, retaining and recruiting top academic researchers at the three partner institutes. CIFAR will soon fund policy-relevant working groups to examine AI's implications for government and society.

As 2018 President of the G7, Canada has advocated for a shared approach to AI that is market-driven, inclusive, human-centric, rights-respecting, and multi-stakeholder—as demonstrated by the **G7 Innovation Ministers' Statement on AI and the Charlevoix Commitment to a Common Vision**



Left to right: Richard Sutton, Geoffrey Hinton, and Yoshua Bengio

Image credit: Creative Destruction Lab / Machine Learning and the Market for Intelligence, 2016

for the Future of Artificial Intelligence. Bringing together over 150 of the greatest thinkers on AI from both the public and private sectors from across the G7, the **G7 Multi-stakeholder Conference on AI** in December 2018 discussed how to enable the responsible adoption of AI, with a particular focus on fostering inclusion in AI development and deployment, reducing barriers to innovation and enhancing market confidence, fostering accountability in AI and promoting societal trust, and the future of work and skills for the modern economy—all with a view to building a common vision of human-centric AI.

To advance its vision of AI in the longer-term, Canada is also working with France to establish an **International Panel on Artificial Intelligence (IPAI)**, as announced by Canada's Prime Minister Trudeau and France's President in 2018. The IPAI will foster international collaboration to advance a shared understanding of AI issues and to support and guide the responsible adoption of AI that is human-centric and grounded in human rights, inclusion, diversity, innovation, and economic growth. Over the course of 2019, Canada and France will invite international, like-minded partners to join them in shaping the IPAI into a global reference point for AI.

CANADIAN WOMEN IN AI: FOUR AMONG MANY STARS AND ROLE MODELS



Dr. Joëlle Pineau is an Associate Professor and William Dawson Scholar at McGill University where she co-directs the Reasoning and Learning Lab. She also leads the Facebook AI Research lab in Montréal. Dr. Pineau's research focuses on developing new models and algorithms and applying them to complex problems in robotics, health care, and other fields.

Image credit: Marin Leroux, courtesy of NSERC



Dr. Raquel Urtasun is the Head of Uber ATG Toronto. She is also an Associate Professor in the Department of Computer Science at the University of Toronto, a Canada Research Chair in Machine Learning and Computer Vision and a co-founder of the Vector Institute for AI.

Image credit: courtesy of the University of Toronto



Dr. Doina Precup is Research Team Lead, DeepMind Montréal, Associate Professor, Computer Science, McGill University, and Senior Fellow, Canadian Institute or Advanced Research. Dr. Precup is a world-renowned expert in the field of reinforcement learning, a type of machine learning inspired by behavioural psychology.

Image credit: Owen Egan courtesy of McGill University



Dr. Foteini Agrafioti is the Chief Science Officer at RBC and Head of Borealis AI. She is responsible for RBC's intellectual property portfolio in the fields of artificial intelligence and machine learning. Prior to joining Borealis AI, Foteini founded and served as Chief Technology Officer at Nymi, a biometrics security company and maker of the Nymi wristband. Foteini is the inventor of HeartID, the first biometric technology to authenticate users based on their unique cardiac rhythms.

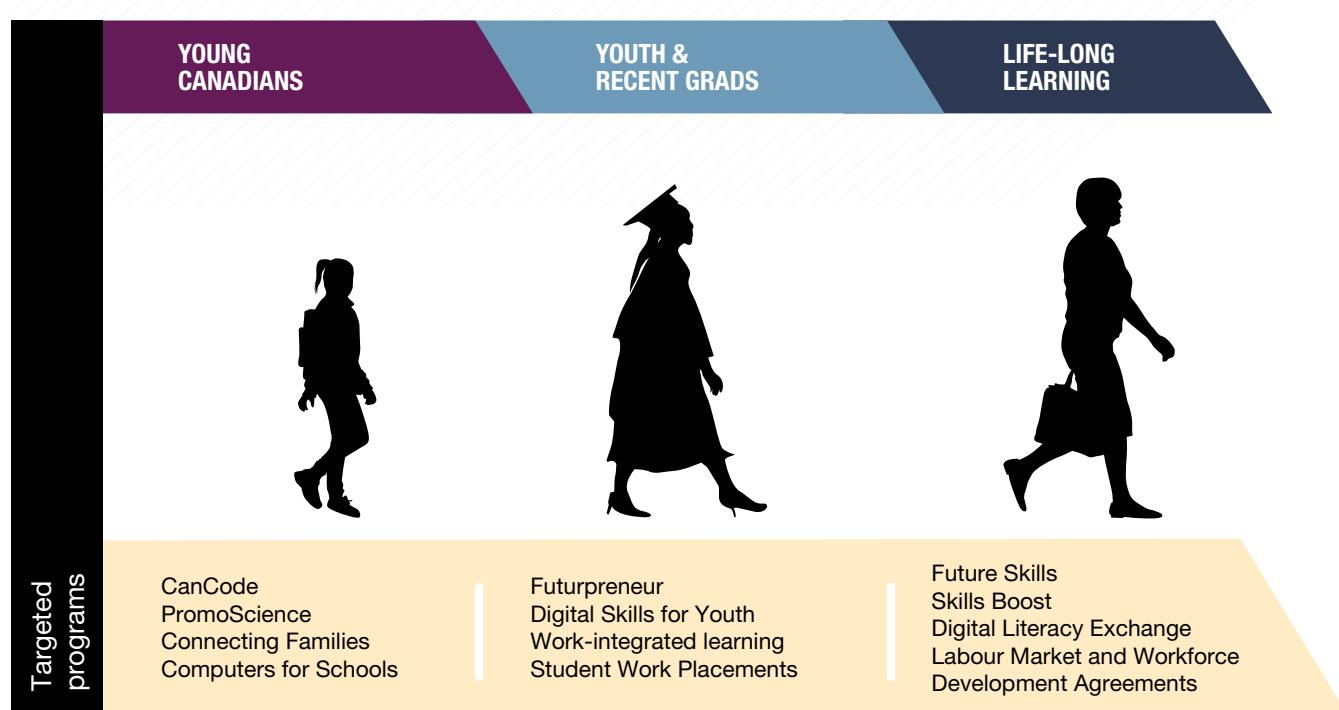
Image credit: Borealis AI

Summary

The Government of Canada is working with partners across the country to equip Canadians with skills for the future, such as through the CanCode program, which fills gaps in access to coding and digital skills. Thousands of Mitacs Research Internship placements are opening up on-the-job learning opportunities for young people. The Plan is strengthening lifelong learning, including through new experimental approaches. Canadian businesses now have quick and predictable access to global talent. Internet connectivity, the fundamental digital infrastructure of the time, is reaching more than 900 rural and remote communities, including 190 Indigenous communities.

Despite progress in equipping Canadians for the future of work, more support is needed to build on existing measures. For example, in October 2018, federal, provincial, and territorial ministers of innovation and economic development agreed to work towards universal access to high-speed internet and improve access to the latest mobile wireless services along major roads and wherever Canadians live and work. A Future Skills Council, representing the private, labour, education and training, academic, and not-for-profit sectors, will provide advice on emerging skills and workforce trends, while a new Future Skills Centre will explore new approaches to skills development.

FIGURE 7
Programs that reach all segments of Canadian society





BUILDING ECOSYSTEMS: SCIENCE, TECHNOLOGY, AND SUPERCLUSTERS



Image credit: Adam Scotti

Building innovation ecosystems through new partnerships, bridging the gap from idea, to commercialization, to growing globally-minded firms

OUR APPROACH

To succeed in becoming one of the most innovative countries in the world, Canada needs to strengthen the bridges from science to commercialization, and to investment and scale-up. The Innovation and Skills Plan creates innovation superclusters that will build new ecosystems and drive Canadian competitiveness. The superclusters support all four pillars of the Innovation and Skills Plan by developing talent pools, encouraging greater business investment in R&D, strengthening supply chains and relationships between firms, and attracting anchor firms. They represent a transformational approach to government support for innovation. The Plan's ecosystem approach is bolstered by the Government's recent historic investment in fundamental science, which will bring about world-first discoveries and feed the innovation pipeline.

What's new about this approach:

- Takes an experimental, transformational approach that aims to build superclusters—world-class, large-scale innovation ecosystems—to strengthen Canadian competitiveness.
- Places a stronger emphasis on science and evidence-based decision-making through investments in fundamental research and a new focus on multidisciplinary, international research.

- Helps Canadian businesses better understand IP so that they can unlock its benefits and scale-up their innovations.

Expected outcomes:

- Creating globally competitive innovation ecosystems that develop new pools of talent, conduct multidisciplinary research, attract international investment, connect SMEs and larger firms, integrate value chains, and build anchor firms.
- Reinforcing fundamental science support with the funding and infrastructure required to make world-first scientific discoveries.

Key programs:

- **Innovation Superclusters Initiative**
- **Fundamental research**
- **Granting councils**
- **Science infrastructure**
- **National Research Council**
- **Intellectual Property Strategy and standardization**

Canada needs to build innovation ecosystems in which industry, academia, and other innovation actors collaborate on developing talent pools, conducting research, commercializing ideas, attracting investment, strengthening supply chains, and growing export-oriented firms. The nation must now build on and strategically support emerging strengths in potential high-growth areas, such as digital technologies, protein industries, advanced manufacturing, AI, and oceans.

The decline in fundamental science and applied R&D must be reversed, along with the fall in business investment in R&D. The unique barriers facing early-career and women researchers in pursuing careers in science must be actively removed and efforts must be made to address the aging science infrastructure that has prevented researchers from being the best in the world. Existing research strengths have not translated into sufficient applied research, technology, or innovation outcomes.

Initiatives in this area of the Plan focus on:

- › Building new partnerships and ecosystems;
- › Implementing a new vision for science and research;
- › Reimagining the National Research Council (NRC); and
- › Developing IP capability.

Implementing a New Vision for Science and Research

Science and research help drive innovation and sustainable economic growth. The Innovation and Skills Plan is re-energizing science in Canada. The recommendations of the [Fundamental Science Review](#), conducted by the Advisory Panel on Federal Support for Fundamental Science, have informed this new direction.

Appointed in June 2016 and chaired by Dr. C. David Naylor, the Panel examined how to make more strategic and effective federal investments in science and research conducted in higher education institutions. The conclusion was that, although Canada has a strong foundation in research and science, critical gaps require immediate attention. These include the provision of adequate support for researchers and greater harmonization and coordination of government support for science. The Panel also noted the opportunity to achieve better equity and diversity outcomes, with more effective support for

A NEW VISION FOR SCIENCE

Challenge: Performing world-leading discovery research that underpins innovation

Description: A historic \$4 billion investment to support the work of researchers and state-of-the-art tools and facilities



 CanadianPM @CanadianPM · Sep 19
Prime Minister Justin Trudeau and Minister Kirsty Duncan host a science fair on Parliament Hill in Ottawa, where students from across Canada presented their creative and innovative projects. #CdnScience



Canadian Science, NSERC / CRSNG and ISED

early-career researchers and empowering of Indigenous people to conduct research and partner with the broader scientific community (Canada, 2017). The Innovation and Skills Plan reflects a concerted effort to respond to the Panel's recommendations through demonstrating support for science, researchers, the tools and equipment that researchers need, and independent science advice.

THIRD-PARTY RESEARCH ORGANIZATIONS IN CANADA

Complementing the important work of the granting councils, a number of world-leading, third-party research organizations, supported by the Government, help Canada maintain its leadership role in fundamental research. These include:

Genome Canada – advances genomics research as a cross-cutting technology platform;

Institute for Quantum Computing – harnesses the quantum laws of nature to develop powerful new technologies and drive future economies;

Perimeter Institute for Theoretical Physics – conducts scientific research, training, and educational outreach in foundational theoretical physics; and

Centre for Drug Research and Development – powers Canada's life sciences industry by training scientific and business talent, and creating and growing companies of scale.

Budget 2018 announced that the Government will consider a new approach to determine how to allocate federal funding to third-party research organizations, as advocated by Canada's Fundamental Science Review, to improve the adaptability and effectiveness of federal research funding for these organizations.

Fundamental Research

Highly skilled and world-class researchers perform the high-risk, blue-sky research that often underpins the largest payoff discoveries and innovations. That is why Budget 2018 announced the largest-ever increase in funding for fundamental research through Canada's granting councils—almost \$1.7 billion over five years. This funding includes the New Frontiers in Research Fund for investigator-led research and interdisciplinary, international, risky, and fast-breaking research.

A new Canada Research Coordinating Committee (CRCC) is coordinating the programs and policies of the granting councils and the Canada Foundation for Innovation, ensuring that Canada's researchers have the support they need to succeed. Through the CRCC, the granting councils are developing new diversity strategies to create greater equity, diversity, and inclusion among funding recipients. The directive is to support transformative, new areas of research, and to better align all research funding. These strategies will influence the distribution of new funding for Canada Research Chairs.

The CRCC is also developing new ways to support the science ecosystem, exploring how to support early-career researchers, promote interdisciplinary research, and secure more international partnerships. In Summer 2018, the CRCC sought the views of Canada's research community in developing the new strategies and modernizing the research system. The first step is a pilot program relating to early-career researchers. In partnership with Indigenous communities, the CRCC is developing an interdisciplinary Indigenous research training model as part of reconciliation efforts with First Nations, Métis, and Inuit.

Research Infrastructure

The Canada Foundation for Innovation (CFI) is receiving permanent funding and more than \$763 million over five years to provide researchers with the tools and facilities they need. Since 1997, the Government has invested more than \$7 billion through the CFI. Federal scientists will also benefit from \$2.8 billion in support over five years for renewed federal research laboratories. To help post-secondary institutions maintain a world-class research environment, the Plan is providing universities with resources to offset the indirect costs of research through \$231.3 million over five years through the Research Support Fund. This funding helps cover overhead costs such as those related to the maintenance of laboratories and other research spaces that are shared widely.



Dr. Mona Nemer (left) and the Honourable Kirsty Duncan, Minister of Science and Sport (right)

World-class research requires researchers across scientific disciplines to rapidly process, exchange, share, and visualize vast amounts of data in novel ways. The \$570 million investment in a [Digital Research Infrastructure](#) Strategy will enhance researchers' access to advanced computing and big data resources.

Science Advice

The [Council of Canadian Academies](#), a not-for-profit research organization that provides independent scientific assessments to inform policy development in priority areas, is receiving continued support. In addition, Canada's new [Chief Science Advisor \(CSA\)](#), Dr. Mona Nemer, is focused on making federal science fully available to the public, encouraging scientists to speak freely about their work, and ensuring that policy decisions consider scientific analyses.

Reimagining the National Research Council

As Canada's largest federal R&D performer, the NRC has a century-long track record of bringing its national network of researchers and scientific facilities to bear on Canada's most pressing and immediate challenges and longer-term innovation goals.

Armed with a new vision, mission, and set of values, the NRC is mobilizing its specialized expertise and facilities to form a collaborative platform to convene the people and ideas that will deliver breakthroughs and solutions in areas that matter to Canadians.

For example, the NRC is deepening engagement with Canadian companies to give them access to the right technical expertise and infrastructure at each stage of

ADVANCED IMAGE ANALYSIS METHOD IMPROVES CLEANLINESS AND SAFETY OF 3D PRINTED PARTS

The NRC and Advanced Powders & Coatings, a GE Additive company, have developed a new way to test the quality of powders used in 3D printing, leading to stronger, cleaner, safer, and more reliable 3D printed parts for aerospace and medical devices.

This innovative method allows the detection of very low concentrations of foreign particles in powders using x-ray micro-computed tomography and 3D image analysis. Using this method, each individual foreign particle is visualized; size, brightness, and overall concentration are measured. In situations where cross-contamination is a concern, the technique is more sensitive and discriminating than current chemical analysis.

The new method was validated with titanium powders destined for production of aerospace parts, in collaboration with industrial partners. The teams are expanding their capabilities to other materials and metals, such as nickel alloys. The method could be used to qualify recycled powders in applications where safety is important.



Dr. Fabrice Bernier, researcher at the NRC, analyzes powders used in 3D printing.

Image credit: NRC

IMPROVING THE HEALTH OF CANADA'S NORTHERN COMMUNITIES

NRC researchers worked with the Public Health Agency of Canada (PHAC) and Vancouver's InventVacc Biologicals to get a Haemophilus influenzae type A (Hia) vaccine into the hands of people in Canada's North. The licensing, production and clinical trials of this vaccine will bring us closer to eradicating this bacterial infection that can lead to meningitis and other lethal conditions, especially among infants in Northern communities.

their growth path. The NRC is doing this by delivering new initiatives that expand its current networks, removing administrative barriers to R&D collaboration, and providing companies with the innovation support they need at the right time. This includes building on the NRC's scientific expertise, and fostering strong collaboration with innovators in both industry and academia.

The NRC is bringing together the best minds available to advance knowledge, fundamental science, and technology development that contribute to Canadian research excellence. For example, it is issuing grand challenges to teams of academic, business, and government researchers to turn bold ideas into game-changing applications that address Canada's most pressing economic and societal problems, and are aligned with government priorities, such as the superclusters. In the near term, these teams are focused on developing:

- › New materials for clean and sustainable sources of energy;
- › Disruptive technologies to significantly improve health outcomes;
- › High-throughput secure networks for rural and remote locations; and
- › AI-assisted design tools and expertise that underpin the other three areas.

To further increase its capacity to deliver leading exploratory and applied research, the NRC is building collaboration centres with university and research hospital partners, such as the Centre Hospitalier Universitaire

Sainte-Justine (focus on pediatric cancer), University of Toronto (microfluidics), Memorial University of Newfoundland (oceans technologies), and University of New Brunswick (cyber security).

Developing Intellectual Property Capability

IP helps researchers achieve commercial success by protecting their ideas and ensuring that they reap the full rewards of their inventions and creations. SMEs that hold formal IP are four times more likely to export and 64 percent more likely to be high-growth firms. Businesses using IP in patent-intensive industries have about 8 to 10 times more revenues than those not using IP (Statistics Canada, 2014). IP-intensive businesses pay 16 percent higher wages, on average, than businesses with little or no IP. SMEs that hold formal IP are three times more likely to engage in product innovation than those without IP and two times more likely to engage in other types of innovation. However, only 10 percent of Canadian SMEs hold formal IP and only 4.2 percent have an IP strategy. Weak IP literacy, complexity, and costs have posed challenges to Canadian innovators and SMEs.

“A national intellectual property strategy is long overdue for Canada and is critical to ensuring the success of the government’s innovation agenda. Canadian innovators welcome the creation of an ‘IP Collective’ as a new tool in Canada’s 21st century digital policy toolkit. The commitment to upwards of \$85 million over the next five years is a strong start for the government to ensure the value of publicly-funded research stays within Canada and benefits the national economy, as well as creates freedom to operate for domestic firms.”

— Council of Canadian Innovators

The *Intellectual Property Strategy* provides Canadian researchers and businesses with access to new IP resources. Its three-pronged approach focuses on IP awareness, education, and advice; strategic IP tools for growth; and IP legislation.

TRADEMARKS MATTER

The story of Haida fashion designer Dorothy Grant is one of inspiration and determination. From weaving spruce root hats with her grandmother in 1981, to opening a store in downtown Vancouver in 1994, and receiving the Order of Canada in 2015, Dorothy Grant has followed her dreams, spreading the Haida culture internationally. According to the designer:

I knew 30 years ago that my hands logo reflected the core philosophy of my fashion design. At first, I was using it as a garment label. Then, I registered it as a trademark that would always represent my name, which I had spent years branding. I fought for six years against a company that claimed my trademark was too similar to theirs: a battle I won, and which was worth fighting. The world of fashion is full of mimes that will copy without asking. That's when it's useful to have a registered trademark to prove you're the owner. People are less likely to copy it.

Dorothy's work, which innovatively combines Haida formline art with haute couture, has been featured in 15 museums in Canada, the U.S., the U.K., and New Zealand. It has been worn in fashion shows and on Oscars red carpets, and has earned her an impressive number of awards in a career spanning over four decades.



Dorothy Grant.

Image Credit: Nadya Kwandibens. Red Works studio

First, understanding the valuable role IP can play in supporting business growth is an essential preliminary step. A series of new initiatives target increasing IP awareness, particularly among women, Indigenous entrepreneurs, and other groups who have been less likely to use IP. These include supporting the participation of Indigenous people in international and national discussions on IP, research activities and capacity building. The [IP Strategy](#) also supports training for federal employees who deal with IP in innovation programs and the development of IP expertise and advice for Canada's innovation community (e.g., a partnership-based approach to improve entrepreneurs' access to IP legal clinics at universities, and the creation of a team of government IP experts to ensure that IP is considered across all innovation programs for business). More generally, the Canadian Intellectual Property Office (CIPO) is launching a suite of programs to help improve IP literacy among Canadians.

Second, the IP Strategy helps businesses grow and capture the economic value of IP. For example, the creation of a new IP

marketplace, a one-stop, online listing of public sector-owned IP available for licensing or sale, aims to reduce transaction costs for businesses and researchers, and improve entrepreneurs' access to public sector-owned IP. In addition, a [Patent Collective pilot program](#) will work with entrepreneurs to promote IP best practices and awareness, provide IP intelligence and support, and facilitate access to IP. This gives SMEs better access to the critical IP they need to grow their businesses.

To support a well-functioning IP regime that provides greater clarity and reduces abusive practices, the Government will continue to update and modernize Canada's IP legislative framework. Already, in 2018 it enacted a series of changes to prevent misuses and improve the efficiency of the IP regime. Work on these reforms will continue, notably through the establishment of minimum requirements for patent demand letters, adoption of new deadlines for decisions at the [Copyright Board of Canada](#), and the establishment of a new [College of Patent and Trademark Agents](#).

SUPER CLUSTERS

SUPER GRAPPES

Superclusters: Bridging Science and Technology to Attract Investment and Create Ecosystems

The Government is bridging the gaps from science to commercialization, to investment and scale-up through [the Innovation Superclusters Initiative](#). By creating new innovation ecosystems, superclusters support every pillar of the Innovation and Skills Plan—advancing skills development, fundamental and applied research, commercialization, investment, growth, and exporting. Fostering partnerships between academics, post-secondary institutions, investors, innovation intermediaries, and businesses creates new opportunities and growth across the innovation

continuum and the economy. Stronger partnerships between businesses and post-secondary education institutions help equip graduates with the necessary skills for in-demand jobs and provide firms with the talent they need to be successful. These partnerships facilitate technology transfer and the application of new ideas in the marketplace. Building the right kind of partnerships across supply chains can lead to new efficiencies and mutual economic benefits for both large and small firms. A vibrant innovation ecosystem supports clusters of high-growth companies sharing best practices and establishing demand for goods and services that are more technologically sophisticated.

Strong partnerships between business, academia, and other innovation ecosystem stakeholders, such as venture capitalists, have allowed globally renowned clusters to

FIGURE 8
Canada's Superclusters



SUPER CLUSTERS

Challenge: Building lasting advantage from high-density networks and clusters

Description: Created new industry-driven partnerships to build on five areas of key Canadian strengths – \$950M/5 years

Achievements: Five superclusters have been selected, representing more than 450 businesses, 60 post-secondary institutions and 180 other participants who will match targeted investments, dollar for dollar, of up to \$950 million over five years. Expected to create 50,000 middle-class jobs and grow Canada's economy by \$50 billion over the next 10 years

thrive, such as those found in Silicon Valley, Boston, Tel Aviv, London, Berlin, Shanghai, and Bengaluru (Startup Genome, 2018). These clusters are able to drive growth across an entire country. For instance, Silicon Valley and the U.S. Northeast corridor (including Boston, New York City, Philadelphia, Baltimore, and Washington) represent 25 percent of U.S. GDP (Khanna, 2016).

The Innovation and Skills Plan takes a new approach to strengthening Canada's most promising clusters and accelerating economic growth in highly innovative advanced industries through the Innovation Superclusters Initiative. Superclusters are innovation hotbeds that bridge science and investment, energize economies, drive growth, and create thousands of middle-class jobs. With close geographic connections and a high degree of connection within their local innovation ecosystems, superclusters bring together businesses of all sizes, academics, post-secondary and other research institutes, sources of finance, and other innovation assets. Overall, superclusters encourage industry-driven R&D activities, provide access to cutting-edge research equipment, develop pools of highly skilled talent, attract international corporate investments, and create hubs of global competitive advantage for advanced industries.

BUILDING ON THE CANADIAN COLLABORATION AND PARTNERSHIP EXPERIENCE

Cluster success stories over the past decades in Canada have been anchored in collaborative approaches pioneered by such organizations as the Consortium for Research and Innovation in Aerospace in Québec, Innovacorp in Nova Scotia, Canada's Oil Sands Innovation Alliance in Western Canada, the Centre for Drug Research and Development in British Columbia, the MaRS Innovation District in Toronto, and Communitech in Waterloo (the Toronto-Waterloo corridor is often referred to as Silicon Valley North). However, Canada has not seen a sufficient number or scale of such initiatives, and the density of connections between companies, research institutions, and other innovation assets is lower than that found in other world-leading centres.

The Superclusters Initiative aims to accelerate the growth and development of large-scale business-led innovation superclusters, translating the strengths of Canada's innovation ecosystems into new commercial and global opportunities for growth and competitiveness. The private sector is matching dollar for dollar the Government's investment of up to \$950 million.

“By connecting and building collaboration across Canada’s dynamic technology and manufacturing sectors, the Advanced Manufacturing Supercluster is looking to supercharge our innovation performance and economic opportunities for all Canadians. We are already seeing companies coming together to work on truly transformative technology projects and develop new programs for digital skills in manufacturing—initiatives that have taken off just by introducing businesses to one another. The power of connecting entrepreneurs across industries and technologies is truly remarkable.”

— Jayson Myers, CEO, Next Generation Manufacturing Canada

Selecting the superclusters was a competitive two-phase application process focused on how applicants could deliver the strongest value and best position Canada for global leadership. The first phase attracted more than 50 letters of intent, which represented more than 1,000 businesses and 350 other participants from all regions of Canada. Government officials, third-party contractors, and expert reviewers conducted a rigorous assessment, and nine applications were invited to advance to the second phase and submit detailed proposals. The value of the process itself is demonstrated by the number of new partnerships announced by applicants as a direct result of their participation in proposals.

The five superclusters chosen to receive funding encompass more than 450 businesses, 60 post-secondary institutions, and 180 other participants. They represent a new way of doing business—one where the Government provides targeted and direct investments through a selection process to build long-term advantage, develop global brand recognition, draw investment, attract talent, and create new opportunities for Canadians.



Based in Atlantic Canada, the Ocean Supercluster will harness emerging technologies to strengthen Canada’s ocean industries—industries such as marine renewable energy, fisheries, aquaculture, oil and gas, defence, shipbuilding, and transportation. This supercluster will ensure Canada’s future prosperity as a source of jobs and solutions to global challenges, such as how to meet the energy demands of the 21st century.

- › Contribution: **UP TO \$153 MILLION**
- › GDP impact over 10 years: **\$14 BILLION**
- › Jobs created over 10 years: **3,000**



Based in Quebec, the AI-Powered Supply Chains Supercluster (**SCALE.AI**) will bring the retail, manufacturing, transportation, infrastructure, and information and communications technology sectors together to build intelligent supply chains through AI and robotics. This supercluster will help Canadian SMEs scale-up and make Canada a globally competitive export leader.

- › Contribution: **UP TO \$230 MILLION**
- › GDP impact over 10 years: **\$16.5 BILLION**
- › Jobs created over 10 years: **16,000**



SUPERCLUSTERS—EXPLORING DIGITAL TWINNING'S POTENTIAL

BC Digital Tech Supercluster members came together in May 2018 to advance the potential application of Digital Twinning. Digital Twinning uses physical data on how the components of an object operate and respond to the environment, as well as data provided by sensors in the physical world to improve operations and add value in production processes.

Gartner (2018) forecasts that, with an estimated 21 billion connected sensors and endpoints by 2020, digital twins will exist for billions of things in the near future.

The May 2018 meeting highlighted the use of the technology for existing processes and systems in Industry 4.0, and the value of Digital Twins to reduce risk in early design decisions during product development and to improve operational efficiency.



Based in Ontario, the Advanced Manufacturing Supercluster will build up next-generation manufacturing capabilities, incorporating technologies such as advanced robotics and 3D printing. By focusing on training and technology adoption, this supercluster will help make the words “Made in Canada” synonymous with “innovative” and “value added”.

- › Contribution: **UP TO \$230 MILLION**
- › GDP impact over 10 years: **\$13.5 BILLION**
- › Jobs created over 10 years: **13,500**



Based in the Prairies, the Protein Industries Supercluster will use plant genomics and novel processing technology to increase the value of key Canadian crops coveted in high-growth foreign markets for plant-based meat alternatives and new food products. Building on Canada’s worldwide reputation as a leader in agricultural production, this supercluster will make Canada a leading source for plant proteins and, ultimately, feed the world.

- › Contribution: **UP TO \$153 MILLION**
- › GDP impact over 10 years: **\$4.5 BILLION**
- › Jobs created over 10 years: **4,500**



Based in British Columbia, the Digital Technology Supercluster will use bigger, better datasets and cutting-edge applications of augmented reality, cloud computing, and machine learning to improve service delivery in the natural resources, precision health, and manufacturing sectors. Employing digital technologies will save time and money and improve the health and lives of Canadians.

- › Contribution: **UP TO \$153 MILLION**
- › GDP impact over 10 years: **\$5 BILLION**
- › Jobs created over 10 years: **13,500**

FIGURE 9
Superclusters: Building Ecosystems



Summary

The Innovation and Skills Plan is bridging science and technology to support commercialization and attracting investment. It recognizes that fundamental science underpins innovation through world-first discoveries upon which new ideas are built. New funding is supporting a diverse research community, accompanied by investments in research infrastructure that will strengthen Canada's competitive advantages in advanced computing, AI, and big data analytics. Partnerships and collaboration infuse the Innovation and Skills Plan's approach to research, technology, and ecosystem development. The NRC is developing a collaborative platform to convene the people and ideas that will deliver new technological breakthroughs and solutions in areas that matter to Canadians.

The five industry-led superclusters are building innovation ecosystems across the country by bringing together businesses of all sizes, academics, post-secondary and other research institutes, sources of finance, and other innovation assets. They are reinforcing every aspect of the Innovation and Skills Plan—supporting skills development, fundamental and applied research, commercialization, investment, growth, and exporting. Over the coming years, the superclusters will build long-term competitive advantage, develop global brand recognition, draw investment, develop business capacity in the development and use of IP, attract talent, and create new opportunities and jobs for Canadians.



INVESTMENT, SCALE-UP, AND GROWING COMPANIES



Image credit: General Fusion

Attracting investment, supporting the growth of leading Canadian companies and start-ups, and exporting

OUR APPROACH

The Innovation and Skills Plan is helping Canadian businesses, including those owned by women and Indigenous people, to start-up, scale-up, and become globally competitive. Grand challenges and the Government's buying power are supporting SMEs and the development of new innovations. Through four flagship programs, the Plan offers support for firms of all sizes to grow and export to markets around the world. It has a focus on direct support, increasing access to late-stage capital for innovative firms in every sector. The Plan emphasizes clean growth by offering advisory support and funding for clean technology firms. It is also making Canada a leading destination for global companies by working to attract more foreign direct investment.

What's new about this approach:

- › Provides both direct and indirect support for firms.
- › Uses the Government as a first customer to support innovative SMEs.
- › Provides an integrated approach to support firms at all stages of growth.
- › Makes advice and capital available to firms looking to go global and export.

Expected outcomes:

- › Increasing the number of Canadian companies that successfully scale-up and export, including those owned by women.
- › Strengthening Canada's venture capital system.
- › Driving clean growth through globally oriented clean technology firms.
- › Unlocking the innovation potential of Canadian firms to solve challenges of great societal importance.

Key programs:

- › **Innovative Solutions Canada**
- › **Women Entrepreneurship Strategy**
- › **National Research Council-Industrial Research Assistance Program**
- › **Regional Growth Strategies**
- › **Strategic Innovation Fund**
- › **Trade Commissioner Service**
- › **Business Development Bank of Canada**
- › **Export Development Canada**

Despite Canada's strong record in starting businesses, relatively few companies scale-up into global competitive companies, exporting and operating at the cutting edge of innovation. The importance of such large firms is clear: they make big investments in R&D, are more productive, pay higher wages, are more cyber secure, have more diverse workforces, export more, and provide employees with greater job security and benefits (see Atkinson and Lind, 2018). However, only 2 percent of mid-sized businesses in Canada succeed in becoming large businesses (BDC, 2016).

Other key challenges involve helping researchers who struggle to commercialize their discoveries, and entrepreneurs, particularly women and Indigenous people, to attract investment and grow their businesses. Firms must be able to take full advantage of adopting productivity-enhancing technologies (e.g., AI, advanced sensors, robotics, the Internet of Things, cloud computing), attract late-stage capital, and export to markets around the world. Certain sectors struggle to find a sufficient supply of patient capital—particularly clean technology firms. Canada needs a clear path to growing more companies by focusing on capital markets, participating in emerging markets, and providing incentives for the expansion of Canadian companies and their long-term presence in Canada to create jobs for the middle class.

Initiatives in this area of the Plan focus on:

- › Supporting start-ups through Government grand challenges;
- › Encouraging inclusive innovation through a focus on women, Indigenous people and other underrepresented groups;
- › Helping firms at different growth stages, through four flagship programs;
- › Increasing firms' access to capital; and
- › Emphasizing clean technologies as a transformational opportunity.

Supporting Start-ups

Innovative Solutions Canada

Innovative Solutions Canada targets its new approach to government procurement at innovators and entrepreneurs. Modelled on the successful U.S. Small Business Innovation Research (SBIR) program, it positions the federal government as a first customer, issuing specific challenges and looking for proposed solutions. The program supports the development of early-stage, pre-commercial innovations. The challenges are designed around solutions and desired outcomes, rather than known products or process specifications. Innovative Solutions Canada also helps Canadian firms generate and leverage new IP. In addition, one of its objectives is to encourage procurement from companies led by underrepresented groups, such as women, Indigenous, youth, disabled individuals, LGBTQ+ and others.

As of December 2018, 14 different federal departments and agencies had launched 42 challenges. Of these, 28 challenges are closed to new applications, having received 559 applications. Future challenges include examining new ways to make roadways safer, to create energy from unlikely sources, and to make materials that Canadians use and interact with on a daily basis more environmentally sustainable.

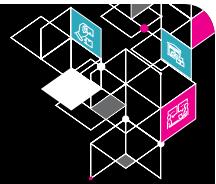


INNOVATIVE SOLUTIONS CANADA

Challenge: Providing first-customer opportunities for new innovations

Description: Using Government as a first customer to solve government challenges and support Canadian innovators – \$100M+/year

Achievements: 42 challenges launched by 14 different federal departments; 28 challenges have closed for assessment, receiving 559 applications



INNOVATIVE SOLUTIONS CANADA— WHERE CHALLENGE MEETS OPPORTUNITY

Examples of challenges released by departments and agencies:



Connected Vehicle and Engineered Surfaces Challenge

To develop novel solutions that incorporate Frequency Selected Engineered Surfaces (FSES) technology into connected vehicle designs as a means to move towards wireless connectivity within vehicles, and as a tool to manage interference emanating from vehicles into other vehicles, and into the overall urban environment.



Innovative platform to facilitate evidence-informed decision-making

To develop an innovative platform/platforms that will provide Canadians with immediate access to relevant, trustworthy, public health information adapted to their specific questions and needs, based on core content from PHAC in areas such as immunization and travel health.



Artificial Intelligence and Big Data Analytics for Advanced Autonomous Space Systems

To apply AI and big data analytics to bring tangible advancements in the operation and use of space assets in support of government operations, public safety, public health, and discovery.



3D Printing and Additive Manufacturing: Metal Powder Bed Density Test Equipment.

To develop new solutions to enable the testing of metal powder bed density in additive manufacturing processes.



High Energy Lasers

To develop the capability to detect and defeat non-cooperative objects by means of compact, efficient, and robust laser sources.

Note: The application deadlines for challenges vary. For a complete list of current open challenges, please visit: <https://www.ic.gc.ca/eic/site/101.nsf/eng/home>

“Our community of early-stage investors, incubators and accelerators provides much-needed coaching, connections and capital to Canada’s early-stage companies seeking to grow and scale up. Many times, their ‘first customer’ serves as critical validation that allows these companies to penetrate their markets locally and globally. The Innovative Solutions Canada program... will help Canadian companies gain early customer traction while also allowing Canadians to benefit from the adoption of homegrown innovative solutions.”

– Sandi Gilbert, Chair of the Board, National Angel Capital Organization (NACO Canada)

GRAND CHALLENGES UNDER THE IMPACT CANADA INITIATIVE

Under the Impact Canada Initiative, federal departments also issue challenges to solicit new ideas and proposals from all Canadians and communities. Prizes are awarded to whomever can first or most effectively find a solution to thematic problems. Impact Canada has two initial streams:

- › Smart Cities Challenge program delivered by Infrastructure Canada: to help communities of all sizes improve the lives of residents through

innovation, data, and connected technology. This stream will contribute \$300 million in funding over 11 years. The first phase has been launched.

- › A clean technology program delivered by Natural Resources Canada: to drive new solutions in areas such as climate change, green growth, and applying new technologies to reduce negative environmental impacts. This stream will contribute \$75 million in funding over four years. A series of challenges will soon be posted on this platform.

Helping Firms at Different Growth Stages: Flagship Programs

The Innovation and Skills Plan features **four flagship programs** that are working together to ensure a streamlined delivery of programs to companies as they move along the innovation continuum:

- › National Research Council-Industrial Research Assistance Program (NRC-IRAP);
- › Regional Development Agencies (RDAs);
- › Strategic Innovation Fund (SIF); and
- › Trade Commissioner Service (TCS).

The relationship of these programs is discussed further in the *Program Simplification and Reorganization* section.

National Research Council-Industrial Research Assistance Program

Many high-potential Canadian firms at an early stage in their scale-up journey are looking for business innovation support tailored to their specific circumstances and needs. Through the Innovation and Skills Plan, **NRC-IRAP** helps businesses identify and pursue opportunities to accelerate their growth through advisory services and financial support. The program supports high-potential firms in bringing their products and services to the global marketplace.

NRC-IRAP

Challenge: Commercializing technologies and start-up financing

Description: Provides financing and advice to innovative SMEs

Achievements: Approved 11,700 projects since 2015, contributing \$870M and leveraging over \$1.4B

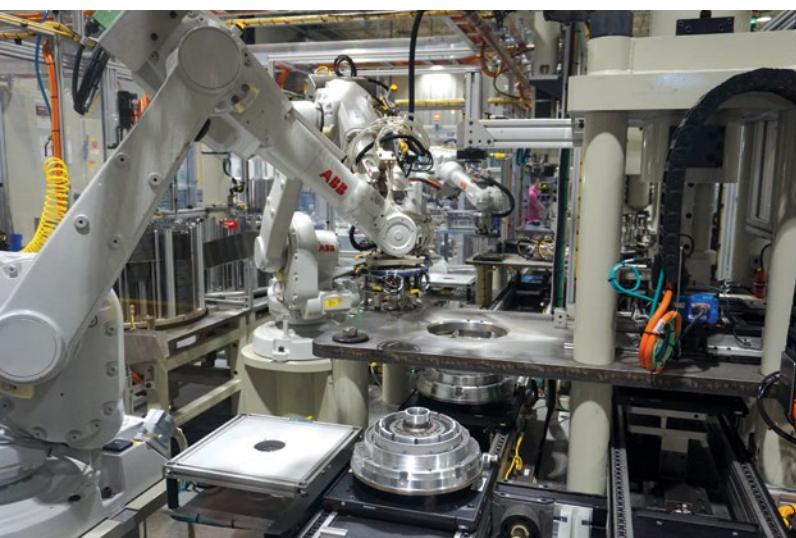


Image credit: Linamar

“With smart cities on the rise, the potential applications are endless.”

– Vince Arone, Co-Founder,
PinPoint GPS Solutions



The PinPoint GPS Solutions team Image Credit: NRC

NRC-IRAP SUPPORTS CANADIAN FIRMS BUILDING SMART CITIES

Is your city a “smart” city? While flying cars are not here yet, we are well on our way towards creating the green infrastructure, intelligent transportation, and other data-driven technologies that will make our urban areas healthier and more sustainable.

PinPoint GPS Solutions of Mississauga, Ontario is at the forefront of this transition. With help from NRC-IRAP, PinPoint GPS is creating integrated smart systems for tracking and improving the performance of commercial transportation fleets.

The tech company’s plug-and-play computer module fits into a vehicle and can seamlessly monitor and analyze engine performance, route efficiency, and driver behaviour. Combining AI, GPS, and cloud computing, this technology enables clients to “follow” their fleet anywhere and obtain real-time data for business and environmental optimization.

Budget 2018 announced an increase in total funding for NRC-IRAP and in its contribution threshold—from \$1 million to \$10 million. This allows NRC-IRAP to support SMEs as they transition from smaller firms to larger, more complex R&D and commercialization projects that require higher funding levels. Once these SMEs achieve sufficient scale and growth, they can access other business innovation support programs that focus on later-stage companies, such as the newly consolidated RDA programs, SIF, and the TCS.

Regional Development Agencies

To succeed in creating a culture of innovation, Canada requires a strong foundation for sustained and inclusive regional economic growth. The Innovation and Skills Plan takes into account regional priorities and needs through \$511 million allocated over five years for the six RDAs, located across the country. The RDAs are adopting a

simplified program structure by channelling support through the Regional Economic Growth Through Innovation (REGI) program, and the development of new regional growth strategies. The REGI program has two new streams:

- › Business scale-up and productivity: Investing in and supporting businesses at various stages of development, including high-growth firms, to accelerate their growth, help them scale-up, and enhance their productivity and competitiveness in both domestic and global markets; and
- › Regional innovation ecosystems: Creating, growing and nurturing inclusive regional ecosystems that support business needs and foster an entrepreneurial environment conducive to innovation, growth, and competitiveness.

COMMERCIALIZING NEW PRODUCTS AND STRENGTHENING BUSINESS PRODUCTIVITY THROUGH INTELLIGENT INNOVATION

Aptly named Intelligent Wellhead Systems (IWS) is creating brilliant solutions for the energy sector. Chief Executive Officer Mitch Carlson and Chief Technology Officer Brad Martin spent almost 20 years working in high-pressure snubbing operations where drill pipe, production tubing, and specialized down-hole equipment are inserted into gas wells under pressure. Their first-hand knowledge and experience of the stress and dangers in live well intervention inspired them to develop a new tool that would reduce well-control incidents and make operations more efficient.

IWS received a repayable contribution through Western Economic Diversification's Western Innovation Initiative to commercialize and scale-up the manufacturing of a wellhead component that allows pressure control operators to see inside the blowout preventer stack in real-time. The inVision technology increases efficiencies, reduces the carbon footprint of oil and gas operations, and makes daily tasks substantially safer. IWS is expanding into the Gulf of Mexico, Middle East, South America, and the U.S.



Image Credit: Intelligent Wellhead Systems

REGIONAL DEVELOPMENT AGENCIES



Challenge: Supporting the growth of Canadian firms in all regions of the country

Description: Through a simplified suite of programs, and new regional growth strategies, the RDAs are supporting regional clusters, disruptive technologies and their adoption (including clean technologies), inclusive growth, and the scaling-up of Canadian firms

Achievements: Announced 5,000 projects since 2015, contributing \$2.2B, and leveraging an additional \$6.2B; launched three regional growth strategies

Building on elements of the Innovation and Skills Plan, the regional growth strategies play to the strengths of the RDAs as conveners in regional innovation ecosystems. The regional growth strategies—three of which have been announced to date—take a collaborative economic development approach to support innovation and entrepreneurial drive through concrete actions aligned with shared priorities within each region.

In addition to the regional growth strategies, the RDAs are a mechanism for delivering tailored support to women- and Indigenous-owned firms, as well as clean technology companies.

Strategic Innovation Fund

Prior to the Innovation and Skills Plan, more than two-thirds of direct support for late-stage firms was delivered through ISED programs and exclusively targeted the aerospace, defence, and automotive sectors. SIF consolidated these previous sector-specific funds, taking a new approach to spurring innovation through supporting all sectors and strengthening supply chains. With an initial budget of \$1.26 billion over five years and delivered by Innovation Canada (discussed in the next section), SIF provides repayable and non-repayable contributions to firms across

all of Canada's industrial and technology sectors, responding to the blurring of industry boundaries in today's digital economy. SIF aims to:

- › Encourage R&D to accelerate technology transfer and commercialization of innovative products and services;
- › Facilitate the growth and expansion of firms in Canada;
- › Build on areas of economic strength;

- › Strengthen and expand the role of Canadian firms in regional and global supply chains; and
- › Attract and retain large-scale investments that create new, good, and well-paying jobs.

SIF fills a gap in the innovation support continuum by making large-scale investments, of more than \$10 million, that support a wide range of activities, from R&D to the commercialization of products, processes, or services.



Ultrasound simulator with augmented reality
Image credit: CAE

SIF SUPPORT FOR NEW SIMULATION TECHNOLOGIES

In August 2018, the Government invested \$150 million in CAE to harness the power of AI, cloud computing, big data, and augmented and virtual reality to develop the next generation of simulation and training products. This funding will secure a \$1 billion investment in R&D in Canada, create 400 new engineering and manufacturing jobs over the next five years, and retrain 1,700 employees with new digital skills. Canada's next generation of pilots, engineers, doctors, and nurses will have access to some of the most advanced simulation tools and training in the world.



Pilot in simulator cockpit
Image credit: CAE



Prime Minister Justin Trudeau announces SIF funding to CAE
Image credit: CAE

STRATEGIC INNOVATION FUND

Challenge: Growing and expanding Canadian firms

Description: Provides late stage growth capital to help Canadian firms scale-up and go global—\$1.26 billion initial budget supplemented by an additional \$1.15 billion.

Achievements: Announced 31 agreements, totalling \$795M, leveraging a total investment of \$8.1B and expecting to secure 50,000 jobs.

For high-growth firms finding it difficult to secure financing for expansion and growth, SIF offers support for expansion or material improvement of existing industrial or technological facilities. SIF is also a flexible mechanism to support and attract sizeable new green field projects and foreign direct investment to Canada.

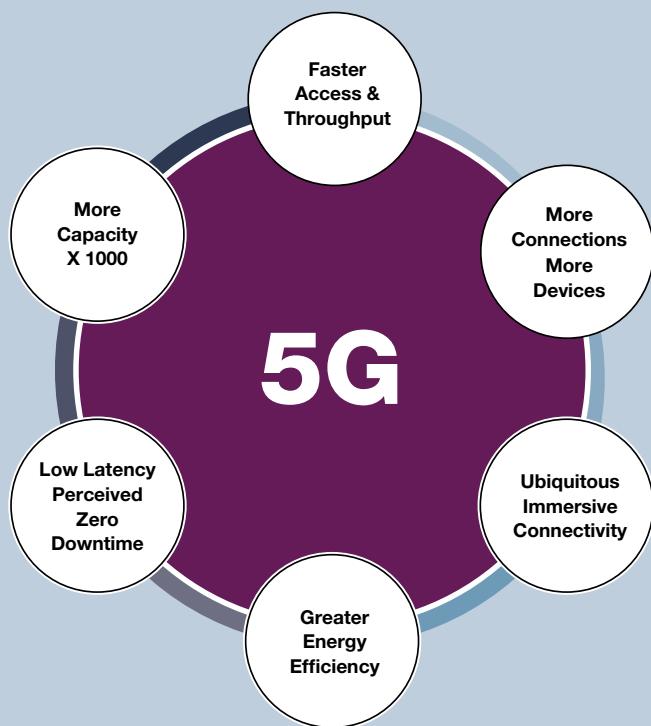
SIF's support for larger projects means significant job creation through the growth and expansion of firms at later stages in their scale-up journey, and the attraction of investments of sufficient size and quality to make a real difference for the performance of Canadian companies and their suppliers. It also means increased R&D collaborations between academia, not-for-profits, and the private sector—collaborations that are larger in scale, scope, and longevity than was often the case in the past. Additional support has been provided for SIF, such as \$800 million announced in the 2018 Fall Economic Statement.

SIF SUPPORT FOR 5G THROUGH THE ENCQOR PARTNERSHIP

The digital world is at an inflection point with the number of connected devices expected to grow to 50 billion by 2020. The next generation of wireless communications systems, called 5G to denote that it is the fifth generation of development, will become the most critical building block of Canada's digital society.

5G will facilitate the next generation of high-capacity, extremely fast, reliable, secure, and ultralow latency wireless networks. 5G will also enable new systems and applications that could rely on billions of sensors feeding streams of real-time data through machine-to-machine communications.

In March 2018, the Government announced the first public-private partnership aimed at increasing economic growth driven by 5G technology—a key investment in making the digital economy a reality. Spearheaded by five world-class digital technology companies—Ericsson, Ciena, Thales, IBM Canada, and CGI—the ENCQOR project brings together industry, SMEs, the public sector, centres for innovation, and universities. With a partnership investment of \$400 million, it will secure over 4,000 good middle-class jobs, including 1,800 specialized 5G jobs over the next five years, leading to new innovations in wireless telecommunication. This project will provide access to 5G networks



for SMEs, researchers, and academia; it will not only unlock the technological promise of 5G in the near term, but will also drive long-term economic growth in Quebec, Ontario, and the broader Canadian innovation system.

Trade Commissioner Service

Breaking into new markets presents a number of challenges for Canadian firms, such as understanding the local environment and finding customers. The Innovation and Skills Plan aims supports globally oriented firms through tailored advice and financing. In the 2018 Fall Economic Statement, the Government announced (i) new investments to help Canadian businesses export and grow, and (ii) enhanced trade services for Canadian exporters, through additional financial resources to the TCS, which helps Canadian companies and organizations overcome these challenges and grow globally. With offices across Canada and in 161 cities around the world, the TCS provides Canadian businesses with on-the-ground intelligence, qualified contacts, partnership opportunities, and practical advice on foreign markets to help them make better, timely, and cost-effective decisions to achieve their goals abroad.

TRADE COMMISSIONER SERVICE

Challenge: Canadian companies entering new markets abroad

Description: Provides services and advice to help Canadian companies navigate the complexities of international markets

Achievements: Since 2015, it facilitated 406 foreign direct investment projects representing a minimum of \$48.3 billion and 20,800 jobs; Canadian exporters concluded 3,421 commercial agreements facilitated by the TCS

ALBERTA START-UP FINDS EARLY SUCCESS IN INDIA

Failure analysis is big business in industries such as oil refineries and chemical plants. The failure of critical equipment such as bearings and gears can lead to unplanned maintenance shutdowns that have a major impact on a company's productivity and profitability.

Nanoprecise Sci Corp of Edmonton, Alberta applies its expertise in advance of failures, using secure wifi-enabled sensors installed on pumps or motors, for instance, as well as sophisticated software and cloud-based AI to continuously monitor such machinery. This allows companies to predict when components are likely to break down, so that they can repair them before they cost hundreds of thousands of dollars in production time, scheduling difficulties, and liability issues.

With the assistance of the TCS, Nanoprecise is winning major customers in India for its groundbreaking capabilities. Founded just under two

years ago by Sunil Vedula, Nanoprecise has four employees in Canada and a satellite office in India, where Vedula, an Indo-Canadian, has connections.

Two early successes there have involved pilot projects with the India Farmers Fertiliser Cooperative (IFFCO), one of the largest manufacturers of complex fertilisers in India, and with the Larsen & Toubro (L&T) Nabha Power 700 MW thermal powerplant in Punjab, one of the country's most efficient power generation facilities. Nanoprecise has drawn up case studies of how its predictive monitoring technology helped both firms detect faults and prevent damage in critical equipment at an early stage, avoiding the cost of shut-downs plus unplanned repairs.

Nanoprecise is also going after business in the U.S. and countries in the Middle East, with the help of the TCS.



“The TCS is able to get you in to meet the key decision makers in a company who would otherwise be inaccessible... Trade commissioners will often know the vice-president of engineering or director of maintenance, so it accelerates the sales cycle...They’re such an asset to small companies.”

— Don McClatchie, vice-president of business development for Nanoprecise

The additional resources will increase the number of trade commissioners in key markets abroad, and across Canada, to help Canadian firms successfully enter new markets, and take advantage of the opportunities created by Canada's new free-trade agreements, particularly those covered by the Canada-EU Comprehensive Economic and Trade Agreement (CETA) and Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). The TCS will also modernize and refresh its digital presence to offer exporters new online tools and to connect them more effectively with the full range of Canada's trade promotion programs and services. To support Canada's innovators, the TCS will expand and improve advice and services in areas such as digital, e-commerce, and IP, and expand the successful [Canadian Technology Accelerator](#) (CTA) program into technology hubs around the world. The CTA program provides mentorships, introductions to potential clients and partners, and desk spaces in business accelerators abroad.

The TCS complements work being done across the government to help entrepreneurs and small businesses grow, and create good middle-class jobs through trade and innovation, particularly through the promotion of export opportunities to Canadian SMEs.

Increasing Access to Capital

Increasing the availability of capital for Canadian start-ups and SMEs helps them grow and create high-quality jobs. It requires a healthy venture capital (VC) ecosystem that allows growth-oriented firms to scale their activities, meet increased demand, invest in innovation, and seek opportunities in international markets. Some sectors with frontier technologies, such as clean technology and health science, require patient capital—longer-term investments for which investors will not see returns right away. Furthermore, women and Indigenous entrepreneurs have experienced difficulties in accessing capital to grow their businesses. Through the Innovation and Skills Plan, the Government is working with the private sector to fill gaps in Canada's investment ecosystem.

The steady upward trend in the total amount of VC investment in Canada has been propelled in part by government investments in the VC ecosystem, such as the Venture Capital Action Plan (VCAP). VC investment increased from \$1.9 billion over 365 deals in 2013 to \$3.5 billion over 592 deals in 2017 (CVCA, 2018). Despite this increase in the total amount of VC in Canada, the average deal size has not grown as rapidly as in other



The Honourable Mary Ng, Minister of Small Business and Export Promotion, at the Surrey Board of Trade

VENTURE CAPITAL CATALYST INITIATIVE

Challenge: Increasing access to late-stage capital

Description: A federal investment of \$400M that will be leveraged to raise a total of about \$1.5 billion for venture capital; \$50M that will invest in clean technology firms

Achievements: Announced \$350M for five private-sector-led funds-of-funds, and \$50M for funds focused on underrepresented groups



countries—increasing by only 16 percent versus 77 percent in the U.S. and 123 percent in the U.K. (BDC, 2017).

Opportunities exist to strengthen the Canadian VC ecosystem, including through greater diversity in investor participation, greater gender diversity, increased flexibility in meeting underserved sectors, and openness to new VC financing models. Taking up these opportunities will likely make Canada's VC industry more self-sustaining and help scale-up Canadian start-ups to be the next gazelles or unicorns. It will also diminish the likelihood of fast-growing Canadian firms being acquired or moving to the U.S. to raise capital for growth.

The Innovation and Skills Plan's **Venture Capital Catalyst Initiative (VCCI)** builds on VCAP by increasing the availability of late-stage financing for innovative Canadian firms, and strengthening the Canadian VC ecosystem over the long term.

"Across Canada, you can find small and medium-sized firms with innovative new products and services. These companies often need an injection of capital to scale up and make their mark on global markets. This announcement under the Venture Capital Catalyst Initiative, part of the Innovation and Skills Plan, furthers the Government of Canada's work to create an investment environment where made-in-Canada breakthroughs can challenge the status quo and change the world. I look forward to all the future benefits and new jobs resulting from this announcement."

— The Honourable Navdeep Bains, Minister of Innovation, Science and Economic Development

The Business Development Bank of Canada (BDC) is delivering VCCI funding of \$450 million. With funds leveraged from the private sector, this investment is intended to inject up to \$1.5 billion into Canada's risk capital market. It has already allocated funding to its first two streams: (i) \$350 million focused on large, returns-driven funds-of-funds; and (ii) \$50 million focused on alternative investment models by investing in proposals that support new models and underrepresented groups, such as women or diverse fund management teams and entrepreneurs, or underserved regions and sectors. The 2018 Fall Economic Statement announced an additional \$50 million for VCCI to increase capital for Canada's clean technology firms. Corporate investors, institutional investors, provincial governments, and other players also participate in VCCI.

"The VC industry plays an essential role in helping our most innovative entrepreneurs get started and scale their companies to compete with the best in the world. BDC is uniquely positioned to support this initiative. As the most active VC investor in the country, BDC Capital, our investment arm, can unite the best players in the ecosystem and create a new generation of international champions for a more prosperous Canada."

— Michael Denham, President and Chief Executive Officer, Business Development Bank of Canada

VCCI includes a comprehensive focus on increasing diversity and addressing gender balance among VC fund managers and portfolio companies. All applicants for funding through the VCCI are required to demonstrate how their strategies will advance these objectives, and are also evaluated on this basis. Successful candidates must report on the gender balance of the fund managers and entrepreneurs that they support.

NEW SOURCES OF BUSINESS-LED PATIENT CAPITAL

The private sector is responding to the Minister of Finance's Advisory Council on Economic Growth, which called for the financial sector to create a fund that provides patient capital to help grow Canadian firms. Announced in March 2017, Canada's biggest banks and other financial institutions launched the **Canadian Business Growth Fund**. This fund of up to \$1 billion over 10 years will help SMEs access patient capital. To date, \$545 million has been committed to the fund, which made its first investment in fall 2018 of \$15 million to help Kelowna-based Lift Auto Group scale-up.

Clean Technology

Canada is supporting clean growth across the country through the Pan-Canadian Framework on Clean Growth and Climate Change. The Framework, developed in collaboration with provinces and territories and in consultation with Indigenous people, will help meet emissions reductions targets, grow the economy, and build resilience to a changing climate.

To unlock the economic and environmental potential of the clean technology sector, the Government is providing \$2.3 billion to new programs that support clean technology companies as they innovate, grow, demonstrate, compete, and capture global market opportunity. The Plan includes \$1.4 billion in new financing through the BDC and Export Development Canada (EDC), allocating \$950 million in growth capital to support clean technology producers, and approximately \$450 million in additional project financing. In January 2018, BDC launched its \$700 million Cleantech Scale Up Initiative to grow Canada's clean technology industry, protect the environment, and create jobs. Since the launch, investments totalling \$206 million have been provided to Canadian clean technology companies.

The RDAs are also supporting the Innovation and Skills Plan's emphasis on clean growth by investing \$100 million a year in support of clean technology.



Challenge: Creating and scaling-up clean technology firms

Description: \$2.3 billion for clean technology companies, including start-up funding, patient capital, and tailored advice

Achievements: The BDC has provided \$206 million to clean technology companies since January 2018, and SDTC has invested over \$1 billion in over 300 companies since its inception in 2001

SUSTAINABLE DEVELOPMENT TECHNOLOGY CANADA

Sustainable Development Technology Canada (SDTC), an arm's-length foundation, supports Canadian companies with the potential to become world leaders in the development and/or demonstration of new clean technologies that address climate change, clean air, clean water, and clean soil. The Innovation and Skills Plan is recapitalizing the SDTC's SD Tech Fund by making \$400 million available to support the development and demonstration of early-stage clean technology projects. In 2017–2018, SDTC approved 24 new projects and is on track to increase investments in 2018/19 by more than 40 percent. Since 2015, SDTC has invested over \$330 million in 94 projects, leveraging over \$750 million from other sources.

Women Entrepreneurs

The McKinsey Global Institute estimates that advancing women's equality in Canada has the potential to add \$150 billion in incremental GDP to the economy by 2026 (McKinsey Global Institute, 2017a). However, women entrepreneurs face barriers in starting and growing their businesses, including accessing capital and other business resources. Approximately 15.6 percent of Canadian SMEs are majority women-owned, 10 percent of high-growth firms are majority women-owned, and about 11 percent of women-owned businesses export (ISED, 2018a).

WOMEN ENTREPRENEURSHIP STRATEGY



Challenge: Reducing the systemic barriers that women face in growing their businesses

Description: A comprehensive, whole-of-government plan to help women grow their businesses through access to financing, talent, networks, and expertise – \$2B

Achievements: Announced the Women Entrepreneurship Knowledge Hub

The new comprehensive [Women Entrepreneurship Strategy](#) (WES) addresses these challenges and lowers barriers. The Strategy includes \$2 billion for programs and initiatives delivered by a number of departments and agencies across the Government, focusing on four areas: helping women-led businesses grow, increasing access to capital, improving access to federal business innovation programming, and enhancing data and knowledge.

The strategy includes a commitment of \$105 million for nationally coordinated, regionally tailored investments to help women entrepreneurs and support regional innovation ecosystems—delivered by the RDAs. The funding is provided through (i) the WES Ecosystem Fund, an investment of up to \$85 million over five years to strengthen capacity within the entrepreneurship ecosystem and close gaps in service for women entrepreneurs; and (ii) the Women Entrepreneurship Fund, a two-year, \$20 million direct investment in women-led businesses to help them grow and reach new markets.

In addition, the BDC has committed to a new lending target of \$1.4 billion for women-owned businesses over three years and has increased the size of its [Women in Technology Venture Fund](#) to \$200 million. [Farm Credit Canada](#) is creating a new lending product for women entrepreneurs in agriculture.

Other initiatives are connecting women to expanded export services and opportunities, such as through an investment of \$10 million in the [Business Women in International Trade Program](#). EDC will make available up to \$250 million in financing and insurance solutions, on commercial terms, to support women-owned and women-led businesses looking to export. As part of the strategy, the BDC's partnership-based [WE Talk Business initiative](#) is offering 14 one-day boot camps across the country during Fall/Winter 2018-2019. The boot camps help women entrepreneurs acquire the skills, network, financing, and management advice to grow their business.

BDC BOOT CAMPS FOR WOMEN ENTREPRENEURS

To build the agenda for the boot camps, BDC teamed up with renowned and trusted leaders Janice McDonald, award-winning entrepreneur and President of the Beacon Agency, and Clare Beckton, Executive in residence at the Centre for Research and Education on Women and Work (CREWW) at Carleton University. BDC is tailoring some of the boot camp events to the unique needs of women entrepreneurs leading technology firms, as well as Indigenous women entrepreneurs. Each event includes a partner roundtable, bringing together key players in each community to discuss issues of common interest. Participants will include Women's Enterprise Organizations of Canada members.



From left to right:
Devon Brooks –
CEO & Co-Founder of Sphere,
Marie Chevrier –
CEO & Founder of Sampler,
Lauren Rathmell –
Co-Founder & Greenhouse
and Marketing Director of Lufa
Farms, and
Eva Wong –
Co-Founder & COO of Borrowell

Image credit: Kristin Mackinnon

The Government is investing \$9.5 million to share data and best practices for women entrepreneurs, including \$8.6 million to fund a new [Women Entrepreneurship Knowledge Hub](#). Ryerson University will host this new research network, which will work in collaboration with researchers and experts from eight regional hubs. To help policymakers make well-informed, evidence-based decisions that will achieve better results for more people, the strategy aims to strengthen the collection of gender-disaggregated data.

A WES Expert Panel will guide efforts in regional and national programs. Composed of up to seven members from the private sector and civil society across the country, with significant experience, expertise, and knowledge in a range of disciplines, the Panel will provide advice on gaps in support and services available to women entrepreneurs in Canada.

On May 1, 2018, legislative amendments that require publicly traded companies incorporated under the *Canada Business Corporations Act* to provide information about the diversity of their boards and senior management teams, including policies that support diversity, received Royal Assent. The Government will also create an annual award for Canadian corporations showing leadership in promoting women, including minority women, to senior management positions and boards of directors.

The WES aligns with and draws on recommendations made by the Canada-United States [Council for Advancement of Women Entrepreneurs and Business Leaders](#), launched in February 2017. This council released reports on five themes: growing women-owned businesses, increasing women in STEM roles, encouraging women entrepreneurs, enabling women to access capital, and advancing women as leaders in the private sector.

Indigenous Entrepreneurs

Despite some successes, various barriers impede the development and growth of Indigenous businesses. A primary obstacle is limited access to capital due to legislative and market-based barriers, such as limitations in the *Indian Act* (e.g., inability to use land/property on reserves as collateral), remoteness, financial illiteracy, low accumulated wealth, and a lack of credit history.

To help address these barriers, the Government offers a series of supports to Indigenous entrepreneurs. The BDC's [Indigenous Banking Unit](#) provides financing and consulting services, including the [Aboriginal Business Development Funds](#), in partnership with community organizations, to increase access to capital for Indigenous entrepreneurs who may not normally qualify for a loan; and [Indigenous Entrepreneur Loans](#) of up to \$250,000 for both businesses and start-ups. Through the BDC's alliance with Canadian Executive Service Organization Aboriginal Services, loans come with ongoing mentoring and business management advice for the first two years following loan approval. The Government also supports [Aboriginal Financial Institutions](#) (AFIs) across Canada, the National Aboriginal Capital Corporation Association, and funding for loans to entrepreneurs through non-repayable contributions and funds to offset the administrative costs of loans. AFIs provide loans and non-repayable contributions to Indigenous-owned businesses.

Supporting Indigenous economic development is also a key priority for the RDAs. In 2017–2018, RDAs approved approximately \$94 million in funding for Indigenous economic development projects. RDAs are also developing regional growth strategies that reflect their unique regional circumstances and context while aligning with the targets and goals of the Innovation and Skills Plan. This includes adopting a whole-of-government approach to achieve outcomes in priority areas, such as economic development and job creation for Indigenous people.

MADE IN CANADA INNOVATION: SUPPORTING CANADIAN TECHNOLOGY START-UPS



Innovative Solutions Canada announced a \$300,000 investment in Winnipeg's CEMWorks Inc. and Waterloo's mmSense Technologies Inc. to develop proof of concepts for proposed solutions to ISED's connected vehicle challenge.



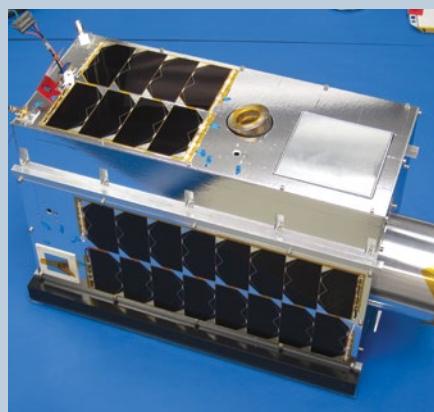
Support from FedNor helped Sudbury's Symboticware to develop and commercialize its product that collects and relays data from remote locations, such as underground mines, to monitor mobile equipment in real time.

Image credit: Symboticware Incorporated



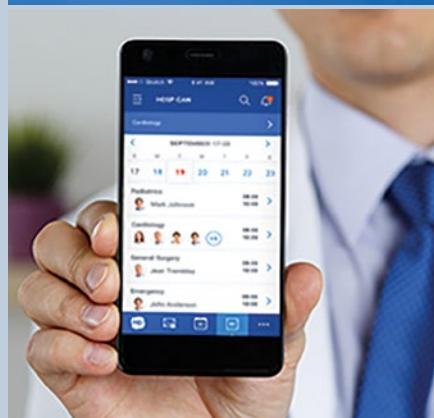
NRC-IRAP's advice on technology adoption and R&D helped Edmonton's Black Cat Wear Parts Ltd. scale-up. It now has plants in the U.S. and China, and 120 employees.

Image credit: Black Cat Wears Parts Ltd.



Through increased venture capital for the BDC to invest in cleantech, it is supporting Montréal's GHGSat so that it can build its first satellite constellation, the world's first high-resolution satellite capable of measuring greenhouse gas.

Image credit: GHGSat



With assistance from the TCS and provincial trade programs in Quebec, PetalMD has signed up two hospitals in France and one in Belgium to use its cloud-based systems to deal with their complex physician management needs.

Image credit: PetalMD



SIF invested \$7.6 million to support a \$19-million project by St. John's-based Bluedrop Performance Learning Inc., a company that provides simulation technology, simulators, and training programs to the aerospace and defence sectors. The project is expected to create or maintain more than 200 jobs.

Image credit: Bluedrop

Summary

The Innovation and Skills Plan takes a new approach to making Canada a leading destination for global companies to establish themselves and to supporting Canadian companies, including women-owned firms and Indigenous entrepreneurs, as they progress along the innovation continuum—from starting-up, to scaling-up, to competing

globally and exporting. To facilitate this support, and provide simplified access to government programming, four flagship programs each target firms at a different stage of growth: NRC-IRAP, RDAs, SIF, and TCS. In addition, the Government is leveraging its procurement power to better support innovative SMEs through Innovative Solutions Canada. New injections of risk capital also ensure that companies have better access to the late-stage patient capital they need to grow.



PROGRAM SIMPLIFICATION AND REORGANIZATION



Offering a timely, client-centric single window in the delivery of business innovation programs in every region

OUR APPROACH

After simplifying and reorganizing business innovation and clean technology programs across all federal departments, the Innovation and Skills Plan has launched a new, easy-to-navigate suite of programs. These programs respond to the challenges and opportunities facing Canadian businesses along the innovation continuum. Four flagship programs each target a different critical stage of firm growth. Firms can access the complete program suite through the new Innovation Canada digital platform (Innovation.Canada.ca).

What's new about this approach:

- › Provides a single window for firms to access tailored support, with special access for high-growth and clean technology firms.
- › Reduces the number of programs by two-thirds and increases overall funding.
- › Offers a simplified suite of programs, featuring four flagship programs that correspond to different firm growth stages.
- › Addresses challenges and identifies opportunities through six business-led Economic Strategy Tables that focus on areas of high-growth potential.

Expected outcomes:

- › Improving access to business innovation support programs at every stage of growth, saving firms time and money and allowing them to focus on competitiveness and growth.
- › Aligning access to demand-driven support programs with different stages of firm growth.

Key programs and initiatives:

- › Horizontal review of innovation and clean technology programs
- › Four flagship programs
- › Innovation Canada
 - | Digital single window
 - | Accelerated Growth Service
 - | Clean Growth Hub
- › Economic Strategy Tables

The previous suite of federal government programs for supporting innovation in Canada was difficult to navigate and a number of overlapping programs had similar mandates. Other programs were too narrowly focused for today's economy. In addition, many Canadians simply did not know where to go to get government support, preventing them from capitalizing on opportunities to grow and compete.

Canadian firms need a clear point of entry to a streamlined suite of relevant business innovation programs that meet their specific needs at different points along the innovation continuum—whether they are looking for funding, tax credits, expert advice, or wage subsidies, or forming new partnerships. The new suite of business innovation programs aims to better meet firms' needs, while creating more opportunities for the Government to work closely with industry in addressing remaining challenges.

Initiatives in this area of the Plan focus on:

- › Streamlining innovation support programs;
- › Creating a single point of contact for firms to access support; and
- › Engaging business leaders in targeted sectors to help drive innovation, competitiveness, and economic growth.

Streamlining Innovation Support Programs

The horizontal review of business innovation and clean technology programs across every federal department during 2017 identified many reasons for why the Government must embark now on transformational change in our approach to support innovation and growth. Canadian businesses need supports that are easy to access and tailored to address their real-world needs in today's highly competitive global economy. Different firms have different needs during their scale-up and growth journeys; as a result, they have asked for a simple, easy to access, and coherent suite of programs that respond to their position on the innovation continuum.

The horizontal review resulted in an increase in overall funding for innovation support programs, along with a reduction in the number of separate business innovation

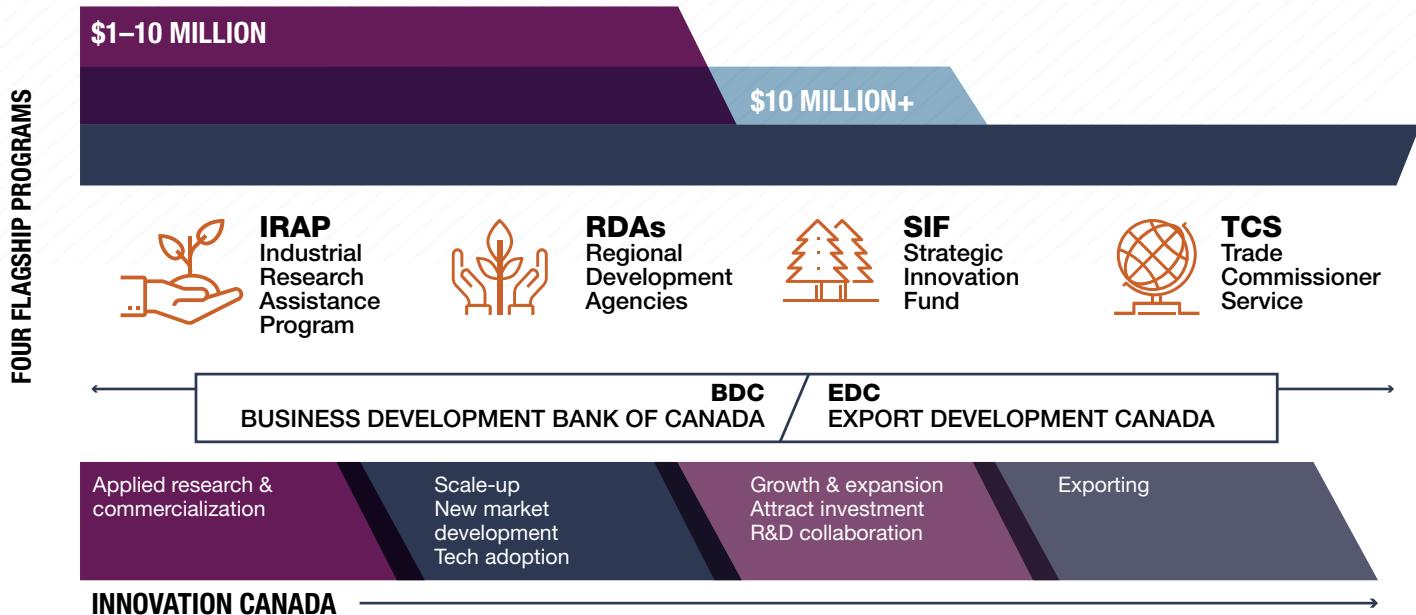
programs—from 92 to about 35. The new suite of programs supports firms at all points on the innovation continuum. As part of this streamlining and consolidating, the **four flagship programs**, described in the *Investment, Scale-up, and Growth* section, each target support at a different critical stage of firm growth:

- › **National Research Council-Industrial Research Assistance Program targets applied research and commercialization** – It provides funding and consulting services to help SMEs conduct research and commercialize technologies.
- › **Regional Development Agencies target scale-up and export** – They offer a suite of programs to help firms adopt technologies, grow, and enter new markets; to support regional growth across Canada; and to support women, Indigenous entrepreneurs, and clean technology companies.
- › **Strategic Innovation Fund targets large-scale, later-stage funding** – It supports large-scale projects that can lead to significant job creation, including R&D, technology transfer and commercialization, growth and firm expansion, attraction of large-scale foreign investment, and creation of new partnerships between researchers and industry.
- › **Trade Commissioner Service targets international market linkages** – It helps firms of all sizes navigate international markets by providing insights and access to international contacts that facilitate entering new markets and exporting.

Other government programs, especially those provided by the **BDC** and **EDC**, complement the efforts of the flagship programs in helping Canadian firms scale-up challenge. The BDC's financing and advisory services help innovators transform their ideas into successful companies, and existing high-growth firms reach new heights. EDC provides the financing, insurance, and loan guarantees that firms need to go global and export to new markets. Due to the small domestic market, exporting is critical for Canadian firms looking to become globally competitive anchor firms that will drive Canada's innovation ecosystems.

All of these programs, as well as other government innovation supports, are accessible through the Innovation Canada digital platform, which connects firms to the programs best suited to their needs.

FIGURE 10
A New Approach to Programs: Helping Firms at Every Stage of Growth



Creating a Single Point of Contact for Firms

Innovation Canada is the new single point of contact for Canadian innovators, simplifying access to the programs under the Innovation and Skills Plan, and guiding firms from starting-up, to scaling-up, to going global. It is home to key programs such as SIF, Innovation Superclusters Initiative, and Innovative Solutions Canada. At its core, Innovation Canada is designed around three complementary features: a digital platform where anyone can visit and receive a tailored list of innovation support; the Accelerated Growth Service, which helps high-growth firms access Government programs and reach their full potential; and the Clean Growth Hub, which improves the access of Government services for clean technology companies. These interconnected programs ensure that Canadian innovators can grow to their full potential through a more effective and accessible suite of programs.

INNOVATION CANADA

Challenge: Simplifying and coordinating government support programs for innovation

Description: A single point of contact for Canadian innovators and entrepreneurs. Includes a digital single window that provides a tailored list of business innovation programs at the federal, provincial, and territorial levels

Achievements: Reduced the number of separate business innovation and clean technology programs by two-thirds; InnovationCanada.ca has received 420,000+ visits

innovation.canada.ca

INNOVATION CANADA DIGITAL PLATFORM: easy access into the suite of consolidated innovation support programs for business.

The Innovation Canada digital platform allows firms to identify and access the most effective innovation program supports to achieve their scale-up and growth ambitions. In this role, it takes into account a company's competitive circumstances, including regional location, size, sector, target markets, and ownership (e.g., by women entrepreneurs and other underrepresented groups), as well as where it lies along the innovation continuum. Innovation Canada matches a company's needs and other innovation support needs with the most relevant programs.



Image credit: Linamar

INNOVATION CANADA'S DIGITALLY ENABLED BUSINESS SUPPORT

The Innovation Canada digital platform matches businesses with the best fitting programs and services from across federal, provincial, and territorial governments—all in under three minutes.

On any given day, the AI-enhanced platform offers over 1,000 innovators and entrepreneurs personalized lists of programs and services to help them grow. The platform has already received 420,000+ visits since its launch in January 2018. The benefits are clear and tangible:

- **Saves businesses time and money.** In under three minutes, a business can immediately receive a tailored list of programs and services (including funding, loans, tax credits, wage subsidies, internships, etc.). This used to take 30 minutes on the phone and two to five days of research wait time.
- **Explains programs in plain language.** Everything on Innovation.Canada.ca is organized and written to make it easy for Canadian businesses to understand what services are available, and which opportunities to pursue. What does the program do? Who is it for? How does it work?

ACCESS TO THE ACCELERATED GROWTH SERVICE (AGS): tailored support for companies with high-growth potential.

“I look at the AGS as having my own government account team...there to help with roadblocks and answer questions.”

— Norma Bilin, CEO, Augurex

The AGS helps high-potential companies grow through customized expert support. The AGS's clients receive access to a dedicated advisor and a customized plan of potential government programs and services such as financing, exporting, innovation, and business advice. Led by ISED, the AGS is delivered in collaboration with the BDC, EDC, TCS, the NRC, and the RDAs. To date, over 450 high-potential firms have enrolled in the AGS and accessed more than \$350 million in funding.

“You’re not just part of the AGS network, you’re part of their larger network across government.”

— Alexandre Nadeau, CEO, Tecnar



CLEAN GROWTH HUB: access to business supports for clean technology companies.

The Clean Growth Hub supports clean technology companies and projects, enhances program coordination, and tracks results. Its team of experts from across government help clean technology users and producers find and understand the programs and services best suited to their individual circumstances. The Clean Growth Hub has met 776 clients since its inception in January 2018.

Jointly led by ISED and Natural Resources Canada, the Clean Growth Hub has 16 participating federal departments and agencies, reflecting a whole-of-government approach to supporting clean technology firms. The Hub also leads the administrative data component of the Clean

Technology Data Strategy to ensure alignment and integration of data collection and reporting activities, and fosters consistent, complementary, and comparable federal data.



6
tables

ECONOMIC STRATEGY TABLES: SIX SIGNATURE INITIATIVES

- 1. Agile regulations** – Implementing an outcome-based approach to regulations that stimulates innovation and supports new collaborative relationships between industry and regulators
- 2. Skills and talent** – Positioning Canadians for jobs of the future and leading in the global competition for talent
- 3. Technology adoption** – Driving technology adoption through centres where innovators, purchasers and regulators get practical experience so they can leapfrog global competition
- 4. Infrastructure (digital and physical)** – Providing universal internet access to all Canadians and physical infrastructure that helps goods get to export markets
- 5. Own the podium** – Adopting a new mindset of rallying behind high-growth firms to build business winners and create global leaders in each of the six sectors
- 6. Canada Brand** – Refreshing Canada's economic brand to tell the world what its innovative economy has to offer

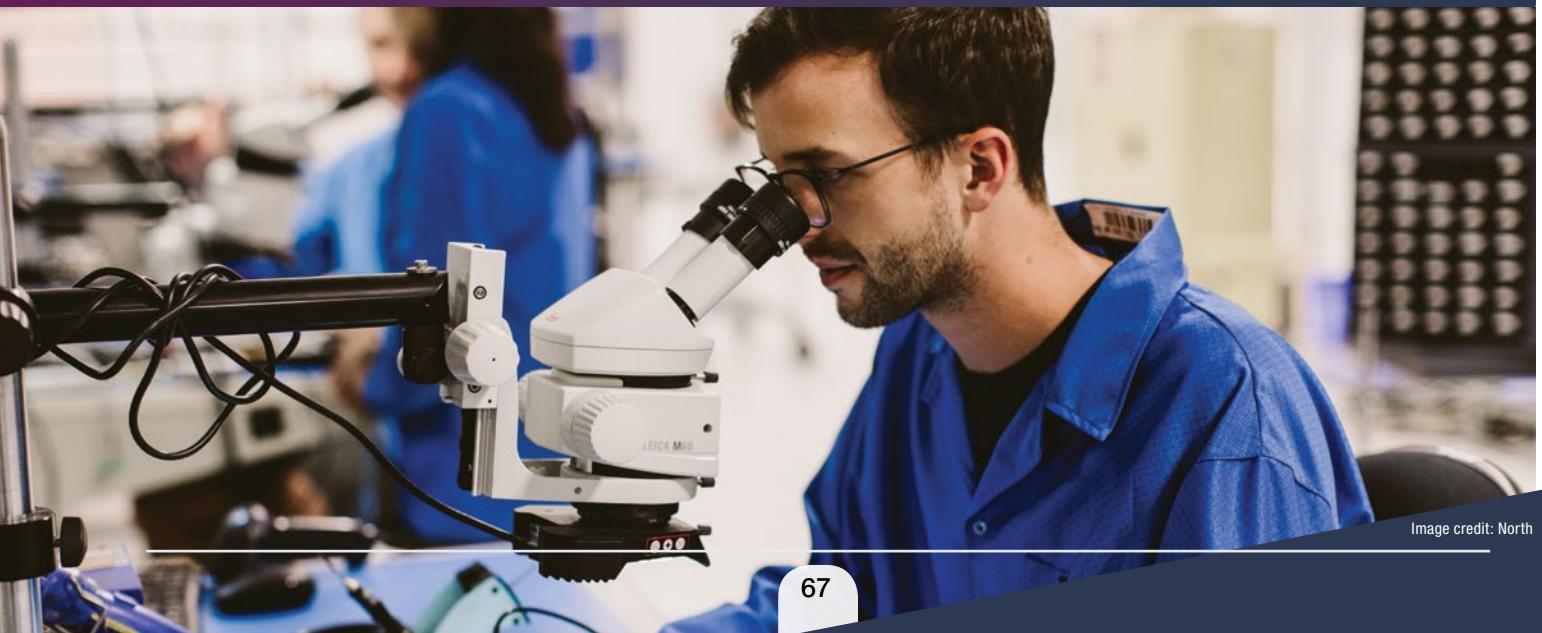


Image credit: North

Engaging Business Leaders

The Government acted upon the suggestion of the advisory Council on Economic Growth that government and business should work together to identify and remove unnecessary obstacles to economic growth in selected sectors, helping raise the country's collective ambition and unleashing its real and inclusive growth potential. In 2017, the Government created **six Economic Strategy Tables** to drive innovation, competitiveness, and economic growth in advanced manufacturing, agri-food, clean technology, digital industries, health/bio-sciences, and resources of the future.

"We need to set an ambitious, quantifiable target that we will work together to achieve. For me, it is not important where we rank today; what is important is our velocity, the speed at which we improve. Let's accelerate the distribution of knowledge. Lack of knowledge distribution is what limits the speed of growth. If we can learn best practices and disseminate knowledge faster than others, then we will succeed. We will have the leading edge"

— Charles Deguire, Chair, Advanced Manufacturing Economic Strategy Table

Each Table was composed of up to 15 CEOs, collectively reflecting a balance of gender and diversity, including Indigenous CEOs. During 2017 and 2018, the Tables held 34 meetings, 67 engagements sessions with businesses across the country, and 8 meetings with provincial, territorial, and federal governments; they also invited public submissions and comments.

The Tables issued their interim reports in February 2018, and their first set of recommendations on innovation and competitiveness in September 2018. The reports recognize the increasingly competitive and complex global environment faced by Canadian industry, a new tax regime in the

U.S., and the rapid pace of technological transformation. They also outline sector-specific action plans and propose **six signature initiatives** to jolt Canadian global competitiveness and attract investment. According to the Tables, the total economic potential of their initiatives, if implemented, could be up to \$318 billion in additional GDP growth by 2030—an increase of 15 percent above 2017 levels. The Tables arrive at this figure by establishing the economic potential of each signature initiative to accelerate the six economic areas and factoring in their ability to create positive multiplier effects for the wider economy (Economic Strategy Tables, 2018).

The Tables make both sector-specific and cross-cutting recommendations. For example, in the area of tax policy, they point to an opportunity to address tax competitiveness in a way that aligns with their recommendations on high-growth firms and reinforces areas of Canadian strength. They recommend Canada match the U.S. allowance for a 100 percent depreciation deduction in the first year for investments in equipment until 2023. In this way, Canadian early adopters could lower their business costs and boost adoption of innovative technologies. In addition, several Tables made specific recommendations on accelerated capital cost allowance for their sectors.

Another recommendation is the redesign of the Scientific Research and Experimental Development (SR&ED) program to help companies scale-up. SR&ED is a tax incentive that encourages businesses to conduct R&D in Canada. Canadian SMEs receive a refund of up to 35 percent of the first \$3 million in eligible expenditures annually, but larger companies receive less. They propose a redesign that would refocus support on more high-performing scale-ups to increase the chances of building billion-dollar anchor firms; low-performing firms would be allowed to fail to free up tax dollars. Given changes in the kind of research done in today's digital economy and the importance of growth capital that comes from outside Canada, the Tables believe that a review of SR&ED research and Canadian ownership eligibility criteria is needed (Economic Strategy Tables, 2018).

The Tables highlight a common set of factors for achieving their sectoral growth targets:

- › All economic sectors must be digital sectors to leapfrog competition.
- › Regulatory agility is critically important.
- › Skills are the new currency.
- › Inclusiveness, diversity, and parity require commitment.

- › All levels of government need to operate at the speed of business and with better coordination.

The Economic Strategy Table process has been an unprecedented opportunity to engage with Canadian industry leaders, who have generously offered their time due to their belief in the potential of this opportunity to drive Canada's long-term growth and competitiveness.

ECONOMIC STRATEGY TABLES: Setting Ambitious Growth Targets



Advanced Manufacturing

*Chair: Charles Deguire
President & CEO, Kinova Robotics*

GROWTH TARGETS
By 2030, increase manufacturing sales by 50% – to \$1 trillion
Increase manufacturing exports by 50% to \$540 billion



Digital Industries

*Chair: Tobias Lütke
Founder & CEO, Shopify*

GROWTH TARGET
By 2025, double the number of Canadian digital firms with more than \$1B in market capitalization to 26



Agri-Food

*Chair: Murad Al-Katib
President and CEO,
AGT Food and
Ingredients*

GROWTH TARGETS
By 2025, increase domestic sales by 27% to \$140B and increase exports by 32% to \$85B



Health and Biosciences

*Chair: Karimah Es Sabar
CEO & Partner,
Quark Venture*

GROWTH TARGET
By 2025, double exports to \$26B double total firms to 1,800 double high-growth firms to 80



Clean Technologies

*Chair: Audrey Mascarenhas
President and
CEO, Questor
Technology Inc.*

GROWTH TARGET
By 2025, Clean technology is one of Canada's top 5 exporting industries, nearly tripling current value to \$20B annually



Resources of the Future

*Chair: Lorraine Mitchelmore,
Former President &
Country Chair, Shell*

GROWTH TARGET
By 2025, grow annual resource exports by \$100B to \$350B



The Honourable Mélanie Joly, Minister of Tourism, Official Languages and La Francophonie

SEIZING THE POTENTIAL OF THE TOURISM SECTOR

Tourism represents 2 percent of national GDP and supports 1 in 10 jobs in Canada. It is a uniquely inclusive industry that is important in communities large and small in every region across the country. Recently, Canada has experienced significant growth in tourism, with 2017 being the best year on record in terms of the number of tourists visiting this country (almost 21 million). 2018 numbers are expected to break that record yet again. A 2018 McKinsey & Company study of Canada's tourism sector performance identified the sector as a high growth opportunity within the Canadian economy, and suggested that tourism export revenue in Canada could reach \$46 billion by 2030. However, the study also identified key barriers to seizing the full potential of Canada's tourism sector, such as: over-concentration of demand in our large cities during the peak travel season; low awareness of Canada as a destination in parts of the world; access to the country and many of its natural

wonders is difficult; and, a growing labour gap (shortages of up to 120,000 by the mid-2020s). Innovation is increasingly playing a role in transforming the tourism industry. For example, social media is becoming one of the more powerful tools to target high-yield visitors, more and more bookings are made through online platforms, and the sharing economy is an expanding area of economic activity.

Canada's Tourism Vision, released in May 2017, identified ambitious targets for the sector and an Action Plan for achieving them. Building on this, ISED has been mandated to develop a new federal tourism strategy to unlock tourism's potential for driving regional economic development and creating jobs across Canada. This strategy is being informed by an Advisory Council on Jobs and the Visitor Economy, which was announced in November 2018.

“Tourism may be doing well now, but more can be done to ensure we can move ahead of our competitors in the global tourism market. Canada’s marketing campaigns, immigration policies, and both short and long-term labour needs must be put in a better competitive position to increase our share of global tourist arrivals. By working with the tourism industry and employing a whole-of-government approach to policy per OECD discussions, we can ensure that New Tourism Vision goals are met, and tourism will remain a thriving and competitive market.”

— Tourism Industry Association of Canada, 2018

Canada's newest astronauts: Joshua Kutryk and Jennifer Sidey

Image credit:
Canadian Space Agency



OPPORTUNITIES IN THE SPACE SECTOR

Space provides the only vantage point from which it is possible to collect data about our planet on a global scale. Canada has only just begun to leverage the digital possibilities of space to connect populations in all regions of the country, to better understand and monitor climate change, to help the Canadian Armed Forces defend our security and sovereignty, to respond to and mitigate natural disasters, and to manage our natural resources. Canada can, and must, do a better job in unlocking the potential of its space sector for the benefit of Canadian businesses and society at large.

The space sector is one of the most R&D-intensive sectors in the Canadian economy. Canadian space companies have a global reputation in space operations, satellite communications, space robotics, space-based radar, optical science instruments, and value-added Earth Observation and geospatial services. They operate at the frontier of scientific discovery and technological applications compelled by solution-driven outcomes.

Every day, Canadians leverage space technology, services, and data, providing a backbone for the economy and the invisible infrastructure that supports a high quality of life.

The Government has demonstrated its commitment to the Canadian space program by investing \$379 million in 2016 to continue participation in the International Space Station (ISS) partnership until 2024. Canada's newest astronauts Joshua Kutryk and Jennifer Sidey were announced on Canada Day 2017, and, in December 2018, Canadian astronaut David Saint-Jacques flew to the ISS on a six-month mission. The Government has also made new funding available in support of Canada's space industry, helping to support made-in-Canada innovations, such as the demonstration of a new quantum key distribution satellite to study secure communications and the development of technology for low Earth orbit satellites to deliver faster internet access to remote communities.

Summary

The Innovation and Skills Plan has driven an historic transformation of business innovation programs. The new easy-to-navigate suite of programs is responding to the challenges and opportunities facing Canadian businesses today and into the future. The Innovation Canada single window platform delivers both the four flagship programs

that target critical stages of firm growth and the complete new suite of business innovation supports. However, the substantial progress in program simplification and consolidation is only the beginning of what can be accomplished through the Innovation and Skills Plan. For example, several of the Economic Strategy Tables' recommendations suggest areas, such as in the area of regulation, where the Government can act with greater agility and speed.

MOVING FORWARD



Image credit: North

While Canada has taken major steps and made progress, many challenges still require attention and action. The future of work is full of uncertainties about what skills Canadian businesses will need and how Canadians should prepare themselves. New debates are emerging surrounding the ethics of developing disruptive technologies. For innovation to succeed, citizens must trust governments and businesses to protect their interests. Firms are asked to be transparent when handling data, and citizens are looking for the right tools to provide informed consent when giving access to their data. Adopting productivity-enhancing technologies (e.g., AI, advanced manufacturing, the Internet of Things, cloud computing, and many other digital technologies) will be essential in enhancing Canadian competitiveness and thriving in the data-driven digital economy. Access to 5G may lead to new opportunities, but it will be important to avoid creating new digital divides. Cyber security is becoming a growing issue for firms of all sizes. In addition, innovation and regulatory bottlenecks still exist for many companies in advanced sectors.

The Innovation and Skills Plan is a multi-year approach to growing a strong culture of innovation and strengthen Canada's competitive advantages. It provides the framework for Canada to become a leader in the data-driven digital economy, strengthen regional ecosystems, and support Canada's high-growth potential areas.

Thriving in the Data-driven Digital Economy

Technological transformation is already underway. It is characterized not only by the acceleration of technological advancement, but also by the increased integration and convergence of technologies. These new technologies are transforming existing industries, creating new business models, empowering innovation, and driving growth. For instance, AI could potentially deliver additional economic output of around US\$13 trillion by 2030, boosting global GDP by about 1.2 percent a year (McKinsey Global Institute, 2018). The global connected and autonomous vehicles market is projected to reach a value of approximately £907 billion by 2025 (Transport Systems Catapult, 2017). By 2035, 5G wireless technology is projected to enable US\$12.3 trillion of global economic output (IHS Economics, 2017). E-commerce in Canada is expected to increase from \$29.6 billion in 2015 to \$55.8 billion in 2020 (Canada Post, 2016).

“Digital’ is not an industry. It isn’t a strategy. It’s an essential tactic that should be embedded into every industry. The competitive advantage of any Canadian company will be connected to its digital advantage”

– Tobias Lütke, CEO and founder of Shopify

Achieving success in this era of transformation requires embracing and leveraging the power of digital technologies and big data. Ongoing efforts will aim to improve the quality of life for Canadians, drive productivity, encourage growth, and strengthen competitiveness. Action is required today because the impact of the data-driven digital economy will only continue to intensify and expand. Investing in digital technologies now will solidify Canadian leadership for years to come, in the same way that investments in AI in the 1980s successfully provided the foundation for Canada's leadership in the sector today.

PROTECTING THE PRIVACY OF CANADIANS AND IMPROVING DATA ACCESS

PRIVACY – The implementation of mandatory data breach reporting under the [Personal Information Protection and Electronic Documents Act \(PIPEDA\)](#) assures Canadians that they will be informed about any risks to the distribution of their personal information, while ensuring there are meaningful penalties when appropriate steps are not taken in the event of a breach.

CYBER SECURITY – A new [National Cyber Security Strategy](#), and associated investments, means a clear and trusted federal source for cyber security information, practical tips to apply to online activities, and heightened awareness of malicious cyber activity. For businesses, the strategy means increased cyber security guidance, tools, and resources to improve cyber resilience, and a Cyber Certification Program that will raise the cyber security baseline among SMEs, promote consumer confidence in the digital economy, and better position Canadian companies to compete domestically and globally.

NEW SOURCES OF DATA – Reinstatement of the mandatory long-form [census](#) provides the Government with the data needed to make the right decisions. The Government is investing to ensure collection of data in emerging areas of importance, such as the [Clean Technology Data Strategy](#). Through Bill C-36, the Government is [renewing and modernizing Statistics Canada](#) to improve collection, use, and sharing of data while, at the same time, protecting the privacy of Canadians.

As with all elements of the Innovation and Skills Plan, the input of Canadians, through the national Digital and Data Consultations in particular, will inform next steps. The Government will continue to explore how to prepare Canadians for the future of work and ensure firms have access to the pipeline of talent that they need to grow. The Government will unleash innovation by improving digital infrastructure, encouraging technology adoption, and supporting sectors where Canada has demonstrated leadership. The Government will also reaffirm Canada's trust and privacy frameworks to safeguard Canadians. Targeted actions in these areas of the data-driven digital economy will help Canada become, and remain, one of the top five most innovative countries in the world.



Digital and data consultations with stakeholders and the Honourable Navdeep Bains, Minister of Innovation, Science and Economic Development Canada

NATIONAL DIGITAL AND DATA CONSULTATIONS

On June 19, 2018, the Honourable Navdeep Bains launched national consultations to better understand how Canada can support the data-driven digital economy. Discussions included Canadians across the country, as well as firms of all sizes, academics, and non-profits, and focused on three areas:

FUTURE OF WORK – exploring how new technologies may impact the way we work, the jobs of tomorrow, and the employment landscape.

UNLEASHING INNOVATION – ensuring Canadian businesses can remain competitive, adapt traditional approaches, and identify, adopt, and implement digital and data-driven technologies.

PRIVACY AND TRUST – ensuring that frameworks have the right balance between supporting innovation and protecting privacy interests while promoting trust when it comes to data.

“Unlocking the economic opportunities from digital transformation will help Canada’s competitiveness, attract investment and create thousands of good quality middle class jobs from coast to coast to coast. At the same time it’s also brought with it new uncharted challenges surrounding the changing nature of work, privacy, information and of course consent.”

– The Honourable Navdeep Bains,
Minister of Innovation, Science and
Economic Development Canada, June 2018

Strengthening Regional Ecosystems

Innovation happens everywhere in Canada, from Cambridge Bay in the Far North, to Sudbury in Northern Ontario, to Vancouver, Toronto, Montréal, and Halifax. Recognizing important regional differences with unique sets of challenges and opportunities, the Government is developing regional growth strategies to create jobs, strengthen local communities, and grow innovative, world-class companies. These strategies will drive growth and support regional innovation ecosystems.

“... a growth strategy for Atlantic Canada must address both economic and population growth. Our region’s businesses must innovate, attract, develop and retain skilled workers, and must compete globally if they are to grow and create high-quality jobs for Atlantic Canadians. In addition, we must work together to help build inclusive communities where all people can participate and contribute to Atlantic Canada’s economy.”

— Atlantic Growth Strategy, 2018

Three of these strategies have been launched so far. Under the Atlantic Growth Strategy, the Government and Atlantic Provinces have worked collaboratively to build a vibrant economic future for Atlantic Canada by focusing on strategic priorities, including skills and immigration; innovation, clean growth and climate change; trade and investment; and infrastructure. The Federal Strategy on Innovation and Growth for the Quebec Regions prioritizes innovation and clean technology, growth and exports, entrepreneurial talent, and inclusive growth. The Prosperity and Growth

Strategy for Northern Ontario focuses on growth opportunities for transitioning businesses in traditional economic sectors to become more knowledgeable and innovative; supporting entrepreneurship, trade, and the digital economy in emerging economic sectors; and building strong communities through major projects, such as the Ring of Fire, and support for emerging Indigenous entrepreneurship, workforce, and regional networks. From coast to coast to coast, regional growth strategies will support the goals of the Innovation and Skills Plan at the regional level, addressing their unique needs and circumstances.

Building Canadian Leadership in Key Sectors

The six Economic Strategy Tables have been established for sectors with great potential for Canadian businesses to grow and create high-quality jobs for Canadians. Through their recommendations, the Tables have provided a new perspective for policy development, reflecting the issues that matter the most to industry.

The implementation of these recommendations is already underway. For instance, the 2018 Fall Economic Statement announced immediate changes to Canada’s tax system to support business investment through capital cost allowances. It also made a number of regulatory changes to make it easier for businesses to grow and create jobs, and established a Centre for Regulatory Innovation to help businesses connect with regulators and support a number of sandboxes. However, more work still needs to be done to bolster Canada’s competitiveness and create a culture of innovation. The Economic Strategy Tables’ recommendations and work on major priorities for agile regulations, upskilling and access to talent, export strategies, and technology development will be essential to informing the next steps of the Innovation and Skills Plan.

FIRST STEPS IN IMPLEMENTING THE ECONOMIC STRATEGY TABLES' RECOMMENDATIONS

The Government's 2018 Fall Economic Statement made a number of new commitments in response to the Economic Strategy Tables' recommendations:

- Allow businesses in the manufacturing and processing sector to immediately write off the cost of machinery and equipment, and the full cost of specified clean energy equipment;
- Accelerate investment incentive for businesses of all sizes, across all sectors of the economy;
- Invest in innovation with \$800 million for SIF;
- Support Canadian clean technology innovators through \$50 million of venture capital, under the Venture Capital Catalyst Initiative;
- Launch a Centre for Regulatory Innovation (e.g., exploration of sandboxes/pilots);
- Establish a dedicated Advisory Committee on Regulatory Competitiveness'
- Act upon 23 early action items identified by the Canadian Free Trade Agreement's Regulatory Reconciliation and Cooperation Table;
- Invest to help Canadian businesses export and grow;
- Enhance trade services for Canadian exporters;
- Accelerate infrastructure projects through the National Trade Corridors Fund;
- Accelerate the implementation of the Multimodal Integrated Passenger Freight Information System; and
- Continue positive discussions with Telecos to accelerate deployment of next-generation digital technology and rural broadband.

Developing a Culture of Innovation

The Economic Strategy Tables report that establishing a positive culture of innovation will allow Canada to seize new opportunities for economic growth. The Innovation and Skills Plan is more than just the sum of its parts. It is helping to inspire a new innovation mindset. It is establishing a basis for expanding Canadian competitiveness and a Canadian identity. It is helping to firmly ground Canada's brand on the world stage in innovation. It will also continue to allow all Canadians to look to the future with confidence.

To succeed, Canada needs to embrace an innovation mindset—one that is marked by rising levels of ambition to improve economic and social outcomes through innovation. A whole-of-government approach, which supports firms at all points along the innovation continuum and Canadians at every stage of their lives, reinforcing Canadian competitiveness. An increasing number of Canadian businesses are showing their willingness to compete globally. Developing a powerful Canadian innovation brand and identity in domestic and international markets will lead to faster and greater progress. A strong culture of innovation is the foundation upon which to build the confidence that Canadians need to successfully transform this time of change and disruption into long-term economic and social advantage.

CONCLUSION



Dr. Hugo Larochelle, Research Scientist at Google Brain, Adjunct Professor at the Université de Montréal, delivers a lecture on deep learning

Image Credit: Michelle-Andrea Girouard (courtesy of CIFAR and the Vector Institute).

Canada is competing in a global innovation race. Disruptive technologies are redefining the ways Canadians do business. They are changing the nature of work, creating new industries, and supporting the rise of new world-leading firms. With other countries recognizing the benefits of embracing this change and strongly supporting their innovation systems, Canada cannot afford to be left behind.

The Innovation and Skills Plan is Canada's response. It works along the innovation continuum: it helps Canadians at every stage of their lives, supports fundamental and applied research, provides targeted support to firms at every stage of growth, and redefines government support for innovation. Key programs, such as the Innovation Superclusters Initiative, are building world-class, large-scale innovation ecosystems that will strengthen Canadian competitiveness and create a culture of innovation.

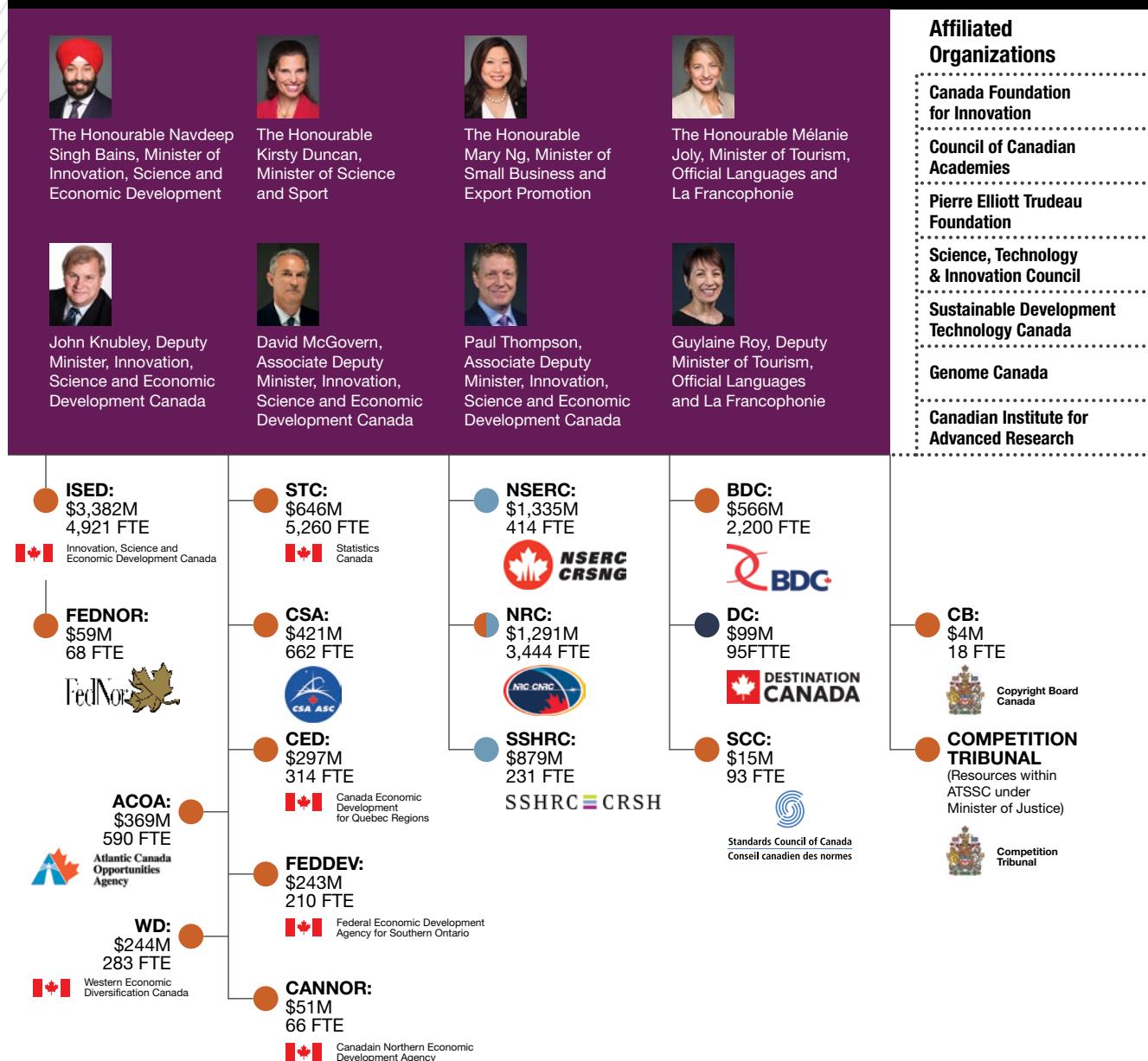
Early, but meaningful, impacts of the Plan are already being felt across the country. More young people are being trained for the jobs of the future, and the Global Skills Strategy is making it easier to attract the best minds from around the world to Canada. The development of superclusters is driving growth and Canada's leadership in key areas of strength. Innovators are engaged in creating solutions to grand challenges. High-growth potential areas across the country are receiving targeted support. Inclusive growth policies are working to ensure everyone can participate in the innovation

economy. Businesses of all sizes are benefitting from accelerated access to better innovation support programs, helping them commercialize, scale-up, export, and compete globally.

Looking forward, there are still significant challenges to overcome and exciting opportunities to embrace. The Innovation and Skills Plan is a long-term plan that is building a solid foundation for future success and global competitiveness. It requires partnerships and industry buy-in at all stages along the innovation continuum. With strong Government leadership, barriers to success will continue to be removed, investments will be made, experimentation will flourish, and strong partnerships will bolster and reinforce Canada's important role on the world stage. To win, every player has a role to play, and while Government is the enabler, business is the leader in driving innovation. Through continued determination and support across the innovation continuum, the Innovation and Skills Plan will succeed in branding Canada as one of the top five most innovative countries in the world.

ANNEX A. INNOVATION, SCIENCE AND ECONOMIC DEVELOPMENT CANADA PORTFOLIO

THE ISED PORTFOLIO'S TOTAL BUDGET IS \$9.9B AS OF SUPPLEMENTARY ESTIMATES (B) 2018–19 AND SUPPORTS 18,869 EMPLOYEES.



INNOVATION, SCIENCE AND ECONOMIC DEVELOPMENT CANADA ABBREVIATIONS

BDC – Business Development Bank of Canada

CANNOR – Canadian Northern Economic Development Agency

CB – Copyright Board of Canada

CED – Canada Economic Development for Quebec Regions

CSA – Canadian Space Agency

DC – Destination Canada

FEDDEV – Federal Economic Development Agency for Southern Ontario

FEDNOR – Federal Economic Development Initiative for Northern Ontario

ISED – Innovation, Science and Economic Development Canada

NRC – National Research Council

NSERC – Natural Sciences and Engineering Research Council

SCC – Standards Council of Canada

SSHRC – Social Sciences and Humanities Research Council

STC – Statistics Canada

WD – Western Economic Diversification Canada

SEE THE MINISTERS' MANDATE LETTERS HERE:

- › Minister of Innovation, Science and Economic Development
<https://pm.gc.ca/eng/minister-innovation-science-and-economic-development-mandate-letter>
- › Minister of Science <https://pm.gc.ca/eng/minister-science-mandate-letter>
- › Minister of Small Business and Export Promotion <https://pm.gc.ca/eng/minister-small-business-and-export-promotion-mandate-letter-august-28-2018>
- › Minister of Tourism, Official Languages and La Francophonie <https://pm.gc.ca/eng/minister-tourism-official-languages-and-la-francophonie-mandate-letter-august-28-2018>

ANNEX B. CONTACT US

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Ottawa, Ontario K1A 0H5

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Telephone (international): 613-954-5031
TTY (for hearing impaired): 1-866-694-8389
Business hours: 8:30 a.m. to 5:00 p.m.
(Eastern Time)
Email: ISED@canada.ca
www.ic.gc.ca

Federal Economic Development Agency for Southern Ontario (FedDev)
1-866-593-5505
<http://www.feddevontario.gc.ca/eic/site/723.nsf/eng/00018.html?OpenDocument#email>

Federal Economic Development Initiative or Northern Ontario (FedNor)
ISED@canada.ca

Western Economic Diversification Canada (WD)
1-888-338-WEST-9378
WD.contactus-contactez-nous.DEO@canada.ca

Strategic Innovation Fund
1-800-328-6189
http://www.ic.gc.ca/eic/site/icgc.nsf/eng/h_07026.html#240

Find the programs and services that are right for your business

Innovation.canada.ca

Speak to an Innovation Advisor about creating a new innovative product, process or service,
Toll-free in Canada: 1-888-576-4444
TTY: 1-800-457-8466

Trade Commissioner Service
trade@international.gc.ca

Business Development Bank of Canada (BDC)
1-877-232-2269
Live chat: https://www.bdc.ca/en/contact_us/pages/default.aspx

Accelerated Growth Service
<http://www.ic.gc.ca/eic/site/117.nsf/frm-eng/RSMH-AUVLVH>

Clean Growth Hub
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All statistics cited in this report are current as of the time of writing. The jobs related statistics are drawn from various sources and based on different methodologies, including Statistics Canada surveys, quantitative modelling undertaken by external experts, and estimates of potential future job creation/maintenance by businesses and project proponents.

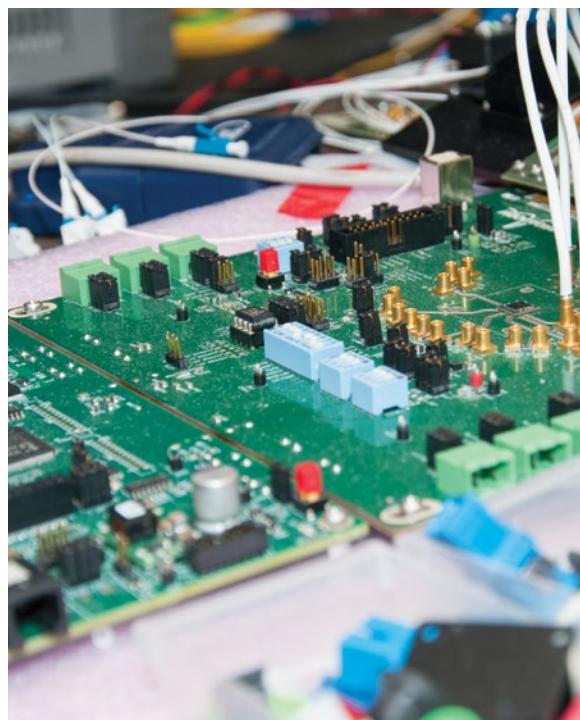
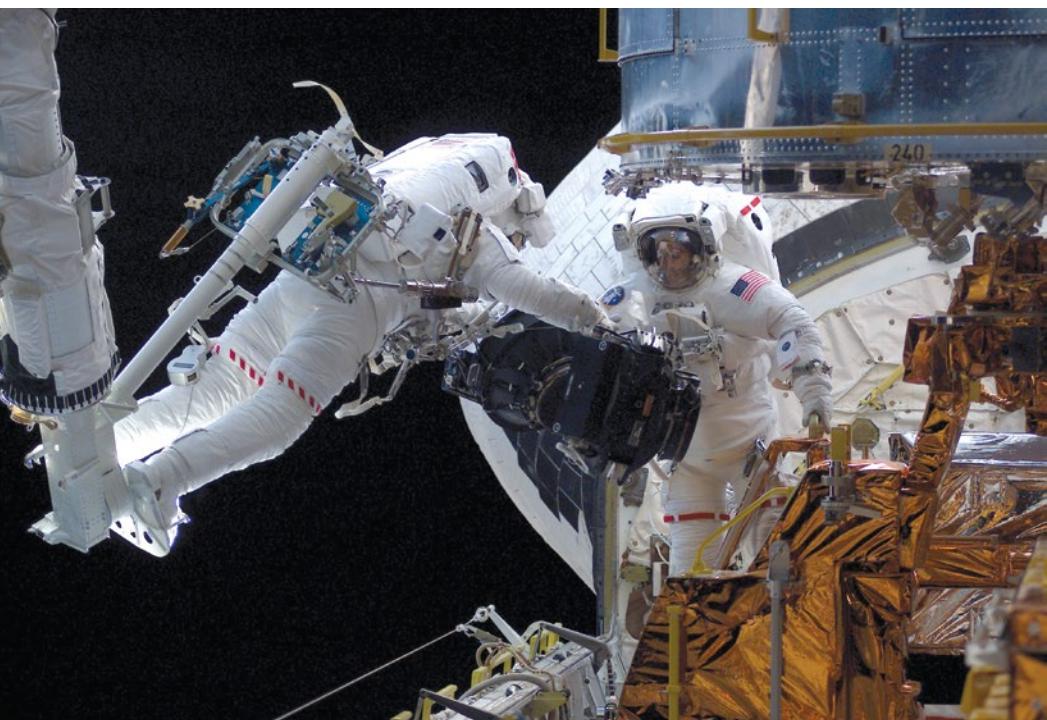


Image credit: Canadian Space Agency



Image credit: Canadian Space Agency

