

**CANADIAN
BIOTECHNOLOGY:
SOLVING FOR TODAY.
BUILDING FOR
TOMORROW.**

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OPPORTUNITY OF BUILDING BIONATION

The COVID-19 pandemic has had a profound impact on our world. The biggest public health crisis in decades has infected millions of people, shut down economies and plunged the global economy into what is predicted to be the worst recession since the Second World War. As many countries struggle to contain the virus, it is unclear what the future holds. But one thing is for certain: biotechnology is critical to our national recovery from COVID-19, from both a healthcare and economic perspective.

In terms of the immediate response, the biotechnology community is leading the way on three fronts: diagnostics (testing), therapeutics (treatment), and developing a vaccine to reduce the spread of the virus. In Canada, companies and labs identified for support under the Government of Canada's national [medical research strategy](#) are working relentlessly on vaccine and therapy clinical trials. These innovations are vital to ensuring Canada remains able to address future pandemics and public health emergencies.

In the hopes that promising technologies will ultimately prove effective and life returns to some sort of normal, governments are prudently dedicating policy resources to solve for the economic rebuild in a post-COVID environment. As the impact of the coronavirus is assessed and priorities for economic growth are identified, there is recognition that some important economic sectors will be slow to return to full steam, while others may never recover. In this context, governments need to identify strategic sectors to both launch the economic recovery and become economic cornerstones in the long-term.

As part of BIOTECCanada's BIO 2020 event this past June, the federal Minister of Innovation, the Honourable Navdeep Bains, participated in a virtual panel session on innovation. During the discussion the Minister indicated the government is focused on solving for the crisis today but also developing the economic rebuild plan for Canada. On both fronts, the Minister acknowledged the important role the biotech sector is playing.

"Moving forward, our government will continue to invest where it is most needed to reinforce Canadian assets and ensure that, as a nation, we are equipped to respond to pandemics now and in the future. And, as we gradually re-open our economy, maintaining and fostering strong partnerships to address current challenges and grow Canadian assets and capacity in the life science sector will remain essential."

– The Honourable Navdeep Bains, Minister of Innovation, Science and Industry, May 2020, BIOTECCanada Webinar celebrating Canadian leadership at BIO 2020

The biotech sector is vital for our health security and economic growth. The government has leaned heavily on the sector through the pandemic and will in all likelihood continue to do so going forward. Accordingly, leveraging and investing in the sector's multiple strengths and components, including early stage companies, universities, research institutes, and large multinational companies, will create an environment conducive to bringing high value, next-generation agricultural, health and industrial products to the world and enable the economy and healthcare system to get an early jump on recovery. Now is exactly the time when we should be focusing on the future.

THE ROAD AHEAD

“Understandably, as we sit amidst the uncertainty generated by COVID it can be difficult to see past the current crisis and identify a clear sight-line on longer term objectives. That said, now is exactly the time when we should be focusing on the future. The biotech sector represents an important opportunity for health security and economic growth. The government has leaned heavily on the sector through the pandemic and will in all likelihood continue to do so going forward.”

– Andrew Casey, President and CEO, BIOTECCanada

The events of 2020 have demonstrated the need to establish a resilient economy over the long-term to ensure Canada can address future COVID-like health challenges. The effects of COVID-19 on the global economy have been no less than devastating. Now as countries seek to tackle the economic realities the pandemic has brought, competition for investment, job creation and economic diversification have intensified. Correspondingly, it is imperative Canada capitalize on its strong capacity in the life sciences to help effect growth in our new economy.

Hundreds of biotechnology companies are developing and introducing solutions to improve agriculture and nutrition, protect our environment, and improve healthcare outcomes for many other diseases. The sector is helping to fill the economic void of other industries debilitated by the pandemic. As one of the country’s premiere high technology performers, biotechnology continues to act as an innovation engine, a source of highly skilled employment, and a destination for investment capital. It also creates innovative technologies that lead to other industries, such as agriculture, resource management, and manufacturing, being more competitive.

In order to maximize these positive impacts and accelerate Canada’s recovery, the biotechnology community requires a new private-public sector investment model to grow the industry and generate revenue. Government investment is essential to commercialize R&D and support early-stage company growth, making companies more attractive to outside investment capital. We need to build on the sector’s momentum and our collaborative dialogue with government to secure long-term, substantial investment. The aspirations of the government’s Health/Bio-sciences Economic Strategy Table (HBEST) – to double the sector size by 2025, making Canada a top three global hub – are only possible if we are competitive in attracting investment. Governments around the world see biotechnology as a key to their economic recovery. Canada has all the ingredients to become global destination for biotechnology investment.

Capitalizing on Economic Opportunity

“This is a critical time for industry to come together with public policymakers, academia, and researchers to leverage our investments in basic research for improved health outcomes and sustainable economic recovery in Canada.”

– Gordon C. McCauley, President and CEO,
adMare BioInnovations

Biotechnology is a catalyst that strengthens Canada’s productivity and standard of living, and a key pillar of our knowledge economy transforming traditional industries for the future. It provides opportunity for our talented young people and bolsters Canada’s global reputation as a place where the world’s brightest scientists and researchers can find a home.

The biotechnology ecosystem extends across the country with world-class universities, research institutes, start-ups, small and medium enterprises, and large multinational corporations. It supports a highly skilled and educated workforce. Companies also provide opportunities for knowledge-based consulting services like information technology, legal, marketing, human resources, finance and accounting.

A healthy bioeconomy means increased economic growth, high-skilled jobs, more effective healthcare spending, improved productivity, and globally competitive leadership in research commercialization. Biotechnology is supporting the transformation of foundational Canadian industries like mining, forestry, oil and gas, and agriculture. It is opening new markets, promoting sustainability in resource management and advancing manufacturing technologies, and is central to Canada's fast-growing cleantech and agri-food sectors.

With the bioeconomy comprising an estimated one-third of the world's total economy, biotechnology represents a massive economic opportunity. The Organization for Economic Cooperation and Development (OECD) estimates the global bioeconomy will reach US\$1 trillion by 2030. This growth is being fueled by powerful global challenges that are upending our world and making biotechnology indispensable:



The **bioeconomy** comprises an estimated:



1/3

of the world's total economy

The **OECD** estimates the global bioeconomy will reach:



US \$1 trillion
by 2030



Sustaining a growing population:

By 2050 the global population is expected to reach nine billion people, placing enormous pressure on our planet and requiring the healthcare, agriculture, forestry, energy and manufacturing sectors to rethink how to meet the growing demand for medicine and vaccines, food and clean energy.



Mitigating climate change:

Climate change is the defining issue of our time. From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global in scope and unprecedented in scale. The global focus on tackling climate change and investing in clean energy and biofuels is creating a range of economic opportunities and challenges. Industrial biotechnology promises to make efficient carbon neutral biofuels, enable carbon capture technologies, and adapt agriculture and forestry to provide the building blocks of a wide array of biodegradable biomaterials with no fossil fuel-derived ingredients.



Fighting pandemics:

COVID-19 has shown that infectious disease outbreaks can have catastrophic consequences. It has forced us to face the reality that epidemics are becoming increasingly common as a result of globalization, urbanization, and climate change. Though COVID-19 has been referred to as a "once in a century event", the next pandemic is likely to hit much sooner.

Biotechnology offers solutions to all of these challenges and more, and Canada has a thriving biotechnology sector ready to answer the call. We are at a critical point where the science is coming together through genomic understanding, gene editing, big data, artificial intelligence, 3D printing and cell therapies, which are driving major breakthroughs. We are on the cusp of seizing these truly transformational technologies that have been decades in the making and at last becoming available.

“Biosciences will revolutionize the 21st century as digital technologies revolutionized the 20th century... If you think the past two decades have been exciting for biosciences research, just wait to see what the next 20 years has in store for Canada.”

– Dr. Rob Annan, President and CEO, Genome Canada

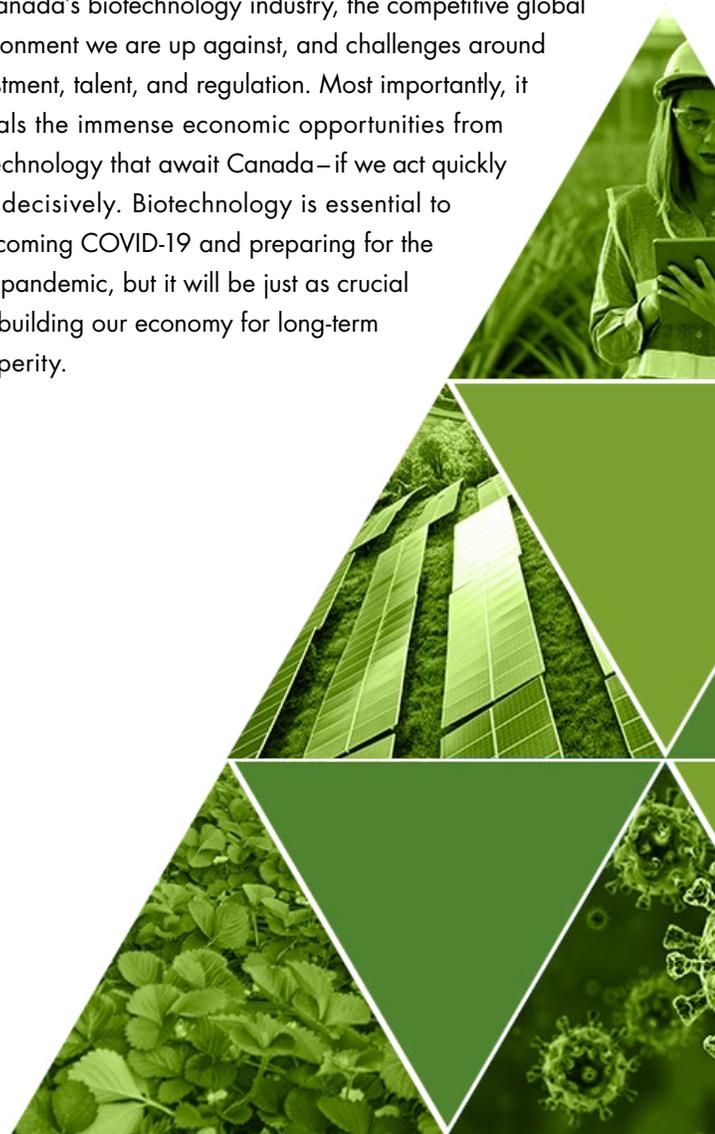
The economic opportunity to solve the world’s biggest challenges through biotechnology is vast – and even more critical now that COVID-19 has dealt the economy a crushing blow. Yet there is risk that Canada may miss out on the full potential of biotechnology in driving economic recovery, with the pandemic heightening already fierce global competition for investment capital. To claim our share of the action, Canada must double-down on investment and ensure the sector is part of recovery conversations going forward.

Creating a Dedicated Life Sciences Fund

Our biotechnology sector’s greatest hurdle is attracting investment. While there is a strong venture capital market, companies need more funding. We believe the solution is creating a national, dedicated life sciences fund in Canada to support the VC market, early stage growth, and incubator organizations accelerating the next wave of companies, and to secure companies so that they stay in Canada and become anchor companies. The government must be a key player in this fund for it to be truly successful.

BIOTECCanada’s submission to the Government of Canada’s pre-budget consultations in August 2020 called for a \$500 million investment to establish the Life Sciences Capital Catalyst Initiative (LS-VCCI). Every federal dollar in this fund would be leveraged with two other dollars, creating a total envelope of \$1.5 billion. **Fitting within the well-established VCCI framework, the fund would build on the government’s previous successful VCAP and subsequent VCCI funds and help the government achieve investment returns for its economic stimulus and growth targets.**

The bottom line: government is actively looking for ways to get Canada’s economy back on track, and biotechnology offers an effective solution. This paper situates the fund in a broader context, discussing the strengths and momentum of Canada’s biotechnology industry, the competitive global environment we are up against, and challenges around investment, talent, and regulation. Most importantly, it reveals the immense economic opportunities from biotechnology that await Canada – if we act quickly and decisively. Biotechnology is essential to overcoming COVID-19 and preparing for the next pandemic, but it will be just as crucial to rebuilding our economy for long-term prosperity.



IT'S IN OUR DNA

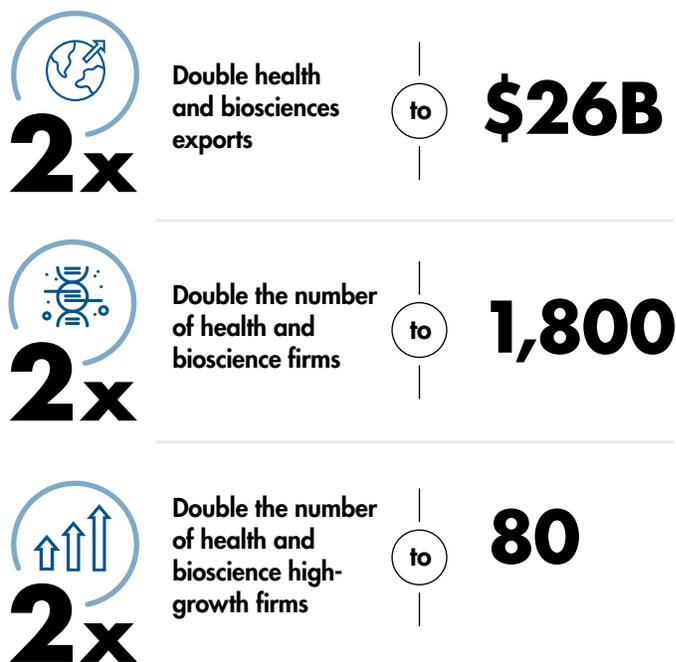
When COVID-19 struck, Canada's biotechnology sector immediately rose to the challenge. Some companies went into overdrive aiming to develop vaccines and anti-viral drugs, while others began donating equipment, supplies and people to support the broader healthcare response. These ongoing efforts would not have occurred without the strong biotechnology foundation that has been building in Canada for more than a hundred years.

Canada is a biotechnology pioneer with a long history as a global leader. Canadians can point to such important milestones as Banting and Best developing insulin in 1922, Jonas Salk's polio vaccine in 1955, and the University of Toronto's discovery of blood-forming stem cells in the 1960s. More recently, Canada has claimed a number of global firsts: a herbicide-resistant canola crop in 1995, stem cells generated from skin in 2008, bio jet fuel in 2012, the first commercial gene therapy in 2015, and the Ebola vaccine which was approved by the U.S. Food and Drug Administration and the European Medicines Agency in late 2019. Canadians are very involved in the global race to develop a viable COVID-19 vaccine.

There are numerous reasons why biotechnology has flourished in our country. Canada brings many strengths to the table: previous science, technology, and innovation policies have created a well-educated population, successfully supported fundamental science, and provided broad-based indirect support through tax incentives. Our depth of research talent paired with welcoming, livable communities has drawn investors to create and fund drug development companies. We are getting close to realizing our vision of anchor firms.

However, study after study has shown that Canada has not kept pace with competitors in transforming itself into an innovation leader – we excel at scientific research, but struggle to commercialize and scale up. Canada's

Health/Bio-sciences Economic Strategy Table (HBEST) released recommendations in 2018 to accelerate the pace of commercialization to ensure a sustainable, globally competitive health ecosystem with a robust innovation economy and improved health outcomes. While not exclusive to biotechnology, the HBEST had strong representation from the sector and established 2025 targets that will carry us in the right direction, including:



"Canada needs to unlock the full potential of its innovations and accelerate the pace of commercialization to ensure a sustainable, globally competitive health ecosystem with a robust innovation economy and improved health outcomes."

– Karimah Es Sabar, Chair, Health/Bio-sciences Economic Strategy Table & Member of the Industry Strategy Council

Ecosystem

Canada has the foundation to be one of the world's most innovative nations. We have robust economic fundamentals and one of the G7's strongest economies. In fact, Canada [recently surpassed](#) the U.S. for the first time ever in a ranking of the world's most competitive economies. The BIONATION network includes our world-class universities and research institutes, start-ups, small and medium enterprises, and large multinational corporations.

There is a vibrant pan-Canadian biotechnology ecosystem with clusters located in every province, from the Quebec-Ontario Life Sciences community to AdMare BioInnovations in British Columbia to AgWest Bio in Saskatchewan to PEI BioAlliance.

With approximately 900 innovative biotechnology companies located in Canada feeding a national network of discovery and development, the sector is a catalyst for long-term economic growth in all regions of the country. Biotechnology is ripe to produce Canada's next "unicorn" and replicate success seen in other sectors like ICT, telecom, and financial services.

"Biologic medicines have the ability to change people's lives and investments in research can have an enormous impact for future generations. Research and innovation in health requires ongoing support in all parts of the health and biosciences ecosystem."

– Brian Heath, Vice President & General Manager,
AMGEN Canada

Talent

The Canadian workforce is very well-educated with 56.7 percent of 25-64-year-olds holding a tertiary degree – the highest percentage among all OECD countries in 2017. In 2015, Canada continued to rank among the OECD's [top five countries](#) for youth in reading, science, and math. Canada also has the highest share of women with post-secondary degrees.

Canadian governments have done a good job recognizing women in STEM, cultivating next-gen talent through post-secondary institution investments, and fostering a more entrepreneurial culture with the start-up community. In the biotechnology sector, BioTalent Canada's partnership network has brought together over 55 bio-economy employers, national and provincial industry associations, municipalities, post-secondary institutions, service providers and immigrant serving agencies, all working to strengthen the Canadian bioeconomy through skills development.

"We're supporting the growth of talented individuals and companies in the biotechnology industry in Canada."

– Rob Henderson, President and CEO, BioTalent Canada

Among its most successful initiatives, the Student Work Placement Program has helped over 850 students gain the skills and experience to be career-ready upon graduation. This work-integrated learning program not only bridges the gap between industry and academia, but forms part of the recommendations outlined in the Health/Bio-sciences Economic Strategy Table (HBEST) report, which discussed fostering future talent to address the skills shortage. Newcomers to Canada are also a key source of talent and essential to economic recovery as employers seek to meet their hiring needs. BioTalent Canada's BioSkills Recognition helps immigrants validate and showcase their abilities to employers.

The HBEST report also identified a lack of access to executive talent. A critical element in growing the biotechnology sector in Canada is retaining and developing top management talent ("C-Suite") that will lead the next generation of Canadian biotech companies. We are preparing our senior workforce using existing mentors to train protégées to lead these promising new companies. For example, the adMare Academy's Executive Institute, supported by Pfizer Canada, is a 10-month, focused executive development program custom designed to ensure that the Canadian life sciences sector has the management talent it needs to lead the world.

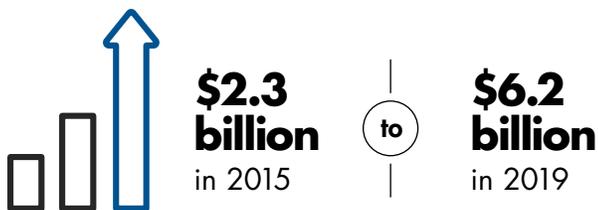
“There are few experienced CEOs or C-Suite executives. We do not live in a world where hundreds of them can be found in our own backyard. That is why we should support those ready and willing to start new projects.”

– **Didier Leconte**, Vice-President, Investments, Life Sciences and Funds of Funds, Fonds de solidarité FTQ

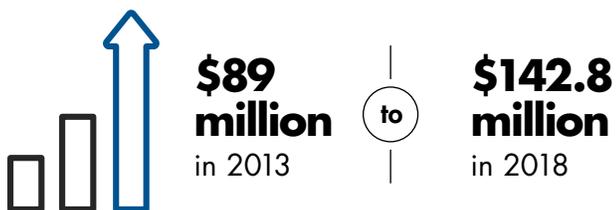
Investment

Generally speaking, access to venture capital has grown in Canada in recent years and the proposed Life Sciences Capital Catalyst Initiative (LS-VCCI) will find a marketplace of biotechnology innovators ready to take Canada to the next level. Canada ranked third in the OECD for VC investment as a percentage of GDP in 2016, lagging only behind the U.S. and Israel (OECD, 2017e). VC investment has [steadily increased](#) from \$2.3 billion in 2015 to \$6.2 billion in 2019. In addition, Canada’s angel capital investment [increased](#) from \$89 million in 2013 to \$142.8 million in 2018.

VC investment has steadily increased from:



In addition, Canada’s **angel capital investment** increased from:



Canadian business investment in the biotechnology sector is strong, contrary to other research-intensive areas. Nationally, business expenditure on R&D (BERD) fell from 1.25 percent of GDP in 2001 to 0.82 percent of GDP in 2016, ranking Canada 22nd within the OECD. The biotechnology industry punches above its weight, accounting for 11 percent of all BERD in Canada.

Federal research funding mechanisms such as the Scientific Research and Experimental Development Tax Incentive Program (SR&ED), the National Research Council’s Industrial Research Assistance Program (IRAP), and granting councils like the Canadian Institutes for Health Research provide crucial support.

According to the 2018 Deloitte Biotech Industry Data survey, the vast majority (80 percent) of Canadian biotechnology companies access the SR&ED Program, making it the largest government program supporting three kinds of research: basic or fundamental research, applied research, and experimental development. The SR&ED Tax Credit is an essential tool in meeting all of these objectives. Importantly, investors see the SR&ED Tax Credit as a competitive advantage for Canadian companies. Moreover, the credit also provides new and small innovative companies the ability to maximize their revenue stream to more effectively drive innovation forward. Overall, the SR&ED Tax Credit is critical in attracting investment and driving experimental research and scientific development in Canada.

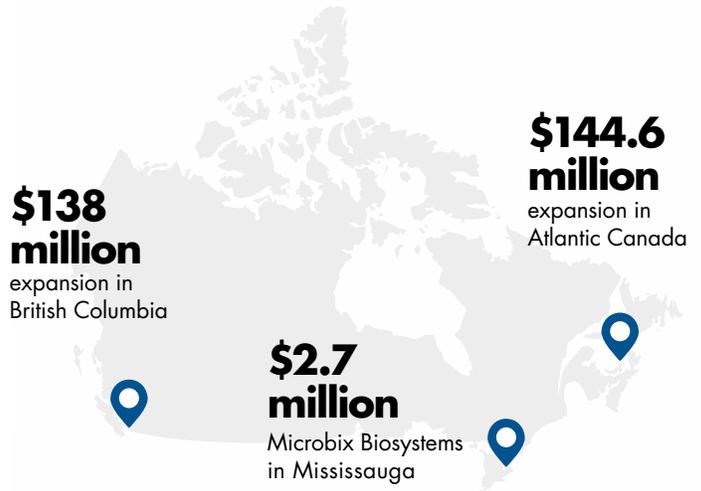
Still, global competition for investment dollars has never been fiercer. Commercializing ideas in the health space takes 10-15 years and can cost nearly \$1 billion – requiring a significant amount of capital with investors assuming risk over a long period. For these reasons, biotechnology innovation across all sectors has a specialized pool of investors with scientific expertise who understand the unique realities of commercialization.

Ultimately, if Canada is not attracting investment capital then the innovation, which is often equally mobile, will leave, taking with it the economic benefits associated with its commercialization. To retain innovation through the commercialization life cycle and reap the associated economic benefits, Canada must continue to support the competitiveness of the SR&ED Tax Credit aligned with the direction and objectives of the Government's Innovation Agenda.

Accordingly, any changes to the SR&ED Tax Credit structure must be made with an understanding and appreciation of the significant contribution the SR&ED Tax Credit plays in supporting early stage, pre-commercial companies. In this context, any changes to the SR&ED must focus on improving its efficiency, effectiveness and global competitiveness while also ensuring it is aligned with the direction and objectives of the Government's Innovation Agenda.

The next most frequently accessed program is IRAP, available to small and medium-sized businesses. In addition, IRAP provides specific funding for these companies to hire young researchers for up to a 12-month placement. The cap on funding was recently raised to \$10 million, allowing companies to grow and develop as future leaders in biotechnology.

Further, the government has invested in expanding biotechnology R&D and production facilities through the Strategic Innovation Fund (SIF), such as [BioVectra's](#) \$144.6 million expansion in Atlantic Canada (\$37.5 million from SIF), STEMCELL Technologies' \$138 million expansion in British Columbia ([\\$4.5M from SIF](#)) and Microbix Biosystems in Mississauga (\$2.7 million). The SIF is currently funneling \$600 million over two years to support COVID-19 vaccine and therapy clinical trials.



The SIF is currently funneling:



“To build Biochem Pharma in Montreal from six employees to a global multinational company with over 1,000 employees took the vision and determination of management but just as importantly, the will and passion of an entire ecosystem including a well-educated basin of talent, universities doing cutting-edge science, supportive governments and a strong local shareholder base.”

– Dr. Francesco Bellini, Co-Founder, Biochem Pharma

BUILDING MOMENTUM

“Over the last few years, Versant has partnered with researchers and entrepreneurs to create a biotechnology portfolio of more than six companies founded around Canadian technology and talent. With these companies, we have been able to form significant syndicates or partnerships with global pharmaceutical companies that provide the financing required for these companies to compete on a global scale.”

– Jerel Davis, Managing Director, Versant Ventures

Canada is only scratching the surface of the opportunity biotechnology brings. The sector is currently [experiencing a boom](#), perhaps best reflected by recent initial public offerings amid the economic turmoil of COVID-19. In June 2020, Montreal’s Repare Therapeutics celebrated the biggest IPO ever by a Canadian biotech company. Hamilton-based Fusion Pharmaceuticals also went public that month. It’s shaping up to be a solid year for the sector – publicly traded firms have already sold \$1.5 billion in equity in 2020, up from \$1 billion in all of 2019 and \$735 million in 2018.

Momentum is building from 2019, a record year marked by large-scale venture capital investments, major acquisition deals, and a string of US\$1 billion valuations. According to the [Canadian Venture Capital and Private Equity Association](#) (CVCA), 2019 was the first time over \$1 billion was invested in Canadian life sciences companies across 117 deals.



Innovative biotechnology companies working on advanced therapies for human health claimed the lion’s share of activity.

It is telling that Fusion Pharmaceuticals, Repare Therapeutics, and Chinook Therapeutics (out of Vancouver) all made the top 10 of the [2020 Narwhal List](#), a report highlighting Canada’s fastest-growing tech companies positioned to become world-class firms. The list ranks computer technology, health technology, and clean technology companies by their financial velocity – the rate at which they raise and deploy investment dollars to fuel growth. Biotechnology companies are at the top of the pack (Chinook took #1, Repare #3), confirming that this is a sector to watch. Of the top health technology companies on the 2020 list, biotechnology had a strong showing, accounting for eight of the 10.

The unprecedented venture capital investments, acquisitions, and valuations over the last two years and a half signal a sector revival. The transactions also reflect a changed dynamic where big pharma increasingly partner with start-ups to perform risky R&D work on new drugs, rather than doing it in-house. This means that promising early-stage Canadian drug developers can raise large sums of money to fund development, and ultimately go public. With this evolution, the sector is poised to realize its vision of anchor firms who will lead Canadian biotechnology into the future.

“BIONATION allows us to highlight the growing number of made-in-Canada innovations, enhancing attractiveness for private investments towards high value deals and start-ups.”

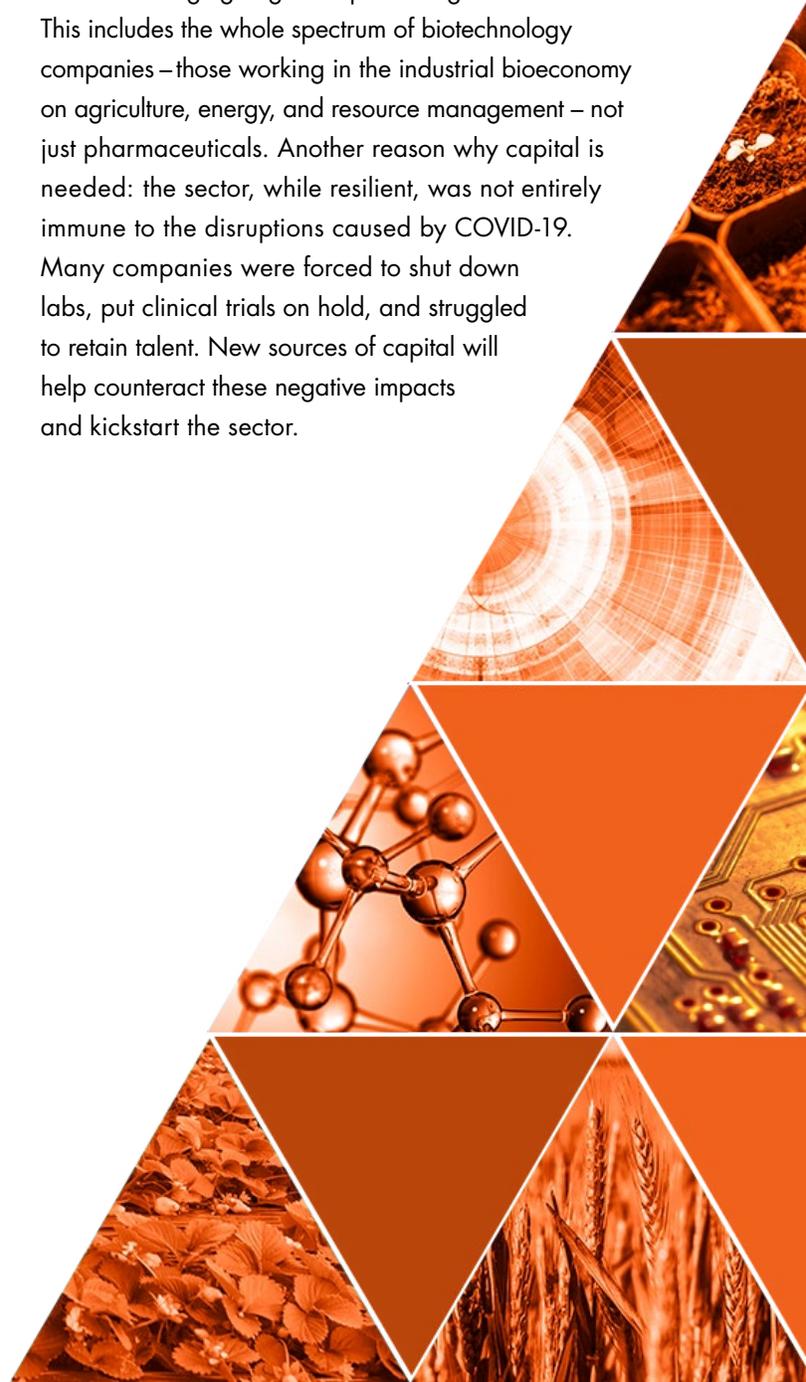
– Nadine Beauger, Chief Executive Officer, IRICoR

But we cannot rest on the laurels of recent successes – it will take further investment to make Canada a true global competitor and tap into the infinite opportunities that will boost our economic recovery. Access to capital was cited as the top issue facing the industry in the Deloitte survey, and as one of the top barriers in the HBEST report. The latter stated we need a large and vibrant life sciences capital market that invests significantly in Canadian companies. Current capital is insufficient and institutional investors are only just starting to take notice of the sector.

Therefore, we are proposing a milestone partnership with private capital investors and government to generate a first-in-Canada competitive fund directed at one of our most successful tech industries. Investors, incubators, and regional economic development organizations have come together to focus on the long-standing issue of capital investment and attraction. Industry returns have been growing over the past few years, driving new potential for start-up companies seeking to grow operations in Canada. Too often, however, companies are forced to move or limit operations as their level of investment required is simply not available in Canada.

The Life Sciences Capital Catalyst Initiative (LS-VCCI) would maximize returns on investment by supporting company creation and early-stage growth of innovations emerging from Canada’s leading academic institutions, growing the Canadian venture capital investment pool by facilitating collaboration between VC firms and in turn attracting investment from larger domestic and international investors, and creating Canadian-based anchor companies.

Capital will be even more critical as companies move from the emerging to growth phase in greater numbers. This includes the whole spectrum of biotechnology companies – those working in the industrial bioeconomy on agriculture, energy, and resource management – not just pharmaceuticals. Another reason why capital is needed: the sector, while resilient, was not entirely immune to the disruptions caused by COVID-19. Many companies were forced to shut down labs, put clinical trials on hold, and struggled to retain talent. New sources of capital will help counteract these negative impacts and kickstart the sector.



THE GLOBAL LANDSCAPE

“Life scientists are generally people with a vision and with nerves of steel. While this is a tough business, which is getting tougher, there will always be people who work hard and are willing to take risks when they have an enormous belief in the end goal.”

– Dr. Simon Pimstone, Xenon Pharmaceuticals

COVID-19 has put Canada on the map as an attractive investment destination. Our government’s strong, stable response to the crisis and our ability to develop science and step up to find vaccines and therapies have been noted by industry observers. The world is looking and sees Canadian biotechnology delivering game-changing solutions during the pandemic. Venture capitalists in the U.S. view Canada as a hidden gem. However, COVID-19 has also opened countries’ eyes to the economic opportunity of biotechnology, meaning competition for dollars is even more intense than it was pre-COVID. Canada has to sharpen up and increase investment to keep operations growing domestically.

Our competitors are aggressively 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.

Many countries, such as the U.S., China, U.K, France, and Israel, are significantly increasing their support of innovation systems. Successful countries understand the importance of the knowledge economy and biotechnology to their future and are using all their policy and economic levers to make their countries the most attractive places to develop, grow and commercialize ideas.

Biotechnology is a focus for many of these governments’ economic development strategies – and they are constantly moving forward – creating more hospitable locations to incubate, foster, and grow the next wave of companies.

Biotechnology is highly moveable. Unlike resource-based industries, capital, people and ideas can move freely across the globe. Companies, academics and research stars have many choices and often the sense of adventure their forebears could have never imagined.

We are competing in a global innovation race and cannot afford to be complacent. Our biotechnology sector operates in a hyper-competitive and ever-changing world for investment and talent, not only with biotechnology companies but a broad range of business sectors. As global forces reshape the economic landscape, new strategies and models are needed to boost productivity and competitiveness.

We must ensure we have the right hosting conditions to attract investment capital. Funders consider a number of factors when they make their choices, including how quickly and broadly their products will find a market. Access for patients to the latest medicines, a regulatory system that recognizes innovation, and a world-class intellectual property regime are also essential ingredients for Canada’s success.

RISING TO THE CHALLENGE

“I have witnessed and participated in the incredible growth of the biotech industry with challenges and successes in the last 50 years. I believe that the biotech industry can and will play a most important role in Canada’s future economic growth with a clear vision and focus on the B.E.S.T. (Business, Entrepreneurship, Science and Tenacity or perseverance) model.”

– Dr. Albert (Bert) D. Friesen

In addition to playing in a highly competitive global environment, our biotechnology industry faces several home-grown challenges; namely: investment, talent, and regulatory capacity. This section explores those challenges along with some key recommendations to keep industry moving in the right direction.

Our Investment Climate

Access to capital remains the number one challenge our industry faces as it seeks to bring new technologies into the global marketplace.

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. They have traditionally targeted the aerospace, defence, and automotive sectors.

The unique length and depth of the development process for biotechnology products stands out amongst dozens of other innovative technologies. On average, these technologies take 7-10 years to develop and work through initial regulatory paths. The length of development time and high level of risk involved with

scientific discovery can cause potential investors to shy away from this industry. Moreover, given the lack of venture capital funds in Canada, companies look to the global marketplace for investment or out-licensing opportunities. While venture capital has been on the upswing the last few years, there are a limited number of investment funds dedicated to the sector. The ones that do exist are highly successful.

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). Even accessing government programs is not without its challenges. According to the Deloitte survey, nearly two-thirds of Canadian biotechnology companies identified application barriers, including difficulty and work effort required, as the biggest challenge with accessing government programs. Given the importance of government programs in supporting the sector’s growth trajectory, streamlining application processes may have a significant impact on sector performance at little to no public cost.

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 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 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).

Besides more total investment needed, how can we better support our companies to reach markets and scale up?

- Create a venture capital fund dedicated to life sciences to build on the momentum and financial success already generated and propel the next generation of biotechnology innovations in Canada. With co-investment from the government, institutional investors, and international sources, the proposed Life Sciences Capital Catalyst Initiative (LS-VCCI) will provide the capital required to support the full Canadian life sciences innovation continuum. The Venture Capital Action Plan (VCAP) and Venture Capital Catalyst Initiative (VCCI) were proven tools that attracted investment into life sciences that otherwise would not have gone into the sector. These funds were successfully leveraged to grow existing Canadian companies with a goal to create emerging anchor companies. We envision a similar outcome for LS-VCCI.
- Ensure that cleantech VC funds include investments that target industrial biotechnology companies in Canada.
- Improve the SR&ED to benefit SMEs. Canada has established itself as a competitive place to invest and drive R&D. This is in part due to the SR&ED Tax Credit program that competes against a multitude of global competitors modeling public policy after what Canada has established. Ensuring the SR&ED remains at the forefront of attracting investment is integral to the goals of long-term economic growth.

Our Talent

“I am confident that Canadian universities are recruiting and training some of the best science and technology minds in the world. Canada does not suffer from entrepreneurship and the desire and motivation to start next-generation companies. What we need is a supportive ecosystem that continues to train the best, but more importantly retains and grows the best.”

– Ali Tehrani, President and CEO, Zymeworks

A critical shortage of talent in Canada resides in the senior management of biotechnology companies with our relatively low levels of compensation. In the 2018 Deloitte survey, respondents said recruitment and retention of top talent was their biggest challenge after access to capital. The sector needs to grow substantially for talent acquisition and retention.

Canada’s research community needs more 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).

What can we do to increase the diversity of skills within the biotechnology ecosystem?

- Maintain stock option capital exemption to attract and retain top talent in Canada. Stock options are one of the most important tools for early-stage companies to attract and retain top talent.
- Work together to mentor and develop C-Suite talent to drive next-generation innovation towards commercialization.
- Leverage our universities' strong communities and align with the Government of Canada's objective to attract the best talent from around the world.

Our Regulatory Capacity

An effective regulatory environment ensures safety while encouraging the development and adoption of innovative new products and services. The speed at which our governments responded to the COVID-19 pandemic, whether to create and launch relief programs, simplify and shorten procurement processes or expedite clinical trials, shows us that we can and must aim higher.

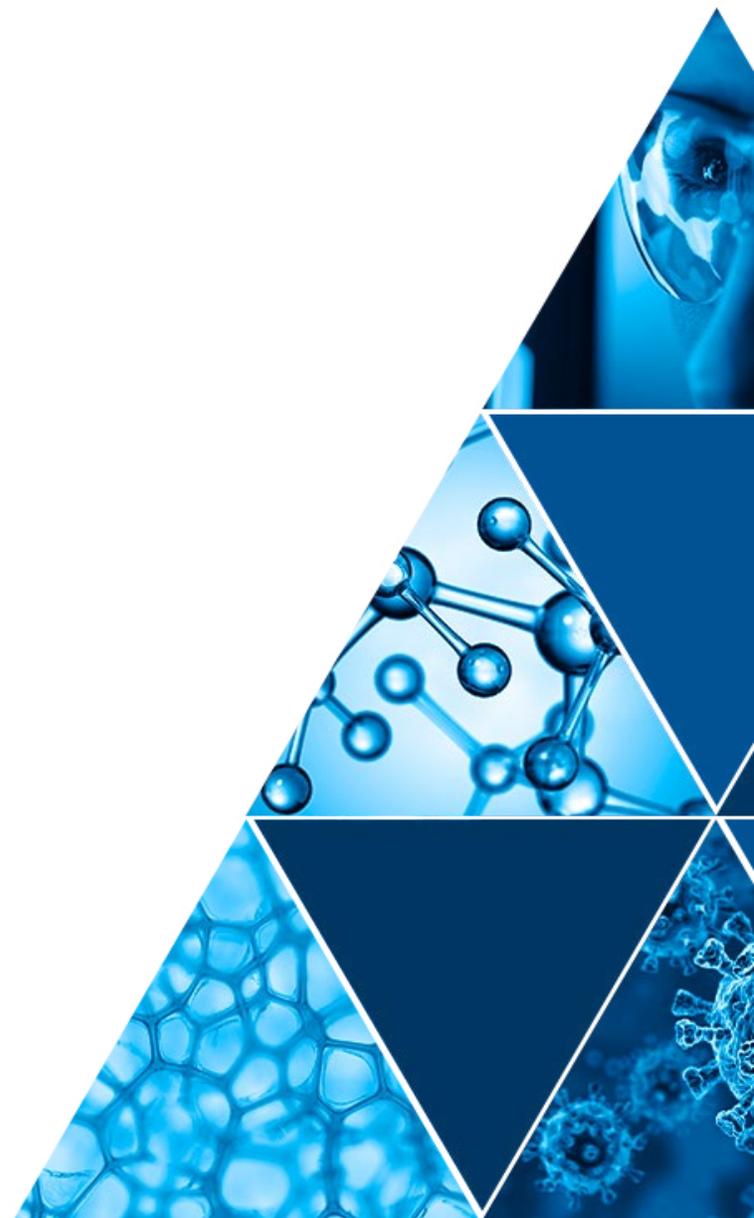
A high performing regulatory system should be predictable, efficient, consistent and transparent, so as not to present barriers to business investment, innovation and ultimately, economic growth and values improved outcomes that benefit Canadians.

How can our regulatory system better serve as a catalyst for new products and innovations?

- This discussion paper touches on some of the remarkable innovations developed by our community. We have seen the incredible opportunity that new technologies like gene editing, AI, and nanotechnology offer. Canada is also a country of abundant natural resources, providing opportunities to leverage biotechnology in agriculture, aquaculture and forestry to increase efficiency, environmental performance and competitiveness.

How can we adopt these technologies and leverage Canada's natural advantages?

- Implement modernized regulatory processes that are aligned globally and harmonized to attract technology to Canada in order to ensure Canada has the regulatory capacity to draw the next generation of technologies into use for and by Canadians.
- Measure the performance of regulatory process on commercializing new biotechnologies with metrics of how fast Canadians gain access to these new technologies relative to other jurisdictions.



TIME TO ACCELERATE

“The emergence of cell and gene therapy has ushered in a new scientific era and is one of the greatest recent advances in modern medicine.”

– Daniel Hebert, Country Medical Head, Oncology, Novartis Pharmaceuticals Canada

COVID-19 has clearly underscored the importance of biotechnology and the need for a strong, resilient domestic sector. We are in for a long battle which will require biotech companies to contribute in various ways. We know that biotechnology is going to play a vital role in beating COVID-19 from a healthcare perspective. It offers promising solutions to testing, vaccine development, and therapeutics, all of which are key to overcoming the pandemic and addressing similar, inevitable crises in the future. Canadian companies are already making great strides in these areas.

But the sector is equally critical to Canada’s economic rebuild. Where other sectors were badly damaged by the pandemic and will take years to bounce back, biotechnology is filling the void, continuing to create good jobs, draw investment capital, and churn out innovations at a rapid pace. In every region of the country, thousands of highly skilled researchers and employees linked to a national ecosystem of expertise are dedicated to finding the tests, therapies and ultimately vaccines needed for COVID-19. Many more are seeking solutions for other health-related challenges, not to mention agricultural, industrial, and environmental quandaries. The sheer breadth of the sector and the seemingly endless opportunities for applications of the technology add up to a compelling value proposition.

The Canadian biotech ecosystem is an economic strength that positions Canada well to compete successfully in the global economic recovery. Canada’s biotechnology industry has a demonstrated history of scientific discovery

and development which has led to the creation of a robust, diverse biotechnology ecosystem extending to every region of the country. As a result, the sector is poised to deliver solutions for future challenges. The need for post-pandemic economic stimulus and targeted economic growth places this industry at the forefront of immediate impact.

To accomplish this, the government can build on its strategic investments in the biotechnology industry to increase Canada’s competitiveness in attracting the necessary investment and talent required to grow the industry and establish it as an economic cornerstone. Growing the amount of investment capital available now into venture capital funding in Canada will fuel the growth of viable companies toward that goal. Canada cannot afford to do anything less than rise to the challenges of today.

If we are to enhance Canada’s recovery and fully reap the long-term economic benefits of biotechnology, then we need bold partnership from government and private capital in the form of a dedicated life sciences fund. Built from the existing VCCI model and managed by life science investment specialists, the fund will secure long-term economic growth within the sector and deliver high returns for all parties who invest. A prompt commitment over the next six to 12 months is needed to maximize investment and make a real impact on economic recovery.

There has never been a more opportune time for government and investors to focus on biotechnology. Canada’s life sciences venture capital sector has seen significant growth in recent years and companies are seeking game-changing levels of investment required to mature into the next cohort of potential anchor companies that will serve as economic drivers for the recuperating economy. Growth of investment in competitive economies is drawn in by governments who commit to fundamental support – we have seen this play out in other countries, and we are confident it is a recipe for success in Canada. Now is the time to accelerate.

OUR BIONATION PARTNERS

