CENTRE FOR DIGITAL ENTREPRENEURSHIP & ECONOMIC PERFORMANCE

FEBRUARY 2021

SCALING VENTURE CAPITAL IN CANADA'S LIFE SCIENCES SECTOR

deepcentre

A FRAMEWORK FOR GROWTH AND INNOVATION

BY: ANTHONY D. WILLIAMS

ABOUT THE DEEP CENTRE

ADVICE - IMPACT - SUCCESS

The Centre for Digital Entrepreneurship and Economic Performance (DEEP Centre) is a Canadian economic policy think-tank. Founded by Anthony Williams in 2012 as a non-partisan research firm, the DEEP Centre's work shapes how jurisdictions build fertile environments for launching, nurturing and scaling companies that will thrive in an increasingly connected world. Its research and advisory services have helped policymakers around the world identify and implement powerful new policies, programs and services to foster innovation, growth and employment in their jurisdictions.

© DEEP Centre Inc. 2020

SCALING VENTURE CAPITAL IN CANADA'S LIFE SCIENCES SECTOR

A FRAMEWORK FOR GROWTH AND INNOVATION

TABLE OF CONTENTS

© DEEP Centre Inc. 2020

ABOUT THE REPORT

Scaling Venture Capital in Canada's Life Sciences Sector provides an overview of the life sciences investment landscape in Canada and identifies needs and opportunities for public investment in the sector's venture capital and startup support infrastructure. The report was commissioned by Canada's Department of Innovation, Science and Economic Development (ISED). Specifically, ISED asked the DEEP Centre to:

- Provide an overview of recent investment trends in Canada's life sciences sector, including data-driven insights into startup and investment activity;
- Interview ecosystem leaders (including business accelerators, VCs and university-based commercialization centres) to identify commercialization challenges and investment needs in the life sciences sector that can be addressed by public interventions; and
- Provide the Government of Canada with recommendations for how to strengthen Canada's life sciences sector, with a focus on building a more robust venture capital and startup support infrastructure to nurture homegrown global champions in biomedical research, drug development, medical devices and digital health solutions.

This report summarizes the DEEP Centre's findings from the research and provides recommendations for scaling domestic sources of life sciences venture capital and maximizing the global success of Canada's leading life sciences companies.

The information, opinions and interpretations expressed in this report are those of the authors and do not necessarily reflect the official policy or position of the Government of Canada. The Government of Canada is not responsible for the accuracy, reliability or currency of the information.

© DEEP Centre Inc. 2020

EXECUTIVE SUMMARY

KEY FINDINGS ON SCALING VENTURE CAPITAL IN CANADA'S LIFE SCIENCES SECTOR

The life sciences sector includes all science and technology-based products and services applied to human health and certain segments of the agricultural and animal health industry. It is a highly dynamic and innovative sector: a source of highly skilled jobs, fast-growing firms and expanding global markets. Areas poised for growth include the digital health and medical devices market, which is projected to reach $US612 billion by 2025, and the biopharmaceutical market, which is due to reach US$1.2 trillion by 2024. Much of this growth will come from exciting developments in precision medicine, biomedical engineering and AI-enabled health diagnostics and drug discovery.

The Canadian life sciences ecosystem consists of some 900 firms. This encompasses multinational pharmaceutical enterprises, generics firms, biopharmaceutical SMEs, contract research and manufacturing organizations and medical technology manufacturers. These firms collectively employ more than 91,000 people directly, while some 2.1 million Canadians work within the broader health system. Health and biosciences are significant contributors to Canada's economy. In 2016, the industry contributed $7.8 billion to Canada's GDP with promises of much more to come. A string of successful IPOs since 2017 demonstrates that Canadian health and bioscience companies are developing world-class solutions, raising record amounts of investment capital and are poised to reap considerable rewards in an industry that is overflowing with revolutionary technological advances.

Despite evident progress in building a vibrant ecosystem, and the significant government investment in science, sector leaders believe that Canada is just beginning to tap the sector's tremendous growth potential. To be sure, the Canadian life sciences sector is still immature when compared to more advanced markets such as the United States, the United Kingdom and Germany. For example, Canada still lacks a national, research-driven bio-pharmaceutical company to anchor the ecosystem. We have a small pool of seasoned executives with the experience to scale health and biosciences ventures into formidable global competitors. Canada's life sciences venture funds are also dwarfed in size by US-based leaders such as Orbimed and Versant Ventures, which means Canadian firms rely predominantly on foreign sources of late-stage venture capital and private equity financing.

© DEEP Centre Inc. 2020

EXECUTIVE SUMMARY

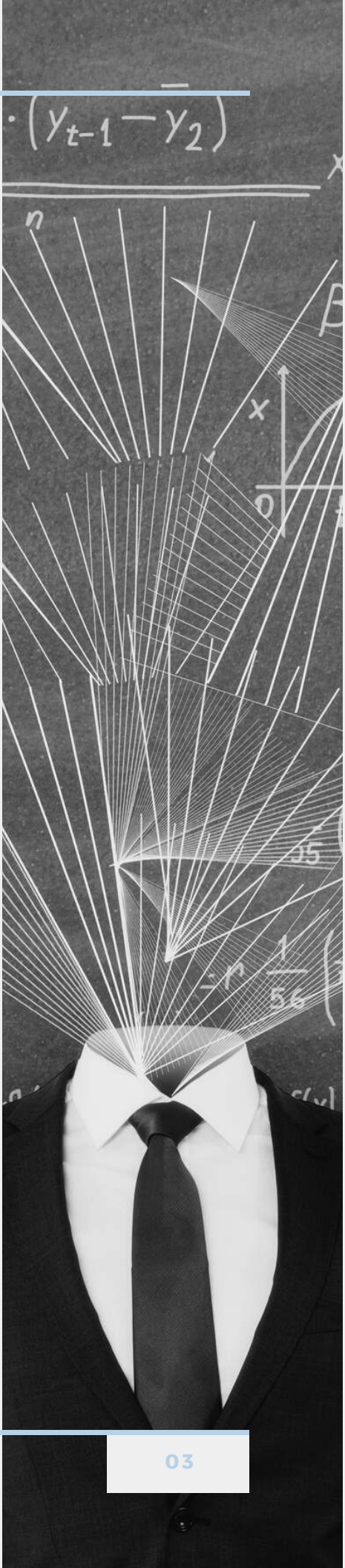
The relative lack of venture funding in Canada, in turn, has several detrimental impacts on the economic performance of the life sciences sector. It limits Canadian investors' capacity to invest through to later funding rounds, resulting in earlier exits to foreign investors and ultimately fewer self-sustaining Canadian anchor companies. It dilutes Canadian ownership stakes in growth-stage companies and means domestic investors recycle fewer profits from exits into the Canadian ecosystem. The comparatively small size of the Canadian funds also constrains fund managers' capacity to invest in infrastructure and hire a larger bench of seasoned executives to support and advise the companies in their portfolio.

Access to capital and the inability to date to sustain large anchor firms in Canada are pre-eminent concerns for Canadian life sciences leaders. However, conversations with leading investors and sector executives highlighted other challenges inhibiting the growth of the Canadian life sciences sector. These challenges include a lack of capacity to translate biomedical research into investable companies, a pattern of largely superficial engagement by global healthcare companies in building the domestic ecosystem, and the sluggish adoption of digital health solutions in Canada's healthcare system.

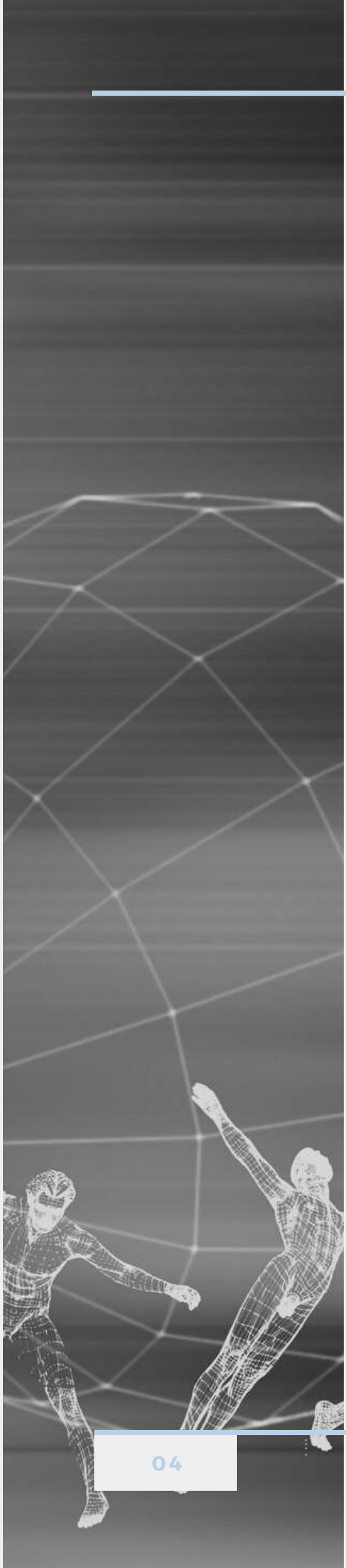
Life sciences leaders in Canada are confident that a concerted effort to address these challenges could deliver a significant upside, including exceptional economic returns, high-quality jobs, more efficient healthcare delivery and better health outcomes. For example, the Health and Biosciences Economic Strategy Table convened by the Government of Canada established the following vision for the sector:

> *"By 2025, Canada will double the size of the health and biosciences sector and become a top-three global hub by leveraging and advancing innovative technologies; attracting and retaining capital, skills and talent; and ensuring a vibrant ecosystem that will unleash the full potential of the sector and lead to improved health outcomes."*

To double the industry and break into the top three life sciences hubs globally, table members called for strategic action to strengthen every facet of the sector. In particular, they set targets to double health and biosciences exports to $26B, double the number of health and bioscience firms to 1,800, and double the number of health and bioscience high-growth firms to 80.



© DEEP Centre Inc. 2020



EXECUTIVE SUMMARY

To help realize these objectives, this report on Canada's life sciences sector provides an overview of the life sciences investment landscape and identifies needs and opportunities for public investment in the sector's support infrastructure. Drawing on proprietary investment data from Hockeystick and a series of executive interviews with sector leaders, the report offers a series of seven recommendations for accelerating growth and innovation in Canada's life sciences sector.

- **Strengthen and diversify early-stage funding for life sciences** to support an expanding pipeline of healthcare and biotech startups. Sector leaders recommend scaling existing seed funds and creating new seed-stage funds to diversify the pool of early-stage life sciences investors in Canada and reduce the export of intellectual property. There were also calls to improve support for angel investment with a combination of tax incentives, deal syndication and investor education.
- **Boost Canadian sources of late-stage VC and private equity funding** to accelerate growth and stem the loss of potential multi-billion-dollar firms. Sector leaders appealed for the creation of a dedicated funding envelope to support and invest in the development of later-stage venture and private equity capital funds that focus on life sciences. There were also calls for the federal government to encourage large Canadian institutional and pension funds to invest as limited partners in later-stage venture capital and private equity funds.
- **Grow the life sciences talent pool in Canada** to ensure that promising life sciences companies are not hindered by a lack of skilled leadership. In the short term, sector leaders see a continued need to source experienced talent from the US. However, over the longer term, sector leaders recommend placing a greater focus on developing the existing talent pool by backing first-time CEOs and training, coaching and supporting competent local management teams that are firmly rooted in Canada.
- **Enhance the capacity to create sustainable, investment-ready companies out of Canadian universities** to ensure a robust pipeline of biotech, med-tech and digital health startups. Sector leaders recommend investing in high-quality translational services that offer startup capital and infrastructure and can bring private sector expertise and discipline to the process of building new ventures around breakthrough science. There were also appeals for Canadian investors to replicate the full-stack, end-to-end VC model that has been successful for US funds such as Versant Venture.

© DEEP Centre Inc. 2020

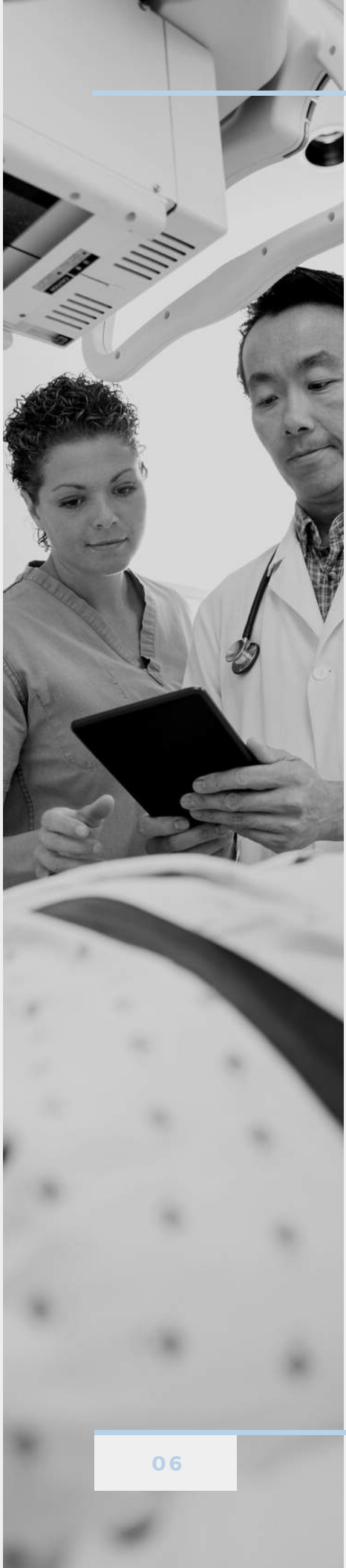
EXECUTIVE SUMMARY

- **Promote engagement with global healthcare companies** to bring a much-needed infusion of capital, expertise and channel/partnership opportunities to the domestic ecosystem. Sector leaders acknowledge that the most reliable way to attract foreign investment is to create game-changing companies and innovation opportunities within Canadian clusters. However, there were also calls for the federal government to negotiate a relationship with big pharma in which market access is conditional on increased R&D investment in Canada and corporate venture participation in Canadian life sciences funds.
- **Improve early adoption opportunities for med-tech and digital health startups** to create springboard opportunities for companies to raise capital and market their solutions abroad. Sector leaders recommend increasing funding for technology demonstration projects to enable leading hospitals and digital health startups to test, refine and verify the performance of new technologies in real-world environments. Sector leaders also recommend establishing a national health procurement agency to lead a systemic shift in Canada's approach to health tech procurement, coordinate pilot projects and build the evidence base for translating innovative products for use within health systems across the country.
- **Fine-tune Canada's policy and regulatory environment** to ensure Canada remains an attractive and competitive environment to host cutting edge biomedical innovation and commercialization. Sector leaders called for a more robust innovation culture in which policymakers see Canadian healthcare and the economic growth of the health and biosciences sector as mutually reinforcing. There were also appeals to ensure that tax credits and funding programs are globally competitive, with an emphasis on the need to re-assess the eligibility criteria for SR&ED credits to ensure that high-growth biosciences firms are not excluded.

The body of the report consists of five chapters.

Chapter 1 provides a brief overview of Canada's life sciences landscape and discusses the rationale for further investment in the sector. We document reflections from sector leaders on whether there are unique assets or niche opportunities where Canadian players can differentiate themselves in today's global life sciences market. We also examine recent efforts to nurture a new cohort of homegrown anchor companies that will generate significant employment and prosperity in Canada.

© DEEP Centre Inc. 2020



EXECUTIVE SUMMARY

Chapter 2 provides a data-driven analysis of recent startup and investment activity in Canada's life sciences sector, focusing on the 2017 to 2019 period. Drawing from Hockeystick's proprietary datasets covering investments from Angels, VCs, Private Equity firms and government programs, the analysis of investment activity illuminates the the current size and scope of the funding deals for leading life sciences companies across the country. As both life sciences companies and investors are diverse, the analysis covers not only industry-wide investment activity but also highlights differences that occur at the regional and sectoral (or vertical) level.

Chapter 3 analyzes critical commercialization challenges and investment needs in the life sciences sector. Drawing on our conversations with sector leaders, we summarize the most significant commercialization and scaling challenges for life sciences ventures in Canada, including access to venture capital, executive talent, high-quality advisory services and anchor customers.

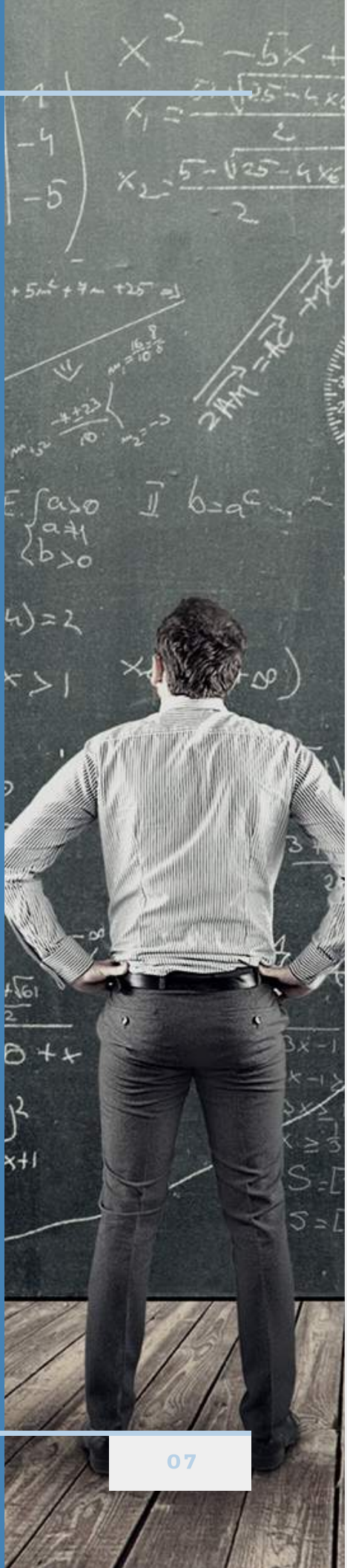
Chapter 4 provides detailed guidance and recommendations for strengthening Canada's capacity to nurture high-growth firms in biomedical research, drug development, medical devices, digital health solutions and other sub-sectors that fall under the life sciences umbrella. With a focus on scaling domestic sources of early and late-stage venture capital, we summarize the steps that sector leaders should take to build more significant homegrown anchor companies in Canada. We also examine how changes to policy, programming, procurement and the regulatory environment could make Canada a more competitive environment to host cutting edge innovations and companies.

Chapter 5 draws final conclusions and provides a summary of our recommendations for industry leaders and policymakers.

© DEEP Centre Inc. 2020

CHAPTER 1

THE LIFE SCIENCES LANDSCAPE IN CANADA

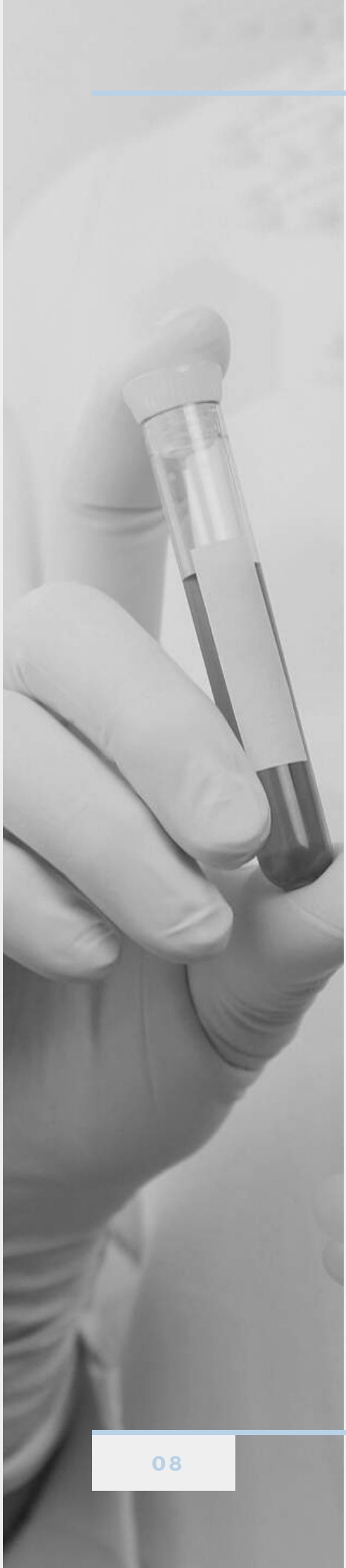


Disruptive waves of technology-enabled innovation have washed over numerous sectors in recent years, from media and entertainment to financial services, hospitality and even government. While much of the focus of late has been on artificial intelligence, machine learning and robotics, a parallel and equally exciting set of developments is unfolding in the life sciences sector.

Rapid advances in biomedical innovation have opened the floodgates for what promises to be a revolutionary age in biotechnology and healthcare. Researchers have built on breakthroughs such as mapping the human genome, advances in gene editing and cell therapy, the development of new antibodies and the use of computer modelling in drug discovery to devise more precise and targeted approaches to treating a range of diseases. That includes an explosion of new techniques to go after cancer in ways that maximize the therapeutic impact on diseased cells while minimizing collateral damage.

Despite the wave of promising developments, healthcare and biotech remain notoriously tricky businesses. It typically costs hundreds of millions of dollars in clinical development to earn regulatory approval for new treatments, devices and diagnostics. The risk and reward for entrepreneurs and investors bringing new therapeutics to market have few parallels in other sectors. The identification of a breakthrough therapy can lead new biotech ventures to attain billion-dollar valuations overnight, only for their discoveries (and corresponding market capitalizations) to be sidelined by the next wave of scientific advances.

© DEEP Centre Inc. 2020



CHAPTER 1

THE LIFE SCIENCES LANDSCAPE

As one experienced executive recalls:

> *"Nobody in Canada would finance a biotech company, regardless of whether you made your milestones or not. We had none of the essential pieces of infrastructure a growing biotech needs – especially global investors with deep knowledge and deep experience of how you get from great idea to great drug candidate."*

There are encouraging signs, however, that the sector's prospects are changing for the better. A recent wave of successful public offerings has convinced many industry watchers that the domestic industry is experiencing a renaissance and is now poised for significant growth. In December 2020, Vancouver-based AbCellera closed a record-breaking IPO for US$555 million. Earlier in 2020, Repare Therapeutics and Fusion Pharmaceuticals, both precision oncology companies, raised US$253 million and US$212.5 million, respectively, during their first days of trading. All three join other leading Canadian biotech companies such as Zymeworks and Aurinia Pharmaceuticals in reaching billion-dollar valuations on the NASDAQ. Together these homegrown leaders demonstrate that Canadian entrepreneurs and investors can translate cutting-edge biomedical research into world-class companies that will attract interest and investment worldwide. In fact, publicly-traded Canadian firms have sold over $1.6 billion in equity so far in 2020, up from $1 billion in all of 2019 and $735 million the year before that.

These recent successes have instilled a sense of optimism among sector leaders who are calling for additional investment to sustain the momentum. As one interviewee explains:

> *"Zymeworks built a company based on licensing deals and partnerships with global pharma companies. Ali Tehrani always had the vision to build a big sustainable company in Canada. It's very doable today... Health care is the story for the next five years. Big capital sees it as the next wave of opportunity. The government must have a strategy if they want to build more a robust domestic sector."*

© DEEP Centre Inc. 2020

CHAPTER 1

THE LIFE SCIENCES LANDSCAPE

While the renewed momentum for biomedical innovation in Canada demonstrates promise, there is concern that the sector is at an inflection point where a lack of new investment could see the economic fruits of Canadian investments in research and innovation harvested by investors and companies in other countries. As documented in this report, biopharmaceutical giants continue to cherry-pick our best ventures, while promising Canadian biotech companies raise their largest venture rounds from foreign investors.

While there is nothing inherently wrong with acquisitions or raising capital abroad, sector leaders warn that an over-reliance on foreigners to provide growth financing will drive many life sciences ventures and the associated economic benefits out of the country.

> *"The main anxiety is that we are losing companies to the US," said one investor. "We can't find domestic sources of late-stage financing, which means we are losing the capacity to create Amgen-like companies here in Canada. We have been successful in building companies to the point where they are gaining international recognition. But in too many cases, we go the acquisition route because no one in Canada can write a big enough cheque."*

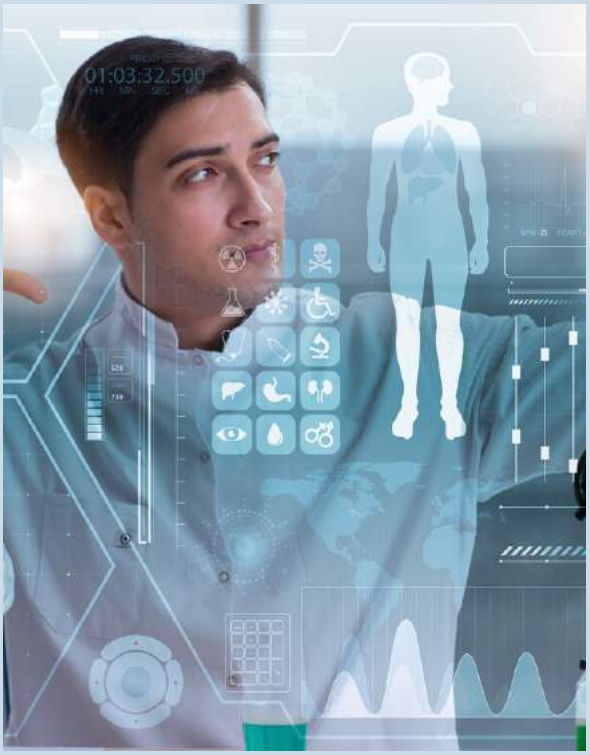
THE RATIONALE FOR PUBLIC INVESTMENT

Sector leaders in Canada link the rationale for investment in life sciences to the sector's unique benefits for society: exceptional economic returns, high-quality jobs, more efficient healthcare delivery and better health outcomes. Indeed, few sectors offer a more significant opportunity for economic growth and substantial returns to society and the environment. A 2018 study published by Deloitte estimates that worldwide health care spending will reach approximately US$8.7 trillion this year. The medical devices market is projected to reach $US612 billion by 2025 and the global biopharmaceutical market will reach an estimated US$1.2 trillion by 2024.

© DEEP Centre Inc. 2020

CHAPTER 1

SECTOR LEADERS ON THE RATIONALE FOR INVESTMENT



*"**This is a virtuous cycle**. Good life sciences companies typically build off publicly funded research and public institutions. We hire Canadian kids out of university to be part of the team. Then we create products that change patient lives. We have a great health care system and world class clinical research. We spend a fortune funding research. Now we need to work on realizing the economic opportunity. We have an opportunity to build the healthcare infrastructure for the future."*

*"**We can build global biotech companies** if we own the entire value chain. Right now, we are in a canoe with many holes. We are barely keeping it above the waterline. There are real gaps in capital at the beginning and the end. The current VCs need more money at the early stages and the later stages. It's a food chain, and you need the whole continuum."*

*"**We need to own the podium in life sciences**. We do better in life sciences research and patents than many countries. Now we need to reap the benefits. We probably need at least two rounds of VCCI in the life sciences, with two pots of at least $400 million. If you get that off the ground, the public investment in the R&D will be worthwhile."*

© DEEP Centre Inc. 2020

CHAPTER 1

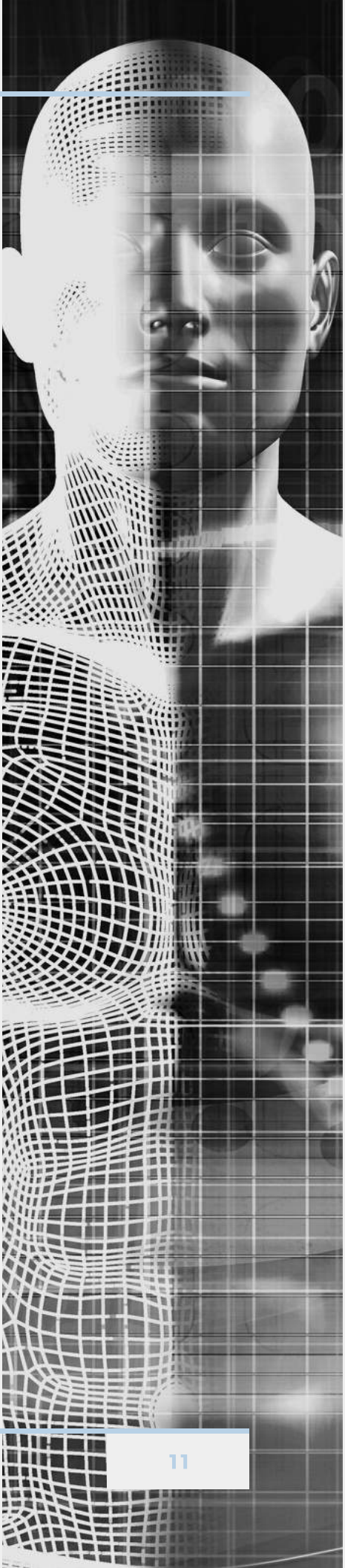
THE LIFE SCIENCES LANDSCAPE

Much of this growth will come from exciting developments in precision medicine, biomedical engineering and AI-enabled health diagnostics and drug discovery. New drugs and novel treatments derived from these methods could hold the key to eliminating dreadful diseases such as Alzheimer's, diabetes, and cancer. Applications of biotechnology in fields such as agriculture, ecology and energy production are also leading to cleaner and more efficient manufacturing, novel approaches to climate change mitigation, and to increasing food yields and nutrition for the benefit of people worldwide.

Despite these benefits and opportunities for growth, interviewees claim that Canada is nowhere close to exploiting the sector's full economic potential. "Healthcare is a $10 trillion marketplace, and yet Canada imports nearly every product in the sector," said one interviewee. "The government has already made a significant investment in life sciences research, which historically has benefited other jurisdictions. Investing in life science commercialization capitalizes on the convergence of these two tremendous opportunities where Canada can have a competitive advantage in the innovation economy."

Most sector leaders consulted for the study see the need for high-profile national leadership in forging a strategy to translate Canada's scientific excellence into commercial opportunities. In particular, they perceive opportunities to better leverage Canada's significant research spend and to strengthen a virtuous circle of reinvestment in the domestic life sciences sector.

> *"We have to realize how much the health industry contributes to Canadian society," said another venture investor. "Biotech R&D is a high spend. Healthcare is a high spend. Health innovation is valuable to society. We could easily double the number of companies. . . The data is there to justify public investment. There is no question that the health sector is going to return the benefits to society. Piecemeal stuff won't get you there. It would help if we had a national strategy. We need to do it together and do it with a long-term plan."*



© DEEP Centre Inc. 2020

CHAPTER 1

THE LIFE SCIENCES LANDSCAPE

The same sector leaders criticized the propensity to view healthcare as a cost centre instead of a driver of innovation and economic development. Canadian biotechnology entrepreneurs also cite a general hostility toward the idea of creating companies around scientific discoveries as a significant obstacle to commercialization. “The socialized medicine we've had in Canada has set the stage for this idea that you do great science, and then you give it away like insulin,” said one interviewee whose organization commercializes research emerging from publicly funded universities and research institutes. “But people don't think about the jobs and industry that won't be created when you give your science away for free.”

Many sector leaders fear the prevailing attitudes towards healthcare innovation will limit the domestic investment available to fuel homegrown life sciences companies. A lack of investment, in turn, could cause Canada to miss out on significant economic opportunities. “We need Canadian capital and expertise cycling in Canada,” said one interviewee. “The government has not seen the potential for life sciences to be a driver of economic development. This is a big game, and we are missing out on a significant economic opportunity. The returns on that investment could be huge.”

UNIQUE ASSETS AND OPPORTUNITY SPACES FOR CANADIAN LEADERSHIP

Canada’s life sciences sector has many assets, including world-class research institutions and hospitals, a growing cohort of proven biotech entrepreneurs and enterprises, and a highly educated workforce. Canada also boasts scientific leadership in regenerative medicine, oncology, infectious diseases, metabolic diseases, neurodegeneration, genomics and precision medicine. For example, in regenerative medicine and stem cell research, Canada has more than 400 scientists working on a range of conditions at 68 institutes across the country and is among the world leaders in the quality and influence of its scientific output.

As part of our consultation, the DEEP Centre asked sector leaders whether Canada should target particular areas of scientific distinction its efforts to grow the sector. We also wondered whether there are niche opportunities in biotechnology or digital health where Canadian life sciences ventures can differentiate themselves.

© DEEP Centre Inc. 2020

CHAPTER 1

SECTOR LEADERS ON OPPORTUNITIES FOR LEADERSHIP

*"**AI could be a differentiating factor**. We normally apply AI to financial services, retail and logistics. Health care is a bit behind. But we see a big opportunity. AI companies are interested in the life sciences, and life sciences companies are partnering with AI leaders.*

*"**Boston and San Francisco became life sciences hubs** because they took on large molecules at a time when the science was just growing. Biogen and Amgen focused on those areas first. We see a similar play in gene editing and cell therapy. We can do this in Canada. It's hard to compete against a group that already has a lock in the market."*

*"**Regenerative medicine is one of the hottest sectors in biotech**. Canada has a rich history of scientific excellence. It's an area where we have real expertise, and we can take the lead. There is a lot of IP available, and we can build companies relatively quickly because of our expertise in the ecosystem."*

© DEEP Centre Inc. 2020

CHAPTER 1

THE LIFE SCIENCES LANDSCAPE

Sector leaders agree that Canada's scientific excellence is a distinct advantage but expressed mixed views on the opportunities for Canadian leadership and differentiation. Most interviewees do not see a need for the Government of Canada to steer investment into particular therapeutic domains. On the contrary, sector leaders would prefer decisions about how and where to allocate capital are left mainly to private sector fund managers.

However, as highlighted in their remarks, interviewees pointed to areas of strength in the domestic sector and saw opportunities for leadership in advanced biologics, precision medicine, cell therapies, and the application of AI to drug discovery and health IT.

There was also broad agreement that digital health also presents significant opportunities for Canada and Canadian companies. “Chronic disease and mental health are areas that we focus on a lot, and we see a significant upside,” said one investor in the digital health space. “From a payer perspective, a 2% improvement in efficiency or improvements in health outcomes could be massive. The opportunity to make improvements in digital care is significant. We are seeing lots of companies trying to solve these problems.”19

There is also a concern, however, that it is hard for Canadian players to differentiate their offerings in a highly competitive digital healthcare market and that a lack of domestic adoption hampers commercialization efforts. As one sector leader explains:

> *"It's easier to differentiate in biotech than in digital health. In the health care system, we have a wall of bureaucracy. Efficiency is not an important vector. Canadian firms need traction in the US. But unfortunately, you are at a major disadvantage as a Canadian company because they usually lack a deep understanding and connectivity to the US healthcare market. The Canadian market as a whole is tough. We have the people to code. But we don't have a system to generate opportunities.”*

© DEEP Centre Inc. 2020

CHAPTER 1

THE LIFE SCIENCES LANDSCAPE

BUILDING ANCHOR COMPANIES IN CANADA

The lack of a large research-driven pharmaceutical company has long symbolized Canada's failure to capitalize on its significant investments and leadership in biomedical research. Numerous interviewees lamented the frequency with which larger competitors from the United States and Europe are swallowing up high-value IP and clinical-stage companies in Canada. As one interviewee put it:

> *"We need a real focus on creating substantive companies. Northern Biologics just sold off its most valuable assets to Boehringer Ingelheim. It's a source of sadness. You can't build a sustainable industry on par with our research capability if we are selling off our best assets for a fraction of the economic value... We are the only advanced pharma market in the world without a large research-driven biopharmaceutical company."*

Scaling up Canadian ventures would help stem their acquisition by foreign entities and help keep jobs, innovation, intellectual property and other benefits in the country. Sector leaders all agree that having at least one large anchor company in Canada (if not more) would be a game-changer, as anchor firms attract, recruit and develop talented managers who often become founders of spinoff biotech startups. Scaled-up anchor companies will also acquire small and mid-sized life sciences companies so they can fill their innovation pipeline with new assets and technologies, thereby building their capacity while providing a vital source of funding for the domestic ecosystem.

Despite a poor track record, sector leaders are more confident than ever that Canada can nurture a small number of global anchor biotech companies that will generate significant employment and prosperity. Companies such as Zymeworks, Repare Therapeutics and AbCellera are on the pathway to becoming significant international players. Investors expect more companies will follow in their footsteps. However, they also caution that it's unrealistic to expect that most early-stage life sciences ventures will opt to go-it-alone and build large, sustainable companies headquartered in Canada.

© DEEP Centre Inc. 2020

CHAPTER 1

SECTOR LEADERS ON BUILDING ANCHOR COMPANIES IN CANADA

*"**They have to be world-class companies**. Life sciences is a very global sector. You can't do me-to companies. You have to be globally-connected, and they have to list on the NASDAQ. The way to grow the companies is to ensure they are multi-product companies with unique platforms, which makes them tougher acquisition targets. Zymeworks is a good example. Single product companies can generate returns, but they are easily acquired."*

*"**Acquisitions of companies will happen, and that's not always a bad thing**. Acquisitions can generate a lot of wealth, and this wealth will get reinvested. Big exits also create incentives for other entrepreneurs to follow in their footsteps. But we need a national pharma company in Canada. They need to be supported from beginning to end, from seed investments to clinical trials to listing on public markets. The government should invest billions in doing what the US and Switzerland have done."*

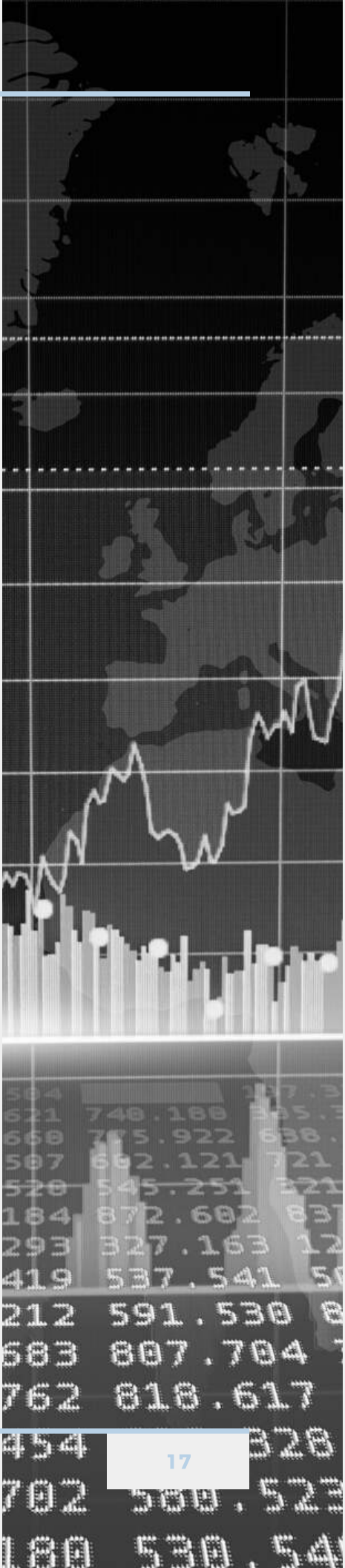
© DEEP Centre Inc. 2020

CHAPTER 1

THE LIFE SCIENCES LANDSCAPE

"Canada can build a handful of anchor companies. Zymeworks is one, and Fusion Pharmaceuticals could be on its way to becoming another," said one investor. "The vast majority of biotech in Canada do not check all the boxes. We can't fit a square peg into round holes. We need to acknowledge that the majority will end up being bought by US companies. That has been true of all of our companies except for Zymeworks."

Interviewees expect that acquisitions of Canadian biotech companies will continue but argue that exits can be healthy, especially when the returns flow back to Canadian investors. "Exits are not bad," said one investor. "The capital gets recycled, and the exits help build a cohort of very valuable, experienced senior executives and talent that we can recycle into new companies that will try again. It is part of building the ecosystem, and it happens all over the world. The US is two decades ahead of us in Canada. We shouldn't tear our hair out about the lack of anchor companies."



© DEEP Centre Inc. 2020

CHAPTER 2

LIFE SCIENCES INVESTMENT ACTIVITY, 2017 - 2019

In Chapter 2, we provide a data-driven analysis of recent startup and investment activity in Canada's life sciences sector, focusing on the 2017 to 2019 period. For this component of the study, the DEEP Centre partnered with Hockeystick, a leading provider of private investment data in North America. In Canada, Hockeystick is the exclusive database used by the Canadian Venture Capital & Private Equity Association, the National Angel Capital Association and thousands of private firms and sources of capital. The data for the analysis of investment activity in the life sciences sector is drawn from Hockeystick's proprietary datasets covering investments from Angels, VCs, Private Equity firms and government programs.

The goal of the data-driven analysis of investment activity was to understand the current size, scope and trends in life sciences investment activity. As both life sciences companies and investors are diverse, the analysis covers not only industry-wide investment activity but also highlights differences that occur at the regional and sectoral (or vertical) level. We specifically focus on four verticals within the broader life sciences sector, including:

- **Bio-pharma companies** developing medicines and therapeutics to cure or manage disease or protect people from infections.
- **DX/tools companies** developing new diagnostics (e.g., in vitro diagnostics) and tools (e.g., genomic sequencing) for medical research, testing, analytics and drug discovery.
- **Medical device companies** that market medical devices (e.g., surgical tools, robotics, imaging, etc.) for the healthcare sector.
- **Health tech companies** that build digital solutions for healthcare delivery, administration and health and wellness.

Our analysis of recent investment activity in the life sciences sector includes tables and charts that highlight key trends across sub-sectors, stages of maturity, and geographic regions of Canada. Along with the findings from the executive interviews highlighted in Chapter 3, this review of investment activity provides a data-driven foundation for our recommendations on how the Government of Canada can strengthen Canada's capacity to nurture high-growth firms in biomedical research, drug development, medical devices, digital health solutions and other sub-sectors that fall under the life sciences umbrella.

© DEEP Centre Inc. 2020

CHAPTER 2

LIFE SCIENCES INVESTMENT ACTIVITY

KEY TAKEAWAYS AND HIGHLIGHTS

Based on our analysis of the Canadian life sciences venture data, we can highlight the following key takeaways.

Summary of deal volume and value:

- Over $2.4B in funds were raised over the 3 year period between 2017-2019.
- In 2019, a number of clinical stage biopharma secured Series B+ funding deals, driving a significant increase (148%) in later stage venture capital funding.
- Deal volume in the life sciences sector has been largely consistent (over 100 deals each year). While deals count was down in 2019, total deal value was up from 2017 and 2018.

Most active company types:

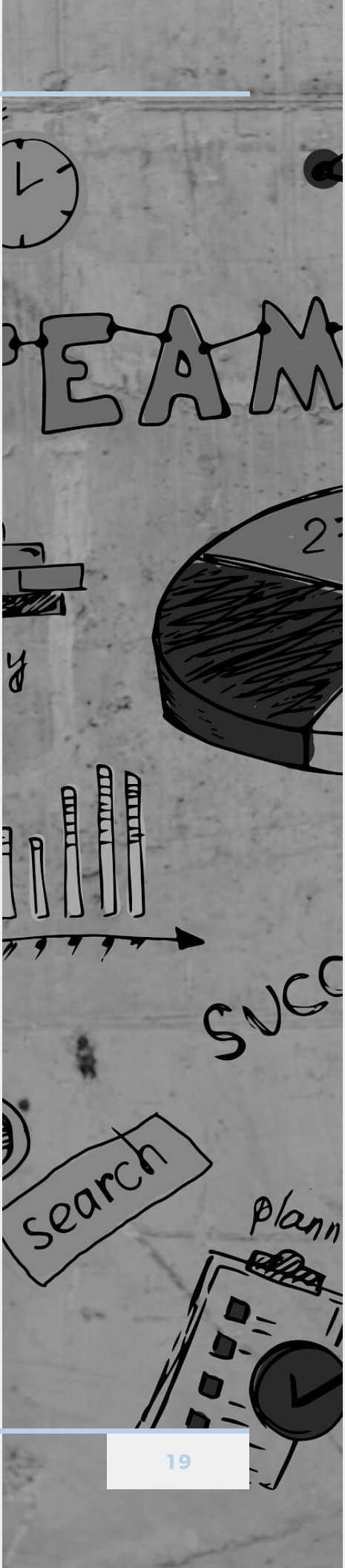
- Biopharma companies account for most of the increase in deal value ($1.1B or 46% of the total funding) with values trending higher in 2019.
- Healthtech companies are also driving a significant proportion of the total deal value over the 2017-2019 period ($682M or 28%).
- Devices and DX/tools verticals have seen consistent total deal values across the 3 years (both near $100-$150M annually)

Geographic highlights:

- Over 50% of total VC deal value over the 2017-2019 period was secured by companies in Ontario, 25% from Quebec, and 13% from BC.
- Companies in Atlantic Canada secured 10 VC deals for a total deal value of over $49M.
- Alberta-based deals were primarily in the DX/tools space
- Saskatchewan-based deals were primarily in the Biopharma sub-sector.

Investor and mega deals highlights:

- Four biopharma companies (Fusion Pharma, Geneseeq, Repare Therapeutics, and Milestones Pharmaceuticals) secured late-stage deals valued over $100M.
- One healthtech deal (PointClickCare Technologies Inc.) was valued at over $100M.
- Desjardins Capital, iGan Partners Inc., and Anges Quebec were among the most active life sciences investors in Canada based on deal counts (see table 9 in Appendix I).



© DEEP Centre Inc. 2020

CHAPTER 2

LIFE SCIENCES INVESTMENT ACTIVITY, 2017 - 2019

268
Unique companies have rasied capital

374
Rounds of funding

586
Grants

272
Unique companies have received grants

$2.4bn
Total funding raised

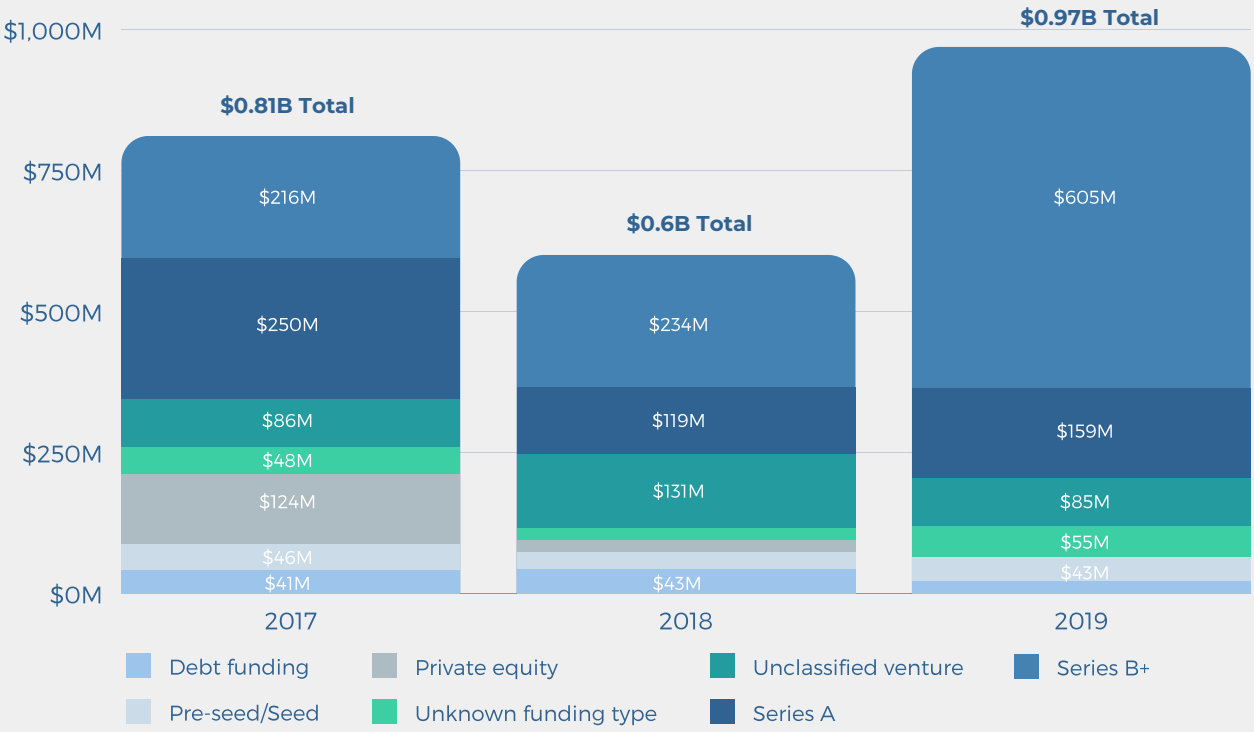
$10.3bn
In exits

© DEEP Centre Inc. 2020

CHAPTER 2

LIFE SCIENCES INVESTMENT ACTIVITY, 2017 - 2019

CHART 1: LIFE SCIENCES INVESTMENTS, TOTAL FUNDING BY YEAR



In Chart 1 above, we look at total deal values across funding types for the life sciences sector as a whole. Here we see that life science companies raised over $2.4B in funds over the three-year period, with nearly $1 billion funding deals in 2019 alone.

Digging into the specific funding types, we see that Series A and Series B+ investments generally account for the greatest proportion of total funding in the 2017 - 2019 period.

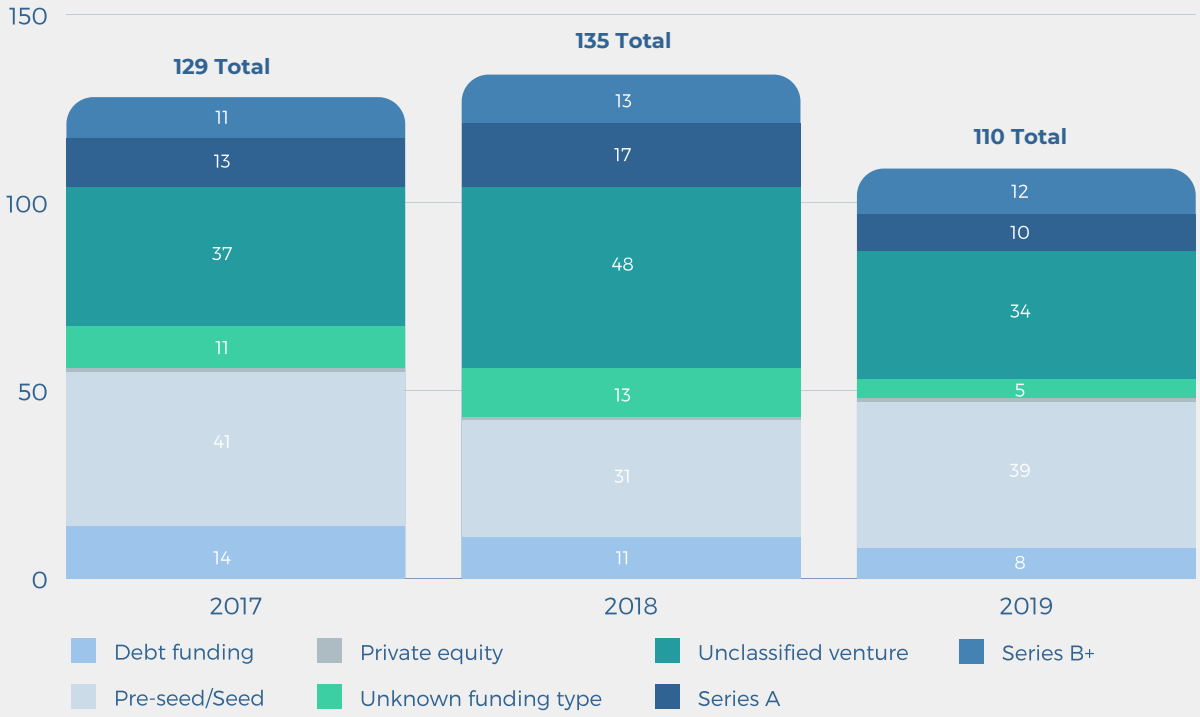
2019 was a particularly big year for late stage venture deals for biopharma companies, with Fusion Pharma, Geneseeq,and Repare Therapeutics all securing $100M+ deals. Given limitations in data reporting, a number of life sciences funding deals could not be classified.

© DEEP Centre Inc. 2020

CHAPTER 2

LIFE SCIENCES INVESTMENT ACTIVITY, 2017 - 2019

CHART 2: LIFE SCIENCES INVESTMENTS, DEAL VOLUME BY YEAR



In Chart 2 above, we look at deal volume across funding types for the life sciences sector as a whole. In this instance, we see that deal count has remained constant over the 2017-2019 period with 100+ deals in each of the three years. Notably, 2018 saw the highest number of deals, but the lowest total amount of funding. While we see a slight dip in the number of deals in 2019, we also see a record amount of funding raised due to the aforementioned mega-deals.

With respect to specific funding types, we see that seed and pre-seed deals are generally the most numerous . The number of Series A and Series B+ has remained fairly consistent over the three-year period.

As in the previous analysis of total deal value, there are a significant number of life sciences funding deals that could not be classified due to limited reporting.

Table 1 below provides a more granular breakdown of life sciences venture capital rounds over the 2017 - 2019 period.

Table 2 provides a breakdown of investment activity by province. Here we see that Ontario accounts for more than half of all of the venture deals and the total amount of funding raised. Quebec-based companies account for 25% of the total deal value, while BC-based companies account for 13%.

© DEEP Centre Inc. 2020

CHAPTER 2

LIFE SCIENCES VENTURE ACTIVITY, 2017 - 2019

TABLE 1: VENTURE CAPTIAL ROUNDS BY YEAR

ROUND	2017		2018		2019	
	DEALS	FUNDING	DEALS	FUNDING	DEALS	FUNDING
PRE-SEED	5	$6M	3	$2M	8	$3M
SEED	36	$39M	28	$28M	31	$40M
SERIES A	13	$250M	17	$119M	10	$159M
SERIES B	7	$124M	6	$92M	8	$400M
SERIES C	4	$90M	2	$2M	3	$91M
SERIES D			4	$140M	1	$114M
SERIES E						
UNCLASSIFIED	37	$86M	48	$131M	34	$85M

TABLE 2: VENTURE ACTIVITY BY PROVINCE

	DEALS	FUNDING		DEALS	FUNDING
ONTARIO	100	$938M	SASKATCHEWAN	6	$8M
QUEBEC	48	$599M	ALBERTA	3	$21M
BRITISH COLUMBIA	25	$257M	NEWFOUNDLAND	1	$1M
NOVA SCOTIA	8	$48M	PEI	1	$0.5M

© DEEP Centre Inc. 2020

CHAPTER 2

LIFE SCIENCES INVESTMENT ACTIVITY, 2017 - 2019

CHART 3: FUNDING BY VERTICAL 2017

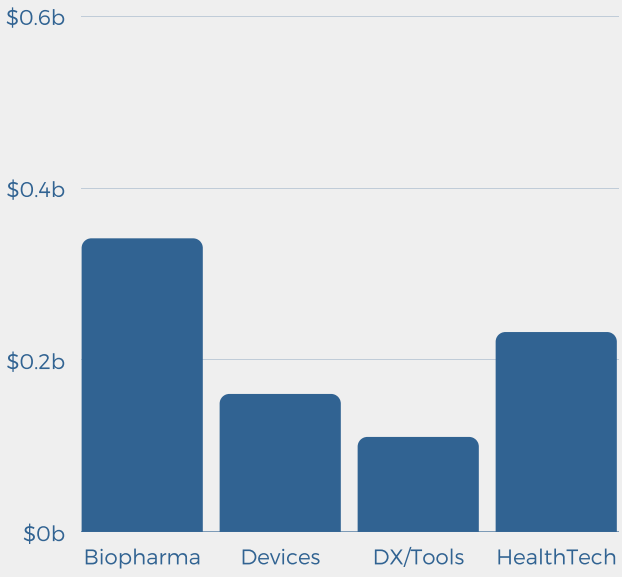


CHART 4: FUNDING BY VERTICAL 2018

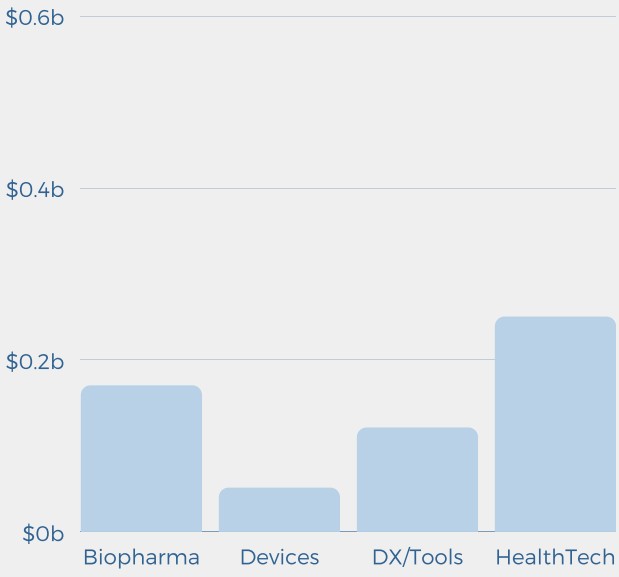
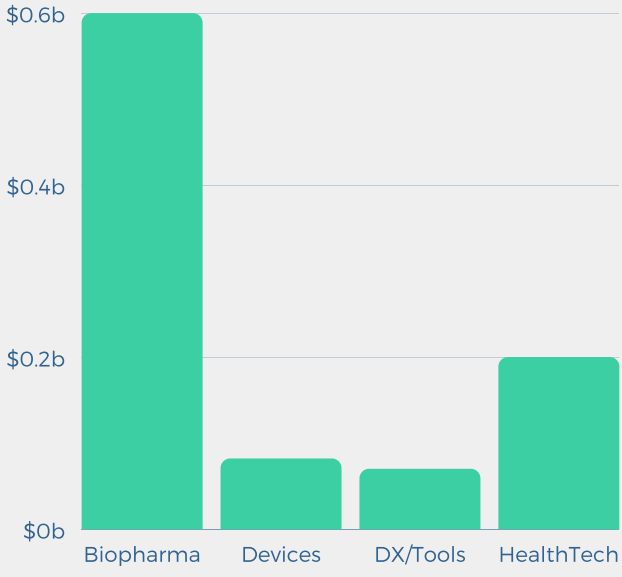


CHART 5: FUNDING BY VERTICAL 2019



Charts 3, 4 and 5 display the total funding by vertical from 2017 to 2019. While healthtech funding has remained constant over the three-year period, biopharma has fluctuated with an outsized year in 2019. Devices and DX/Tools have seen consistent funding, albeit at a lower level than biopharma and healthtech.

Table 3 below summarizes the deal counts, average funding amounts and total funding in each of four life sciences verticals over the 2017-2019 period. Healthtech sees the largest deal count, while biopharma sees the highest aggregate funding amount, as well as the highest average deal size.

Table 4 highlights the biggest life sciences funding deals over the 2017-2019 period. Eight of the ten largest deals were in the biopharma space, with PointClickCare and League securing significant late-stage healthtech deals.

© DEEP Centre Inc. 2020

CHAPTER 2

LIFE SCIENCES VENTURE ACTIVITY, 2017 - 2019

TABLE 3: VENTURE ACTIVITY BY VERTICAL, 2017-2019

VERTICAL	TOTAL FUNDING	AVERAGE FUNDING	NO. OF DEALS
BIO-PHARMA	$1,111M	$12.2M	78
DEVICES	$293M	$3.8M	77
DX/TOOLS	$301M	$3.2M	93
HEALTH TECH	$682M	$5.4M	126
TOTAL	**$2,386M**	**$6.4M**	**374**

TABLE 4: TOP 10 LIFE SCIENCES FUNDING DEALS

COMPANY	VERTICAL	LOCATION	ROUND TYPE	FUNDING AMOUNT
Fusion Pharma	Bio-Pharma	Hamilton, ON	Series B	$140M
Geneseeq	Bio-Pharma	Toronto ON	Series D	$114M
PointClickCare Tech.	HealthTech	Mississauga, ON	PE/Growth	$111M
Repare Therapeutics	Bio-Pharma	Saint-Laurent, QC	Series B	$109M
Milestone Pharma	Bio-Pharma	Montreal, QC	Series D	$103M
Repare Therapeutics	Bio-Pharma	Saint-Laurent, QC	Series A	$91M
Chinook Therapeutics	Bio-Pharma	Vancouver, BC	Series A	$86M
Milestone Pharma	Bio-Pharma	Montreal, QC	Series C	$71M
League	HealthTech	Toronto, ON	Series B	$62M
Fusion Pharma	Bio-Pharma	Hamilton, ON	Series A	$59M

© DEEP Centre Inc. 2020

CHAPTER 3

COMMERCIALIZATION CHALLENGES AND INVESTMENT NEEDS

In part two of our consultations, the DEEP Centre asked sector leaders to identify the sector's most pressing commercialization challenges and investment needs. In the section, we take a look at several domains flagged as sources of concern by individuals who provide startup support or invest in life sciences ventures in Canada. Among other things, these challenges include translating biomedical research into investable companies, securing early-stage capital and scaling the capacity of Canada's later-stage venture funds. Additional challenges include increasing the domestic engagement of global healthcare companies and boosting the adoption of digital health solutions in Canada's healthcare system.

TRANSLATING BIOMEDICAL RESEARCH INTO INVESTABLE COMPANIES

Interviewees agree that Canada has world-class science, pointing to the fact that Canadian researchers' output ranks highly in personalized medicine, neurodegeneration, proteomics, bioinformatics, and regenerative medicine. Sector leaders want the federal and provincial governments to maintain and better coordinate their funding for basic research to ensure that domestic universities, research institutes and consortia are leading or keeping pace with rapid advances in these fields. However, they also warn that producing world-class science is a necessary but insufficient condition for building a life sciences sector that is on par with Canada's research capabilities and investments.

Based on current deal flow, investors see both a deep reservoir of high-value IP and a strong pipeline of Canadian biotech and digital health companies. However, many also noted a gap in the capacity to build investment-ready companies out of Canadian universities. "There is a very healthy pipeline of companies, but we have seen an evolution in the nature of the deal flow," said one seed-stage investor. "The notion initially was that we could take companies out of the tech transfer offices and translational centres and help them transition into investor-ready companies. But it didn't pan out that way. The number of companies spun out of the CECRs was going down. The deal flow didn't materialize, and the companies were not strong enough."

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

When asked about the strengths and weaknesses of Canada's capacity to commercialize its biomedical research, interviewees identified two primary concerns that they claim have caused universities to underperform in their contributions to building a pipeline of high-quality life sciences ventures. The first concern is that the incentives for tech transfer offices are not necessarily supportive of creating a more robust life sciences sector in Canada. Universities typically seek to make quick returns on the intellectual property they generate. Spinning off companies requires time, talent and a substantial investment of capital with relatively uncertain returns. By comparison, licensing promising IP to a global pharmaceutical company is low-risk and can generate short-term returns, often without further investment from the university.

As one interviewee explains: "We have world-class research, but it's hard work to build capacity in Canada. Academic institutions don't have a mandate to create companies. It's easier to take the path of least resistance by licensing innovations to global pharma companies. We would rather develop the assets further and increase the value. We want to build domestic capacity, but we need an active management approach to do so. Universities don't always put Canada first. They try to extract the biggest licensing deals as quickly as possible."

The second concern is that the tech transfer offices in Canadian universities lack the expertise and private sector discipline required to commercialize biomedical innovation successfully. As one interviewee put it,

> *"Companies go to the Tech Transfer Office, but they are not qualified to provide the advice. They are not hiring the right people. That department is staffed by academics, not hustlers. The good startups seek out other health startups and learn from one another. There is a big gap to fill, but it has to be done competently. VCs do this full-stack role in a robust ecosystem."*

The dearth of commercialization capacity at the university level has many sector leaders calling for a stronger, independent company-building function in Canada. Interviewees differ, however, in their assessment of what constitutes an optimal support model for early-stage startups.

© DEEP Centre Inc. 2020

CHAPTER 3

SECTOR LEADERS ON THE CHALLENGES OF TECHNOLOGY TRANSFER

*"**There is not enough smart money at the early stage**. If you need to build or run a proof of concept or run preclinical studies, you won't have sufficient funds. The TTOs don't have the capital or the expertise to set up companies to raise private capital. Even credible repeat entrepreneurs have trouble raising. There are very few seasoned managers that have experienced a big win, and we are not at the stage where enough capital is recirculating."*

*"**We have a strong pipeline of companies in Canada**. We must keep working to generate more. Kendall Square has 1,000 companies. But we have the raw material. We are seeing more deals now and are getting tons of inbound interest."*

*"**There are already incredible technologies sitting in the labs**. They need polishing. But we do need to break down the silos between the TTOs and the ecosystem. We need to get the investors and businesspeople involved in the commercialization process. There is a ton of horsepower we could leverage."*

*"**A lot of the biotech innovation is coming out of the universities**, but we need a stronger commercial drive and private-sector discipline around investment decisions to create a robust early-stage innovation continuum. We can't just rely on the universities to drive the creation of new companies."*

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

When asked about the strengths and weaknesses of Canada's capacity to commercialize its biomedical research, interviewees identified two primary concerns that they claim have caused universities to underperform in their contributions to building a pipeline of high-quality life sciences ventures. The first concern is that the incentives for tech transfer offices are not necessarily supportive of creating a more robust life sciences sector in Canada. Universities typically seek to make quick returns on the intellectual property they generate. Spinning off companies requires time, talent and a substantial investment of capital with relatively uncertain returns. By comparison, licensing promising IP to a global pharmaceutical company is low-risk and can generate short-term returns, often without further investment from the university.

As one interviewee explains: "We have world-class research, but it's hard work to build capacity in Canada. Academic institutions don't have a mandate to create companies. It's easier to take the path of least resistance by licensing innovations to global pharma companies. We would rather develop the assets further and increase the value. We want to build domestic capacity, but we need an active management approach to do so. Universities don't always put Canada first. They try to extract the biggest licensing deals as quickly as possible."

The second concern is that the tech transfer offices in Canadian universities lack the expertise and private sector discipline required to commercialize biomedical innovation successfully. As one interviewee put it,

> *"Companies go to the Tech Transfer Office, but they are not qualified to provide the advice. They are not hiring the right people. That department is staffed by academics, not hustlers. The good startups seek out other health startups and learn from one another. There is a big gap to fill, but it has to be done competently. VCs do this full-stack role in a robust ecosystem."*

The dearth of commercialization capacity at the university level has many sector leaders calling for a stronger, independent company-building function in Canada. Interviewees differ, however, in their assessment of what constitutes an optimal support model for early-stage startups.

© DEEP Centre Inc. 2020

CHAPTER 3

SECTOR LEADERS ON COMPANY CREATION & EARLY STAGE SUPPORT

*"**We lead the world in creating biotech companies, but we don't scale them well**. Our role is to help create and scale early-stage biotech companies. We will spend 2 -3 three years and $2-3 million to the point where companies are investable. We provide access to expertise, including science-based expertise and business expertise. We give them high-grade lab space in Montreal and Vancouver and we invest seed capital. To date, we have done that 8 to 10 times. Those companies have raised $750 million and are worth over $2 billion today."*

*"**Seed funds can play a more active role in building the pipeline**. Big US-based funds like Flagship Pioneering have company-building models with in-house labs and the expertise to create new companies from scratch. We can bring some of this together in Canada. We have built the machinery and infrastructure, but capital is still the missing ingredient. With public money and success, we will reinvest that back into the ecosystem. It means being very thoughtful and collaborative. A pure VC model will not go there. LPs are expecting a 20% return on a quick turnaround."*

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

"We need to make early-stage biotech commercialization an attractive space by rewarding people who have the experience, understand the industry and have incentives. You can have accelerators, but the conventional 500 Startups model won't work. The exits aren't going to drive short-term profits. Our model is far from self-sustaining. We are making returns, and we can invest the returns. But you can't let market forces drive the business because the market forces don't necessarily align with Canadian interests. You need proper public funding for the commercialization stage."

Sector leaders in the 'full-stack VC' camp are less confident in the ability of non-profit commercialization organizations to create investment-ready companies. They are calling for more 'smart money' at the early stage. Citing the money and expertise required to build viable life sciences ventures, they see privately managed seed funds as the most reliable way to build the ecosystem. As one interviewee put it:

"It takes so much money to work in bio-pharma that I am not sure there is the capacity to run a high-quality accelerator in the biotech space. Some organizations are getting there, but they are not putting their own money into the companies they create. They operate in press releases and PPTs to government. MaRS toiled away for ten years, but the economics were not venture returns. It was all achieved on the back of government funds. They aren't taking risks. They have no skin in the game. The oversight we do is different. The due diligence is different. The sleepless nights are different. Incubators may provide some crutches for early-stage companies. But if you do the math, the money in versus the output does not make sense."

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

Several interviewees also called for Canadian funds to emulate large US-based biotech funds such as Versant Ventures and Flagship Pioneering, which have moved towards what investors call the "full-stack model." This typically means three things. 1) They are actively involved in company building where they identify high-value IP in universities and assemble a team to take it to market. 2) They can support ventures through multiple funding rounds, sometimes starting as early as the seed stage and moving right through to growth stage financing and private equity. 3) They build broad, multi-disciplinary teams that offer support for the vital functions that startups need to be successful, including engineers, in-house scientists, regulatory experts and more. In other words, full-stack VCs don't just bring money; they bring expertise, connections and resources, and they get in trenches along with the founding teams they support.

SECURING EARLY-STAGE FUNDING

Following our conversations on company creation, sector leaders expressed unanimous concern about inadequate seed-stage funding for life sciences ventures, with interviewees pointing to a dearth of capital and too few seed-stage investors. Numerous interviews noted that the shortage of early-stage venture capital and angel investment creates a "valley of death" when translating research innovation into new therapeutics, medical technologies and digital health solutions. As one interviewee sums up:

> *"It is easy to find grant funding at the university level. And you can find series A+ financing once a company has been sufficiently de-risked. But everything in between is really anemic."*

Executives attribute the paucity of seed investors to the fact that venture investment in the health and biosciences sector has a higher inherent risk relative to other industrial sectors. The risks include substantially longer timelines for certain products to reach the market, increasing regulatory complexity and global pricing pressures. As one interviewee explains:

© DEEP Centre Inc. 2020

CHAPTER 3

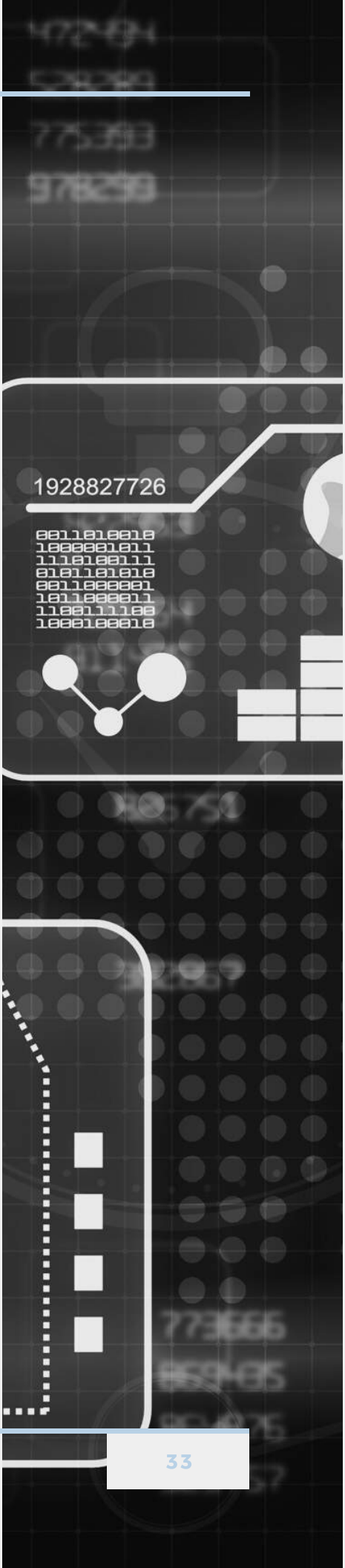
CHALLENGES AND INVESTMENT NEEDS

"There is an enormous push for innovation, but there are not many seed investors in Canada. Digital health has a healthy amount of seed-stage investment. But with the longer-term commercialization in therapeutics, biotech is thinner at the seed stage. Seed investments can be economically prohibitive. You need a long runway. Without patient investment, companies will hit the valley of death. Seed investors also get diluted because they typically don't have the capital to follow-on in later rounds."

Recent technological advances could lower costs and accelerate time-to-market by making experimentation and product development in the life sciences more accessible to biotech startups. Decreasing costs in sequencing technologies, automation, and advances in machine learning, for example, are making biology experiments faster, more reproducible, and cheaper. In turn, these trends could boost the number of life sciences startups and further justify the need to increase the amount of seed capital available in Canada and expand and diversify the number of seed investors.

Sector leaders also noted that angel investors have been active in the sector and contribute to early-stage funding, often alongside VC funds. However, they argue that the sector presents some challenges for angels and that the industry could do more to encourage investment, especially from serial entrepreneurs and ex-operators that can provide guidance in addition to capital. As one interviewee explains:

"Without angel investment, many life sciences companies would not exist. Most companies are angel-backed until series A. It's prolific, but there are some challenges. Angel backed companies often have bad terms and contracts. Plus, angels don't have time or the expertise to do the due diligence. An angel investing $50K will not spend six months doing due diligence or hiring expensive IP lawyers. We need more ex-operators investing that can lend the business expertise. Generalists can only go so deep."



© DEEP Centre Inc. 2020

CHAPTER 3

SECTOR LEADERS ON THE EARLY-STAGE FUNDING GAP

*"**We need more seed investing in the translational space**, but it's hard to get discipline around these investments. Money gets wasted here. You need to understand the timeframe and the science. In some cases, you will need a proof of concept before there is serious venture investment. You also need to put the entrepreneur's feet to the fire. Scientists will treat the money like a grant, not an investment. You need guidance and tough love from experienced business-people."*

*"**There remains a large gap in the seed stage**. We can't achieve big gains in the sector given the supply of capital today. Historically, a lot of the seed capital has been attached to universities. That doesn't work that well. You need the seed investors to be independent. In short, there is not enough capital, and it would be helpful to have more players."*

*"**Our companies typically come out of academia**. We address the seed capital gap with prospect funds of $200,000 and seed investing in the $1-5 million range. But in addition to capital, you need industry professionals that can work with the IP and are mandated to put Canada first. We can lower the risk and drive the investment potential by doing the clinical work here in Canada."*

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

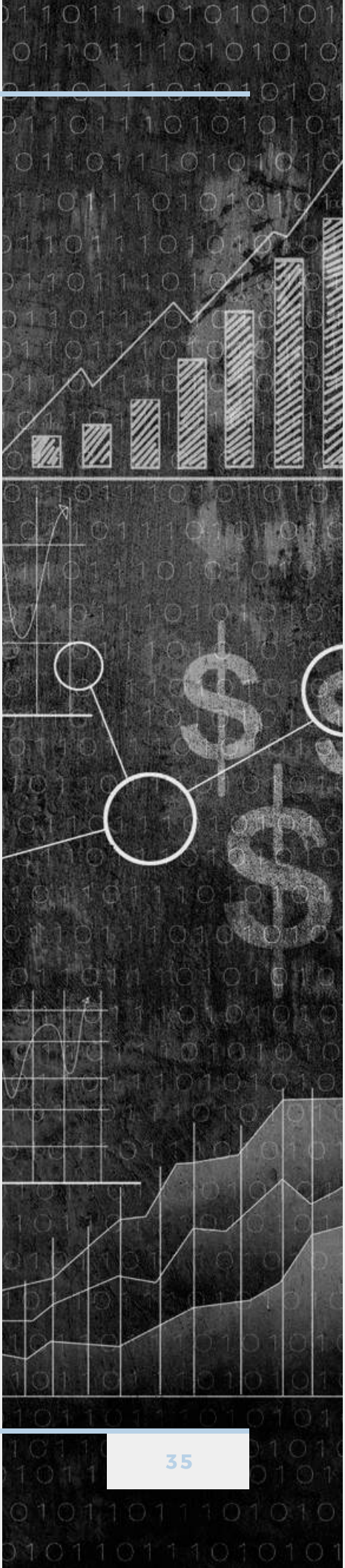
As discussed further in our recommendations, interviewees suggest that a combination of tax incentives, matching funds and investor education could boost the participation of angels in the life sciences sector. Said one interviewee:

> *"There is non-dilutive money from the government, but we need incentives to attract more private money at the early stage. Lab space and the talent to get started are very expensive. More money from angel investors would be beneficial. You need successful people to redeploy their capital. They can lend their expertise to help grow the companies. There is no real incentive to invest at the early stage in biotech and medtech."*

SCALING LATE-STAGE VC CAPABILITIES IN CANADA

By most measures, venture investment in the life sciences sector is at all-time highs, with fundraising, investments, IPOs and returns all peaking in the 2018 to 2019 period. US healthcare venture fundraising set a record in 2019, raising $10B+ to invest in healthcare companies. Investment into venture-backed biopharma, medical devices, diagnostics and health tech reached $32B, slightly below the record set in 2018 but far ahead of the 2017 total. Investor returns have been strong as well. Taken together, 2018 and 2019 returns nearly equal total returns from the 2014–2017 period. According to Silicon Valley Bank, robust mezzanine valuations coupled with positive IPO step-ups have created a buoyant and prolonged market for biotech and healthcare IPOs. In the past four quarters, life sciences companies have accounted for almost half of the 141 initial public offerings in the United States and 39 percent of the US$38.2-billion raised.

While there is abundant late-stage capital for biomedical innovation globally, sector leaders point to Canada's comparatively smaller funds as a problem. Lumira Ventures is currently Canada's most prominent life sciences fund having invested over $450 million through multiple funds. CTI Life Sciences has invested $245 million through two funds, the first of which was launched in 2006 and the second of which closed in 2015. As of July 2020, Amplitude Venture, co-created by BDC Capital, had reached 75% of its fundraising target for a $200 million fund focused on precision medicine.



© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

Lumira, CTI Life Sciences and Amplitude, however, are a fraction of the size of the larger, multi-billion-dollar US biotech venture and private equity funds such as ARCH Venture Partners, Baker Bros Advisors, Orbimed Advisors, Perceptive Advisors and Versant Ventures.

Several of the large US biotech investors have been very active in Canada. OrbiMed, for example, has backed at least a half-dozen Canadian companies in the past five years, including AbCellera, Repare, Fusion, Clementia and Bellus Health. Versant Ventures, on the other hand, has deployed its company-building approach in Canada with considerable success. The Bay-area venture fund has built eight companies in Canada and had five exits, including the sale of BlueRock Therapeutics to Bayer, the Repare Therapeutics IPO and a reverse takeover by its Chinook Therapeutics of Aduro Biotech, a Nasdaq-listed company. In 2018, Versant also launched a US$100-million venture capital fund focused exclusively on Canadian opportunities.

While sector leaders welcome the inflow of US investment dollars, they worry that the foreign dominance of late-stage venture capital in Canada will inhibit the ecosystem's growth. As one fund manager explains:

> *"The investment dollars are increasing in Canada's life sciences sector, but if you peel the onion, you will see that many dollars are coming from the US, and Europeans are hunting in Canada too. We are at the same stage as where IT was ten years ago. We are generating good returns, but in absolute terms, our funds are small. You can argue that we are not taking advantage of the resources. Canadian companies' boards are controlled by US investors, and the most promising companies will move gradually down to the US."*

Sector leaders believe that scaling late-stage funds in Canada would have several inter-related benefits. First, larger funds would have the depth of capital to write bigger cheques and support companies through multiple funding rounds, while still diversify their risk.

© DEEP Centre Inc. 2020

CHAPTER 3

SECTOR LEADERS ON SCALING LATE-STAGE VENTURE CAPITAL

*"**We have to keep the investment flow from the US, but we need larger funds in Canada** that can invest alongside US investors. AbCellera got funding from the government and subsequently received financing from two US VCs. None of the returns will go to Canada. The Canadian funds were told to go home. If you ask the CEOs of Canadian biotech companies, they may not say there is a lack of capital because they are raising in the US. But they will be pulled to the United States."*

*"**Fusion Pharma went to US investors because they wanted the continuity of capital**. Most Canadian funds can't provide the continuity through to the later stages. To do the continuity of capital, you need to be able to invest in the later rounds. Otherwise, all of the profit goes to US LPs and pension plans. You don't get that virtuous cycle of reinvestment. I think it matters. We got squeezed out of two big Canadian deals. There was nothing we could do about it."*

*"**Capital is mobile, especially at the later stage**. Seed and Series A are usually a local phenomenon. Once you take a company past the clinical stage, they can get capital from anywhere. The international funds bring different networks, and much more capital. Most of the late stage groups in Canada don't provide anything special. Biotech companies are looking for money, expertise and networks. Our domestic investors are not there yet."*

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

A typical fund will not put more than 10% of its capital at risk in a single company. That means a $200 million fund can invest no more than $20 million per company, limiting the size of their ownership stake and constraining their ability to participate in funding rounds following series A. The recent series B deals for Fusion Pharmaceuticals and AbCellera provide two cases in point.

In May 2020, Vancouver-based AbCellera closed a US$105 million Series B financing led by OrbiMed and DCVC Bio. The investor syndicate included Viking Global Investors, Peter Thiel, Founders Fund, Eli Lilly and Company and Presight Capital. Notably, no Canadian funds participated. Fusion Pharmaceutical's Series-B financing in April 2019, also for US$105 million, was led by Varian and OrbiMed and included Perceptive Advisors, Pivotal bioVenture Partners, and Rock Springs Capital. In this instance, Genesys Capital and FACIT were invited to follow-on, but only Varian, Orbimed and Pivotal obtained board seats.

Among others, these deals have led Canadian fund managers to complain that they act as a 'farm team operation' for foreign investors. In other words, Canadian VCs do all the heavy lifting and de-risking. Then US investors take a controlling stake and reap the majority of the profits when Canadian companies go public or are acquired. With more capital, Canadian funds argue they would have the capacity to invest alongside US-based biotech funds in the larger growth stage rounds. Several interviewees noted that the Canadian IT funds experienced the same 'farm team' dynamic until firms like Georgian, iNovia and OMERS achieved greater scale.

A larger pool of late-stage capital in Canada could have other benefits. For example, Canadian fund managers argue that increasing the proportion of Canadian ownership in late-stage life sciences ventures would increase the probability of keeping our best companies in Canada. The reasoning is that Canadian investors could retain more influence over company governance and may be more inclined than US investors to build capacity within Canada.

Higher ownership stakes would also increase the capital recirculating in Canada when life sciences companies have a liquidity event. In other words, more of the profits from IPOs and acquisitions would flow back to Canadian funds, and Canadian investors could subsequently redeploy that capital in the next generation of healthcare ventures. As one interviewee put it:

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

"How do we create companies that don't get sold every time? It comes down to the problem of company ownership. If Canadians own 15% when companies have a liquidity event, then a small fraction of the funds are recycled into Canada. Clementia sold for $1 billion, and a small percentage flowed back into Canada. Canadian VCs need to own 25- 30 % of the companies, and then the capital gets recycled into Canada.

Can we stop the companies from being sold? The only way to do that is to have enough capital to keep them private. We need the P/E funds. The companies cost a lot to build. Once they are public companies, they are on the market. Get more of the wins into CDN hands, and then in the next generation, we will own 50%."

Finally, larger funds can also afford to invest in infrastructure and hire a larger bench of seasoned executives to support and advise the companies in their portfolio. A deep talent bench, in turn, would open up the possibility to invest more capital in early-stage companies that require access to lab space and more hands-on support. Canadian funds could also better compete with US investors like Versant, Orbimed and Flagship that can offer healthcare ventures access to a deep pool of in-house resources and continuity of capital through to later funding rounds.

It is worth noting that not all interviewees agree that scaling the capacity of later-stage life sciences funds is the sector's most urgent priority. For example, a couple of interviewees noted that promising Canadian healthcare companies have no problem tapping into the global supply of late-stage venture capital for biomedical innovation. Not only is the ability to raise money internationally a sign of strength, but there are also advantages in tapping the depth of experience and networks that international investors bring.

Several sector leaders also argued that it would be easier to justify an infusion of new capital into later-stage venture funds once there is a significant expansion in the pipeline of clinical-stage biotech companies in Canada. Their advice is to scale-up the amount of seed capital available in Canada and wait for the pipeline to mature before expanding the pool of late-stage capital.

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

As one interviewee put it:

> *"Late-stage in Canada doesn't make any sense. Canada can produce one good late-stage venture deal a year in Canada. The US will create 10 of those a year. Do we need a local group that can lead a $100 million round at the series B? We are too small. They will invest less than 50% of their funds in Canada. The pipeline is not there yet to merit the investment. The later stage funds have to get a return, and they have to deploy the funds quickly. The expectations are that they will only operate within a certain risk profile, which means not much of their capital will be deployed at the early stage."*

That global biotech investors such as Orbimed and Versant bring tremendous experience, and deeper pockets is beyond doubt. As Clarissa Desjardins, the founder of Clementia, told the Globe and Mail:

> *"Having OrbiMed onboard brought a pace, scale and level of expertise that was really like joining the big leagues. It was quite different in terms of the scale of financing and the pace at which you could build a global network. OrbiMed's goal was to build the best company with the best people worldwide, and money was no object. That was very different from our early experience in building biotech firms."*

However, most Canadian fund managers argue that maintaining the status quo in late-stage venture financing would mean accepting the country's ongoing designation as a farm team for foreign investors and the associated problems in retaining valuable assets in Canada. They also refute the claim that they would deploy 50 percent or more of their capital in the US and steer away from early-stage investments. Said one later stage investor in Canada:

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

"As we have gotten bigger, we have deployed more capital in Canada, not less. We have also done more seed and early-stage investing because 1) we have deeper team resources, 2) we have great geographic representation with partners in Vancouver, Toronto and Montreal, 3) we have deeper infrastructure and connectivity than a seed only fund, and 4) from a portfolio architecture perspective we can take more risk (early stage) with a larger fund as we have more depth of capital to support these companies as they scale and are not adding financial risk on top of business risk."

RECRUITING EXPERIENCED MANAGEMENT TALENT

On the issue of accessing skilled talent, sector leaders see reasons for optimism and concern about the talent pool in Canada. On the one hand, none of the interviewees consulted by the DEEP Centre identified any immediate technical skill gaps in the life sciences sector. Indeed, most think Canada enjoys a significant competitive advantage in its talent pool, particularly in the education and training of highly skilled technical talent at Canada's universities, colleges and polytechnics. Emerging technologies like AI and robotics will transform the way healthcare is delivered, however. And sector leaders are encouraging post-secondary institutions to work with industry to equip the next generation of health and biosciences workers with the knowledge and experience required to make an immediate impact.

On the other hand, sector leaders did express concern about the limited availability of repeat entrepreneurs and experienced executives who have seen companies scale, have done it internationally, and can join life sciences startups to share that experience and provide management depth. Next to capital, sector leaders say this dearth of experienced management talent is the most significant challenge for Canadian life sciences ventures.

The specific skills gaps identified by sector leaders included clinical development, regulatory affairs, sales, marketing and capital-raising. For example, biotech firms need specialized executives to lead clinical trials and to navigate the regulatory approval process in different countries.

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

With relatively few Canadian high-growth success stories in the life sciences sector, there is a paucity of homegrown executive leadership available to fill these specialized roles.

> *"Some first time CEOs in Canada are learning on the fly," said one interviewee, "but we don't have enough of experienced biotech executives in Canada to fill the gaps. Boston, New York and San Francisco have much deeper talent pools. We have to grow the talent pool here in Canada. Training will be a factor, but it's not something you learn from a book. We also need to recycle talent."*

Several sector leaders noted that while the Canadian talent pool is deeper than it used to be, maturing biotech companies frequently recruit experienced executives from the United States. Sector leaders welcomed recent federal initiatives to streamline immigration processes and argued that Canada could do more to attract experienced executives, particularly ex-pats.

However, for various reasons, Canadian biotech companies often struggle to convince seasoned US-based executives to relocate to Canada. Some of the challenges are related to compensation, taxation and the cost of family relocation. The lack of critical mass in the Canadian ecosystem is a factor as well. With the small number of life sciences companies in Canada, American executives may struggle to find alternative employment options in Canada if their current employer fails. As a result, Canadian life sciences companies often create satellite offices in Boston, New York and Seattle to house US executives. As one sector leader explains:

> *"Management talent is the single biggest hurdle, but we are better now than we used to be. In some cases, we can parachute in repeat CEOs who have experience around the world. They typically combine technical skills with business development skills. But it is hard to uproot the people from the US. Compensation issues and family relocation issues are tough. You end up creating a satellite office in the US. If the company is big enough, it can manage multiple offices."*

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

Despite these challenges, several life sciences investors noted that well-capitalized companies with good prospects will attract the talent they need.

> *"If you build an outstanding company and raise enough cash, you can attract great leadership," said one late-stage investor. "We have had no problems recruiting great people. There is a whole class of repeat entrepreneurs. Some people are on to the 2nd, 3rd and 4th companies. That didn't exist 5 to 10 years ago. Sometimes you need a Boston office. It happens all over the place. People can increasingly work virtually."*

In addition to management talent, the sector leaders also pointed to the limited pool of early-stage investors with the expertise and experience to evaluate and identify high-potential biomedical innovation opportunities for investment as an inhibiting factor in life sciences commercialization.

BUILDING PARTNERSHIPS WITH GLOBAL HEALTHCARE COMPANIES

For most of the last century, the critical advances in biomedical innovation were happening inside large, well-funded R&D machines of the world's largest pharmaceutical companies. The labs of firms like Merck, Eli Lilly and Bayer attracted the most talented Ph.D. graduates from the leading universities from which they harnessed the revolutionary developments in biology and chemistry to pump out life-changing medicines and therapies.

After decades of investment in sprawling global R&D operations, plummeting productivity caused the pharmaceutical industry to change course. The old R&D-intensive approach gave way to a new model that relies increasingly on acquisitions, outsourcing and agile partnerships with university researchers, biotech startups, and even competitors. Rather than invent everything in-house, large pharmaceutical giants scour the world for new ideas, technological advances and talent, and rely on a continuously renewed pipeline of external innovation opportunities to drive their competitiveness and growth.

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

One executive with several decades of experience in global healthcare companies explained the transition this way:

> *"In the R&D space, it's obvious in hindsight that the pharmaceutical industry lost its way on R&D productivity somewhere during the mid-1990s. When we looked at how to tackle the R&D productivity, it became obvious that we needed to empower, inspire, energize and connect individuals both within our corporate boundaries and increasingly across institutional boundaries."*

Johnson & Johnson's decision to launch a global network of life science business incubators (JLABS) – including a JLABS location within the MaRS Discovery District – illustrates how the new model of biomedical innovation works. While J&J harbours ambitions to become the world's leading digital healthcare company, it does not necessarily possess all of the skills, capabilities and cultural agility required to master the array of digital technologies that are already reshaping healthcare delivery. JLABS emerged in 2012 as a new model to bolster investments in meeting the world's greatest unmet medical and healthcare needs by working in partnership with a diverse global ecosystem of emerging life sciences companies. In other words, JLABs enables one of the world's largest healthcare companies to stay on top of the latest developments in science and technology by helping address the commercialization and growth challenges facing promising startup companies in the sector.

The JLABs location in Toronto is an impressive 40,000 square foot facility that includes modular lab units, office space, shared core laboratory equipment, business facilities, third-party services and educational events. According to Allan Miranda, head of JLABS @ Toronto, the incubator now hosts more than 50 resident companies aiming to make advancements and develop new technologies across several areas within the medical device, health tech, pharmaceutical, and consumer health sectors. JLABS links the healthcare entrepreneurs of Toronto with the full breadth of Johnson & Johnson Innovation, including opportunities for funding, access to top lab equipment, and the ability to connect with research and development experts at Janssen Inc.

© DEEP Centre Inc. 2020

CHAPTER 3

SECTOR LEADERS ON PARTNERING WITH GLOBAL PHARMA

"**Corporate accelerators can work, but they tend to be loss leaders**. J-Labs creates a good environment for companies, and it's good for networking. Does it lead to better deal flow? Not necessarily. Most of the value in having big pharma involved in the Canadian ecosystem is in the corporate venture activity and the partnership opportunities driven by US-based operations. They are already looking at Canadian companies. Our VC funds should connect with corporate VCs, but we need size and critical mass, and we need to have companies that are exciting enough."

"**Some companies in our portfolio have co-development agreements with large players,** but corporate partnerships are very rare in the Canadian medical device sector. Medtronic talks to everyone, but they don't get involved early. They will track the companies and wait until the last minute to do M&A. Revera has an innovation program with a full RFP process. Fluffy things must turn into real deals, or you can easily waste time."

"**Partnerships with big pharma can add value**, but we should develop the value of our IP assets as much as possible. We want to occupy a larger share of the value chain. A great deal of partnering with global pharma has focused on offloading IP from universities. It has been a sign of weaknesses. We should build this capacity ourselves. We shouldn't treat partnering as an escape route. We should use partnerships to help our biotechs get to a later stage."

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

While most sector leaders consulted by the DEEP Centre were complimentary of the JLABs investment in Toronto, they lament what they describe as the largely superficial engagement of global pharma in developing the Canadian life sciences ecosystem. Statistics from the Patented Medicines Prices Review Board (PMPRD) help substantiate their case, showing a clear pattern of diminishing R&D investment over time. According to the 2018 annual report of PMPRD, the R&D-to-sales ratio for all pharmaceutical patentees in Canada was 4.0% in 2018. This represents a 66% decrease from a peak of 11.7% in 1995 and is well below the agreed-upon target of 10% since 2003.

Several interviewees attribute the dearth of foreign investment in innovation to the ecosystem's relative immaturity and to an inability to extract more concessions from big pharma in negotiations over drug pricing. “Canada has given big pharma patent rights, drug pricing and tax breaks,” said one interviewee, “and we haven't asked them to step up and contribute to innovation and ecosystem development. They say they are doing clinical research, but they have not invested in the sector in a significant way.”

Sector leaders are calling from more significant R&D investment from multinational pharmaceutical companies. They also see potential to engage global healthcare leaders as limited partners in domestic life sciences venture funds and as commercialization and licensing partners for Canadian startups. For medtech and digital health startups, the presence of an engaged and invested corporate community in the local startup ecosystem provides better access to anchor customers, channel relationships and global value chains.

Said one investor:

> *“Early adopter customers are critical in the whole process. They bring credibility. They help with financing and product development. They help on the management side too. These relationships accelerate the companies so much more quickly, even more quickly than a big check from an investor.”*

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

On the other hand, biotech startups may leverage licensing partnerships with global pharmaceutical companies to get new therapeutics to market without having to build a global sales and marketing operation from scratch. Said one sector leader:

> *"Our companies do a good job of partnering with large pharma when they need to. In most cases, partnering with pharma is good. Zymeworks built a multi-million-dollar business through licensing deals and partnerships with big pharma while working on their in-house drug candidates. Not every company needs to build a global sales and marketing organization. Sometimes licensing presents a better option."*

In other cases, biotech entrepreneurs can take advantage of mentoring opportunities that connect new entrepreneurs to experienced business executives who can provide advice at key pivot points, shape product development and help mould vital management competencies. As one investor put it: "We don't want corporate investors having differential rights, but the right corporates can be hugely beneficial. They can provide insights into tools, competitors and expertise on product development, marketing and regulations."

While foreign investments in life sciences innovation in Canada can bring clear benefits, there are also reasons for caution and concern. Some sector leaders worry, for example, that acquisitions and licensing deals are inhibiting Canada's capacity to build large anchor companies. The recent acquisitions of Clementia Pharmaceuticals, BlueRock Therapeutics and Northern Biologics highlight contrasting fortunes and demonstrate why the Canadian ecosystem's relationship with global pharma is complex and multi-faceted.

When French pharma giant Ipsen acquired Montreal-based Clementia for US$1B in February 2019, it looked like yet another example of a large international competitor swallowing up another promising Canadian biotech. In an attempt to refill its dwindling pipeline, Ipsen acquired Clementia after the FDA granted its late-stage drug candidate rare paediatric disease and breakthrough therapy designations to treat an ultra-rare bone disorder.

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

While the drug was on an apparent path to approval in 2020, it subsequently failed in phase III clinical trials, leading Ipsen to write-down the entire value of its acquisition. The winners, in this case, were Clementia's founders and early investors, including the venture-capital arm of the Business Development Bank of Canada, which banked US$137-million after investing less than US$20-million early on for a 14.5 percent stake in the company.

While the Clementia acquisition looks like a win in the final analysis, other recent acquisitions highlight a pattern of selling off top-tier Canadian scientific assets to global pharmaceutical companies. Both BlueRock Therapeutics and Northern Biologics, for example, were founded on breakthrough research developed by Canadian scientists affiliated with the University Health Network (UHN) — antibody-based therapeutics in the case of Northern Biologics and revolutionary stem cell research in the case of BlueRock. Both companies attracted record-setting investments from Versant Ventures, and both companies were subsequently acquired within 3 to 5 years of Versant's initial Series A investment.

In August 2019, Bayer AG, which already owned 40% of BlueRock Therapeutics, paid an additional US$600 million to acquire the remaining 60% held by Versant and BlueRock's management team. Less than a year later, Northern Biologics' preclinical cancer antibody pipeline was acquired for an undisclosed sum by Boehringer Ingelheim, the world's largest private pharmaceutical company.

The UHN's Technology Development and Commercialization office has pitched these transactions as validation for the "tremendous value of collaboration between industry and UHN researchers." However, for many sector leaders, acquisitions like these demonstrate that Canada is selling off its most promising scientific assets for a fraction of the economic value that could have accrued had patient Canadian investors developed the assets further.

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

FINDING EARLY ADOPTION PARTNERS

In addition to capital and talent, digital health and medtech firms need opportunities to test, refine and scale-up their innovations. Canada's public healthcare system could make a significant contribution to helping startup companies raise capital and expand internationally by providing real-world environments for demonstrating new solutions, leveraging healthcare expertise and engaging with institutional partners. In turn, this engagement could provide opportunities to secure a first sale of technologies or products that were implemented, tested, monitored and verified in a real-world demonstration environment.

While improving the adoption of digital health solutions will accelerate the commercialization of homegrown healthcare innovations, there is additional upside in making the healthcare system more efficient, effective and sustainable. For example, Canada Health Infoway estimates that digital health systems could boost productivity by $408 million. Better use of data and analytics could also save the health system $10 billion a year through better clinical decisions, personalized care and new research.

Whereas sector leaders point to huge efficiencies from investment in digital solutions in the big US-based hospitals, they criticized the lack of federal and provincial leadership in helping Canadian digital health innovators get a foothold in the domestic market. Not only is the domestic market small in comparison with the US, they argue that risk-averse Canadian institutions have few incentives to invest in innovation. A complex regulatory environment and a set of fragmented procurement processes in Canada's healthcare systems also pose unique challenges to achieving adoption at scale across Canada. As one venture investor explains:

> *"Technology procurement is vital for health tech, software and diagnostics. Most Canadian companies sell nothing to Canada. In the US, they have programs to help with early adoption from US companies. It creates a big hurdle for Canadian startups. In Canada, the hospitals and provincial health ministries are risk-averse. Federal money could help the provinces unleash innovation, but the market is small, and it's a pain to obtain regulatory approval in ten provinces."*

© DEEP Centre Inc. 2020

CHAPTER 3

CHALLENGES AND INVESTMENT NEEDS

Companies targeting the private sector with digital health solutions, including large Canadian employers and insurers, do not fare much better. As one interviewee explains:

> *"In the Canadian health tech space, you need a domestic homerun. We are limited to a small subset of anchor customers, so maybe you need 2 out of 4 insurers in Canada. You only have four dice to roll. From the investor and commercialization perspective, we also need founders to think about the US market very early. Canadian founders typically have networks in Canada. They know someone in Manulife, and they pitch to Canada investors based on a Canadian pipeline. The investors see risk because it's too focused on a small number of Canadian clients."*

Most interviewees see public procurement reform and additional funding to create testbeds for digital health solutions and medical technologies as viable strategies for accelerating the health tech sector's growth while boosting innovation in Canada's healthcare system. We explore these ideas further in Chapter 4.

© DEEP Centre Inc. 2020

CHAPTER 4

STRATEGIES AND SOLUTIONS FOR ACCELERATING GROWTH AND INNOVATION

In our conversations with sector leaders, we asked for guidance and recommendations on strengthening Canada's capacity to nurture high-growth firms in biomedical research, drug development, medical devices and digital health solutions. Sector leaders reflected on the steps required to boost the domestic supply of venture capital and build more significant homegrown anchor companies in Canada. Interviewees also offered their insights and prescriptions for policy, procurement or regulatory changes that could make Canada a more competitive environment for hosting cutting edge health innovations and companies. The key insights and recommendations are summarized below.

1. STRENGTHENING AND DIVERSIFYING EARLY-STAGE FUNDING FOR LIFE SCIENCES

As noted in section 2, there is broad agreement among interviewees that the Canadian life sciences sector needs a larger pool of early-stage capital to support the expanding pipeline of healthcare and biotech startups. Recommendations from sector leaders included improving support for angel investment, scaling existing seeds and creating new seed funds to diversify the pool of early-stage life sciences investors.

Although healthcare and biotechnology are challenging spaces for angels, sector leaders see wealthy individuals as a critical source of financing for early-stage companies. In a 2019 report, the National Angel Capital Organization (NACO) found that angel groups poured approximately $35 million into life sciences companies in 2018, representing 25% of the total amount invested by organized angel groups in Canada. Sector leaders would like to boost these numbers and identified three actions that could promote angel engagement in the sector.

© DEEP Centre Inc. 2020

CHAPTER 4

ACCELERATING GROWTH & INNOVATION

- **Implement Canada-wide incentives**. First, sector leaders favour further initiatives by federal and provincial governments to lessen the perceived downside risk of providing seed capital to life sciences ventures. Several interviewees pointed to BC and Quebec as evidence that tax credits and matching funds have positively impacted angel participation in the sector. For example, generous provincial tax credits spurred wealthy BC investors to provide a steady source of early-stage funding for the province's biotechs, including Aurinia and Zymeworks, two of Canada's most valuable biotechs today. Anges Québec Capital, on the other hand, provides matching funds for qualified angel investments and has been an active investor in the province's biotech and medtech sectors. Sector leaders would like to see such incentives rolled out across the country.

- **Syndicate deals and pool due diligence**. Angels generally lack the resources to perform due diligence on life sciences ventures. They may also lack the experience to provide mentoring, support and guidance to the founding teams that they elect to support. Where possible, family offices and angel groups should invest alongside established VCs in early funding rounds, which would allow angel investors to rely on due diligence performed by sector experts. However, the fact that angel investment often precedes VC investment suggests that there is also a role for organized angel groups to syndicate deals and pool efforts to perform due diligence on new healthcare and biotech ventures.

- **Improve investor education**. Third, sector leaders pointed to a general lack of knowledge about the returns and typical timeline to liquidity that early-stage investors can expect from life sciences ventures. Several interviewees encouraged organized angel groups to boost their efforts to better educate angel investors about the life sciences sector in Canada.

In addition to angel funding, sector leaders point to the need to expand early-stage venture financing in Canada. Interviewees suggested three strategies: scaling-up existing seed funds, introducing new seed funds to the ecosystem and encouraging later-stage life sciences funds to invest earlier.

© DEEP Centre Inc. 2020

CHAPTER 4

ACCELERATING GROWTH & INNOVATION

- **Scale existing seed funds**. A dedicated envelope of VC funding could help existing life sciences seed funds such as Amorchem, FACIT, Genesys Capital, and iGan to build on their successful track records. As one sector leader put it, "There is an enormous opportunity globally in drugs and diagnostics, and there is so much innovation. But the pool of capital in Canada is the same as we had in 2012. We have replenished the seed funds, but we have not grown them."

- **Create new seed funds**. Sector leaders also called for creating a small number of new seed funds that would attract new fund managers and diversify early-stage capital players in Canada. As one investor put it, "VCs can become complacent quickly, especially if they have been successful. We need to fertilize the ecosystem and keep the incumbents on their toes. We could use some new players in Canada." One interviewee called for creating a seed fund that translational centres in Canada could jointly access. Others focused on the need for specialized seed funds to deploy their expertise in particular technologies and therapeutic domains to accelerate the company building process to where firms can attract larger rounds from later-stage investors. One interviewee suggested that a public contribution of $30-50 million would be sufficient to attract a significant sum of private sector capital into a specialized seed fund. "With $30-50 million, we could create a seed fund focused on cell and gene therapies. We could leverage that to $150 million with private contributions. For each seed investment, we could attract two additional investors and grow the total amount invested to $300-450 million."

- **Encourage later stage funds to invest earlier.** Finally, several interviewees suggested that Canadian funds that primarily invest in Series A deals or later could be encouraged to invest more of their funds at the seed stage. "We are missing the early-stage company building," said one sector leader. "I would rather see the government help expand what we are doing and have later stage funds move to the earlier stage."

© DEEP Centre Inc. 2020

CHAPTER 4

SECTOR LEADERS ON BOOSTING EARLY-STAGE FUNDING

"**Angel investors will invest in the sector if they are less mystified by the technology**. They understand that it is a long runway. We need more education around the potential returns on biotech innovation. It can be faster than you expect. You don't need revenue to get an exit. Biotech companies also need to position their companies differently and paint a clear picture of the potential payback. It would also help if the investments were de-risked. Quebec has matching funds for angel investments, and BC has generous tax credits. We would love to see that across the country."

"**The sector needs more money if we are going to grow**. We will optimize our potential with a fund ranging between $200 and $250 million. There are a handful of other seed-stage groups that could use some scale. But the scale should be earned. We have been doing this for 20 years. We are just now deserving the scale we are getting and have had to claw our way there. We should all be able to raise money here in Canada, but we need stronger local participation. There is an LP deficiency in Canada. $20 million is the largest cheque people are willing to write, and there are 4 or 5 sources for the money. Once you are raising $100+ million, it becomes a long road."

© DEEP Centre Inc. 2020

CHAPTER 4

ACCELERATING GROWTH & INNOVATION

2. CLOSING THE LATE-STAGE FUNDING GAP IN CANADA

As documented throughout this report, the relative lack of Canadian late-stage funds has several detrimental impacts on the life sciences ecosystem's economic performance. It limits the capacity to invest through to later funding rounds, resulting in earlier exits to foreign investors, and ultimately fewer self-sustaining Canadian anchor companies. It dilutes Canadian ownership stakes and means investors recycle less profit into the Canadian ecosystem. The small size of the Canadian funds also constrains their capacity to invest in infrastructure and hire a larger bench of seasoned executives to support and advise the companies in their portfolio.

Sector leaders argue that boosting local sources of late-stage VC and private equity funding would accelerate the domestic ecosystem's growth and stem the loss of potential multi-billion-dollar firms. Interviewees identified two essential actions to help close the late-stage funding gap.

Create a dedicated VC funding envelope for life sciences funds. In addition to scaling seed-stage funding, sector leaders recommend creating a dedicated envelope that would support and invest in developing later-stage venture and private equity capital funds that specialize in life sciences. Sector leaders recognize that the Venture Capital Catalyst Initiative (VCCI) has already provided an important vehicle to secure early-stage VC funding for high-growth firms, including funds and companies in the life sciences sector. However, while the large share of VCAP and VCCI funding allocated to IT-related funds positioned OMERS, Georgian, iNovia and others to compete with US-based venture funds, the same is not yet true for life sciences funds. Sector leaders argue that a further infusion of public funding would help catalyze the additional private sector investment required to make Canadian venture funds significant players in late-stage venture capital and private equity funding for life sciences. As one interviewee put it:"

> *The sector needs a bigger pool of capital. A $1 billion-dollar life sciences fund would be game-changing. We could increase the size of the existing funds, and we could create new seed funds with new managers specializing in digital health, medical devices and biotech.*

© DEEP Centre Inc. 2020

CHAPTER 4

ACCELERATING GROWTH & INNOVATION

It would also be healthy to refresh the talent pool. The government could invest now, and it would cost taxpayers very little. The Government of Canada would make it up on returns. They need to do it now because the sector is moving too slowly. The funds are drying up. The performance of the sector is good. Now is time to take the next step."

Encourage large Canadian institutional and pension funds to invest as limited partners in later-stage venture capital and private equity funds. As noted in the interviewees' commentary, the comparatively small size of the Canadian venture funds up to this point has presented an obstacle to LP engagement. Thus, in addition to public funding, sector leaders are calling for federal leadership in cajoling greater institutional participation in scaling the late-stage venture funds. Sector leaders would also like to see institutional investors actively co-invest in larger financing rounds for the more advanced Canadian companies. The CPP investment in Fusion Pharmaceuticals, for example, is seen as a positive step forward. Sector leaders note that institutional investor participation in late-stage financing rounds is particularly critical when Canadian companies are targeted for acquisition by foreign multinationals.

Finally, the Health and Biosciences Strategy Table recommended leveraging ISED's Accelerated Growth Service to enhance support for firm scale-up. It specifically recommends taking action to keep high-potential health and biosciences firms in Canada and allow them to grow into anchor firms for the sector. For example, when a high-potential Canadian firm is targeted for acquisition, the program could provide strategic financial support to Canadian late-stage capital funds to help them compete against foreign multinationals and financial investors.

© DEEP Centre Inc. 2020

CHAPTER 4

SECTOR LEADERS ON ENGAGING INSTITUTIONAL INVESTORS

"**We have to convince institutional investors to put more money into the domestic ecosystem**. Many have backed away from the life sciences sector. No VC will be big enough to write a cheque for $200-300 million. You need the pension funds, but they don't have the people and expertise to do the due diligence or the deal flow to justify building an internal team. They will need to rely on Canadian VCs to do due diligence. They could invest in those funds first, including CTI, Lumira, Genesys and Teralys."

"**Institutional LPs are coming back to the life sciences to participate in new funds**. You couldn't have made that case 5 -10 years ago. CDN companies have been a big part of that story. $1 billion in funding for a group of high-performing funds would give a huge lift to the sector. You need to have high standards and the ability to attract legitimate third-party capital. The government should be first in and last out. They could run it through the fund of funds structure."

"**It is hard for the pension funds to invest in a VC fund under $500 million**. However, Fusion Pharma secured a direct investment from the Canada Pension Plan. The deal could be the seed of a larger effort across the country to get institutional investors more interested in participating from series B onward. We need more great stories. The local LP community could become more active when they can get better access to high-quality later stage deal flow."

© DEEP Centre Inc. 2020

CHAPTER 4

ACCELERATING GROWTH & INNOVATION

3. GROWING THE LIFE SCIENCES TALENT POOL IN CANADA

Access to sophisticated executive management talent is a challenge across the Canadian startup ecosystem. As in other sectors, there are no quick remedies for the shortage of experienced executives in the Canadian life sciences ecosystem. However, sector leaders point to both a short and long-term strategy for ensuring that promising life sciences companies are not stymied by a lack of skilled leadership.

Recruit US-based executives. In the short term, most sector leaders see a need to source experienced talent from the US until organic growth and talent recycling in the domestic ecosystem builds the local talent pool. Given the challenges in relocating experienced executives to Canada, it seems likely that companies will need to establish satellite offices in major US-based hubs.

> *"There are unique skills required for biotech companies in regulatory approvals and clinical development. In the short-term, we can't lose traction. We need to set up satellite offices and build part of our executive teams in the US. They typically stay in Seattle, Boston and the Bay area, and they spend some time in Canada helping to nurture companies. Most will not relocate to Canada. They would need to resettle their families. The tax structure is different, and the potential job mobility is low. Relocation is a tough sell for experienced executives."*

Build domestic capacity. Over the longer term, sector leaders recommend placing a greater focus on training, coaching, and supporting Canada's existing talent pool. However, some believe that a more urgent focus on building the local talent pool would fast track the ecosystem's development. For example, several interviewees called for Canadian fund managers to back first-time CEOs and develop competent management teams that are more firmly rooted in Canada. They cite the organic growth of biotech centres in Boston and the Bay area as a model for Canadian hubs like Montreal, Toronto and Vancouver. "Boston to took off because entrepreneurs and investors had some huge wins and kept plowing capital and talent back into the ecosystem," said one interviewee. "We need capital and talent recycling here in Canada too."

© DEEP Centre Inc. 2020

CHAPTER 4

SECTOR LEADERS ON GROWING THE TALENT POOL IN CANADA

"**If we look across the border for executive management talent, we will not build our domestic capacity**. We have a pool of people that are working on their 2nd or 3rd companies with us. We also have to back first time CEOs. That's the only way to build a pool of serial entrepreneurs. The people from outside the country aren't going to stay in Canada if they exit the company. Local investors investing in local CEOs is the way to strengthen the ecosystem. When you are right, you create a long relationship that could lead to the creation of several significant companies. You can't take a short cut."

"**Sometimes you need to attract talent from outside the country**, but I would prefer a stronger focus on developing Canadian management. Allowing first-time CEOs to be successful will benefit the ecosystem in the long term. I would recommend against management training programs. It's not six weeks of training. It's two decades of experience that you need. You need to have sustainable companies operating in Canada to house the talent."

© DEEP Centre Inc. 2020

CHAPTER 4

ACCELERATING GROWTH & INNOVATION

4. ENHANCING COMPANY CREATION CAPABILITIES

Sector leaders see a gap in the capacity to create investment-ready companies out of Canadian universities and identified two strategies for improving company creation and incubation capabilities.

Invest in high-quality translational services. Sector leaders argue that the ecosystem needs independent "company-builders" that offer startup capital and infrastructure and can bring private sector expertise and discipline to the process of building new ventures around breakthrough science. Organizations such as FACIT have provided foundational support to companies such as Turnstone Biologics and Fusion Pharmaceuticals, while adMare has supported Repare Therapeutics and others. Most sector leaders favour bolstering investment in translational services with a proven track record. However, some also see a need for consolidation and critical mass to ensure support organizations have the scale, infrastructure and expertise to do the job properly. As one interviewee put it:

> *"We need to invest in an organized fashion and build critical mass. We don't need to recreate the CECR program. The merger of CDRD, NEOMED and Accel-RX into a pan-Canadian entity was a good step forward. We need to work across the provinces. You need the funding to support the investments in people, expertise and infrastructure. They need to offer specialized services with deep expertise."*

Create full-stack VCs. Other sector leaders noted that scaling later stage funds would provide the depth of capital and talent fund managers need to replicate the full-stack, end-to-end VC model that has been successful for US funds such as Versant Ventures.

"Scale is really important," noted one late-stage investor. "Funds that are well-capitalized can write bigger cheques and participate in the later funding rounds. Larger funds will also address some of the gaps in management. If you want to hire a top CEO, you need to have a company with three years of cash. You can also invest in the team on the venture side. We need experienced people to help augment and support the companies in the portfolio. We need a budget to attract experienced ex-operators who can provide sophisticated management advice."

© DEEP Centre Inc. 2020

CHAPTER 4

SECTOR LEADERS ON ENHACING TRANSLATIONAL SERVICES

"**You can't rely on generalists like you can in IT**. Advisors need expertise in financing, product development and regulation. It's tough to find those services in BAIs. The best companies don't need incubators; they need full-stack VC funds with the bench strength to help grow significant companies. You need to pay people well. Look at Versant and Flagship. They have 60 people on their team. They will attract better CEOs, and their output is higher. Full-stack is the way the venture model is going. The bar is super high. They push for disruptive science and prep their companies to list on the NASDAQ."

"**We could use some consolidation on a regional or vertical basis**. Focus on 4 or 5 organizations that are doing distinct things. Capital and people are the main challenges. Don't dilute the capital. You don't need to spread it around. We need scale. The government has put about $400 million into translational services like adMare. The State of California has invested at least a billion. We have half the amount of money than the second-largest cluster in the US."

© DEEP Centre Inc. 2020

CHAPTER 4

ACCELERATING GROWTH & INNOVATION

5. PROMOTING ENGAGEMENT WITH GLOBAL PHARMA

Investment from global healthcare companies can bring a much-needed infusion of capital, expertise and channel/partnership opportunities to the domestic ecosystem. On the other hand, the ongoing acquisitions of promising Canadian life sciences companies by foreign entities inhibit our ability to grow globally competitive anchor firms. However, on balance, interviewees see a significant upside in attracting more R & D activity and increased corporate investment into new and existing venture capital funds. To make this happen, sector leaders see two developments as fundamental.

Cultivate attractive investment opportunities. The most reliable way to attract investment is to build a life sciences ecosystem that demands attention. That means creating companies and clusters with world-class credentials. Healthcare executives often make a distinction between "run of the mill" R&D work and "game-changing" innovation projects. The former includes small scale pilot projects and routine industry-academic collaborations. These may be the bread and butter of many university-based consortia, but they will not attract serious investments from global anchor firms.

> *"Canada is a high-cost jurisdiction with a small market. Attracting global firms that don't already have a footprint here is hard. We need to offer a compelling value proposition for engagement, either by creating a significant market opportunity as an outcome of the partnership, by de-risking innovation investments, or by providing access to novel technologies and exciting companies."*

Provide leadership in negotiating a favourable relationship with big pharma. Sector leaders agree on the federal government's need to play a role in extracting more benefits from Canada's relationship with big pharma. There are mixed views, however, whether to proceed with a carrot or stick approach. Some interviewees attribute to the dearth of investment to the absence of a tougher negotiating stance. They want federal leaders to play hardball to convince global healthcare companies to contribute to domestic life sciences venture funds and other innovation activities. Others claim that a policy focus on containing drug prices has soured Canada's relationship with global healthcare companies. They favour a less adversarial approach with concessions on drug pricing in exchange for more significant investment in building the domestic ecosystem.

© DEEP Centre Inc. 2020

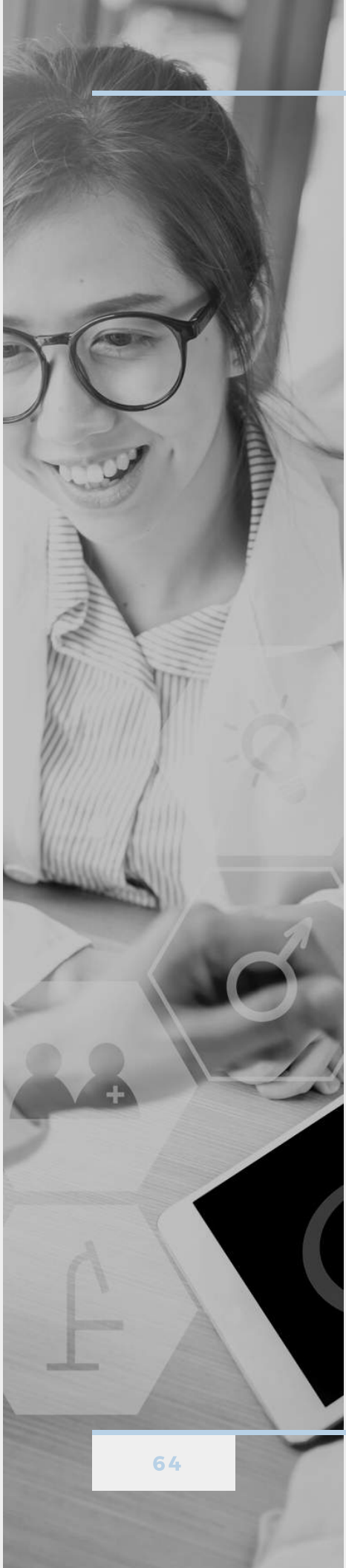
CHAPTER 4

SECTOR LEADERS ON ATTRACTING INVTESMENT FROM GLOBAL PHARMA

"**Pharma has a bad relationship with Canada and vice versa**. It has a blowback effect on the domestic sector and its development. Merck Canada is always reporting on how difficult it is to get drugs approved and priced accordingly. There is a naïve notion that our public health financing will be okay if we cut drug prices. It makes a minimal difference. The hospital stays related to mental health, cardiovascular health and diabetes are the three big cost centres for the healthcare system. You need to fix that with better chronic disease management solutions, data sciences and better medicines."

"**With VCAP, the feds convinced the big banks to put money into the VC funds**. Could we ask large pharma to contribute to a life sciences fund? They can play a positive role in the ecosystem. The leaders of the Canadian divisions of global pharma are not from Canada. They are only measured on marketing and sales, not on impact. We should play hardball with big pharma and convince them to invest in the sector. You need real leadership with someone from the government to stand up and make them show good faith."

© DEEP Centre Inc. 2020



CHAPTER 4

ACCELERATING GROWTH & INNOVATION

6. EXPANDING PROCUREMENT OPPORTUNITIES FOR MEDTECH AND DIGITAL HEALTH STARTUPS

Sector leaders argue that improving early adoption opportunities for medtech and digital health startups could create springboard opportunities for companies to raise capital and market their solutions abroad. As the Health and Biosciences economic strategy table put it: "Our public health systems need to have the confidence to back Canadian innovations, as well as the capacity to reach out to our innovators for Canadian-based solutions to issues related to service delivery and care. We need to let our homegrown talent shine and grow, knowing that once we give them the scope to expand in Canada, they can then succeed globally."

Sector leaders believe Canada underinvests in health innovation, and point to countries such as Denmark, which reserves 20% of its healthcare budget for investment in ICT and medical technologies. Interviewees believe two key reforms could significantly improve domestic adoption opportunities for health tech startups.

Increase funding for pilots and testbeds. A first step in promoting domestic adoption is to make more funding available for technology demonstration projects in leading Canadian hospitals. The ability to test, refine and verify the performance of new technologies in real-world environments would better position Canadian health tech innovators to produce the best value-for-money technologies. Verified technologies could subsequently be considered for scaled adoption across the healthcare system once regulators complete the necessary regulatory assessments.

Establish a national health procurement agency and a value-based procurement model. The next step in boosting the adoption of digital health solutions is to establish a national health procurement agency that could lead a systemic shift in Canada's approach to health tech procurement. Sector leaders say that purchasers should adopt a "value-based model" in which they consider price alongside other factors such as improved patient outcomes, reduced demand for more expensive health services, increased quality of life and economic benefits. A health procurement innovation agency could also help de-risk adoption of breakthrough technologies and solutions by coordinating pilot projects and building the evidence base for translating innovative products for use within health systems across the country.

© DEEP Centre Inc. 2020

CHAPTER 4

SECTOR LEADERS ON EXPANDING PROCUREMENT OPPORTUNITIES

"**Canada puts money into big programs like mental health, but these grants are often a road to nowhere**. The measurement KPIs focus on IP and jobs created. They are not investment-driven metrics. They are appropriate for universities and hospitals, but it's a lousy recipe for commercialization. Instead, we should create legit RFPs to procure real solutions that will address mental health challenges. Companies need opportunities to deploy their solutions. We need real contracts, not just fun money. For medical device companies, kind of early adoption gets them the traction they need to raise capital."

"**We need to have testbeds in Canada, and we need to create channels for pilot projects**. Big hospitals in the US see huge efficiencies from digital solutions. The Toronto-based hospitals could be part of a testbed system. Don't try to fix the whole system at once. Find some leaders among the hospitals who will be willing to take the risk and provide funding for demonstration projects that help defray the cost."

© DEEP Centre Inc. 2020

CHAPTER 4

ACCELERATING GROWTH & INNOVATION

7. FINE-TUNING THE POLICY AND REGULATORY ENVIRONMENT

Interviewees mostly applaud Canada's policy and regulatory environment for life sciences. Still, they would like to see a stronger innovation mindset and a focus on ensuring that tax credits and funding programs are globally competitive.

Adopt an innovation mindset. Most leaders agree that Canada's policy framework needs to recognize and encourage the sector's social and economic opportunities with greater force and urgency. “On a cultural level, health care is seen as an expense," said one sector leader. "We need an innovation mindset and a concerted focus on economic opportunities. The fragmentation on the regulatory side is also a problem. There is a lack of clarity on how things get approved, which dampens private sector investment. On drug pricing, we have heard rumblings about Canadian rights to drugs. It's wholly unrealistic to think that we can have special rights on pricing in Canada. We need a more rational perspective.”

Review SR&ED eligibility. Sector leaders recognize Canada's Scientific Research & Experimental Development tax incentives (SR&ED) as a highly effective lever for promoting private sector R&D and early-stage VC investment. However, they are concerned that the current eligibility criteria, including a narrow interpretation of R&D, make the benefits inaccessible to many health and bioscience companies. The Health and Biosciences strategy table noted that Canadian-based companies that list on a public stock exchange or have greater than 50% ownership by non-Canadian investors are ineligible for SR&ED credits. “The current system cuts off R&D support at the exact instant when Canadian firms are demonstrating the greatest growth potential by going public or attracting foreign direct investment," said the report. "It also removes a highly effective lever for retaining R&D activities in Canada once a Canadian SME becomes publicly traded and further accentuates gravitational forces to move head offices and R&D activities outside of Canada."

Sector leaders would like the Government to Canada to allow full SR&ED access for eligible Canadian-based companies regardless of whether such companies trade in public or private markets. Doing so, they argue, would provide a greater incentive for health and biosciences firms to fast-track technology development, expand their innovation pipelines and grow into anchors that will strengthen the Canadian innovation ecosystem.

© DEEP Centre Inc. 2020

CHAPTER 4

SECTOR LEADERS ON FINE-TUNING GOVERNMENT PROGRAMS

"**SR&ED and IRAP are absolutely critical**. Ali at Zymeworks said that the SR&ED kept the company alive at one point in the journey. We have heard that story time and again. It is critical to supporting the growth and success of early-stage biotech companies. We have to ensure that those programs continue to be as competitive as possible. The delivery of funding could be faster, more efficient and more standardized."

"**SR&ED is a great program and IRAP has high-quality people in life sciences** to guide companies to other sources of support. But we are generally skeptical of most of the non-dilutive funding and don't wait around for it. It operates on a counter-productive cycle. Time is your enemy. Public support needs to be seriously focused and directed to a commercial outcome."

© DEEP Centre Inc. 2020

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

The global health and biosciences sector represents one of the most dynamic and sustainable growth and innovation opportunities in today's economy. Much of the sector's growth will come from exciting developments in precision medicine, biomedical engineering and AI-enabled health diagnostics and drug discovery—all areas in which Canada excels. Moreover, novel treatments derived from these methods hold enormous health benefits and could eliminate dreadful diseases such as Alzheimer's, diabetes, and cancer.

Amidst this global opportunity, Canada's health and bioscience leaders are seizing the day. A string of successful IPOs since 2017 demonstrates that Canadian health and bioscience companies are developing world-class solutions, raising a record amount of investment capital and are poised to reap considerable rewards in an industry that is overflowing with revolutionary technological advances. Companies such as Zymeworks, Aurinia and Fusion Pharmaceuticals are viable candidates to become global anchor companies that can further accelerate the Canadian ecosystem's growth and success.

We have based the insights and recommendations within this report on conversations with leading Canadian investors and other organizations in the life sciences sector. They reflect an optimistic and ambitious sense of Canada's potential in the industry and underline the many positive achievements to date. Indeed, it is clear that the health and biosciences sector presents enormous opportunities for Canadian companies and broader societal benefits and improved health outcomes for Canadians.

Conversations with sector leaders also point to some significant challenges and barriers. Despite progress in building a vibrant ecosystem, sector leaders believe that Canada is just beginning to tap the sector's tremendous growth potential. Canada still lacks a national, research-driven bio-pharmaceutical company to anchor the ecosystem. There is a small pool of seasoned executives with the experience to scale health and biosciences ventures into formidable global competitors. Canada's life sciences venture funds are also dwarfed in size by US-based leaders such as Orbimed and Versant Ventures, which means Canadian firms rely predominantly on foreign sources of late-stage venture capital and private equity financing.

© DEEP Centre Inc. 2020

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

The relative lack of late-stage funding in Canada, in turn, limits the capacity of Canadian investors to invest through to later funding rounds, resulting in earlier exits to foreign investors, and ultimately fewer self-sustaining Canadian anchor companies. It dilutes Canadian ownership stakes in growth-stage companies and means investors recycle less profit into the Canadian ecosystem. The comparatively small size of the Canadian funds also constrains fund managers' capacity to invest in infrastructure and hire a larger bench of seasoned executives to support and advise the companies in their portfolio.

How much capital do investors require to participate in late-stage funding rounds investment in Canada? One sector leader offered the following assessment:

> *"A company that spends $30 million in pre-clinical R&D will spend $200M - $1billion in clinical development. Witness the recent IPOs of Repare Therapeutics and Fusion Pharmaceuticals. Fusion raised $30 million in its series A round, $100 million in Series B financing, and post-IPO it has $300M to execute its clinical strategy. The same is true for Repare Therapeutics. As public companies, Zymeworks has already raised more than US$700M for clinical development, and Aurinia raised more than $500M. If the IPO window slows or closes, Canadian companies and their funders will need 10x or more for scale-up and clinical development versus the early-stage funds required for starting up.*
>
> *So the simple math is this: A startup fund deploying $200M triggers the requirement for more than $2 billion of clinical development funding. If there is the potential for 1 $200M early-stage fund in Canada, then there is the potential for at least 8 $250M mid and later stage funds. This is why, on average, our companies have raised 10x the capital that we invested. It also shows that if we have it, we could invest far more in our Canadian companies. For example, in the cases of both Aurinia and Zymeworks, we hit the 10% investment limit dictated by our fund's terms."*

© DEEP Centre Inc. 2020

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

Access to capital and the inability to date to sustain large anchor firms in Canada are pre-eminent concerns for Canadian life sciences leaders. However, executives highlight other challenges that inhibit the growth of the industry. These challenges include a lack of capacity to translate biomedical research into investable companies, a pattern of mostly superficial engagement by global healthcare companies in building the domestic ecosystem, and the slow pace of digital health adoption in Canada's healthcare system.

Life sciences leaders in Canada are confident that a concerted effort to address these challenges could deliver significant upside, including exceptional economic returns, high-quality jobs, more efficient healthcare delivery and better health outcomes. In support of these outcomes, this report offers a series of seven recommendations for accelerating growth and innovation in the Canada's life sciences sector. In conclusion, we briefly summarize these recommendations below.

- **Strengthen and diversify early-stage funding for life sciences** to support an expanding pipeline of healthcare and biotech startups. Sector leaders recommend scaling existing seed funds and creating new seed-stage funds to diversify the pool of early-stage life sciences investors in Canada. There were also calls to support angel investment with a combination of tax incentives, deal syndication and investor education.

- **Boost Canadian sources of late-stage VC and private equity funding** to accelerate the domestic ecosystem's growth and stem the loss of potential multi-billion-dollar firms. Sector leaders appealed for a dedicated envelope to support the development of later-stage venture and private equity funds specializing in life sciences. There were also calls for the federal government to encourage large Canadian institutional and pension funds to invest as limited partners in later-stage venture capital and private equity funds.

- **Grow the life sciences talent pool in Canada** to ensure that promising life sciences companies are not hindered by a lack of skilled leadership. Sector leaders see a short-term need to source experienced talent from the US. However, over the longer term, they recommend placing a greater focus on backing first-time CEOs and training, coaching and supporting competent local management teams that are firmly rooted in Canada.

© DEEP Centre Inc. 2020

CHAPTER 5

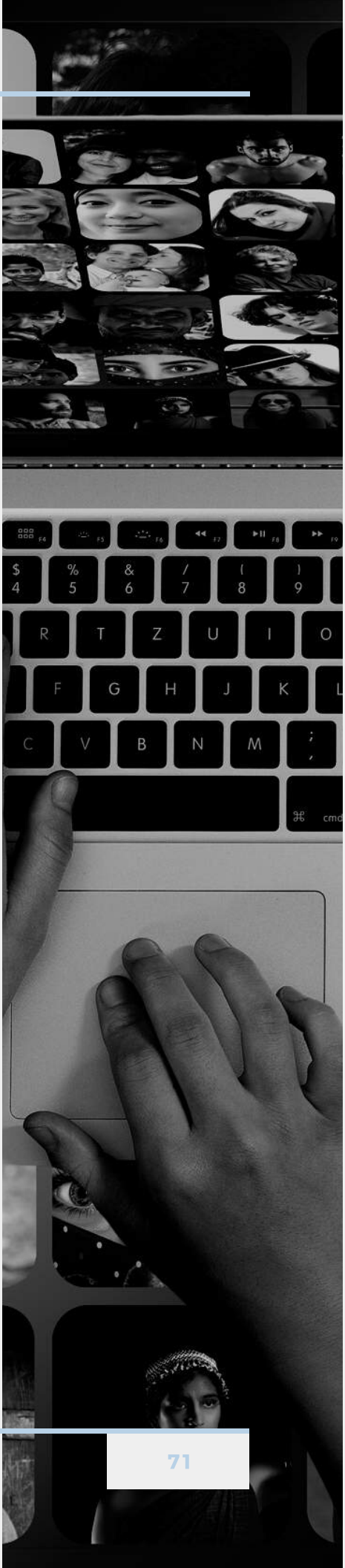
CONCLUSION AND RECOMMENDATIONS

- **Enhance the capacity to create investment-ready companies** out of Canadian universities to ensure a robust pipeline of life sciences startups. Sector leaders recommend investing in high-quality translational services that offer startup capital and infrastructure and can bring private sector expertise and discipline to the process of building new ventures around breakthrough science. There were also appeals for Canadian investors to replicate the full-stack, end-to-end VC model that has been successful for US funds such as Versant Ventures.

- **Promote engagement with global healthcare companies** to bring an infusion of capital, expertise and partnership opportunities to the domestic ecosystem. Sector leaders acknowledge that game-changing companies and innovation opportunities provide the most reliable way to attract foreign investment to Canadian clusters. However, there were also calls for the federal government to negotiate a relationship with big pharma in which access market access is conditional on increased R&D investment and corporate venture participation in Canadian life sciences funds.

- **Improve early adoption opportunities** to create springboard opportunities for medtech and digital health companies to raise capital and market their solutions abroad. Sector leaders recommend increasing funding for demonstration projects to enable hospitals and digital health startups to test, refine and verify the performance of new technologies in real-world environments. Sector leaders also recommend establishing a national health procurement agency to lead a systemic shift in Canada's approach to health tech procurement, coordinate pilot projects and build the evidence base for translating innovative products into provincial health systems.

- **Fine-tune Canada's policy and regulatory environment** to ensure Canada remains an attractive and competitive environment to host cutting edge biomedical innovation and commercialization. Sector leaders called for a stronger innovation culture in which policymakers see the healthcare of Canadians and the economic growth of the health and biosciences sector as mutually reinforcing. There were also appeals to ensure that tax credits and funding programs are globally competitive, with an emphasis on the need to re-assess the eligibility criteria for SR&ED credits so as not to exclude to high-growth biosciences firms.



© DEEP Centre Inc. 2020

APPENDIX I

LIFE SCIENCES INVESTMENT ACTIVITY, 2017 - 2019

TABLE 5: TOP VENTURE DEALS IN BIO-PHARMA

COMPANY	FUNDING AMOUNT	ROUND TYPE
Fusion Pharmaceuticals	$140,112,000	Series B
Geneseeq	$114,000,000	Series D
Repare Therapeutics	$109,131,000	Series B
Milestone Pharmaceuticals	$103,276,000	Series D
Repare Therapeutics	$90,508,000	Series A
Chinook Therapeutics	$86,404,500	Series A
Milestone Pharmaceuticals	$71,319,000	Series C
Fusion Pharmaceuticals	$59,000,000	Series A
Turnstone Biologics	$56,322,000	Series C
ABK Biomedical	$40,000,000	Series B

TABLE 6: TOP VENTURE DEALS IN HEALTH TECH

COMPANY	FUNDING AMOUNT	ROUND TYPE
PointClickCare Technologies	$111,256,500	PE/Growth
League	$62,000,000	Series B
Dialogue	$40,000,000	Unclassified
Natural Partners Fullscript	$33,532,500	Series B
Canary Medical	$33,282,600	Unclassified
Dialogue	$12,500,000	Series A
Dialogue	$4,000,000	Seed

© DEEP Centre Inc. 2020

APPENDIX I

LIFE SCIENCES VENTURE ACTIVITY, 2017 - 2019

TABLE 7: TOP VENTURE DEALS IN DX/TOOLS

COMPANY	FUNDING AMOUNT	ROUND TYPE
Synaptive Medical	$33,057,500	Unknown
Deep Genomics	$16,043,300	Series A
Circle Cardiovascular Imaging	$16,000,000	Series D
Contextual Genomics	$12,000,000	Debt Funding
BlueDot Inc.	$9,325,400	Series A
LightIntegra Technology	$7,141,700	Series B
BenchSci	$6,700,000	Series A
ProteinQure	$5,248,500	Seed
RNA Diagnostics	$5,000,000	Series A

TABLE 8: TOP VENTURE DEALS IN DEVICES

COMPANY	FUNDING AMOUNT	ROUND TYPE
Venus Concept	$38,000,000	Series B
Kinova Robotics	$32,500,000	Series D
Biolux Research	$18,792,000	Series B
EBT Medical	$13,285,000	Series D
CellAegis Devices	$12,800,000	Series A
ESIGHT	$10,000,000	Series A
MolecuLight	$9,973,500	Series C
Clarius Mobile Health	$6,300,000	Series A

© DEEP Centre Inc. 2020

APPENDIX I

LIFE SCIENCES INVESTMENT ACTIVITY, 2017 - 2019

TABLE 9: TOP INVESTORS BY DEAL COUNT

BIOPHARMA		DX/TOOLS	
INVESTOR	**DEALS**	**INVESTOR**	**DEALS**
Fonds de solidarite FTQ	9	Desjardins Capital	14
Anges Quebec	7	BDC	5
GeneChem	6	Northern Ontario Angels	5
Lumira Ventures	6	Angel One Network	4
Westcap Management	6	iGan Partners	4
BDC	5	GeneChem	3
FACIT	4	Roadmap Capital	3
Versant Ventures	4		

HEALTHTECH		DEVICES	
INVESTOR	**DEALS**	**INVESTOR**	**DEALS**
Desjardins Capital	34	Desjardins Capital	13
iGan Partners	23	iGan Partners	10
Anges Quebec	18	Angel One Network	5
BDC	17	Anges Quebec	4
Angel One Network	13	BDC	4
FACIT	10	MaRS IAF	3
Ontario Centres of Excellence	10	Roadmap Capital	3
Fonds de solidarite FTQ	9	Southwestern Ontario Angels	3
GeneChem	9		
Lumira Ventures	9		
Vancouver Angel Forum	9		

© DEEP Centre Inc. 2020

APPENDIX II

STUDY METHODOLOGY AND INTERVIEW SAMPLE

The study methodology consisted of three main components: a review of secondary sources, a data-driven analysis of recent startup and investment activity, and a stakeholder consultation process for identifying and synthesizing essential insights about commercialization challenges and investment needs in the sector.

For the qualitative analysis, the DEEP Centre interviewed representatives of venture capital firms, business accelerators and university-based research organizations in Canada (including consortia and commercialization centres) regarding sector investment needs. The interviews were structured to:

- Better understand the current the startup/scale-up services provided to life sciences companies;
- Document common commercialization and growth challenges experienced across the sector;
- Gain an understanding of the perceived sector investment needs according to key stakeholders;
- Identify practical recommendations for strengthening the investment and support infrastructure for accelerating high-growth life sciences ventures in Canada.

To gain a well-rounded perspective on the issues above, the DEEP Centre conducted 20 1-hour interviews via telephone. The sample reflects regional and stakeholder diversity as outlined in Table 10.

The analysis of investment trends in Canada's life sciences sector was performed in partnership with Hockeystick, a leading provider of private investment data in North America. The data covers life sciences funding deals between 2017 and 2019 and was sourced from Hockeystick's proprietary datasets covering investments from Angels, VCs, Private Equity firms and government programs.

© DEEP Centre Inc. 2020

APPENDIX II

TABLE 10: INTERVIEW PARTICIPANTS

NAME	TITLE	ORGANIZATION
Natalie Dakers	CEO	**Accel-RX**
Gordon McCauley	CEO	**adMare BioInnovations**
Jean-François Pariseau	Co-founder and Partner	**Amplitude**
Nancy Harrison	Venture Partner	**Amplitude**
Dave Smardon	CEO	**Bioenterprise Corporation**
Andrew Casey	CEO	**BIOTECanada**
Michael May	CEO	**CCRM**
Shermaine Tilley	Managing Partner	**CTI Life Sciences**
David O'Neill	President	**FACIT**
Jamie Stiff	Managing Director	**Genesys Capital**
Kim Ryel	Life Sciences Advisor	**Invest Ottawa**
Peter van der Velden	Managing Partner	**Lumira Ventures**
Robert Ritlop	Director of Investments	**MEDTEQ Consortium**
Frank Béraud	CEO	**Montreal InVivo**
Aled Edwards	CEO	**Structural Genomics Consortium**
Jay Crone	Director	**Telus Ventures**
Cedric Bisson	Partner	**Teralys Capital**
Hassan Jaferi	Co-Director	**UTEST/ITAP**
Ryan Heit	Partner	**Vahalla Private Capital**

© DEEP Centre Inc. 2020

ABOUT THE AUTHOR

Anthony Williams is founder and president of the DEEP Centre and an internationally recognized authority on the digital revolution, innovation and creativity in business and society. He is co-author (with Don Tapscott) of the groundbreaking bestseller *Wikinomics* and its follow-up *Macrowikinomics: New Solutions for a Connected Planet*. In addition to his work with the DEEP Centre, Anthony is a research director with the Blockchain Research Institute, an expert advisor to the Markle Foundation's Initiative for America's Economic Future, a senior fellow with the Lisbon Council in Brussels, and chief advisor to Brazil's Free Education Project, a national strategy to equip 2 million young Brazilians with the skills required for a 21st Century workforce.

© DEEP Centre Inc. 2020

READ ON

RECENT DEEP CENTRE REPORTS ON INNOVATION, ENTREPRENEURSHIP AND ECONOMIC GROWTH

Partners for Prosperity and Innovation: Towards Fiscal Sustainability in Canada's Startup Ecosystem. A nation-wide effort to assess the fiscal sustainability of business accelerators and incubators (BAIs) in Canada.

Accelerating Canada's Clean Growth Economy: Cleantech Adoption Strategies for a Low-Carbon World. A cross-sector survey of clean technology adoption and an analysis of measures to accelerate Canada's progress towards a low-carbon economy.

Available at: http://www.deepcentre.com

Boosting E-Commerce in the Digital Single Market: A Foundation for European Growth and Competitiveness. An analysis of the opportunities a single market for digital services would create for European entrepreneurs.

Industry Ecosystems and Blockchain: What Enterprise Leaders Need to Know About Consortia. A report on best practices for enhancing industry engagement and collaboration around Blockchain and other emerging technologies, including an in-depth analysis of over 20 innovation consortia.

© DEEP Centre Inc. 2020

CENTRE FOR DIGITAL ENTREPRENEURSHIP &
ECONOMIC PERFORMANCE

THE DEEP CENTRE

Contact Us:
Anthony Williams
President and Founder
DEEP Centre Inc.
www.deepcentre.com
www.linkedin.com/in/anthonydwilliams/

deepcentre