HOW TO BOOST ONTARIO'S LIFE SCIENCES IP TO HELP PATIENTS AND THE ECONOMY

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Issue

As Ontarians tentatively put the pandemic behind them, the timing is right to look for opportunities to boost economic growth. The life sciences sector is a $10 trillion global market that creates high value jobs and healthcare products. The next government should make it a priority.

The pandemic has highlighted not only the immense strength of Ontario life sciences research but also the sector's weakness in turning innovation into commercial products and services.

Just eighteen months ago, Canada was not much different from 'underdeveloped' countries facing a vaccine shortage. The fate of lives and livelihoods was at stake, yet Canada was entirely dependent on the leadership and goodwill of foreign countries for innovative health product supply. Unfortunately, COVID-19 vaccines are not the exception -- most innovative health products are imported into Canada. Our dependency on foreign manufacturers also means that **the economic benefits of life sciences research accrues largely to our southern neighbours. Herein lies an incredible domestic opportunity to capitalize on an underdeveloped sector.**

Overview

The explosive growth of Ontario's tech industry – now the third largest in North America - has translated into significant provincial economic benefits. Yet Ontario's life sciences sector has not followed the same trajectory. Despite Ontario generating 51% of all of Canada's R&D in life sciences, the vast majority of this work is done by generics or foreign multinationals. As in the broader tech sector, the companies that will transform the economy are those with homegrown intellectual property (IP), and with the potential to become innovative IP receptors for a thriving ecosystem. The lack of these key IP receptors represents a missed opportunity.

Incumbent hubs of Boston and San Francisco continue to dominate life sciences, where support for the nexus of academia and industry commercialization has led to the inception of future anchor companies like Biogen and Genentech, respectively. These companies and related progeny have produced tens of thousands of jobs in the

communities of their academic founders. Emerging life sciences hubs in China, the UK and Spain illustrate that Ontario is not only losing the race to the US.

Ontario's position in the global life sciences ecosystem is not clear. There are many examples of breakthrough life sciences companies created from decades of government investment in academic research and training in Ontario postsecondary institutions, such as Agios, Repare, Pionyr, Allelix-NPS, Phenomic AI, Forbius and AvroBio. However, the commercialization path for local research breakthroughs typically results in Ontario start-ups migrating south of the border, (or Quebec) following receptors, the market and cash. The hundreds of millions of dollars in financing and growth (often with acquisition) generated by these companies has occurred in and benefited the US. **The export of local companies feeds into a perpetual cycle -- the export of Ontario IP and the accompanying need to import healthcare end products. Fewer companies mean there are fewer job opportunities for local scientists and entrepreneurs who have been trained at Ontario's publicly-funded postsecondary institutes.**

Ontario is not unique in its history of exporting IP. When Texas realized it was feeding other jurisdictions with medical innovations and associated economic value, it created the Cancer Prevention and Research Institute of Texas (CPRIT) -- a $6 billion, 20-year initiative focused on cancer research and commercialization aimed at attracting companies to Texas. This investment is the largest state cancer research investment in the history of the US and has resulted in Texas now boasting a booming hub of life sciences companies. Texas has also employed commercialization incentives to become a net importer of companies and assets from other jurisdictions, including Ontario.

The success of Texas shows that Ontario's life sciences industry cannot simply rely on the private sector to step in. Despite its value to the province, the economics of life sciences seed investing typically is not competitive with investment in other sectors or later development-stage investments. While private venture capital is the preferred model for high-risk, high-tech ventures, the limited supply of domestic limited partnerships (LPs) means economic returns often cycle out of the province.

The Business Development Bank of Canada (BDC) has reported that it takes Canadian companies an average of one to two years longer to receive funding after being founded than US counterparts. This is consistent with what has been seen anecdotally in the market -- Canadian VCs demand evidence of more progress from a company before extending a first financing compared to US counterparts. For Ontario to fully realize the benefits of private sector investment in life sciences, commercialization incentives and policy reform are needed.

A further contributing factor to Ontario's prevalent export of life sciences IP is that few local institutional players have a mandate to advance Ontario's life sciences ecosystem. In fact, one of the biggest challenges -- and greatest opportunities -- in economic development policy is to better steward Ontario incumbent institutions and businesses.

Researchers must satisfy international journals while companies must satisfy US investors. Moreover, a longstanding aversion in Ontario to capitalizing on healthcare -- as evidenced by Canada's century-old donation of insulin and thousands of jobs to American industrialists -- limits our willingness to embrace the undeniable potential of leveraging healthcare as an economic engine. **Strong policy backing is required to empower Ontario entrepreneurs to swim upstream and counter the forces that move innovations and jobs to the US.**

The Need for Reform

The critical inflection point in commercialization -- where IP has a substantially greater chance of creating domestic economic value -- requires an understanding of both sides of the research-commercialization continuum in order to develop meaningful strategic interventions. **Siloed and independent development of policies related to research/IP versus commercialization/economic development will continue to miss the biggest opportunity for changing the IP export dynamic.**

Ontario has rightly considered education on IP as a priority for the whole academic sector; however, in life sciences it needs to actively manage IP with Ontario First capital. Moreover, commercialization of life sciences innovations is unique and significantly more challenging compared to other breakthrough technologies (e.g., fintech, ICT, cleantech, etc.) due to the complex underlying biology, long development times, stringent regulatory requirements, and the degree of capital required. To capitalize on the enormous unrealized innovation-oriented economic potential within Ontario's life sciences sector, Ontario needs to commit to specialized solutions for life sciences commercialization.

What policies could stem and then potentially turn around the flood of IP, companies and trained graduates flowing south of the border? How can Ontario compete with Quebec incentives or replicate the local tech industry boom in the life sciences sector, developing sustainable receptors to retain the local talent trained at our publicly-funded universities? **To secure jobs and prosperity in a competitive marketplace, Ontario needs to invest in early-stage commercialization-venture partnerships that directly compete on behalf of the province, using capital and management skills to put Ontario first.**

How to Move Forward

Ontario remains a relatively small emerging player in the US-dominated healthcare marketplace, meaning that most of the key drivers of the geographic destination of economic development -- i.e., IP, talent, capital and management -- are tilted in favour of US markets. Adding to these drivers is the lack of influence of partners who really have Ontario's economic interests in mind. When entrepreneurs and institutes are at the negotiation table, where deals are made for financing and commercializing Ontario taxpayer-supported IP, few if any are standing up for Ontario's best interests. This seat at the negotiation table -- which represents participation and negotiating power -- requires sufficient ownership of the IP by the start-up company, and therefore, capital.

There are two overarching strategic policies to attain this, which will in turn anchor the next wave of sustainable life sciences companies. Both strategies involve commitment from the public sector in return for benefits that can catapult a future generation of IP within an industry sector where Ontario can be competitive, and with the skilled jobs this brings. These policies are:

1. **Dedicated early-stage seed capital for life sciences; and,**
2. **Support for integrated commercialization-venture partnerships.**

1. Although Ontario has a limited pool of seed capital, almost none of it is directed towards the life sciences sector. To maximize the impact of Ontario's inadequate seed capital supply, while also addressing current gaps and opportunities in the market, funds should first be focused on an immediate, underdeveloped opportunity and one that carries the greatest impact for the location of companies and jobs: **seed-stage investing.**

   Investing at later stages of venture development would generate returns for Ontario and is still very much needed to scale anchor life sciences companies, but there is a significant gap in dedicated funds for specialized commercialization-venture groups that focus on seed-stage investments. These types of early investments can provide active management and influence board decisions, prioritizing local company formation at the "root growing" seed-stage in a sustainable and scalable manner. Seeding companies to stay in Ontario will drive the local sector, build on areas of strength and momentum, and enable Ontario to compete on the global stage.

   Likewise, government investment in healthcare 'funds-of-funds' has been effective at advancing life sciences. However, this model typically results in less optimal impact, as a large portion of fund profits often ends up with internationally based LPs rather than domestic commercialization ventures. By missing the sweet spot at the seed-stage, these traditional approaches not only limit local job creation but fail

to capitalize on significant public healthcare investment. Simply expanding access to the Ontario Capital Growth Corporation (OCGC) and the Venture Capital Catalyst Initiative (VCCI) to local non-traditional commercialization-venture groups, which have a mandate to prioritize Ontario, would be a major step forward in addressing the seed-stage gap.

2. A hybrid approach that employs **hands-on commercialization and seed venture capital principles** -- while bringing together **public and private partners --** is key to scaling Ontario's life sciences industry. These unprecedented, non-traditional "commercialization-venture" groups are unique for their willingness to roll up their sleeves and provide interim leadership along key stages of the development pathway. Such groups are also focused on Ontario's early-stage IP and provide the most "bang for the buck" -- or greatest potential to maximize value creation for the province by creating domestic IP receptors. While many players are needed for an effective life sciences industry strategy, including foreign multinationals, generic manufacturers and service providers, domestic IP receptors have the most transformational potential for the economy. To that end, Ontario should further support existing **risk-sharing public-private-partnerships (PPPs)** that harness commercialization-venture best practices and have a mandate to prioritize Ontario.

   In a commercialization-venture PPP model, the public partners must deploy capital for equity ownership in Ontario IP and therefore provide Ontario a direct seat at the negotiation table to influence "Ontario First" objectives. These PPPs should incentivize private sector investment in Ontario, including philanthropists looking to make a difference for patients and Canada's future economy. A PPP that is structured in a way that leverages the strengths of the research-commercialization continuum and provides additional innovation support where it is most needed will harness value creation for Ontario-discovered assets, create a transformative legacy for IP innovation, open new avenues for economic growth and, ultimately, improve healthcare for the people of Ontario.

Conclusion

Ontario is at a crossroads: the economic consequences of the pandemic and other pressures have put the sustainability of Ontario's momentum in life sciences innovation and its growing leadership position at risk. For research and IP to be successfully translated and innovation outcomes realized, an ecosystem that provides Ontario First seed capital and sustained incubation is critical. Without government support, the resulting economic and social benefits of research and innovation cannot be fully realized. Fueling high-potential innovations into an early-stage commercialization-venture PPP will create R&D jobs, scale up local life sciences companies and attract investment into the province. Growth in Ontario's innovation economy also will ultimately deliver the best healthcare to patients.

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