ONTARIO 360 – INNOVATION AND COMMERCIALIZATION – TRANSITION BRIEFING

Focus on commercialization to boost innovation in Ontario

Issue

Few issues have received as much rhetoric in political and policymaking circles recently as innovation. There is good reason for this: new and improved products and processes enable businesses to better serve customers, employ more workers at higher wages, and raise productivity and living standards for all of society.

Yet Canada, and Ontario, have long struggled with a weak innovation performance, despite having a large and internationally well-regarded academic research sector. This requires a shift in innovation policy to focus on commercialization—specifically by launching a network of technology and innovation centres (TICs) across Ontario to provide an output for research excellence and a platform for businesses to develop innovative products and processes.

Overview: Support for innovation in Ontario

The Ontario government's efforts to stimulate innovation date back to 1970s-era industrial and technology policy. Since then, the government has developed a number of programs supporting innovation, mainly academic research funding and tax credits for firms performing research and development (R&D). These programs are important for addressing market failures that result in private sector underinvestment in innovation.[1] The spending has been in many ways successful: Ontario universities produce world-renowned research from many 'star scientists' and the province on net, exports over $1 billion of R&D services each year.[2]

[1] Arrow, Kenneth. "Economic welfare and the allocation of resources for invention." In *The Rate and Direction of Inventive Activity*, ed. R R Nelson (Princeton, NJ: Princeton University Press, 1962), 609–626.
[2] Institute for Competitiveness and Prosperity analysis based on data from Statistics Canada, CANSIM Table 386-0003.

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The need for reform: Focus on commercialization gap

Yet, these programs struggle to deliver on the most profitable part of the innovation process: the commercialization of new research and inventions. The data tell a compelling story about our 'commercialization gap':

- Canadian firms receive $3 billion in net payments from abroad for R&D services, but pay $6.4 billion to foreign firms for the use of intellectual property (IP);
- there are 28 percent fewer patents owned by Canadians than invented in Canada (2015) and 36 percent fewer patents owned by Ontario residents than invented in Ontario (2012);
- one-third of the top 25 R&D spending firms in Canada are foreign subsidiaries; and
- there has been a 17 percent decline in business spending on R&D in Ontario since 2000.[3]

Far too often, we watch our research being commercialized by others far from home, or not at all. Our firms are also often slow to adopt new technologies. As a result, we are less productive and hence less competitive globally.

It is time to focus our policy on promoting the commercialization of innovations researched and invented in Ontario. To be fair, some recent innovation supports in Ontario have identified commercialization as a priority. The Ontario Centres for Excellence runs several programs to improve industry-academic collaboration and support on-campus entrepreneurship through incubators and seed financing for start-ups. The Ontario Network of Entrepreneurs operates a series of 18 Regional Innovation Centres across the province that offer a range of services including entrepreneurship programs, mentoring, and help obtaining financing from the private sector as well as different levels of government. But more needs to be done to truly improve commercialization. These policy levers need to be pulled harder, and in new directions.

[3] Institute for Competitiveness and Prosperity analysis based on data from the World Bank, Institut de la statistique du Québec, Research Infosource Inc., and Statistics Canada CANSIM Table 358-001 (respectively).

How to move forward: Best practices from Germany

One innovative way to increase the commercialization of Ontario-produced ideas and improve Ontario firms' technology adoption and competitiveness—with proven success—is investing in a network of technology and innovation centres (TICs) across the province.

TICs serve as an outlet for commercializing research ideas out of universities and into Ontario businesses and also help businesses create incremental innovations to remain competitive. They act as a platform to support business innovation by conducting basic and applied research from discovery to the commercial development of products and business processes.[4] TICs are characterized by their "consultancy-like approach" of quickly providing client firms with on-demand services to fit their needs, such as specialized expertise and equipment essential for commercializing their business ideas.[5] They have a physical location where academic researchers and businesses converge and collaborate to determine the TICs' research agendas.[6] Firms enjoy reduced risk, shorter time to bring products and services to market, and cheaper R&D, as well as increased awareness of and capacity for adopting new technologies to better serve consumers and corporate customers.[7] These benefits are particularly impactful for firms involved with manufacturing and other goods-producing sectors.[8] TICs maximize the impact of other government expenditures on innovation, create jobs from growing more

[4] Bramwell, Allison, Nicola Hepburn and David Wolfe. "Growing Innovation Ecosystems: University-Industry Knowledge Transfer and Regional Economic Development in Canada." *Program on Globalization and Regional Innovation Systems, Munk School of Global Affairs, University of Toronto*, 2012.
[5] Hepburn, Nicola and David Wolfe. "Technology and Innovation Centres: Lessons from Germany, the UK and the USA." *Innovation Policy Lab, Munk School of Global Affairs, University of Toronto*, 2014, 4.
[6] Patry, Gilles and David Moorman. "Technology and innovation centres: The key to improving collaboration" *Policy Options*, 2012.
[7] Hauser, Hermann. "The Current and Future Role of Technology and Innovation Centres in the UK." Report to Her Majesty's Principal Secretary of State for Business Innovation and Skills, 2010.
[8] Comin, Diego, Georg Licht, Maikel Pellens, and Torben Schubert. "Do Companies Benefit from Public Research Organizations? The Impact of the Fraunhofer Society in Germany." Center for Innovation, Research and Competences in the Learning Economy, Lund University, Papers in Innovation Studies, Paper no. 2018/07, 2018.

businesses, address the market failures of the commercialization gap, and act as "anchors for community economic development."[9]

The most prominent and successful TICs are the Fraunhofer Society of applied research institutes in Germany. Founded in 1949, the Fraunhofer Society has been involved in several notable innovations including MP3 audio files and cochlea implants, and each year earns over $3 billion from as many as 8,000 research contracts with the public and private sectors.[10]

Several factors key to Fraunhofer's success suggest best practices for an Ontario network of TICs. A federated governance structure provides coordination and economies of scale on network-wide issues like branding and government funding while giving individual institutes' operational flexibility and a voice in collective affairs. Institutes' funding is evenly split between private contracts, public contracts, and base funding from government. This incentivizes institutes to focus on research closely related to businesses' needs while remaining insulated from short-run business cycles and funding some research on promising long-term topics.[11] Each institute is specialized to match their local economic and academic strengths, meaning institutes are rarely in competition and instead can collaborate on projects and share best practices.

Germany is often held out in policy discussions as the model of a modern economy. While other success factors like a popular apprenticeship system and culture of academic-industry collaboration are harder to replicate, Fraunhofer's role in supporting Germany's strong, innovation-based economy is a model that could be used to improve Ontario's innovation and commercialization performance, particularly in the manufacturing and goods-producing sectors and for small and medium enterprises (SMEs).[12] In addition,

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[9] Bramwell et al., "Growing Innovation Ecosystems." 33-34.
[10] Hepburn and Wolfe, "Technology and Innovation Centres."; Calculated from annual totals provided (in Euros) in Fraunhofer-Gesellschaft. "Annual report 2016: Embracing Digitalization." 2017.; Comin et al. "Do Companies Benefit from Public Research Organizations?"
[11] National Research Council. "Appendix A2: Fraunhofer-Gesellschaft: The German Model of Applied Research." in *21st Century Manufacturing: The Role of the Manufacturing Extension Partnership Program*, ed. Charles Wessner (Washington, DC: The National Academies Press, 2013).
[12] Comin et al. "Do Companies Benefit from Public Research Organizations?"; National Research Council. "Appendix A2."

there are several complementary innovation policies the government should consider to boost commercialization. Management of intellectual property (IP) from Ontario universities should be improved by standardizing IP policies across Ontario universities and either improving their technology transfer offices' capabilities or centralizing IP management in patent collectives that pool IP ownership to discourage transfer abroad. The government should expand demand-pull innovation policies such as voucher programs that subsidize SMEs' purchase of commercialization services and preferential procurement policies. Finally, Ontario should help create a standing federal-provincial council of ministers on innovation policy (mirroring existing councils for environment and education ministers) with adequate capacity to support and integrate different governments' innovation policies, especially on shared-issues like data collection.

The innovation agenda needs to move from rhetoric to reality and from invention to commercialization. Now is the time for Ontario to capitalize on all the good work and brain power we have in this province to create jobs and grow a modern economy here at home.

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