

Q&A

David B. Watters

Q. *What are the components of Canada's innovation ecosystem and how well is it performing?*

A. Unfortunately, Canada's innovation ecosystem performs poorly. The Conference Board of Canada (2013; tinyurl.com/cjovnnj) recently gave Canada an overall "D" grade on its Innovation Report Card, ranking it 13th among 16 peer countries. This performance is generally characterized as being excellent at producing academic research on the one hand, but on the other hand is noted as being poor at commercializing knowledge.

So, what accounts for Canada's relatively poor performance? To answer this question, it is worth examining the organizations that offer innovation support services to Canadian firms, the characteristics of these firms, and the challenges they face.

Components of Canada's Innovation Ecosystem

Canada's innovation ecosystem consists of the public sector institutions, private sector businesses, and academic organizations that offer business resources and support services to Canadian firms. These resources and services assist firms in developing innovative products or services to sell in domestic and global markets.

In the *public sector*, all three levels of government (i.e., federal, provincial, and municipal) offer a variety of innovation support services to firms, as shown by the examples listed in Table 1.

The *private sector* itself offers a range of support services to firms. For example, private sector investors offer risk capital (i.e., angel capital or venture capital funding) to finance startups or early-stage companies. Other business service providers offer services relating to, for example, intellectual property, accounting, marketing, and business management. Frequently, these business service providers are clustered around firms in specific technology subject areas, such as wireless technologies, medical devices, or "cleantech".

Academic institutions (e.g., universities and colleges) also provide a variety of important services to firms. Their most important contribution is a constant supply

of trained undergraduate, graduate, and post-graduate talent in all disciplines that can be accessed by innovative firms. They also provide firms with access to new research knowledge via technology transfer offices or with access to skilled researchers themselves. Finally, they can provide specialized technology and business knowledge through access to academic staff, as well as customized workplace training.

In summary, an effective innovation ecosystem offers firms a comprehensive suite of innovation support services, provided from collaboration among the public sector, private sector, and academic institutions. Unfortunately, in Canada, coordination and collaboration on innovation opportunities between the federal and provincial governments, between universities and the private sector, and between governments and the private sector remain underdeveloped.

Key Characteristics of Firms within an Innovation Ecosystem

Variation in the characteristics of firms will have a significant effect both on the kinds of innovation support services a group of firms would need and on the ways the firms would access these support services. In effect, the public, private, and academic innovation service providers need to "segment" the marketplace of firms that will access their services. As a result, to improve performance of Canada's innovation ecosystem, the nature of the services provided to firms would need to be adjusted to match several basic firm characteristics, including:

- the *number* of firms
- the *size* of firms
- the *industry sector* the firm operate in (e.g., ICT, cleantech, biopharmaceutical)
- whether the firm produces a *product* or a *service* (over 75% of all Canadian firms produce services)
- the *age* of firms (startups face unique sets of challenges)
- whether the firms are *publicly* or *privately* owned
- the *region* of Canada or *regional cluster* within which the firms are embedded

Q&A. What Are the Components of Canada's Innovation Ecosystem?

David B. Watters

Table 1. Examples of innovation support services from the public sector

Type	Description	Examples
Basic research	Research funded primarily through universities to produce talent and new research-based knowledge for access by firms	<ul style="list-style-type: none"> Natural Sciences and Engineering Research Council (NSERC; nserc-crsng.gc.ca) Social Sciences and Humanities Research Council (SSHRC; sshrc-crsh.gc.ca) Canadian Institute for Health Research (CIHR; cihr-irsc.gc.ca) Genome Canada (genomecanada.ca) Canada Research Chairs (chairs-chaieres.gc.ca)
Research infrastructure	Programs to fund research infrastructure or funding for incubators or accelerators to assist the growth of technology-based firms	<ul style="list-style-type: none"> Canada Foundation for Innovation (CFI; innovation.ca) Indirect Costs of Research Program (ICP; indirectcosts.gc.ca)
Applied R&D	Programs that fund applied research	<ul style="list-style-type: none"> National Research Council (NRC; nrc-cnrc.gc.ca) National Centres of Excellence (nce-rce.gc.ca) Centres of Excellence for Commercialization of Research (CECR; tinyurl.com/k29r3ut) Business-Led National Centres of Excellence (BL-NCE; tinyurl.com/jw68etc)
Tax support	Tax credits or deductions	<ul style="list-style-type: none"> Scientific Research and Experimental Development Tax Incentive Program (SR&ED; tinyurl.com/bxzvg2h) Specialized rates for the Capital Cost Allowance (tinyurl.com/mgpqn7y)
Direct support	Funding and other support provided directly to businesses	<ul style="list-style-type: none"> Industrial Research Assistance Program (IRAP; nrc-cnrc.gc.ca/eng/irap/) Sustainable Development Technology Canada (SDTC; sdtc.ca) Business Development Bank of Canada (BDC; bdc.ca) Innovation support programs through regional development agencies: Atlantic Canada Opportunities Agency (ACOA; acoa-apeca.gc.ca), Canada Economic Development for Quebec Regions (CED; dec-ced.gc.ca), Federal Economic Development Agency for Southern Ontario (FedDev; feddevontario.gc.ca), Western Economic Diversification Canada (WD; wd-deo.gc.ca/eng/)
Framework legislation or regulation	Programs to support innovation activity	<ul style="list-style-type: none"> Competition law, patent law, environmental regulation, procurement programs such as the Canada Innovation Commercialization Program (CICP; tinyurl.com/lvfj29n) New approaches to defence procurement, new international free trade agreements and corresponding trade missions, and revised immigration programs, etc
Regional business support	Economic development organizations and partners	<ul style="list-style-type: none"> Invest Ottawa (investottawa.ca) Communitech (communitech.ca) MaRS (marsdd.com) TEC Edmonton (tecedmonton.com)

Q&A. What Are the Components of Canada's Innovation Ecosystem?

David B. Watters

All these characteristics may influence the effectiveness of firm-level innovation. For example, consider *firm size*: Canada has 1,122,306 businesses that have employees (StatsCan, 2012; tinyurl.com/noauuap). Of these:

- 2,528 (0.3%) are large sized (500+ employees) with an average of 1,550 employees
- 18,999 (1.7%) are medium sized (100-499 employees) with an average of 90 employees
- 1,100,779 (98%) are small sized (<100 employees) with an average of 4.7 employees

It is very likely that the way in which a small firm of only five employees manages innovation will be *significantly different* from the way in which a large firm of 1,500 employees manages innovation.

Unfortunately, despite the fact that 98% of all firms in Canada are small, many government policies and programs are designed primarily for larger firms and do not fully recognize the challenges facing the average small firm of five people. For example, such small firms are simultaneously trying to build a sustainable business, conduct research, develop technology, maintain adequate cash flow, and access global markets. As a result, the way in which such small firms access innovation resources from the innovation ecosystem and the kinds of assistance they require will be different from larger firms, as will be the challenges for governments in designing scalable and easily accessible support programs to assist them.

In summary, the function of an innovation ecosystem is to provide firms with efficient and effective access to innovation resources (e.g., access to talent, risk capital, new knowledge, technology intelligence, business mentoring, market intelligence) as well as to establish a supportive regulatory framework (i.e., marketplace rules) for all firms. The function of the firm within this ecosystem is to innovate new products and services for global markets.

The Challenges Facing Firms within Canada's Innovation Ecosystem

There are many challenges within Canada's innovation ecosystem that contribute to its lacklustre performance. Most critiques focus correctly on its poor commercialization performance. For example, while Canadian institutions are good at producing new knowledge, we are not good at supporting firms in integrating that knowledge into innovative goods and services for sale in global markets.

Unfortunately, Canadian governments have focussed too much attention on investment in basic research on the expectation that these investments in new knowledge would trickle down to firms. They have not invested enough in supporting firms to access the services they need to both make innovative goods and sell them in global markets. Furthermore, government policy makers have not fully recognized the structure of Canadian industry – for example, that 98% of Canadian firms have an average of five employees – nor have they identified and provided the resulting kinds of particular support these smaller companies need (e.g., access to risk capital, access to market intelligence, access to business mentorship, access to global business networks) in order to penetrate restrictive and complex emerging markets in China, India, and Brazil.

As a result, governments need to focus more policy attention on routinely surveying and talking to firms, and finding out the real challenges they are facing in trying to innovate new products and services for these global markets. Furthermore, these discussion need to be segmented by industry *sector*, by firm *age*, by firm *size*, etc., as outlined here. Only then should policy makers consider how to adjust the components of Canada's innovation ecosystem, to permit these firms easier access to the innovation services they need so that they may enhance their chances of being successful in global markets.

Q&A. What Are the Components of Canada's Innovation Ecosystem?

David B. Watters

About the Author

David B. Watters is President and CEO of the Global Advantage Consulting Group in Ottawa, Canada, which helps public and private sector organizations to develop growth strategies, to develop new collaboration networks and business models, to design new support services for industry, to enter new commercial markets, and to design measurement systems to monitor performance. His firm also designs and builds “ecosystem maps” to visualize client investments in programs and projects in areas of new technology development, innovation/commercialization expansion, energy/climate change, and trade. David holds an Economics degree from Queen’s University in Kingston, Canada, as well as a Law degree in corporate, commercial, and tax law from Queen’s Law School. As an adjunct Professor at the University of Ottawa's School of Management, he taught International Negotiation to MBA students for seven years. His 30-year career in the Government of Canada included responsibilities as an Assistant Deputy Minister in a variety of economic ministries including Industry Canada, the Treasury Board, and Finance Canada.

Citation: Watters, D.B. 2013. Q&A. What Are the Components of Canada's Innovation Ecosystem and How Well Is it Performing? *Technology Innovation Management Review*. September 2013: 38–41.



Keywords: innovation, innovation ecosystem, public sector, private sector, academia, commercialization, performance, policy