



A NEW MODEL FOR INTERNATIONAL RESEARCH-DRIVEN TRADE
IC-IMPACTS Centres of Excellence Recommendation for Federal Budget 2017

EXECUTIVE SUMMARY

IC-IMPACTS is grateful for the opportunity to submit ideas to the House of Commons Standing Committee on Finance as part of its consultations for Federal Budget 2017.

Since 2013 IC-IMPACTS has been enhancing trade with India through science-based innovations that boost social, economic and community development in both countries. Expanding this model to other countries would position Canada as a global convenor of research-driven innovation. A heightened lead role for Canada will accelerate trade, grow Canada's green economy, create new innovations to improve the health and sustainability of Canadian communities, and deliver significant return on government innovation investments.

The proposed model fosters strong, intersected, and highly creative innovation clusters that are: equally funded by participating countries, respond to urgent community-identified problems, comprise of researcher-led teams of industry, government and communities working together, and deliver platform-based technologies that are rapidly deployed and transferred across economic sectors and communities. Canada's international strategy will become equal, science-based, reciprocal trade focused, and community benefitting.

The result: it will create a brand for Canada as innovation leader and global convenor, it will create new speedways for trade between Canada and its priority international partners, and it will lead to increased growth of the domestic green economy with direct benefits for all Canadians.

IC-IMPACTS recommends that:

*The federal government support the establishment of a **Canadian Centre for International Research Partnerships (CCIRP)** dedicated to building multi-sector, multinational research programs focused on late stage development of platform-based technologies and that the Centre be established through an investment of \$ 80 million over 5 years that will leverage similar matching contributions from at least five partner countries.*



INNOVATION TO GROW CANADA'S ECONOMY

Canada's social and economic success depends on globally competitive firms. This requires harnessing the creativity and excellence of Canada's academic and industrial communities and positioning Canadian industry, especially SMEs, to flourish domestically and compete globally. Success lies in innovation: innovation that is inclusive, that creates a lower carbon future, that takes advantage of an increasingly digitalized, data-driven and "smart" world, and that is frugal by design.

UNREALIZED POTENTIAL

Canada is a top performer compared to other OECD countries in two important aspects¹:

1. Canada has an excellent research community (performing 5th in top cited papers and 8th in number of scientific articles), and
2. Canada is a leader in commercial start-ups (ranking 2nd in new firm density, launching 7.56 new firms per 1,000 working-age people / year, and 4th in ease of entrepreneurship).

Both Canada's gross domestic product (GDP) and the employment of Canadians is driven by SMEs. SME's account for 90% of Canadian exporters² (responsible for GDP totalling \$68 billion) and employ 90.3% of all private sector employees in Canada³. Moreover, 60% of SME exporters introduce at least one type of innovation (compared to 35% of non-exporting SME's), are 3 times more likely to invest in R&D, and have double the average revenue than non-exporting SMEs⁴.

Yet Canada significantly underperforms in terms of its inventiveness, ranking 14th in patent production by population, 15th in trademarks, and 13th in young firms less than five years old involved in patent activity. Only 10% of Canadian SMEs export (87% of whom export only to the United States) and only 10% of exporting SME's export to emerging markets including Latin America, China or other Asian countries combined. The result: Canada ranks close to the bottom of OECD countries in all export markets with the exception of aerospace⁵.

POSITIONING CANADA AS A WORLD LEADER: A BLUEPRINT FOR INNOVATION

The Honourable Navdeep Bains, Minister of Innovation, Science and Economic Development, announced on June 14, 2016 that we need to "**position Canada to lead**" through "**an inclusive innovation agenda**"... to develop "**a bold, coordinated strategy**" which, according to The Honourable Kirsty Duncan, Minister of Science, begins with "**investing in science**" and "**leveraging the remarkable abilities of Canada's researchers**" and which occurs noted the Honourable Bardish Chagger, Minister of Small Business and Tourism, by "**position[ing] Canada [as] a leader in innovation on the world stage**"⁶. [emphasis added]

It is this call to bold ideas, to coordination, and science-based innovation, where the IC-IMPACTS model lays forward a blueprint for international partnership that can position Canada as a global convenor for invention, creativity, and global impact.

Innovation Cornerstones

The federal government clearly recognizes the importance of trade and growth of Canadian businesses, SME's in particular, having created several supportive structures to foster their development (examples: Industrial Research Assistance Program and Canadian Technologies Accelerators initiative). We propose the addition of a unique, complementary tool that can advance strategic bilateral foreign policy goals and create new pathways for industry to priority markets: a **Canadian Centre for International Research Partnerships (CCIRP)**.

Importantly, the proposed CCIRP is distinctive from existing trade programs in several fundamental respects:



- **Partnerships are** bilateral social and economic development collaborations premised on S&T that are mutually benefitting **not aid-driven**;
- **Research** areas are **identified and driven by community-needs**;
- **Innovation is developed and led by researchers** in partnership teams with industry, community, government, and policy/regulatory agencies;
- Projects include **rapid deployment of technologies or innovations into a community context within three years** to accelerate benefit to citizens, improve R&D return on investment for industry, and provide the evidence of product effectiveness to give competitive advantage to industry partners;
- Projects are **funded bi-nationally or multi-nationally** to ensure leveraging of Canadian investment and meaningful participation of all partners; and,
- **All industry can participate** – both SMEs and larger firms – ensuring inclusiveness and supporting growth of companies.

CCIRP is envisioned to be:

1. “Smart” and science based to take advantage of digitalization, integration, and the world’s move to “smart communities”; and to build on Canadian strengths in areas such as quantum computing and digital manufacturing;
2. Focused on late-stage platform technologies to penetrate a range of Canadian industrial sectors;
3. Frugal by design to enable global access to innovations;
4. Low carbon or energy-reducing to ensure Canada is a lead partner in “Mission Innovation”;
5. Impact focused to ensure technologies directly benefit all Canadians;
6. Designed to foster economic development at the local level through the creation of critical social, economic, and community infrastructure;
7. University-hosted to develop science-based economies and leverage prior investment in Canada’s world-leading academic facilities; and,
8. Invested in by international partners to ensure equal and effective participation and outcomes.

Research-Driven Innovation

Prime Minister Trudeau⁷ recently emphasized a need for global action: “We can [collectively] fight climate change without sacrificing growth and prosperity. In fact, our global push toward a low-carbon economy will produce new companies, new growth, and new prosperity”⁸. In June 2016, “Mission Innovation”⁹ established an enabling framework to accelerate global clean energy innovation and set a course for research-driven economic growth.

With the built environment being responsible for the vast majority of global GHG emissions and with water shortages and poor quality undermining health and food security worldwide, several areas emerge as particularly well suited for Canadian-led international innovation clusters: (i) energy (ii) water, (iii) advanced materials, (iv) health technologies, and (v) smart, adaptive and resilient systems. Platform technology development in these areas can transfer across sectors such as manufacturing, agriculture, energy, resources, and information and communications technology (ICT), and help grow a diversified and green Canadian economy.

International Partnerships for Success

The IC-IMPACTS model has demonstrated that equal bilateral investment is a prerequisite for meaningful participation and effective transfer of innovation outcomes into markets and communities. With \$4 million committed over the past two years from India’s Department of Science and Technology and Department of Biotechnology, this model has attracted interest from other countries including China, Mexico, Singapore and Bangladesh.



Three criteria are suggested for determining inclusion of international partners into CCIRP:

- Complementarity and alignment of partner countries' national priorities (such as water, clean energy, digital technologies, low carbon advanced materials, and health diagnostics) with Canadian innovation strengths and industrial sectors (examples: China, India, Mexico);
- Innovation excellence where countries can collaborate with Canada to co-create technologies and together develop expedited routes to major emerging markets (example: Singapore);
- Ability to kick-start new S&T agreements (such as that recently signed between Canada and South Korea) wherein CCIRP provides a ready-made pathway for S&T collaboration and added-value trade.

With a relatively stagnant trade relationship between Canada and India (approximately \$6 billion annually and only 1/100 the magnitude of Canada's trade relationship with the United States)¹⁰, there is opportunity for significant trade expansion involving India. With a strong partnership already established by IC-IMPACTS and **with a written commitment of matched funding** from the Indian federal government for continued research partnership, we recommend that India continue as a core partner country.

International partnerships must equally benefit Canada. Through a signature "partner community" strategy, IC-IMPACTS binational teams respond directly to community-identified challenges in Canada. Three examples are illustrative. A novel, cost-effective water treatment solution was deployed in Lytton First Nations in BC resulting in removal of a decade-long boil water advisory. Three additional Canadian communities (2 of which are First Nations) are piloting this technology. Second, a unique parallel project takes a low-carbon alternative road system deployed in India to an Alberta First Nations community in Fall 2016. A third project transfers a glass fibre reinforced polymer (GFRP) strengthening system deployed last year on Toronto's Highway 401 to an Indian community.

These examples demonstrate the cross-national transference and mutually beneficial impacts that the structure and strategy of CCIRP uniquely affords.

SME Trade Speedway

Several factors affect SME entry into foreign markets: (1) difficulty creating identity, (2) challenge maintaining presence, (3) struggle navigating complex regulatory and business environment; and (4) lack of evidence of product effectiveness in target market¹¹.

International partnerships at time of innovation development help provide industry with insight into regulatory frameworks, demonstrate effectiveness in pilot deployments, and create a network through which innovations can be distributed. The result: a competitive advantage for participating industry.

The success of the IC-IMPACTS approach is demonstrated by two key outcomes:

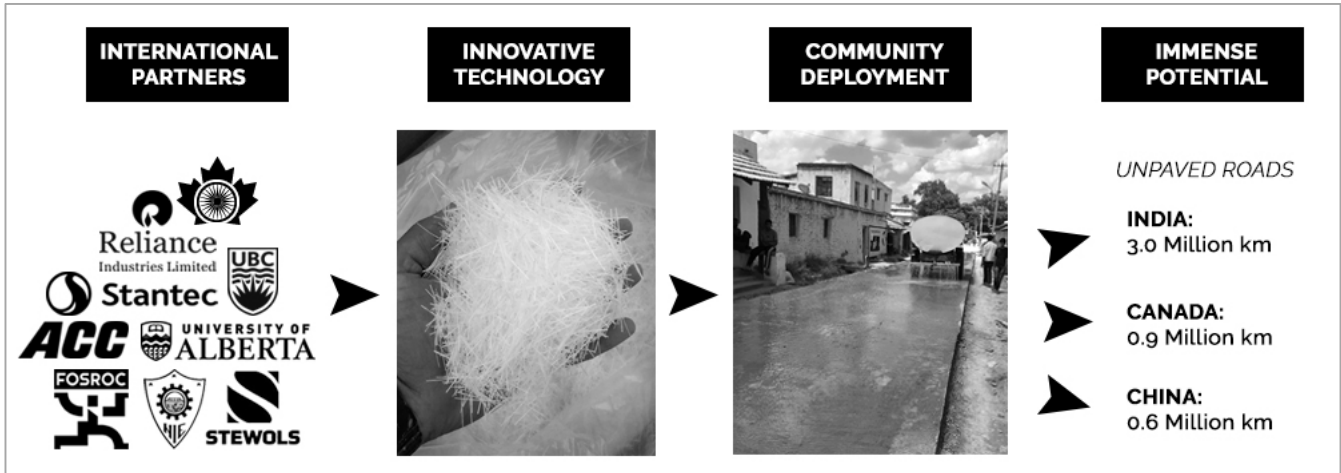
- 12 patents awarded / applied for in 2 years, (3 times the level of other national centres in Canada)¹²
- The model attracts SMEs: 76% of IC-IMPACTS industrial partners are SMEs



New Innovation Pipeline

CCIRP creates a new innovation pipeline.

Example: New Low carbon road system in India



Entrepreneurially Ready Next Generation

Most international partnerships focus on mobility (companies, researchers, and/or students). Few extend knowledge sharing to professional practitioners, policy / code agencies, or innovation end-users. Even fewer provide on-the-ground training in technology transfer in foreign contexts or applied entrepreneurship training. CCIRP includes this programming to keep Canadian industries at the leading edge of global technology development, to create the next generation of entrepreneurially-minded innovation leaders, and ensure the effective uptake of innovations within communities. Building on Canada's world class post-secondary system, CCIRP embodies a knowledge development model that establishes training as a trade sector in and of itself.

SPECIFIC RECOMMENDATIONS

Canada can become a global leader and convenor of international innovation. IC-IMPACTS specifically recommends that:

*The federal government support the establishment of a **Canadian Centre for International Research Partnerships (CCIRP)** dedicated to building multi-sector, multinational research programs focused on late stage development of platform-based technologies and that the Centre be established through an investment of \$ 80 million over 5 years that will leverage similar matching contributions from at least five partner countries.*



References:

- ¹ Conference Board of Canada, “How Canada Performs: A Report Card on Canada”, <http://www.conferenceboard.ca/hcp/default.aspx>
- ² SME Profile: Canadian Exporters. January 2015 report http://www.ic.gc.ca/eic/site/061.nsf/eng/h_02925.html?Open&pv=1
- ³ Innovation, Science and Economic Development website, SME Research and Statistics <http://www.ic.gc.ca/eic/site/061.nsf/eng/03022.html>
- ⁴ SME Profile: Canadian Exporters. January 2015 report http://www.ic.gc.ca/eic/site/061.nsf/eng/h_02925.html?Open&pv=1
- ⁵ SME Profile: Canadian Exporters. January 2015 report http://www.ic.gc.ca/eic/site/061.nsf/eng/h_02925.html?Open&pv=1
- ⁶ Press Release – June 14, 2016. Government of Canada website: <http://news.gc.ca/web/article-en.do?nid=1084709>
- ⁷ Call to Action background document June 14, 2016. Government of Canada website: <http://news.gc.ca/web/article-en.do?nid=1084709>
- ⁸ Prime Minister Justin Trudeau, World Economic Forum Signature Session in Davos-Klosters, Switzerland, January 20, 2016
- ⁹ Mission Innovation Website, <http://mission-innovation.net/about/>
- ¹⁰ 2015: U.S. Trade in Goods with Canada (<https://www.census.gov/foreign-trade/balance/c1220.html#2015>)
- ¹¹ “Talking Trade- Summary Report of the CGA-Canada Roundtables on International Trade”
- ¹² NCE 20016 Monitoring Committee Report Card on IC-IMPACTS with normalized data.