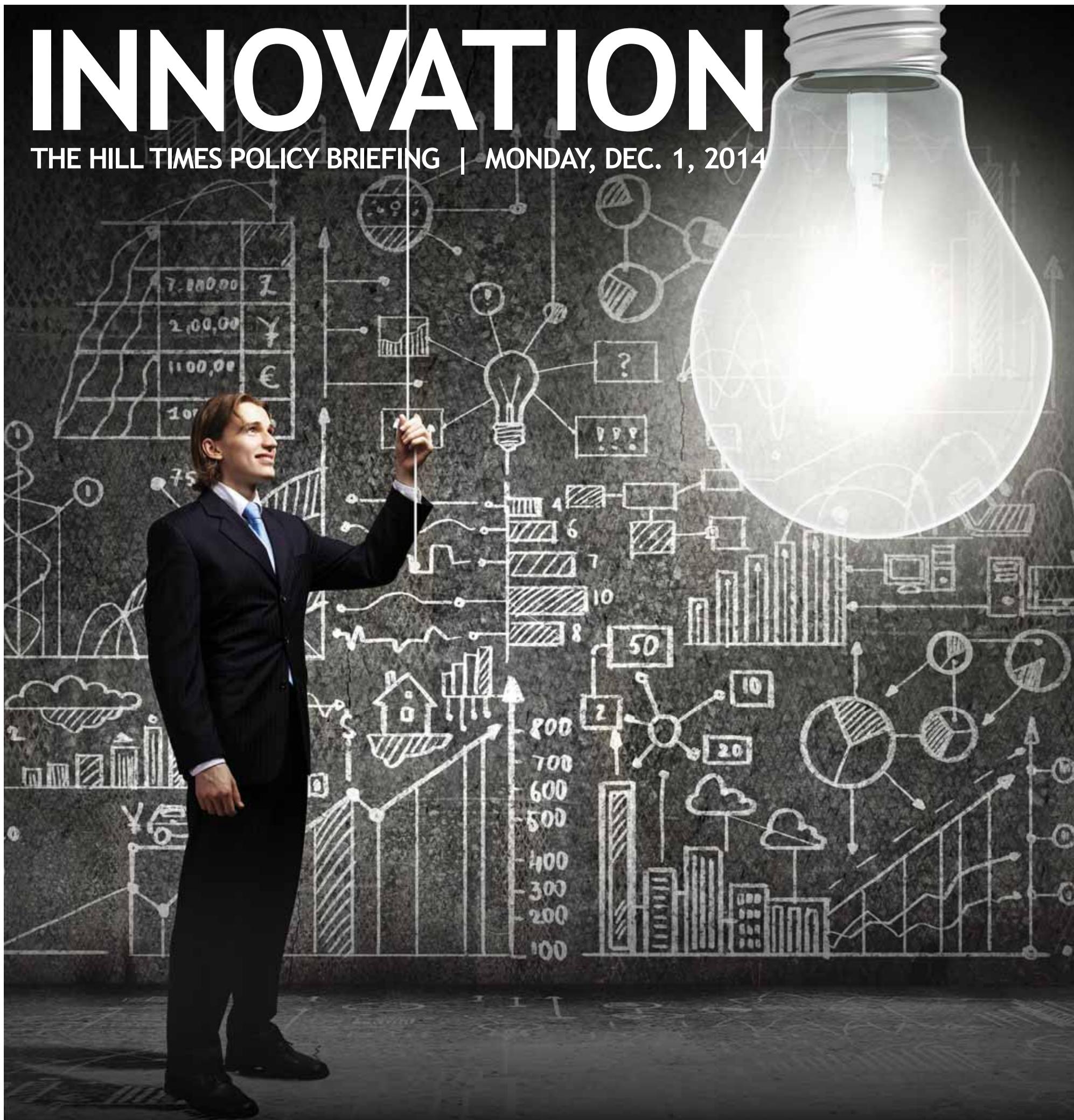


# INNOVATION

THE HILL TIMES POLICY BRIEFING | MONDAY, DEC. 1, 2014



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# INNOVATION POLICY BRIEFING

## GLOBAL COMPETITIVENESS

# Canada's global innovation standing continues to drop, says World Economic Forum

By RACHEL AIELLO

Expanding the nation's capacity to innovate, enhancing business competitiveness and further industry, government and post-secondary collaboration on research and development is needed if Canada wants to see improvements to its global competitiveness ranking, which has fallen once again.

Canada was outpaced in the latest World Economic Forum's (WEF) competitiveness rankings, falling to 15<sup>th</sup> place of 144 national economies in 2014-15, despite holding on to 14<sup>th</sup> place for the last two years. Canada fell out of the top 10 in 2011-12 and this year's score is the lowest the country has seen since 2006's 16<sup>th</sup> place score.

There were a few key drivers to the latest numbers, or progression of the trend highlighted by experts; underperforming on the capacity for innovation, business sophistication and engaging in global markets.

This is causing Canada to lose ground to other countries that are improving at an excellent rate that Canada hasn't been able to keep up with, says Michael Bloom, vice-president of industry and business strategy at the Conference Board of Canada, who assisted the WEF with research on Canada's economic competitiveness for this report, and in years past.

Also sliding one place is the country's innovation record, to 22<sup>nd</sup> from 21<sup>st</sup> in 2013-14. Although the government has made positive steps in terms of funding business development, there is room to make big gains by investing Canadian capital in startups and small enterprises.

"The great startup of today becomes the global company of the future and we're lacking that piece," said Mr. Bloom.

A key part in working towards an improved score is Canada's business sophistication, which in 2014-15 is up to 23<sup>rd</sup> place, from 25<sup>th</sup> the year before. This responsibility falls on the shoulders of companies to embrace aspects of innovation that would boost their competitiveness, like step up their spending on R&D, or research and development, and take the risk of expanding into broader markets outside of Canada's borders.

According to the 2014-15 report, published in September, Canada continues to show strong numbers on health, education and institutions, as well as labour market efficiency.

"We have all these levers, that if they were being pulled on correctly, and at the right amount, and at the right time, we should be doing relatively better than we are now," said Douglas Watt, director of research in the industry and business and strategy group at the Conference Board of Canada, and spokesperson on the report.

"When you think about what we're competing with, other top economies, we need to do better and that's where, if we could pull the basic requirements around health, education, and our institutions, plus the levers around financial markets, market size and higher education and training, we would then produce more goods and services, higher value-added products and services which would lead them to innovation and we would have what the World Economic Forum likes to call more sophisticated business," said Mr. Watt.

The overall rankings are an aggregate of 12 pillars: institutions; infrastructure; macroeconomic environment; health and primary education; higher education and training; goods market efficiency; labour market efficiency; financial market development; technological readiness; market size; business sophistication; and innovation. Of these pillars, the only three Canada ranked in the top 10 of were health and primary education, holding on to last year's seventh place ranking; labour market efficiency, placing seventh; and financial market development, where Canada came in eighth.

When it comes to post-secondary education and training, Canada moved from 16<sup>th</sup> place to 18<sup>th</sup>, despite it still being one of Canada's strongest showings.

Canada's current macroeconomic situation was reflected in the standings as well, ranking just above the bottom 20 countries in terms of

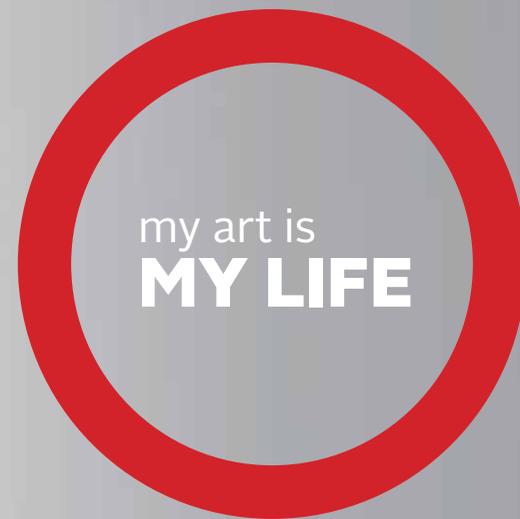
the government debt as a percentage of the GDP, at 124<sup>th</sup>, however, Canada was ranked first for the best score on the percentage of annual change in inflation, as well as on the soundness of the banking system.

Switzerland took the top spot on the competitiveness ranking and among the 14 countries ahead of Canada were the United States in third, Hong Kong in seventh, the United Kingdom in ninth, the United Arab Emirates in 12<sup>th</sup> and Taiwan just ahead, in the spot Canada held last year.

The WEF survey of Canadian stakeholders in the report indicate the "problematic factors" for doing business in contemporary Canada including the access to financing, the tax rates, an inefficient government bureaucracy, an insufficient capacity to innovate and restrictive labour regulations. These concerns were also evident in last year's report, signaling the slow, or non-existing improvement in the areas of financing and government regulations.

"Our research shows that Canadian firms, as a whole, have been slow to embrace global market opportunities and are not as connected into great global value chains as they could be, we're seeing a real need for businesses to do more," said Mr. Bloom, who also mentioned accessing emerging markets and connecting small and medium sized enterprises, or SMEs

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My name is  
Tiko Kerr  
I'm a visual artist  
I'm from Vancouver  
and I am an HIV survivor

I was diagnosed with HIV in 1984 and it was the beginning of my journey of survival. In 2005, after 20 years of taking various medications, I was declared completely drug resistant – it was a death sentence. My doctor and I worked tirelessly to obtain the right to a clinical trial for a new medicine. We succeeded, and in January 2006 I started the new treatment. Within a week my symptoms were improving. After three months the HIV virus could no longer be detected in my system. I have made a full recovery. My life is now full of hope and the possibilities are endless. My life was saved because of ongoing research to develop new, more effective medicines.

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# INNOVATION POLICY BRIEFING

## SCIENTISTS



Scientists, pictured on July 10, 2012, in Ottawa protesting the Harper government's cuts to research and conducting a mock funeral marking 'the death of evidence.' *The Hill Times* photographs by Jake Wright

## Federal scientists to mount 'evidence-based' campaign against government cuts, being muzzled

While Conservatives continue to point to their 'record' research investments.

By Rachel Aiello

The upcoming election is going to be the most important election for science that Canada has seen, say the NDP and Liberal science and technology critics. NDP MP Kennedy Stewart (Burnaby-Douglas, B.C.) and Liberal MP Ted Hsu (Kingston and the Islands, Ont.) both said they think science is set to become a bigger election issue than it has in any recent history.

This, they say, in part will be fuelled by a recent decision from the largest public service union in Canada representing scientists and professionals employed by the federal government. The Professional Institute of the Public Service of Canada (PIPSC) represents 60,000 government workers, including over 15,000 federal scientists and researchers, and in the lead up to the 2015 election the union has decided to become more politically active.

The move is an unprecedented step from the union, breaking from its non-partisan position, to run an "evidence-based" campaign aimed at informing voters of the current government's record. "Our members who are scientists are certainly feeling the brunt of the policies and cuts that have led us to take this exceptional position," said Peter Bleyer, a special adviser to PIPSC president Debi Daviau, speaking on her behalf in an interview with *The Hill Times*. PIPSC is still figuring out what exactly its information campaign will look like, but Mr. Bleyer said they

want to be professional, non-partisan and use evidence to make their case. "My hope would be that the scientists would not have been put in this position, it's much better to have scientists in their labs and teaching students or issuing important reports, than up on Parliament Hill protesting," said Mr. Stewart. It will be interesting to see what kind of effect scientists in both the private and public sector will have on the federal election, as they are more politically engaged now than five years ago, said Mr. Hsu. Mr. Stewart said he hears from

government scientists daily who are experiencing government interference in their work, or not being allowed to comment as an expert in their field of study. "I'm in contact with about 10,000 scientists across Canada and what I've found is that they feel like they just have no choice, if they don't stand up now for science in Canada then all would be lost if we have the same election results as last time," said Mr. Stewart, who described what's happening to scientists as "un-Canadian."

Mr. Hsu said he too is all too familiar with seeing long email chains from government departments deciding whether or not a particular researcher can speak to the media or not. "I've had scientists approach me and say, 'I wrote this paper and then some people tried to change the wording and I think it's more than just cosmetic, it changes what we're actually trying to say.' ... I've also had the experience of trying to phone up somebody I had met before to say, 'Oh can I ask you something?' and they said, 'Oh, well please contact the minister's office,'" said Mr. Hsu, who explained that he had tried to email a friend from graduate school who was a government scientist and got that "terse reply."

"Even the international community is now looking at it going, 'Boy your government's destroying science in Canada,'" said Mr. Stewart. However, the government points to its investments in research resources, representing the largest annual increase in research support through granting councils in over a decade, once they have been fully phased in.

"As the minister of state responsible for the National Research Council (NRC), I can say international scientific collaboration at the NRC is important. Collaboration allows our scientists to share knowledge and leverage resources, which spur greater innovation and commercialization for Canadian businesses," said Minister of State for Science and Technology Ed Holder (London West, Ont.), in an email to *The Hill Times*.

In 2013, PIPSC released a survey of government scientists they commissioned called "The Big Chill," which found that 90 per cent of scientists in the public service feel they are not allowed

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## GLOBAL COMPETITIVENESS

# Canada's global innovation standing continues to drop, says World Economic Forum

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with market partners, as important next steps.

The government and post-secondary institutions are doing well at "discovery phase" research, however they face challenges in collaborating or linking this to the private sector and public markets in order to enhance the sophistication to turn R&D into new products, processes and services with value, often times referred to as the "commercialization gap." It's thought that now, more than ever, is the time to act, given the amount of venture capital waiting just below the border.

"Businesses need invest more in the management of innovation, the decision making process and being able to be bold leaders that understand risk and how to mitigate risk," according to Mr. Watt, who thinks Canada could be doing a better job.

Canada is still lacking on its investment in infrastructure, a key area experts agree is a conduit to productivity, like fibre optics, railways, pipelines, ports, bridges and public transit.

In terms of IP protection, Canada ranked 12<sup>th</sup>, but the strength of IP protection in Canada is the fourth best among the 144 nations. When it comes to the availability of scientists and engineers, Canada is ranked 12<sup>th</sup> and the countries ability to attract talent is among the top 10, at ninth place, however when it comes to retaining talent, Canada slips to 14<sup>th</sup>.

"People come in with quite a high expectation coming through immigration process, to have the opportunity to use their skills and expert knowledge in jobs in Canada and often they find there are barriers to that when it comes to requirements to re-qualify, and costs the associated," said Mr. Bloom, who cited this as an ongoing issue for Canada, losing a portion of our immigrants to the United States, where Mr. Watt described the competition to be



Industry Minister James Moore has pointed to Canada's top ranking in its banking system. *The Hill Times* photograph by Jake Wright

"fierce," and "bold and nimble," with no trouble enticing talent, and now a growing trend draining Canada's top brains, are recruiters coming from countries like China and India to recruit their people back home as their emerging economies are creating more job opportunities.

Another interesting number to come out of the report is Canada's 81<sup>st</sup> place standing on the prevalence of trade barriers. According to experts, this included the interprovincial trade barriers Canada has, as well as the "thickness" between the Canada U.S. border that are additional costs to companies. Considering the year's developments on international trade deals, the Conference Board of Canada anticipates the numbers to reflect that improvement as agreements like CETA and the Canada Korea Free Trade deal are implemented.

Comparing Canada's standing last year, to the current numbers on some key areas indicate that there have been incremental improvements to the areas emphasized or recommended in last year's report to be important places to build. The capacity to innovate is up one place, to 26<sup>th</sup>; company spending on research

and development, or R&D is up two spots to 27<sup>th</sup>; and the government's procurement of advanced research and technology is up from 55<sup>th</sup> place, to 48<sup>th</sup>. One area that has slid by one place to 18<sup>th</sup>, is university industry collaboration on R&D, despite being a growing strength, it seems other countries are finding faster success in this area.

"Smart investment in skills and innovation is key to enhanced productivity and competitiveness," the report reads. "Economies that consistently rank high in the competitiveness rankings are those that are able to develop, attract and retain talent, and constantly introduce new and higher value-added products and services into the market."

Although the challenge posed by innovation is not a new story, it is growing in importance as the emerging markets, globalization and trade integration continues to rise, the more Canada needs to innovate to retain or grow its competitive advantage in niches where Canadian industries can punch above their weight.

"We've always had a certain market out there for our resources, but we depend on moving up the value chain to live well and I think that's why it's worth a continuing effort to figure out how to get the investment and how to create policies that enable trade and encourage people to take the great ideas we generate in Canada and turn them into products and services for global markets," said Mr. Bloom.

*The Hill Times* asked Industry Minister James Moore (Port Moody-Westwood-Port Coquitlam, B.C.) for comment, however none was made available, instead an Industry Canada media relations person pointed to past statements Mr. Moore had made on free trade within Canada and the strength of Canada's economy.

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*The Hill Times*

## INNOVATION STANDINGS

### Rankings of the 144 countries on the World Economic Forum's Global Competitiveness Index for 2014-15

1	Switzerland	51	Costa Rica	100	Honduras
2	Singapore	52	Philippines	101	Dominican Republic
3	United States	53	Russian Federation	102	Nepal
4	Finland	54	Bulgaria	103	Bhutan
5	Germany	55	Barbados	104	Argentina
6	Japan	56	South Africa	105	Bolivia
8	Netherlands	57	Brazil	106	Gabon
9	United Kingdom	58	Cyprus	107	Lesotho
10	Sweden	59	Romania	108	Kyrgyz Republic
11	Norway	60	Hungary	109	Bangladesh
12	United Arab Emirates	61	Mexico	110	Suriname
13	Denmark	62	Rwanda	111	Ghana
14	Taiwan, China	63	Macedonia, FYR	112	Senegal
15	Canada	64	Jordan	113	Lebanon
16	Qatar	65	Peru	114	Cape Verde
17	New Zealand	66	Colombia	115	Côte d'Ivoire
18	Belgium	67	Montenegro	116	Cameroon
19	Luxembourg	68	Vietnam	117	Guyana
20	Malaysia	69	Georgia	118	Ethiopia
21	Austria	70	Slovenia	119	Egypt
22	Australia	71	India	120	Paraguay
23	France	72	Morocco	121	Tanzania
24	Saudi Arabia	73	Sri Lanka	122	Uganda
25	Ireland	74	Botswana	123	Swaziland
26	Korea, Rep.	75	Slovak Republic	124	Zimbabwe
27	Israel	76	Ukraine	125	Gambia, The
28	China	77	Croatia	126	Libya
29	Estonia	78	Guatemala	127	Nigeria
30	Iceland	79	Algeria	128	Mali
31	Thailand	80	Uruguay	129	Pakistan
32	Puerto Rico	81	Greece	130	Madagascar
33	Chile	82	Moldova	131	Madagascar
34	Indonesia	83	Iran, Islamic Rep.	132	Malawi
35	Spain	84	El Salvador	133	Mozambique
36	Portugal	85	Armenia	134	Myanmar
37	Czech Republic	86	Jamaica	135	Burkina Faso
38	Azerbaijan	87	Tunisia	136	Timor-leste
39	Mauritius	88	Namibia	137	Haiti
40	Kuwait	89	Trinidad and Tobago	138	Sierra Leone
41	Lithuania	90	Kenya	139	Burundi
42	Latvia	91	Tajikistan	140	Angola
43	Poland	92	Seychelles	141	Mauritania
44	Bahrain	93	Lao PDR	142	Yemen
45	Turkey	94	Serbia	143	Chad
46	Oman	95	Cambodia	144	Guinea
47	Malta	96	Zambia		
48	Panama	97	Albania		
49	Italy	98	Mongolia		
50	Kazakhstan	99	Nicaragua		

Source: World Economic Forum

## Why does Canada fund research that spurs innovation in developing countries?

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# INNOVATION POLICY BRIEFING

## ENTREPRENEURS

# Canadian entrepreneurs in good shape, more cooperative than U.S. counterparts

By DENIS CALNAN

The government and banking industry in Canada are doing a good job at providing financing to entrepreneurs but are failing at properly communicating to the public about how to access that money, experts say.

"I think it's more of an information gap than a financing gap," said Allan Riding, Deloitte Professor in the Management of Growth Enterprises at the University of Ottawa's Telfer School of Management.

"Part of the issue, of course, is awareness. And new business owners, people who are just entering self-employment, often don't know about what's available," said Prof. Riding.

"Raising financing is not easy, but there is help. Governments and the banks are trying to do that because it's in everybody's best interest," said Prof. Riding.

"Canadian entrepreneurs have it pretty good when we compare ourselves to other countries around the world," said Julia Deans, who is the CEO at Futurpreneur Canada, a national, non-profit organization that helps aspiring entrepreneurs, aged 18-39, with financing and mentoring.

It receives some funding from banks and the government.

Dominic Lim, an assistant professor of entrepreneurship at Ivey Business School at Western University, agreed that there is a lot of support for new businesses. He points to several studies for his information.

In terms of opportunity and resources Canada is ahead of all other G20 countries, except the U.S., said Mr. Lim, referencing a Global Entrepreneurship Monitor report and another report by the Global Entrepreneurship and Development Institute.

"It looks like things are going pretty well," he said.

An Ernst and Young publication called *The EY G20 Entrepreneurship Barometer 2013: Canada*, said the cost of starting a business here "is among the lowest in the G20, while entrepreneurs spend fewer hours on their tax affairs than their peers." It also said that Canadians "benefit from better access to funding."

Mr. Riding said Canada has numerous great programs, including the Canada Small Business Financing Program that has a loan guarantee, which he called "one of the most effective programs in the world" and "under-recognized."

Mr. Lim said Canada just

needs to better coordinate and integrate support for entrepreneurs.

"If the money is somewhere out there and the policies are somewhere out there, but if these entrepreneurs do not know how to get access to that money and take advantage of those programs, then the efficiency is not that high," said Prof. Lim.

That is something Ms. Deans hears as well. She said many young people she has met have told her that the support system is fragmented.

"I think the big challenge to banks and government and organizations like ours is how do we knit what we do together so that a young person is able to find the information and do something with it really easily," said Ms. Deans.

She said there is a lack of entrepreneurial culture in Canada, which the government is trying to address.

"When we went across the country and we did 11 roundtables, we went to so many places where people said, 'My parents, my community, my school—everybody was either neutral about me becoming an entrepreneur or actually negative,'" said Ms. Deans.

"There are a lot of people who, growing up in Canada, with people telling them 'That's the last thing you want to do.'"

She said the culture is starting to change with the popularity of things like CBC's *Dragons Den*.

Neither Prof. Lim nor Prof. Riding buy into the argument that Canada lacks entrepreneurial spirit.

Prof. Riding noted that the University of Ottawa is starting a new Entrepreneurial Hub that aims to promote entrepreneurship across all faculties and schools.

"We're staffing it up as we speak," he said.

Prof. Lim said compared to the U.S. we may be less entrepreneurial, but we are not far behind, when compared to other countries.

He said Canada does have more of a culture of co-operation rather than competition, like the U.S.

"We are, in general, more friendly. And I guess we could say we are more collaborative than competitive. I mean we all want to live together, instead of fiercely competing against your neighbour to have a little bigger house and drive a little better car," said Prof. Lim.

is something that attracts some businesses, like Mighty Cast, a company that was recently profiled as a Canadian Innovation Exchange Top 20 company. The company moved from San Francisco to Montreal.

"In my opinion, building a start-

up company—it's much easier to do in Montreal," said Adam Adelman, co-founder and CEO of Mighty Cast.

"There's a lot of talent, there's a lot of technical and creative talent, there's a lot of government support. And it's a much more collaborative environment here than the Bay Area. It's much more competitive in the Bay Area," said Mr. Adelman.

Prof. Lim said that Canadian culture can sometimes not play out well for business. As an example he said sometimes you may think two venture capital companies may be competing. "And then suddenly they make an offer together," which translates into low valuation, said Prof. Lim.

He said Canada could improve on harnessing innovation from universities, something the U.S. does much better.

That was also a point Prof. Riding made as well. "Governments have been promoting the idea of innovation, which is an extremely important component of entrepreneurship." But he said, "by comparison, there has been less emphasis on the development of knowledge that takes those innovations to market."

"The commercialization aspect, relatively speaking, is being neglected."

Prof. Lim said when entrepreneurs are asked if they feel supported typically the answer is no, despite all the international reports saying they are.

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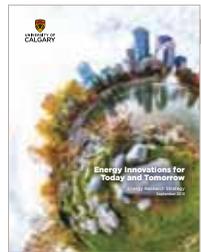
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## INNOVATION POLICY BRIEFING

## GENOMICS

## GAPP looking at funding shortfall

BY DENIS CALNAN

Genome Canada is attempting to address a funding shortfall for innovative commercial products in health, agriculture, fisheries and forestry through its Genomic Applications Partnership Programs (GAPP), with a third round of funding set to be announced this month.

The fund, started in 2013, is involved in many innovations, including trying to bring to market various gene innovations such as disease-resistant fish and vegetables. As well, it is developing tests that would help determine appropriate drugs for Hepatitis C patients.

"We're not looking for really early stage discovery projects. You have to have already shown some initial validation, initial proof of concept and then that's built on through the GAPP project," said Michael Midmer, the director of GAPP, who worked in venture capital for eight years before joining Genome Canada.

"We call this the 'gap,' or 'the valley of death,' where there's just not a lot of funding in Canada in this space. So, often you see academics getting grants and then this valley of death before venture capital comes forward or larger institutional funds. So we're trying to push the Canadian innovation economy through this gap. And hopefully it will be funded and receive future funding to take it all the way to the market down the road," said Mr. Midmer.

Genome Canada is a not-for-profit organization that is funded by Industry Canada and serves as a catalyst to developing and applying genomics. Up until GAPP was brought into existence in 2013 the organization mostly focused on academic research.

GAPP is geared toward industry and commercialization, by helping to pair academic researchers who have innovative discoveries with partners that can help commercialize those ideas. GAPP provides assistance in funding over three-year periods.

"We just couldn't do the research without the GAPP funding," said Daryl Somers, director for applied genomics at Vineland Research and Innovation Centre, a not-for-profit dedicated to horticultural science and innovation.

Vineland is working with Keiko Yoshioka, a researcher at the University of Toronto, to apply her work in discovering a gene involved in plant disease resistance to the greenhouse industry in Canada.

"When you alter the expression of that gene it creates disease resistance. And of course disease pressures are enormous in greenhouse crops and they take away the yield and they take away the profit margin," said Mr. Somers.

Their partnership aims to help farmers combat three diseases in tomatoes, peppers and cucumbers, thereby improving crops and profitability for farmers.

"We get our strategic direction from the stakeholders, which are the growers," said Mr. Somers. "It's very important to understand that this is industry pull. This is stakeholders telling us what they need and then we come up with a solution for it."

Funding for GAPP comes with a condition that the partners bring their own investments to the project as well. While GAPP funds about a third of the costs, which are provided directly to the university partners, companies have to provide a significant amount.

For example, while Genome Canada is anteing up \$802,648 for the Vineland and U of T partnership, the total funding is \$2,416,624.

"Being an institute like we are, we're very careful with our money, so we're quite careful with where we invest it. We do a lot of due diligence around exactly where to invest our monies," said Mr. Somers.

He said, "the stars really aligned for us" in the GAPP partnership.

Of the applications that Genome Canada has received, many are in the health sector.

"Almost half of the applications are in human health. Then in agriculture, then in fisheries, then in forestry," said Mr. Midmer.

GAPP has funded 12 partnerships over two rounds of funding since 2013 and has three more rounds to go until this batch of funding comes to a close at the end of 2015.

Mr. Midmer said even though GAPP projects are still in their relative infancy, many of the projects are moving rapidly and he expects some to be near market-ready within three years. He thinks a product that will help cheese producers will be one of the first GAPP-funded products to hit the shelves.

Agropur Cooperative and the Université Laval are working on a genetic tool to improve cheese quality.

"They're looking at the different bacteria that is in cheese and really trying to quantify what's there, because it has an effect on how long the cheese can stay on the shelf in a grocery store, and if it changes in colour and if it can extend the shelf life then it can extend sales," said Mr. Midmer.

With funding from GAPP, Cooke Aquaculture Inc. and Kelly Cove Salmon Ltd. is working with the University of Guelph on improving growth and resistance to disease and parasites in Atlantic Salmon.

Elanco Animal Health is working with Concordia University on new enzyme combinations for pork and poultry producers to help pig digestion and farmer profit margins.

Another project that Mr. Midmer is keeping his eye on is a pairing between the

Canadian Food Inspection Agency and the University of British Columbia.

"They're looking at protecting Canada's forests from invasive species and they're developing a tool to look at things like gypsy moths and other fungi that come in on ships into the B.C. harbour. And those can be transmitted to our forests if they aren't accurately diagnosed," said Mr. Midmer.

Within the health sector he notes that a Toronto company, Xagenic, is developing a test that can help determine the best drugs for Hepatitis C patients, something he said "could be enormously beneficial."

Also, the Centre for Addiction and Mental Health in Toronto is working with Assurex Health on safer and more effective drug therapy.

*The Hill Times*

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# INNOVATION POLICY BRIEFING

S&amp;T

## NRC's fleet program works on industry fuel consumption

By DENIS CALNAN

The National Research Council is using its expertise and facilities to pair up with industry to improve costs and reduce fuel consumption in ground fleet vehicles for the trucking industry, the military and public vehicles.

"Fleets require a more complex approach to things, because when you talk about a fleet and you talk about maintenance it's a huge cost," said Cristian Tabra, the program leader at the NRC's Fleet Forward 2020 program.

The program was approved by senior management at the NRC in November 2013 and started work soon after, even though the formal announcement of it was made in October 2014.

The program spans seven years and is meant to help develop and commercialize innovative

technology but also to use what is already available to help fleets.

Mr. Tabra said the NRC has been working on various aspects of improving vehicles, like in aerodynamics, for decades. This program is geared to take the NRC's research and make it more accessible to commercial enterprises.

"We've been doing this type of work at NRC for many, many years," said Mr. Tabra.

"We just wanted to apply the same sound principles, engineering, the scientific principles and the knowledge we have to the commercial side of the industry," he said.

This program will apply to transportation and mining trucks, military vehicles and public buses and automobiles, including public transportation and specialized municipal fleets, like fire-trucks, ambulances and police cars.

"Wherever there is a fleet, there is something that we can do for that fleet at the NRC," said Mr. Tabra.

The Canadian Transportation Equipment Association (CTEA) worked on rear impact guards for heavy trailers with the NRC in 2006 and said the partnership was a "win-win."

The Fleet Forward program is expected to operate much like how the partnership between NRC and CTEA worked.

"It's just an example of how it can work between the NRC and industry," said Don Moore, the executive director of CTEA.

Mr. Moore said CTEA worked with the NRC in reaction to strict regulations that came into place requiring strong and energy-absorbing rear-impact guards on heavy trailers.

He said the designs have been very popular within the industry and the product may not have

been possible without the NRC expertise.

"The facilities that NRC has—their testing facilities, their design expertise and their knowledge in the transport side of the business—is solid enough that it was fairly easy to pick up a program like this and work with them," said Mr. Moore.

"They know transportation equipment, they deal with vehicles all the time, they have the facilities to do the kind of heavy testing that we were requiring. And they have the design know-how to back that up with sound engineering and analysis and testing," said Mr. Moore.

The Fleet Forward program has a business approach to research and development, something the Conservative government has been promoting.

"We took a business approach to creating the program at NRC—really identifying the needs of the Canadian industry, rather than sitting back and saying 'You know what, we really know what you need, so here are some technologies that you should adopt.' We went the other way around and really went out and talked to stakeholders and end-users. And we put a strong business case together," said Mr. Tabra.

He said the NRC would be addressing short-term and long-term challenges for fleets.

"In the short-term area it's pretty simple. Clients come to us

with specific issues that they want us to solve," which happens on an ongoing basis, said Mr. Tabra.

Dealing with the long-term challenges is when the NRC's research and development comes into play. Mr. Tabra said the NRC is focusing on two issues right now.

One is vehicle-to-vehicle communication and vehicle-to-infrastructure communication. "That's important because we believe that connected vehicles allow for better deployment of vehicles, increased safety on the road," said Mr. Tabra, noting that that could affect level crossings for trains.

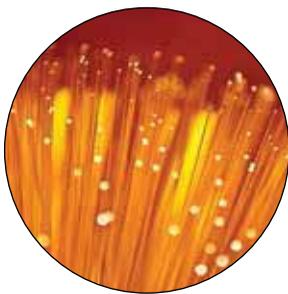
The second long-term focus for the Fleet Forward program is data mining for vehicle prognosis. He said the NRC's data analyzers will be able to help fleet managers know problems before they happen, such as when a vehicle part may fail.

For the Fleet Forward program the NRC expects to use its Climatic Testing Facility, that evaluates the performance of vehicle components under extreme temperatures, as well as its wind tunnel and heavy vehicle tilt facilities.

Partnerships with the NRC are on a case-by-case basis. Clients will either pay a fee for service, or, if they are looking for a collaboration the NRC, will analyze what it can offer and how it can benefit depending on the situation.

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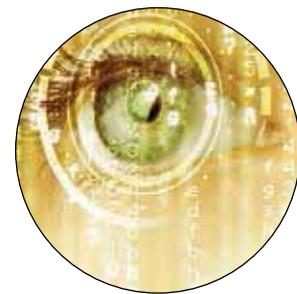
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## INNOVATION POLICY BRIEFING

NATIONAL RESEARCH COUNCIL

# Stakeholders looking for industry element to feds' new science and tech strategy

Stakeholders are wondering if it will make a strong move toward intertwining business and academia or if the final document will just be new language around old policies.

By DENIS CALNAN

While the government is working on a renewed federal science and technology strategy, stakeholders are wondering if it will make a strong move toward intertwining business and academia or if the final document will just be new language around old policies.

The move is to update the 2007 government strategy, Mobilizing Science and Technology to Canada's Advantage. The government said on its website that a new strategy is needed because "the global landscape has changed in the past seven years."

That's something many people working in the field agree with.

Nobina Robinson, the CEO of Polytechnics Canada, a national alliance of Canada's leading research-intensive, publicly-funded colleges and institutes of technology, said the strategy can't come soon enough. Ms. Robinson was a member of the federal Expert Review Panel on Research and Development, known as the Jenkins panel.

"You can innovate on the shop floor, you can innovate in the oil patch, you can innovate in the resource sector," said Ms. Robinson.

That is a view shared by Scott Smith, the director of intellectual property and innovation policy at the Canadian Chamber of Commerce.

Mr. Smith said there are several reasons the strategy needs to be renewed.

"Canada is actually sliding on the innovation scale when you look internationally. So all of the indexes—competitiveness, innovation—we're dropping, instead of improving," said Mr. Smith, citing consecutive World Economic Forum Global Competitiveness reports that have Canada's ranking slipping.

"I would suspect the government is looking at those numbers and saying, 'Okay, well we need to re-evaluate,'" said Mr. Smith.

He said it probably does not make sense for government to keep spending money in the same way it was seven years ago, and instead it needs to turn toward businesses.

"Most research and development is done by large companies," said Mr. Smith.

"They're not always looking at breakthrough technologies, where post-secondary institutions might be," he said, pointing out that would be a reason to continue funding the academic part of the equation.

"But if you want business to participate there needs to be a commercialization



Minister of State for Science and Technology Ed Holder, pictured in this file photo, is responsible for the federal government's science and technology strategy. *The Hill Times* photograph by Jake Wright

aspect to it," said Mr. Smith, noting that industry is better at bringing academic research to commercial fruition.

He said the government and its agencies are already doing some effective pairing in other areas that could serve as a good "template," such as the National Research Council's pairing with industry and Genome Canada's genomic applications partnership programs, which pairs businesses with academics.

Suzanne Corbeil, the executive director of the U15 group of Canadian research universities, said that this government has pushed heavily on building relationships between government, universities and industry.

"I would not be surprised to see that reinforced and maybe even in a stronger way than it was before," said Ms. Corbeil.

She wants to make sure any investment in industry does not come at the expense of work being done at the post-secondary level.

"For our side, what's important is to keep the balance between that approach to research and funding and program development and policies that support the research enterprise in Canada, along with what the basic research requirements are, the fundamental research programs that are at the beginning of the process, as opposed to those that are on the spectrum more aligned to the private sector," said Ms. Corbeil.

She said it is important that the government makes the strategy public as soon as possible to help people involved with other business intertwined with the strategy do their job.

"[Details of] the Canada First Research Excellence Fund are poised to be an-

nounced very soon. And if there is anything in the strategy that would need for us to be aligned with that, that would be critically important," said Ms. Corbeil.

Mr. Smith said he expects it will come out soon because of the approaching election so the Conservatives can campaign on it.

One interesting point that is raising some concern is the addition of the word 'innovation' to the strategy.

"I don't think there's anybody who doubts that Canada needs to have a better 21<sup>st</sup> century logic of how to stimulate both science, technology development and innovation. All three of which are different things," said Ms. Robinson.

"There was great hope that adding the letter 'I' to the 'S' and 'T' strategy, we were actually going to do such an update. But as soon as you put in the letter 'I'—innovation—you're actually talking about something that's not just curiosity-driven, blue-sky research. It's actually market oriented, which will bring a "return on investments or increase profit," said Ms. Robinson.

She said the strategy must clearly state the different roles of those who play a part in the science and technology area, compared to those working in innovation.

Neither Ms. Robinson nor Ms. Corbeil is expecting sweeping changes in the strategy.

"To expect a whole new strategy for science, technology and innovation is not on my mind. Simply because that's not the way it's been described," said Ms. Corbeil, who said she expects more of a "tweaking."

Ms. Robinson notes a strategy is not a program that comes with new funding.

She said she expects "a packaging of the existing status quo," stating that there may be a lack of vision on the part of the federal bureaucracy, rather than the minister.

Minister of State (Science and Technology) Ed Holder (London West, Ont.) was not able to speak about the strategy because it has not been released yet. The release date has not been made public.

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# INNOVATION POLICY BRIEFING

## AEROSPACE

# Canada's success depends on a strong, competitive, innovative aerospace industry

Canadian exports of aircraft, aircraft engines and aircraft parts reached a near-record high of \$10.8-billion in 2013, a 5.4 per cent increase from the year before.

The following is Industry Minister James Moore's speech to the Canadian Aerospace Summit in Ottawa on Nov. 19. The speech has been edited for length and style.



INDUSTRY MINISTER  
JAMES MOORE

I was pleased to join Prime Minister Stephen Harper [recently] in China to strengthen trade and investment between our two nations. China is Canada's second-largest trading partner, with two-way trade totalling \$73.2-billion in 2013, up 38 per cent over the past five years. The relationship between Canada and China is one that the Prime Minister has been working hard to strengthen since taking office in 2006.

And I was pleased to see some of our leading Canadian aerospace firms join our business delegation for what was a very productive visit. This includes Bombardier's agreement with China Express Airlines for the purchase of 16 aircraft with an option for eight more, with a potential value of over \$1-billion. Overall, more than 20 new commercial agreements between Canadian and Chinese firms were signed.

These agreements are valued at more than \$2.5-billion.

They will create more than 2,000 new jobs in the Canadian market: over 20 deals, over 2,000 jobs, [and] \$2.5-billion.

So congratulations to the industry for its work in contributing to Canada's economic growth.

Canada's aerospace industry is one of the key pillars of the Canadian economy: an industry made up of over 700 companies; an industry directly and indirectly employing more than 170,000 Canadians; an industry that contributed \$28-billion to Canada's GDP last year alone.

I don't have to tell you that your industry ranks third in the world in terms of civil aircraft production.

I don't have to cite a report from last summer—courtesy of my department and our hosts, the AIAC—that pointed out that Canadian aircraft production is forecast to grow twice as fast as the global market average over the next seven years.



Industry Minister James Moore said when Stephen Harper, pictured last month in Ottawa with French President François Hollande, became Prime Minister in January 2006, Canada had free trade agreements with only five countries. Canada now has free trade agreements with 43 countries around the world. *The Hill Times* photograph by Jake Wright

In this room we know Canada is plugged into global value chains. We know our aerospace manufacturers export nearly 80 per cent of their products to diverse markets around the world.

And we will continue our efforts to build a prosperous Canadian economy. In fact, Canada's economy is widely recognized as one of the world's strongest. For the past decade, we have led the G7 in economic growth. Our overall marginal effective tax rate is by far the lowest in the G7. The world is taking notice. We are second only to the United States in growth among G7 countries during the recession and its recovery. All credit rating agencies have affirmed Canada's AAA credit rating.

For the seventh consecutive year, the World Economic Forum has declared our banking system to be the soundest in the world. KPMG recently released a report that declared Canada is the most tax competitive country for business in the world.

Our government has opened markets for Canadian products and services by signing 38 new trade deals, including one with the European Union—Canada's most ambitious and far-reaching trade agreement yet, opening up a market of 500 million new customers. When Stephen Harper became

Prime Minister in January 2006, Canada had free trade agreements with only five countries.

After our years of hard work, Canada now has free trade agreements with 43 countries around the world. Those 43 countries constitute half the global marketplace. These agreements will help you increase your exports—they represent tens of thousands of new jobs for Canadians—and will contribute significantly to Canada's economic growth.

In fact, Canadian exports of aircraft, aircraft engines and aircraft parts reached a near-record high of \$10.8-billion in 2013, a 5.4 per cent increase from the year before. We are pleased to see that foreign companies are looking to benefit from Canada's low taxes and open markets.

That's a big part of the reason why Tech Mahindra—an Indian multinational company—is establishing a Canadian headquarters for aerospace, and with it, an additional 300 jobs over the next three years. And it's why firms like Burger King are looking to move north and expand their footprint in Canada.

Canada has a record in which investors have confidence, a record of which Prime Minister Harper is indeed very proud.

One area of the economy where we have seen tremendous growth since the recession is in

manufacturing. In fact, just last week, factory sales for September exceeded expectations and jumped 2.1 per cent. It was the eighth such advance in the last nine months, and yet another positive sign for our manufacturing sector.

Production in the aerospace products and parts industry posted a 22-per cent gain to \$1.9-billion.

We know Canadian manufacturers are facing a different environment than those of previous generations.

Firms have had to adapt to a fluctuating Canadian dollar, rapidly evolving technologies, more volatile commodity markets, discerning customers, more complex supply chains and increased competition.

Allow me to give you some examples of what we have already done to support Canada's manufacturers.

We have removed the federal capital tax and renewed the accelerated capital cost allowance, providing \$1.4-billion in deferred taxes to Canadian business. We are also well on our way to establishing Canada as the first tariff-free country for industrial manufacturers in the G20. We have introduced innovation funding for the aerospace sector, a new aerospace technology demonstration program and support for advanced manufacturing. We have also lowered business

taxes, cutting the corporate rate from over 22 per cent in 2007 to 15 per cent today. And we have reduced the administrative burden on firms so owners can spend less time filling out forms and more time running their operations and growing their business.

The results of our government's action have been impressive.

Manufacturing sales have bounced back and are up more than 25 per cent since the recession.

Our government will continue to create the right conditions for success so that your businesses can do what they do best—grow our economy and create jobs.

Aerospace is an industry that is indispensable to our economy. And if we are to continue punching above our weight in aerospace, we must build on our successes. It was with this validation in mind that three years ago we asked former Cabinet minister David Emerson to consult the industry and come back with a report on aerospace policies and programs.

Our goal was to better support innovation and advancement.

As you know, Mr. Emerson did indeed table such a report, complete with recommendations that came largely from you.

Continued on page 32

## INNOVATION POLICY BRIEFING

## FEDDEV ONTARIO

# FedDev Ontario supports job creation, economic prosperity



GARY GOODYEAR

Supporting angel investors is only one of the many ways my agency—the Federal Economic Development Agency for Southern Ontario—or FedDev Ontario as we're more commonly known, is supporting job creation and economic prosperity across the region.

I am proud to say that, thanks to the leadership of Prime Minister Stephen Harper, Canada has one of the best job creation records in the G7. We are among the leaders in economic growth—envies of the world.

Over the years, our government has been setting the right macro-economic conditions for business innovation and global competitiveness. For example, just last year, Canada leapt from sixth to second place in Bloomberg's ranking of the most attractive destinations for business. We have: lowered taxes, cut the corporate rate from over 22 per cent in 2007 to 15 per cent today, and removed the federal capital tax. We have cut red tape. We're helping to open global markets for our businesses.

In support of Canada's manufacturing sector, we have negotiated trade agreements that will expand market opportunities and create jobs. We've concluded seven different free trade pacts with 38 countries. Canada's two most recent trade agreements, the Canada-European Union Comprehensive Economic and Trade Agreement and the Canada-Korea Free Trade Agreement, promise to add at least \$14-billion annually in new economic activity, equivalent to creating more than 90,000 new jobs.

But we cannot be complacent. This is particularly true for the manufacturing sector.

Manufacturing has been, and still is, the backbone of the Canadian economy.

The sector employs close to 1.7 million Canadians, almost all of them in full-time jobs. It represents nearly half of Canada's business R&D and nearly two-thirds of our merchandise exports.

Canada's manufacturing sales have bounced back and are up 25 per cent to its highest level since the start of the recession.

In addition, our government has provided \$1.4-billion dollars in tax relief to manufacturing companies investing in modern machinery and equipment. We have eliminated tariffs on machinery and equipment, making Canada the first tariff-free zone for manufacturing equipment imports in the G20. We have tax incentives that benefit manufacturers, such as the Scientific Research and Experimental Development Program and the Accelerated Capital Cost Allowance on Manufacturing and Processing Equipment.

These types of investments are critical as intense global competition is pushing manufacturing toward the use of more advanced technologies that are changing the way industry operates.

Advanced manufacturing presents real opportunities. Our government gets it.

Adopting advanced technologies in manufacturing will create economic spill-overs in terms of innovation, productivity, high-quality, highly skilled jobs, R&D investments, and benefits through local supply chains.

Here in southern Ontario, which is home to more than 32,000 manufacturing establishments, we need to leverage our regional assets. Southern Ontario's skilled workers, strong educational institutions, innovative clusters and companies provide a strong foundation for moving forward.

We can, and we must, tap into the global value chains and foreign markets which will position our manufacturers for success.

Over the past five years, FedDev Ontario has delivered programming and leveraged partnerships to help drive manufacturing and business growth into the 21<sup>st</sup> century.

I mentioned earlier that the manufacturing sector in Canada conducts more R&D

than other sectors. However, Canadian businesses in general spend much less on R&D than counterparts in other countries. To help address this issue, FedDev Ontario has invested in centres that allow industry and researchers to team up to innovate.

For example, an auto manufacturer looking to introduce new technology now has access to applied research facilities to test it out at the McMaster Automotive Resource Centre, or MARC, located in Hamilton. FedDev Ontario worked with Mo at McMaster to partner with the university and provide \$11.5-million for MARC. The Centre provides businesses with access to state-of-the-art equipment and R&D expertise in areas such as hybrid and electric powertrains, batteries and lightweight materials. MARC is allowing our region's automotive manufacturing industry to gain a competitive advantage by increasing innovation and productivity. This will help firms increase their sales, exports and growth.

To ensure manufacturing continues to be an economic engine in Canada, our government recognizes that we need to create even more opportunities for manufacturers to develop cutting-edge, game-changing products and processes. This will bring real benefits to the sector and to the economy as a whole. It will increase productivity, lead to greater economic output and put Canadian companies at centre stage.

One way we are doing this is through the Technology Demonstration Program. It supports large-scale technology demonstration projects in the aerospace, defence, space and security sectors. These projects require collaborative effort involving various firms, universities, colleges or research institutions.

We know that when one company succeeds, so does our economy. And one of the organizations that's been devoted to helping our manufacturers succeed is the Canadian Manufacturers & Exporters.

At the grassroots level, we need our manufacturers to start adopting productivity-enhancing advanced technologies, such

as robotics, 3D printing and automated materials handling.

Today, I'm pleased to announce support for helping southern Ontario's manufacturers to invest in these types of technologies. I can assure you they will have a real impact on the bottom line of our manufacturers, by helping to reduce production costs and expand production capabilities.

It gives me great pleasure to announce that the Canadian Manufacturers & Exporters has been awarded up to \$20-million, through FedDev Ontario's Investing in Business Growth and Productivity Initiative, to deliver a new program called SMART Advanced Technologies for Global Growth.

CME's program will provide funding for southern Ontario manufacturers that are exporting, planning to export, or selling into a supply chain, to conduct technology assessments and adopt advanced technologies.

Adopting these technologies will enable businesses to become more competitive and strengthen their ability to participate in global supply chains.

CME anticipates being able to support 200 manufacturers through this program, which will help to create up to one thousand new jobs in the region, and maintain 2,500 jobs.

FedDev Ontario has partnered with CME in the past, providing more than \$38-million to deliver its SMART-branded programming in southern Ontario. This has supported more than 730 projects, which created more than 5,400 jobs and maintained more than 11,000.

I'm sure you'd agree this is significant. In addition to collaborating with CME, we have formed successful partnerships with the Yves Landry Foundation and the Ontario Chamber of Commerce, whose programs have also helped manufacturers with skills training and with entering new markets.

I'm confident that FedDev Ontario's programming and partnerships will assist our manufacturers to leverage advanced technology, improve productivity, succeed in new markets and benefit local supply chains.

This will build a stronger, more resilient regional economy and solidify Canada's position as an internationally competitive player.

*Gary Goodyear is the minister of state for the Federal Economic Development Agency for Southern Ontario and represents Cambridge, Ont. This is an edited version of the speech he delivered at the Advanced Manufacturing Summit in Burlington, Ont.*

The Hill Times

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# INNOVATION POLICY BRIEFING

## AEROSPACE

# Canada's success depends on aerospace innovation

Continued from page 30

Our government has delivered on those recommendations. One of the first steps we took was to confirm stable funding of close to \$1-billion over five years to the Strategic Aerospace and Defence Initiative, or SADI. SADI encourages research and development that leads to innovation. It helps bring about new products and services, enhances competitiveness and fosters collaboration between the private sector, research institutes, universities and colleges. It also helps develop a highly skilled workforce across the country.

This year, we added to the growing list of SADI contributions. And we didn't stop there. Last fall, we launched Canada's first Technology Demonstration Program to support large-scale aerospace projects with strong commercialization potential and promote cross-industry collaboration. We encouraged interested companies to take part.

Tech Demo clearly answered an industry need, triggering an innovative impulse and a demand for new products.

Last spring, we were pleased to welcome the official launch of the Consortium for Aerospace Re-

search and Innovation in Canada, or CARIC. The launch of CARIC was a tremendous milestone.

Thanks to those who helped make the consortium a reality. Building on the momentum of CARIC's launch, our government was pleased to announce last summer a \$30-million investment for the new entity. The support will be provided over the next five years as the consortium expands aerospace research and development in this country.

Canada has a proud history in space, and I would be remiss if I did not take this opportunity to touch on our government's commitment to its continued success.

We appointed strong leadership at the Canadian Space Agency.

Let me thank General Walt Natynczyk, who recently took up a new position as deputy minister of Veterans Affairs, for his incredible work to make Canada's space industry stronger.

Earlier this year I unveiled Canada's Space Policy Framework—a plan for Canada's future in space.

Since its implementation, we have: announced support for the James Webb Space Telescope project, the next-generation space observatory and the most powerful space telescope ever; awarded an

\$8.8-million contract to MacDonald, Dettwiler and Associates to develop the OSIRIS-REx Laser Altimeter, a sophisticated laser-based mapping system and Canada's contribution to the NASA-led mission that will be used to create unprecedented 3D images of an asteroid and allow for the collection of samples from its surface; and

provided \$6.7-million to 12 companies to support the development of products to better use RADARSAT data for earth observation missions, which will survey 90 per cent of the globe, studying the Earth's lakes, rivers, reservoirs and oceans.

In terms of space exploration, we had proudly Canadian companies involved in the European Space Agency's Rosetta spacecraft mission. Saskatchewan's SED Systems, Ottawa's ADGA Group, and NGC Aerospace from Sherbrooke, Que., were integral parts of the mission and they are here today.

As you know, its lander, Philae, made history by being the first to land on the surface of a comet—a remarkable human achievement. The success of the Rosetta mission and other future missions will bring greater opportunities for Canada's space industry in the years to come. In our response to

Mr. Emerson, we also committed to creating the Space Advisory Board to guide our government's space policy.

Today, I am pleased to announce the members of the Space Advisory Board.

- General (retired) Walt Natynczyk, deputy minister of Veterans Affairs Canada, former chief of defence staff and former Canadian Space Agency President;
- Dr. Mamdouh Shoukri, president and vice-chancellor of York University
- Terry Malley, president and CEO of Malley Industries, a New Brunswick manufacturer of advanced specialty vehicles;

- Dr. Arlene Ponting, president emerita of MindFuel, a not-for-profit organization dedicated to inspiring young people's involvement in science through education;

- Lorne Trotter, co-founder of Matrox Electronic Systems and the Trotter Family Foundation. He is a lifelong space science advocate and recognized philanthropist for science education in Canada;

- Fred George, president and CEO of JLK Global Fund International, honorary captain to the Royal Canadian Navy, a venture capital adviser, and one of Canada's leading CEOs;

- John Keating, director of Sandvine and former CEO of COM DEV, the largest Canadian designer and manufacturer of space hardware subsystems; and

- Colonel Chris Hadfield, retired Canadian astronaut, former commander of the International Space Station.

I look forward to working with all of our board members in the days and months ahead. I will hold regular meetings with the board for updates on progress. Our government has listened to your industry. And we have worked diligently to help create new opportunities for growth.

Let me close by reiterating that Canada's success depends on a strong, competitive and innovative aerospace industry.

Over the coming year, we will take further action to ensure that companies in Canada's aerospace and space sectors continue to be leaders in innovation and job creation. With strong leadership from Prime Minister Stephen Harper, the AIAC and the private sector, I am positive we will continue to strengthen aerospace and space sectors that all Canadians will be incredibly proud to call their own.

*The Hill Times*

## SCIENTISTS

# Science becoming election issue: opposition critics

Continued from page 24

to speak freely to the media about the work they do and believe that they should be able to. Nearly half of those surveyed, 48 per cent, said they were aware of actual cases in which their department or agency suppressed information, leading to incomplete, inaccurate, or misleading impressions by the public, industry or other government officials, and nearly one quarter of respondents, and 24 per cent had been directly asked to exclude or alter information for non-scientific reasons.

Mr. Bleyer said the response from government to these findings has been underwhelming, with only a few agencies following up to ask for more information. But he said it did give the people who had been anecdotally experiencing the government's interference, some quantitative data and evidence to support their argument for change.

A subsequent study by Evidence for Democracy echoed PIPSC's findings, scoring the media policies of each government department and found that they overwhelmingly didn't support open communication between scientists and the media, with the Canada Space Agency, PWGSC, Industry Canada, and Natural Resources Canada scoring the lowest.

The NRC scored among the highest on the study. This study

was then followed by an open letter from the Union of Concerned Scientists, signed by more than 800 scientists outside of Canada, from 32 countries, asking Mr. Harper to end the "burdensome restrictions on scientific communication and collaboration faced by Canadian government scientists."

Mr. Bleyer said this all adds to the fodder for change, and noted that they're still waiting on Canada's Information Commissioner to release her report into her office's investigation of allegations that the federal government is muzzling its scientists.

When asked about the ability of scientists to speak publicly about their research—outside of science publications and peer-reviewed papers—without political interference or departmental approval Mr. Holder maintained that ministers are the primary spokespersons for government departments but scientists are "readily available to share their research with Canadians," and pointed to the research federal scientists have shared in the last year.

"Canadian federal departments and agencies produce enormous amounts of public research, over 4,000 science publications per year in areas important to the health, safety, and economic prosperity which is shared with Canadians. As a case in point, Environment Can-

ada fielded nearly 2,500 media inquiries last year, Fisheries and Oceans Canada fielded 1,600 media inquiries and Agriculture and Agri-Food Canada scientists fielded 359 media interviews and published last year," stated Mr. Holder.

Last week, during an infrastructure spending announcement, Prime Minister Stephen Harper (Calgary Southwest, Alta.) said that over the next three years, part of the \$5.8-billion the government is planning to spend would go towards repairing and expanding federal labs and research facilities.

But both opposition parties said the Conservative approach to science is one-dimensional, with a focus on applied science and research that can see an economic return, as opposed to the other side of science which is done for the "common good" to better inform and protect Canadians, as Mr. Hsu put it.

"They want widgets but that's not how science works, you can't go to a scientist and say, 'Okay come up with the next big thing that's going to develop a giant industry in Canada.' I don't think they even understand that basic fundamental," said Mr. Stewart.

In response to questions about the government's focus when it comes to Canada's investments in science research, Mr. Holder stated the govern-

ment's investments continue to "push the boundaries of knowledge, create jobs and prosperity while improving the quality of life of Canadians."

"One of the most important examples in Economic Action Plan 2014 is an investment of \$1.5-billion of new money toward the creation of the Canada First Research Excellence Fund, which will allow universities and colleges to leverage world-class strengths into world-leading research that will create long-term benefits for Canada. Imagine what Sir Frederick Banting could have achieved had he had an investment on that scale at his disposal," stated Mr. Holder.

In addition to restoring scientific integrity, the opposition critics would push to implement some form of in-house science expert(s) for oversight when it comes to shaping policies. Mr. Stewart has put forward a private member's bill, Bill C-558, the Parliamentary Science Officer Act, to create a position for an officer of Parliament. Last week, the bill was endorsed by a handful of professors and advisers on science and policy, including PIPSC, the Centre for Science in the Public Interest, and Katie Gibbs, an author on the Evidence for Democracy report.

Mr. Hsu said the Liberals would be supportive of Bill C-558, but proposed to take it a step further, suggesting each party have

their own internal science adviser.

"It's really important to have somebody at the table who can give good science advice, good science policy and scientifically based advice, but who is a political insider who can sit there when those political conversations take place. And that's something a parliamentary science officer could not do because that office would be a non-partisan, neutral office," said Mr. Hsu. "It's important to have science advice on both sides."

As for what will come in the short-term, it has yet to be seen how PIPSC's decision will play out, but the union hopes its attempts to defend their members' ability to do their job doesn't end up resulting in employment action, a concern they have given the government's moves in recent years. The opposition critics hope it doesn't backfire, resulting in further clampdown.

"I think, as an organization, the union has to say this government policy is not good, it's not consistent with what our profession stands for; facts and evidence-based policy and the ability to communicate facts about nature to the public," said Mr. Hsu.

"When you're mobilizing the scientists against you, you know you've got problems en masse," said Mr. Stewart.

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# INNOVATION POLICY BRIEFING

## PARLIAMENTARY SCIENCE OFFICER

# Why Canada needs a Parliamentary science officer



NDP MP KENNEDY STEWART

Beginning with the elimination of Canada's national science advisor in 2008, the Harper government has used every tool at its disposal to prevent, limit, and restrict public scientists from sharing their research findings with Canadians and policy-makers. Statistics Canada data reveals the Conservatives have slashed over

\$1-billion in S&T funding and laid off 4000 federal researchers since forming a majority in 2011.

Now, an open letter signed by more 800 independent scientists from 32 countries urges the government to restore funding for public science and end the burdensome restrictions on communication and collaboration faced by Canadian scientists. The Harper government's actions continue to draw criticisms from our peers abroad, including the prestigious journal *Nature*. Last year, *The New York Times* argued nothing the Bush administration perpetrated against the U.S. scientific community even "came close to what is being done in Canada."

Although our former environment minister once insisted the issue of muzzled scientists was driven by a "very small number of Canadian journalists who believe that they're the centres of their respective universes and deserve access to our scientists on their timeline," the evidence of Conservative muzzling and censorship continues to mount. As the information commissioner completes her investigation into the communication policies of federal departments, a recent survey conducted by the Professional Institute of the Public Service of Canada found that:

Nine out of 10 federal scientists feel they are not allowed to speak freely and without constraints to the media about their research.

Faced with a departmental decision or action that could harm public health, safety or the environment, 84 per cent of respondents indicated they could not share these concerns with the public or media without fear of censure or retaliation.

Nearly half of federal scientists are aware of actual cases in which the release of information was suppressed or declined—leading to incomplete, inaccurate or misleading impressions.

One-quarter of respondents had been directly asked—for non-sci-

entific reasons—to exclude or alter technical information in an official government document.

Along with tarnishing Canada's reputation as a knowledge leader, government restrictions on the free flow of scientific knowledge undermine our ability to make public policy decisions using the best evidence and data available. Regardless of the policy issue in question—environmental protection, innovation policy, health care, or criminal justice—decision-makers (and the public) cannot make prudent choices if they are denied timely access to relevant information. This is an issue that strikes at the very core of our democratic process.

That's why New Democrats have put forward a concrete plan to end Conservative muzzling once and for all. Based on recent policies implemented by U.S. President Barack Obama's administration, Motion 453 would allow government scientists to speak publicly about their research and prohibit ministerial staff from unduly limiting media access or suppressing scientific results.

Moving forward, we also need a new champion for science in Ottawa. Tabled in the House of Commons last fall, Bill C-558 aims to create an independent Parliamentary science officer tasked with providing politicians with unbiased information and sound advice.

Modelled off similar agencies in other countries, such as the U.K.'s Parliamentary Office of Science and Technology and the White House Office of Science and Technology Policy, this office would shine an essential light on the use (and misuse) of evidence by federal departments and agencies, as well as revitalize the exchange of knowledge between the research community and Parliamentarians. Crucially, its mandate and independence would be guaranteed by legislation (something the former national science adviser was never given by the previous Liberal government, unfortunately.)

It's time to promote real transparency and to chart a bold new course for science in Canada. To drive innovation and fact-based policy, we need to give science and research a stronger voice in the federal government. Taking the muzzle off of our talented researchers and establishing an independent science watchdog for Parliament are crucial steps in the right direction.

NDP MP *Kennedy Stewart, PhD, who represents Burnaby-Douglas, B.C., is his party's critic for science and technology, and an associate professor on-leave from Simon Fraser University's School of Public Policy.*  
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## TALENT

# Canada can be a global innovation leader

Connecting people across international borders is an important component of a strategy to bring this about.



LIBERAL MP TED HSU

I met recently with Jonathan Bagger, the new director of TRIUMF, Canada's national laboratory for nuclear and particle physics. TRIUMF is becoming an innovation driver in nuclear medicine and materials science. It collaborates extensively, with 18 member universities across Canada, and a range of international partnerships. Dr. Bagger, well-known in the world of physics, was himself recruited from the United States after an international search.

A successful research enterprise requires the best and brightest lead researchers. A search for those leaders is necessarily international. International collaboration facilitates innovation and should be encouraged. We must focus on talent retention and recruitment and a commitment to repairing Canada's damaged international reputation in the science, technology and innovation community.

Talent recruitment is not only required for the leadership of publicly-funded research and development. It is also critical in corporate

R&D management. In multinational corporations, the decision of whether or not R&D is conducted in Canada is, in part, dependent on managers competing internally for global allocations of research funding. Moreover, multinationals usually groom top executives by cycling them through their international offices. All else being equal, the presence of top international talent, both in managerial positions and in research positions, will maximize R&D activity in Canada. That talent must be welcomed.

Tariffs have been eliminated over the years to encourage the import of advanced machinery and equipment—tools that make Canadian workers more productive. We can take the same view on facilitating the import of leadership in R&D.

One example I encountered was the case of an Asian corporation setting up a research laboratory in my riding. Foreign experts were needed to train Canadian researchers. Because they needed to stay for longer than six months, the company had to go through the Labour Market Opinion and Temporary Foreign Worker process. In this case, and perhaps generally, it might be a good idea to allow business visitors who are coming to Canada for the purpose of "training employees of a Canadian branch of a foreign company" to stay for longer than six months. This sort of accommodation might

be part of a larger strategy to facilitate international collaborations, which improve the productivity of Canadian workers.

Funding and choosing priorities for funding is also a critical part of innovation policy. In applied research, private sector partners can be asked to vouch for the potential return on investment in research by risking their own capital. For basic research, the ability to participate in international collaborations is a way of vetting the relevance or strength of a research group. Indeed, the leading edge of science, the kind that is mostly likely to produce spin-off benefits for societies who support it, overwhelmingly involves international collaboration.

The new Canada First Research Excellence Fund (CFREF) is step in the right direction for public funding of Canadian R&D. We're still waiting to hear how these funds will be disbursed, but a commitment of sustained, predictable funding to strengthen world-class science, technology and innovation in Canada is an important step towards developing the innovation ecosystem we need. I would go further and suggest that, beyond supporting world-class research, support should be extended to those research groups who have found and earned an important niche in international research collaborations. That idea extends

to support for students. In fact it is often when Canadian students do their graduate or post-graduate research outside the country that they have their best opportunity to join international collaborations.

The value of collaboration between research groups located in different regions of Canada should also be recognized and encouraged.

I think there is a useful analogy to be made with trade policy where the urgency to conclude trade agreements is not only about selling made/grown/harvested/extracted-in-Canada products to other countries, but also in making sure that Canadian industry is able to participate in the manufacture of the highest value products and services, where crossing multiple borders before the final product is assembled is the norm. Achieving global excellence almost always means connecting people across international borders.

Reaping the benefits of international partnerships requires that Canadian scientists work in environments that encourage collaboration. I worry that the federal government's heavy handed management of its own scientists and research capabilities may be hindering the development of important collaborations which Canadian scientists need in order to participate on the world stage.

In October of this year, more than 800 scientists from 32

different countries signed an open letter to the Prime Minister, asking him to "remove excessive and burdensome restrictions and barriers to scientific communication and collaboration faced by Canadian government scientists."

The muzzling of federal scientists is hurting Canada's reputation in science and technology research, and the international science community has chastised Canada's scientific communications policy, saying that "Canada's leadership in basic research, environmental, health, and other public science is in jeopardy."

Canada can be a global innovation leader. Connecting people across international borders is an important component of a strategy to bring this about. Bringing in top research leadership from the international pool is like buying the best machinery in the world in order to improve the productivity of Canadian workers. A focus on talent retention and recruitment, coupled with a concerted effort to restore Canada's science and technology reputation on the world stage, will help foster the international collaboration necessary for a truly innovative and global science and technology ecosystem.

*Liberal MP Ted Hsu, who represents Kingston and the Islands, Ont., and is his party's science and technology critic.*  
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# INNOVATION POLICY BRIEFING

## INNOVATION & PRODUCTIVITY

# Canada could be a world leader in innovation

If and when we encourage value-added production in all sectors, including resource development.



GREEN PARTY MP BRUCE HYER

Innovation and productivity drive economic growth. They allow countries to lead in today's fast-paced global economy. They can raise living standards for everyone (if distributed fairly!). Nobel prize-winning economist Paul Krugman has said, "Productivity isn't everything, but, in the long-run, it is almost everything."

For three decades, Canada has been lagging behind similar countries when it comes to innovation. Until about 1980, Canada largely kept up with productivity and innovation in the United States. By 1984, our relative productivity slipped to 90 per cent of the U.S.—a decline, but still respectable. By 2007, our productivity was just 74 per cent of the U.S. From 1980 until 2011, productivity grew at just 1.4 per cent annually, compared to 2.2 per cent in the U.S.A. Our Conference Board of Canada has consistently ranked Canada near the bottom of the largest industrial economies in terms of productivity and innovation. This productivity gap costs the Canadian economy billions of dollars and countless jobs each year.

Glen Hodgson, chief economist with the Conference Board of Canada, warns that, "If we continue to discount or dismiss the productivity issue, Canadians' future incomes will be threatened." It is diminishing Canadian income today, too. Our productivity gap has meant that Canadians earn at least \$7,000 less per capita than their American counterparts. This shortfall is triple what it was 30 years ago, and it is steadily widening.

When we take a closer look at the numbers, we find that a lack of innovation is largely responsible for our decline in productivity. Experts say that labour productivity depends on three factors: labour skills, labour-enhancing capital and "multifactor productivity" (commonly

known as innovation). In the first two categories, we are actually outperforming the United States. However, when it comes to innovation, Canada has seen zero growth since 1980.

What is the problem with innovation in Canada? Innovation tends to happen in sectors like value-added manufacturing, through research and development. At the end of the 1990s, Statistics Canada indicates that 60 per cent of Canada's exports were value-added. Today, that number has dropped to just 40 per cent, as we focus on exporting raw crude oil at a huge discount. The Canadian economy has shifted toward increased exports of unprocessed resources, and our productivity and innovation has plummeted.

So, how do we pull Canadian innovation out of its downward spiral, and encourage the kind of value-added production that drives sound economic growth?

First, we need stronger protection for intellectual property rights, to allow Canadian companies to take risks, and to compete in the global economy.

Second, we need to return to funding less applied research, and more basic research. Ironically the world's truly revolutionary inventions—the telephone and genetic testing, for example—were not born out of a search for profit, but of basic research. Governments are rarely good at forecasting winners!

Third, we need to unleash venture capital to help innovators take new risks. The money is there. Under Prime Minister Harper, Canada has the lowest corporate tax rate in the industrialized world, but it is not being used to innovate. Former Bank of Canada governor Mark Carney estimated that there is over \$600-billion in "dead money," sitting unused in corporate bank accounts, often shipped out to countries with tax shelters. Tax cuts to large multinationals are useless, unless tied to clear criteria for innovation or capital investment, increasing added value, or at least job creation.

Finally, we need to recognize that environmental protection and economic growth are not enemies. Well-designed regulations and revenue-neutral carbon pricing that does not compromise economic growth could boost innovation and productivity (Google: "Carbon Fee and Dividend" for the best way to price carbon, and reduce both CO2 and poverty). There's nothing inherently unproductive about resource development, when it is done the right way. Post-secondary research, like the creativity of Dr. Mathew Leitch at Lakehead University in my own riding of Thunder Bay-Superior North, is improving the forest industry and fostering innovation. The commercial production of heavy crude oil, on the other hand, still depends on the "hot water" method, developed in 1925! Investment in clean technology is a key element toward reconciling resource development and sustainable growth.

Canada could be a world leader in innovation, if and when we encourage value-added production in all sectors, including resource development. With smarter tax policies supporting sustainable development, we can capitalize on our wealth of natural resources and make Canada more competitive in the global economy ... and more prosperous.

Green Party MP Bruce Hyer is his party's deputy leader and represents Thunder Bay-Superior North, Ont.

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# INNOVATION POLICY BRIEFING

## HUMAN DIMENSION

# Focus on human dimension of innovation

Given that diversity and creativity have been recognized as key attributes to fostering innovation, Canada is well-positioned to embrace and benefit from those differences.



URSULA GOBEL

Innovation is often defined in the context of those discoveries and systems necessary to sustain Canada's competitive leadership in a global economy. We must realize however, that innovation is only as valuable as its capacity to reflect, to resonate with and to serve the human experience. Addressing the social, cultural, and ethical impacts of new technology at every stage—from research and development through to application and commercialization—will invariably shape both the technology itself and its ultimate capacity for societal benefit.

Consider the impact of new surveillance technologies, including those now embedded within insects, or the use of avatars in immersive, three-dimensional virtual environments to enhance learning and teaching.

These research projects were among several recently featured at

the University of Alberta, where humanities and social sciences scholars across many fields of study—from communications and sociology to cultural and native studies—provided valuable insights on issues critical to sustaining Canadian innovation, including emerging technologies, education, employment, natural resources and energy.

These issues, like so many others, have profound human dimensions. In seeking to foster cross-sector innovation, how effectively Canada integrates these efforts with an understanding of the human experience will play a significant role in its long-term success, both at home and internationally.

In this regard, research supported by the Social Sciences and Humanities Research Council (SSHRC) is developing the talent, generating the insights and building the connections necessary for Canada's sustained growth and prosperity in an uncertain and rapidly evolving global context.

SSHRC's recent "Imagining Canada's Future" forum convened some of the country's most talented scholars, together with senior leaders in the academic, government, business and not-for-profit sectors.

Held in Ottawa, the forum aimed to establish a collective understanding of the complex issues facing Canadians in the coming decades, while exploring the roles that respective sectors may play in realizing a successful future. Participants addressed two of six future challenges identified through a comprehensive foresight exercise led by SSHRC: How will the experiences and aspirations of aboriginal peoples help to ensure a shared and successful future? How will the impact of emerging technologies benefit Canadians?

Benoît Dupont, Canada Research Chair in Security, Identity and Technology at the Université de Montréal, underscored the significant security and safety challenges now at hand due to the rapid pace of emerging and disruptive technologies. "The boundaries between machines and people are eroding," he noted. "Machines are becoming more social, making cross-disciplinary work critical to the management of such technologies."

Martha Crago, vice-president of research at Dalhousie University, emphasized the importance of cross-campus and multi-sector collaboration in shepherding technological development, observing that "there are no disciplines anymore, only problems. Workable solutions must therefore necessarily involve experts who bring diverse talents and perspectives to the table."

McGill University doctoral candidate François Leblanc, highlighted the revolutionary capacity of 3D printing in architecture, including its social dimension. Three-dimensional printing has the advantage of fabricating complex shapes, allocating material only where required. It can also enhance entrepreneurship. "You can design products, upload them to web-based factories, and sell them in the virtual marketplace," said Leblanc, adding that such developments, coupled with the benefits of open source software, "...allow everyone to become a designer and producer," thus profoundly democratizing the technology development process.

But innovation and its social dimensions reach far beyond the technology domain. SSHRC-funded research by and with aboriginal peoples, for example, offers an important counterpoint. This complementarity was also made clear at the Imagining Canada's Future forum, with the participation of a number of leading Aboriginal scholars and sector leaders.

JP Gladu, CEO of the Canadian Council for Aboriginal Business, outlined several innovative approaches to economic and social development through best practices for strengthening relations with Aboriginal communities. With some 36,000 Aboriginal businesses now operating in Canada, new programs encourage companies

to participate in the growing Aboriginal business economy by promoting the importance of trust, sustainable growth and traditional cultures, as central elements in the new business model.

Aaron Mills, a Vanier Scholar and Trudeau Fellow pursuing PhD research in law at the University of Victoria, noted that, in opposition to the assimilation aims of colonialism, "aboriginal peoples' goal is not to fit in, but to have our differences stand."

From the field of digital humanities, media artist and Ryerson University professor Lila Pine described her use of new technologies to preserve indigenous languages, and noted the impact made by linguistic differences in shaping not just our conception of the world but our relation to each other.

Given that diversity and creativity have been recognized as key attributes to fostering innovation, Canada is well-positioned to embrace and benefit from those differences. By better integrating an understanding of the human experience moving forward, we can facilitate a more effective and sustainable model of Canadian innovation for the benefit of future generations.

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## ELECTION ISSUE

# Is innovation an election issue?

So given that the growth-productivity-jobs triad is linked so directly to innovation, why heading into an election are the other parties not attacking hard on this exposed flank?



RICHARD HAWKINS

Since 2006, at least a dozen major reports about innovation in Canada have come to three identical conclusions. First, future growth and prosperity depend upon innovation. Second, Canada is not very good at it. Third, what we are doing about it is not working. Such conclusions attract broad political and industry agreement. But it has been nearly two decades since any federal government has taken substantive coordinated action on this file. And as we enter an elec-

tion year, there is little indication that any of the contenders have this issue on their radar.

The Harper government's view is that innovation is a business responsibility. Businesses will naturally innovate provided that the fiscal conditions are favorable and that trade is not impeded. (Not to mention the largest R&D tax subsidies in the OECD.) Their position is at least coherent. But it is also futile. There is no evidence that such remote measures have any specific or predictable impact on innovation. All they really say to innovators is that the Canadian government is disengaged from their challenges and goals.

Accordingly, Canada's standard input indicators (R&D expenditures and the like) have hardly budged since 2006, except to creep downwards. Our

output indicators are even less promising. Export trends are skewed towards undifferentiated commodities (manly energy) and away from the specialized, high value-added manufactures and services that signal genuine upticks in innovation performance. So in terms of enhancing Canada's innovation profile, on these and a host of related indicators, the government has scored basically *nul points*. And if their perspective does not change, no new strategy is going to improve the score.

So given that the growth-productivity-jobs triad is linked so directly to innovation, why heading into an election are the other parties not attacking hard on this exposed flank? Instead, their positions are incoherent, most grazing aimlessly among emotive but largely peripheral issues. Or worse, as with NDP Leader Thomas Mulcair's "Dutch disease," they signal a worryingly poor grasp of the relationship that must be forged between resources, manufacturing, and services in any future Canadian economic strategy.

So upon what foundation might a positive political debate be constructed? A good beginning would be to correct the myopic obsession of current policy with inventing and commercializing new technology. Such inputs are important, but they form only one relatively small piece of a huge

puzzle. Technology is an input—innovation is about outcomes. Creating and sustaining them requires that vision, leadership and organization be coordinated at many levels, most of them unconnected with technology as such. It is here, not in the laboratory, or the boardroom, where Canada has fallen down.

It is ironic that most of the jurisdictions Canadian policy makers now look to for more effective innovation models—the U.S., the Nordics, Israel, Korea, Japan and even China—follow precisely the same models that once we ourselves pioneered. In the past we deployed them very successfully to build major globally competitive industries in agriculture, biotech, computing and communications, aerospace and many other sectors. The oil sands, arguably the biggest innovation in recent Canadian history, and strongly implicated in virtually all of the few positive economic indicators we have seen since 2006, is likewise a product of exactly the kind of visionary and interventionist industrial policy that the Conservatives seem to find so toxic.

Effective innovation policies are not just about R&D subsidies or encouraging university researchers to become entrepreneurs. Neither are they just about SMEs, intellectual property or venture capital. They are about coordinating,

aggregating and leveraging public resources over the longer term to facilitate transformation in existing industries and the emergence of new ones. Growth is sustained by the spinoffs and spillovers from these adjustments. Effective innovation policy entails whatever is necessary at any given time to promote this outcome, a principle that all of our major competitors understand very well.

So maybe it is time to get back with our own game. Perhaps innovation is the "blue water" issue that budding political contenders seek. How they stack up on it would perforce signal a clear choice for voters between different views of how an economy delivers prosperity and what concrete actions different parties would deploy to make this happen.

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# INNOVATION POLICY BRIEFING

## VISION

# Driving innovation—are we there yet?

Moving past the federal election and forward to celebrate our birthday in 2017, are we not due for some truly innovative science and innovation bold ideas from our entrepreneurs, creative youth, elected officials and knowledge communities?



PAUL DUFOUR

‘There has been no effective mobilization of advice and counsel from outside the public service and responsibility for the expansion of various activities has been borne by individual ministers without any evidence of their relation to national policy as a whole.’ (J. Grant Glassco, Commissioner, 1963)

This salient observation on the country’s national science activities by the Glassco Royal Commission on Government Organization could easily have been written today. Canadian governments and their public service have been experimenting on how to mobilize knowledge assets and advice ever since. A key dimension of all of these ventures over the five decades since that landmark report has been the innovation within the country’s science and innovation policies. From time to time, we have been quite creative, with significant impacts on productivity and social benefits. Unfettered creativity can indeed lead to novel action that makes a difference. As the now dated 2007 federal S&T strategy put it, “To achieve world excellence in science and technology, Canadians must promote and defend two complementary and indivisible freedoms; the freedom of scientists to investigate and the freedom of entrepreneurs to innovate and market their products to the world.”

History is always important here. Forty-three years ago, in October 1971, Alastair Gillespie, the freshly minted federal minister of state for science and technology was in Paris, meeting with his science counterparts at an OECD meeting. In his short speech on the subject where he outlined the responsibilities of the newly created ministry of state for science and technology, Gillespie argued for better assessments of technology and their environmental and societal risks that were then emerging, including large oil tankers in the North, new mind-altering drugs, entertainment and learning technology as well as other key developments. Gillespie also noted his concern for clearly articulating what the word innovation meant—“as politicians we have a major responsibility to articulate what innovation is, to other politicians and to our electors.”

Today, more than four decades later, “innovation” is still the word—can we therefore conclude that it is now truly central to, and at the heart of, the dealings of our elected governments?

Not quite. The average stint of ministers responsible for science



Industry Minister James Moore, pictured in this file photo on the Hill. *The Hill Times* photograph by Jake Wright

in the Canadian government since the first appointment of Gillespie is just under two years, about the same for federal deputy ministers over the last few years. Continuity and stability in policy-making as a result has been difficult to maintain. We shed independent advisory organizations without considering their impact. There is no senior minister with a stand-alone department and overarching national vision; piecemeal decision-making with fragmentary evidence has often been the result. Proponents for new knowledge investments must make their case on a continuous and competitive basis with a constantly changing guard—all within a context of diminished expectations and rapidly-changing financial realities and uncertainty.

It is worth remembering, however, that, as the new millennium approached, a spate of policy innovation took hold of Canada’s knowledge ecosystem. The unique Networks of Centres of Excellence established in 1989 had already demonstrated considerable innovation as had the Canada Foundation for Innovation in 1997, but at the turn of the 21<sup>st</sup> century, the Canadian Institutes for Health Research (CIHR) emerged from the old Medical Research Council; the Canada Research Chairs were established; a retooled genomics organization was brought back on the table as Genome Canada.

Other experiments have since followed.

The Perimeter Institute and Institute for Quantum Computing saw the light of day with philanthropic and government support; a Science Media Centre emerged to assist journalists with getting the right science behind their stories as well as aiding scientists to better communicate their work; and the innovative Grand Challenges Canada venture has shown why strategic intent matters in designing new institutions that can fulfil both domestic and global needs. Aggressive initiative from this country’s research communities along with key champions in government circles helped create the Council of Canadian Academies and accomplished what Gillespie presciently suggested was badly needed—science assessments to inform decision-making.

There are a number of other innovations underway designed to fill gaps in our knowledge governance system; these, if properly channelled and supported, will help shape a more effective public dialogue and further action in science and innovation. Science culture—in all of its facets—is in need of more considered support at all levels of government. Government science is being reassessed via an expert panel. The current model for S&T in the federal government needs to evolve in relation to changing external realities such as fast-paced global

scientific advancements and the convergence of disciplines. A health-care innovation advisory panel is underway consulting on key actions for more innovative and effective health care across Canada. Ideas centred on a new Parliamentary office for S&T are circulating along with greater public recognition of research stars, students, teachers and entrepreneurs. Advocacy groups like Evidence for Democracy and PIPSC are holding the government’s feet to the fire with respect to its own research community to ensure sound science for more effective public policy. There is also the new experience of a Quebec chief scientist who not only advises on science and innovation, but celebrates new and upcoming talent through media outreach and awards.

To be sure, experiments have also failed or succumbed to mission creep; sadly, we rarely seem to learn from our mistakes. Recently, the commissioner for the environment and sustainable development has suggested conducting a strategic science audit, asking for public input ... or more precisely, what is working well now; what are the areas that need improvement; what are the biggest risks facing the federal science and technology function and strategies, and what criteria would be used to assess how well the government is doing.

It is never easy to imagine a future that looks brighter at a

time when the lights appear to be dimming. A hopeful trend may be emerging in Canada where institutional experimentation may well be underway once again, a lot of it from bright minds leveraging new partnerships and unique business models as governments struggle to meet the expectations of their citizens—all aimed at improving our culture, quality of life and economic prosperity through innovation and discovery.

Any sustainable architecture for novel science and innovation policy requires real resources, champions, transformative ideas, patience, passion and timing. Moving past the federal election and forward to celebrate our birthday in 2017, are we not due for some truly innovative science and innovation bold ideas from our entrepreneurs, creative youth, elected officials and knowledge communities? As the auditor general concluded in its 1994 report on the role of government in an innovative society, “if we could continue to establish and maintain among us the interconnection that is the basis for societal innovation, we might well become known as Canada, the innovative country.”

*Paul Dufour is fellow and adjunct professor, Institute for Science, Society and Policy, University of Ottawa.*

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## INNOVATION POLICY BRIEFING

CANADIAN INNOVATION EXCHANGE

# Toronto tech conference an American Idol for innovators

It's a 'technology party for the industry,' says founding co-chair Rick Nathan.

By DENIS CALNAN

Some of the country's most innovative companies in digital media and information and communication technology were featured at the annual Canadian Innovation Exchange (CIX) in Toronto last month.

The Nov. 18 event, which was attended by top innovative tech experts in Canada, is described as "a technology party for the industry" by founding co-chair Rick Nathan.

The centrepiece of the event, held at the MaRS Centre, was the showcasing of the CIX Top 20 companies, whose products range from wearable technology and wireless charging spots to investment managing technology.

"Through the day you have all these companies presenting on stage and it's kind of done in an American Idol sort of format," said Mr. Nathan.

Each company had six minutes to present themselves and their product or service on stage. A group of experts critiqued and asked questions of the companies in front of an audience.

"For us it's really validating, it's great to be recognized for innovation," said Trevor Coleman, co-founder and chief product officer at InteraXon, one of the featured companies.

"It's a terrific opportunity to meet some other amazing companies," he said of the event, which allows for substantial networking.

"It's a tremendous honour and validation that we're doing something very innovative and it's very humbling to be in such great company too," said Adam Adelman, co-founder and CEO of Mighty Cast, another of the 20 companies chosen to present at the event.

He said it was a good opportunity to meet the venture community, noting that not just tech people were there but also legal, accounting and beta testing companies.

InteraXon makes a product called Muse, a headband that is meant to help wearers train their brains and reduce stress. The band reads the electric energy coming from the brain.

"Just as the heart-rate monitor measures your heart rate through the electricity generated from your heart muscles, we can detect, in a very general sense, what your brain is doing," said Mr. Coleman, of the Muse, which allows the users to discipline their thoughts.

"We can get an overall level of the activity and how dynamic your brain is at any moment," he said, noting the machine can

detect when your mind wanders, thereby training you to keep focused.

He said every time you bring your brain back to the exercise at hand, "you're building a skill that we call meta-attention, which is your brain's ability to be aware of it's own attention and to direct it where it wants. And that skill is what lets you maintain composure in stressful situations."

Mighty Cast is the company behind a wristband called NEX Band, which is being marketed as "the world's first modular smart band."

Mr. Adelman describes it as a "connected smart charm bracelet."

It allows wearers to customize their band with modules that have different hardware and can connect with various technology, such as your phone or a game. As an example, a charm can light up when a particular person calls your phone.

"Like a charm bracelet, each time you change out one of the charms, or mods as we call them, it obviously changes the style on the outside, but it also changes the application experience on the inside," said Mr. Adelman. Because of the modular design it is adaptable as new technology is introduced into the market.

"Where we're going with all this is actually putting sensors directly into the mods themselves. So, for example if one day you decide you want to be alerted if there are too many ultraviolet rays in the sky, well then you put on the UV mod," said Mr. Adelman. He said pollution or pollen detection may also be possible with different mods.

Other companies featured included those that work in the health-care field, such as Figure 1, which allows nurses and doctors to share and discuss medical issues through photos while maintaining patient privacy; and ViewsIQ, which digitizes patient samples microscopically in pathology and laboratory medicine.

Other companies work in analytics and photos. There was an effort to feature companies from across the country.

At CIX the audience had the chance to choose a favorite out of the 20 companies on the list by "investing" virtual cash in a game that made the talks interactive. The audience choice this year was a company called Gallop Labs, which analyzes data on mobile phones for more effective advertising.

Mr. Nathan said CIX is seeing more diverse companies being featured every year, reflecting the diversity in the Canadian market.

"I think that the quality of emerging Canadian technology companies is going up," he said.

He said the event, which started in 2008, helped fill a hole in the technology innovation sector in Canada. He said that before CIX came along there was no conference that featured emerging technology from across the country and no significant event in Toronto.

He said the idea of CIX is to develop a "national community around our emerging technology sector."

"We used CIX to jump into that gap," said Mr. Nathan, noting it took time to grow it from a Toronto-centric event to one with more of a national scope.

He said the event has built its reputation by featuring

companies that have gone on to success, such as Bionym Inc., which is a wristband that measures a person's cardiac signal and uses it as an ID. It was a company featured in 2013.

Mr. Coleman, who has attended the event in previous years, said as a young entrepreneur he was in awe of some of the companies on the stage in the past. This year he was in a different position.

"I had a number of conversations with people who are at much earlier stages—they had just raised their seed round—and they asked me for tips and advice. I had this sort of interesting moment where I realized, 'Oh my god I'm that guy now. I'm the guy on stage.'"

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