

CANADA'S FUTURE DEPENDS ON A NATIONAL SCIENCE STRATEGY THAT OFFERS BOLD VISION



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Canada's traditionally strong reputation in the international science community is faltering. Stories of funding cuts, lab closures, silenced scientists and ideological-driven policy decisions are making headlines around the world. In light of these events, many had hopes that the recently released federal science strategy would serve as an opportunity to turn things around, but it appears that the shortsighted strategy is a continuation of the status quo.

One of the largest global science gatherings took place last month, the American Association for the Advancement of Science conference in San Jose, CA. Many Canadian scientists who attended found themselves fielding questions, not about their research, but about Canada's science policies. Their international colleagues wanted to know, "What is happening to science in Canada?"

Many stories over the past few years have tarnished Canada's once strong reputation. Some of the world's most prestigious journals have regularly criticized our government's science policies commenting on funding cuts to basic and environmental research. *Nature* has denounced cuts to our world-renowned research facilities such as the Experimental Lakes Area and the Polar Environment Atmospheric Research Laboratory. *The New York Times* even wrote a scathing editorial stating that the "silencing of scientists" in Canada is far worse than it ever was in the U.S. during the George W. Bush years.

These criticisms highlight a worrisome trend for science in Canada—a trend that has continued in recent months.

In December, 2014, federal government scientists made the unprecedented move of pushing through their union for research funding and science

integrity policies as part of collective bargaining negotiations. The same month, health researchers voiced their concern that new funding changes will require them to seek outside matching funds, most likely from industry, in order to finance their research. They are worried this could see health research shifted to short-term commercializable research rather than investing in research that will lead to longer-term discoveries. There is also concern that some research areas—aboriginal and child health for example—will have a hard time attracting matching funds from industry.

The Ottawa-based National Ultrahigh-Field NMR Facility for Solids, a world-class facility that helps us understand the properties of matter resulting in countless applications from industrial materials to new drug treatments, is facing an uncertain future after losing their \$200,000 in annual government funding. Another, the Mont-Mégantic Observatory in Quebec, was just saved at the last minute after struggling to find backing since their federal funding program was cut in 2008.

The numbers back up these examples and show that science funding in Canada is lagging internationally. In 2013, Canada's research intensity, total research dollars spent as a proportion of GDP, fell to 1.62 per cent, the lowest level since 1997. That same year average research intensity for OECD countries was 2.4 per cent; 20 other countries had higher research intensity than Canada.

The direction of change over the past decade is even more alarming. The OECD average research intensity increased every year, growing from 2.16 per cent in 2003 to 2.40 per cent in 2013. In contrast, Canada's research intensity has decreased from 1.99 per cent in 2003 to 1.62 per cent in 2013.

We are not just lagging behind in science funding, but also in how science is used to inform government policy decisions.

A recent article in *Vox* described how a “quiet, evidence-based revolution” is underway internationally. This movement is pushing for government policies that are backed by real evidence rather than guess work or ideology; much like how medicine has become an evidence-based discipline over the past century.

The article singles out Canada for lagging behind the U.S. and the U.K. in this transformation. A prime example of this is the decision to eliminate the long-form census, which was extensively revisited over the past few months while a private member’s bill to reinstate the census moved through Parliament. Despite concerns raised by academics, business groups, local governments and many others about the evidence vacuum that the loss of the mandatory long-form census has created, the bill was defeated.

Another recent example of the lack of integration of evidence into public policy is the revelations that the minister of Finance had accepted the word of the small business lobby on the economic benefits of reducing EI premiums without doing any independent analysis, resulting in the Department of Finance being roundly criticized for being a “fact-free” zone.

This adds up to a worrying view for the future. We used to be known for great scientific advancements—insulin, stem cells, the Canadarm—now we’re known for closing labs and silencing government scientists. How are we going to attract the best scientific minds with this reputation? How are we going to remain globally competitive when other countries are so boldly outspending us on science?

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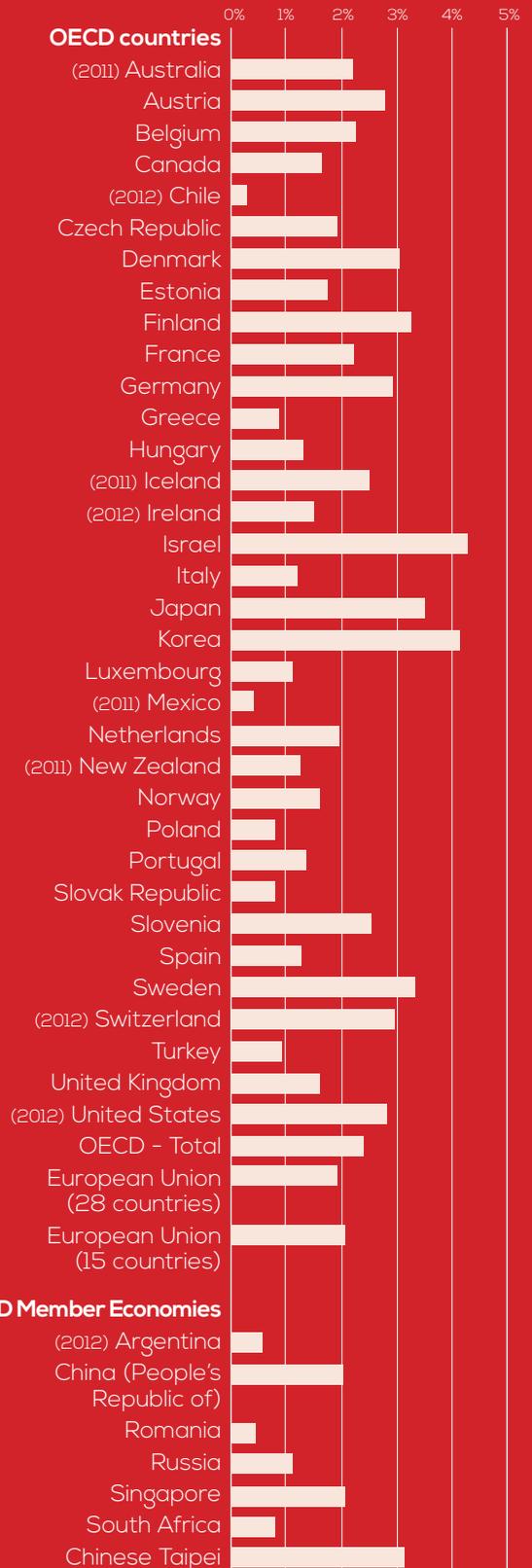
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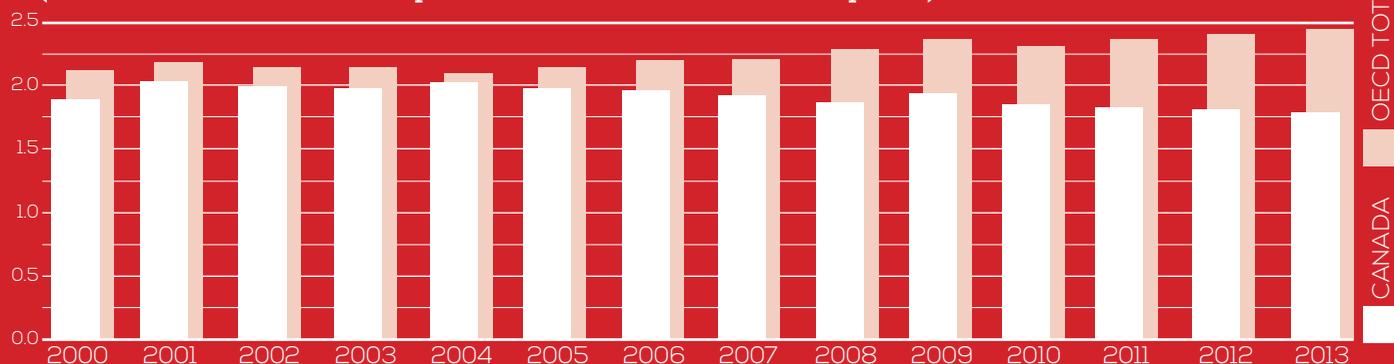
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P R O F E S S I O N A L

Gross Domestic Expenditures on Research and Development as a percentage of GDP, 2013



Canada compared to the OECD, 2000 to 2013

(Per cent of Gross Domestic Expenditures on Research and Development)



WHERE IS CANADA'S LEADERSHIP?

After much waiting, the revised, federal science, technology and innovation strategy was released last December. The new strategy (many years in the making) was an update to the 2007 science and technology strategy, and presented an excellent opportunity for our federal government to offer up a bold and ambitious plan to restore Canada's place as a global leader.

The strategy, much like the state of science in Canada itself, came up short. Indeed, one of the most notable changes from the 2007 strategy was the addition of 'innovation' to the title. It was, however, an apt addition given that innovation seems to be the sole focus of the current government's approach to science.

This title change represents a clear trend over the past few years towards supporting business innovation and commercialization, often at the expense of basic and environmental research. Most notably, the mandate of the National Research Council (NRC) received a major overhaul. The NRC, the main home for in-house government science, had its focus shifted from primarily on basic research to "business-led research" with the goal of becoming a "concierge service" for industry.

This narrow understanding and use of science is expected to continue given Tom Jenkins' recent appointment as the chair for NRC. Jenkins led a panel to investigate how the federal government can support a more innovative economy, resulting in the 2011



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Jenkins report. The recommendations in this report have guided much of the government's science policies since.

Innovation is important, and is certainly an area where Canada can improve, but science is not just innovation and often, innovation is not science. This heavy focus on innovation ignores the broader role science plays in our society. It ignores public interest research—research that informs policy, regulatory research, and basic research that is too risky for industry to fund.

This narrow approach is not even the best way to ensure economic growth, surely one of the government's top priorities. Focusing on innovation might pay off in the short term, with increased commercialization from the existing pool of basic research discoveries that has been filled over past decades. But what about our long-term economic prospects when the pool of basic research has dried up?

History has shown us that society gets the most benefit when we fund the best science, not by making scientists squeeze their research into narrow industry-driven funding requirements. Most of the great scientific and technological advancements you can think of—from GPS to Velcro—were the result of basic research.

The Canada First Research Excellence Fund, the main new research funding vehicle announced in the 2014 budget and detailed in the strategy, falls into a similar trap. While it is welcome to see additional funding for academic research, the fund is reserved for research that aligns with the government's priorities and demonstrates clear economic benefit. This type of very prescriptive research funding does not fund the kind of public interest science needed to keep Canadians safe and healthy—and it certainly is not the best way to spur innovation.

The revised strategy is the perfect exemplification of why Canada has suffered a damning international science reputation in recent years. What is worse, recent events suggest this reputation will only be tarnished further. Based off current trends, one dreads thinking of what questions our international peers will ask our scientists at the next big international conference.

We need a dedicated, comprehensive national science strategy that is honest about the challenges facing researchers in Canada, and offers bold vision, backed with resources, to once again make Canada an international leader in science and innovation. Canada's future depends on it. **P&I**

CANADA RANKS **30th** of **34** OECD countries when it comes to investment in science



W **C** **Z** **S** **2013** Canada's investment in research and development has decreased by **20%**
2008 The OECD average during the same time period has increased **10%**

In **2013**, Canada's research intensity, total research dollars spent as a proportion of GDP, **fell to 1.62%**, the lowest level since **1997**.

ABOUT

1/3

of business expenditures on R&D is performed by **25 firms**

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