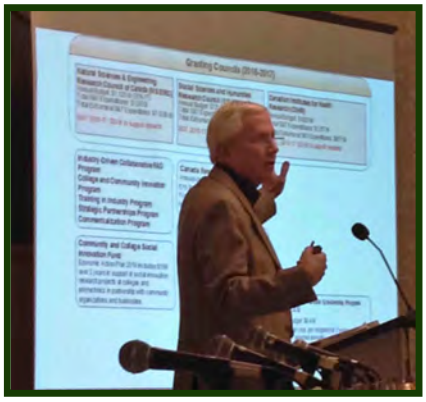

Keynote

"Gravity: Canada's Innovation Challenge"

David Watters
CEO, Global Advantage

Watters began by outlining how different this latest federal budget was, describing it as "phenomenal". "In my 15 years of looking at budgets, I think this is the most distinct and unique that I have seen." He noted that there is a great deal to interest anyone with a stake in research and innovation, but added that there are some challenges that are also present.

He praised the budget document for almost immediately zeroing in on the central problem facing Canada: the median wage income has remained stagnant for a substantial period, particularly for younger people facing few options besides temporary or contract work. "It really is a challenging time in terms of trying to find a home, get a good job that is sustainable and meet all the basic payments to afford a standard of living that my generation took for granted." This challenge underlies the government's overriding focus on supporting and expanding the country's middle class. The budget also reflected the broader global economic slowdown and market volatility, highlighted by the recent drop in the price of oil and the loss of no fewer than 65,000 jobs in Alberta.

Watters asked the audience for their estimate of how much larger this budget was than the preceding Conservative one, which garnered responses that it might be two or three times the size. In fact, he pointed out, this latest budget sets out spending on the order of $27.6B over the next two years, more than 16 times larger than last year's budget, which came in at $1.7B over two years. While this money is obviously aimed at

stimulating economic growth, Watters warned that this scale of spending could shut out opportunities for other investments in economic growth.

He then outlined the eight chapters of the budget, which included helping the middle class, growing the middle class, addressing the needs of indigenous peoples, making the country more inclusive, supporting foreign affairs, creating a more open government, and providing a fairer tax system. Among the goals is a repeated reference to the creation of 100,000 jobs, along with raising of GDP by 0.5% this year and 1.0% next year. Watters wonders how many of these jobs could qualify as middle class, and what that definition might mean. He also calculated that each of these jobs will come at an overall cost of $276,000; given that there are about 500,000 university and college graduates each year, you could give each of them $25,000 to seek employment or create a business and still have another $15B left over for other expenditures. "I'm not saying you should do that; I'm saying we need to think very creatively about the kind of investments that we're making if we want to support the country and really focus on this younger generation and give them the support that they need."

From the perspective of spending on research, Watters argued that it is eclipsed by the emphasis on social policies, with the only such spending among the largest 25 items in the budget being money for Genome Canada, which came in 25th. While he did not deny the need for these other expenditures, he expressed concern about whether there would be any money available for the essential incremental expenditures on innovation.

The budget employs language that includes "redesigning and redefining" the country's innovation agenda, with alignment, coordination, and simplification along with clear outcomes, which will ultimately position Canada as a centre for global innovation, "To me this implies a very fundamental re-thinking of all the programs and activities that support research and innovation."

Watters reiterated that the scope and ambition of the budget exceeded anything he has ever seen, much of which has not been formally costed, leaving it unclear how it will be paid for. The listed commitments include a review of support for fundamental science, a framework for promoting clean growth to deal with climate change, a new defence strategy, a new international assistance policy, renegotiating a health accord, improving the living conditions of indigenous peoples, and eliminating poorly targeted and inefficient programs.

"This is a stunning policy agenda that has been developed. If you were able to do two or three of these things — maybe four — that would be absolutely remarkable. To try and do them all is really going to be superhuman." For just that reason, however, Watters suggested that it was incumbent upon observers like those present at the conference to help the government achieve these ends. Moreover, although the budget could be criticized for placing economic goals before proven performance, he speculated that this

whole package could actually work, simply because it will win just this kind of popular support. It responds to the stated needs of the constituencies that enabled the government to get elected, even if it does leave lingering questions about whether there will be enough money to achieve its stated goals.

Watters presented the 2016 version of his intricate S&T/Innovation Ecosystem Map, which shows the complex flow of money and other activities that provide linkages between diverse players, such as taxpayers, federal departments, granting councils, universities and colleges, the private sector, and global markets. As an access point into this network, he noted that the government's policy capability has been atrophying over a considerable period. "You can either build up that capacity in individual departments or you can just build it up in the centre," he said, pointing to $99 million dedicated to the Privy Council Office, where that policymaking capacity build-up might be occurring with the aim of spreading it elsewhere in the government afterward. He also observed that the Ministry of Innovation, Science and Economic Development will be handling the development of research infrastructure, including some $800 million over four years dedicated to innovation networks and clusters. Nevertheless, the implications of this huge investment are not necessarily clear.

Elsewhere Watters expressed some disappointment at how little was being spent, such as $4M over two years for Global Affairs Canada. "If you're really trying to stimulate global competitiveness, I think there's a real lack of investment in this particular area." He also pointed to a shift in the way regional development agencies (RDAs) were administered, giving more authority to the federal government in each case. "You don't have individual ministers responsible now for the RDAs. You can well see them becoming more an instrument of central government policy than perhaps they have been in the past."

Watters focused on the implications of assigning $345 million to 70 programs supporting private sector innovation, along with $3B for Scientific Research and Experimental Development (SR&ED) tax credits. For him the sheer number of these initiatives raises questions about whether there are too many of them and some consolidation might be warranted. Meanwhile, although the granting councils expressed satisfaction with increases to their budget, Watters argued that those increases were not necessarily worthy of celebration. "Let's talk about the $30M for NSERC; that's on a budget of about $1.1B. That ends up being an increase of about 2.67%. Inflation's running at 2%; so you've got a 0.67% increase. Some people may say that's a lot and a new direction. I think it is not far off what has happened in the past and grossly underfunded in terms of what we need to do in terms of supporting research activity in general." He reiterated his underlying concern about just how much some of these increases represented and whether they should be larger. Similarly with the federally funded not-for-profit

organizations and the Networks of Centres of Excellence, Watters asked about the long-terms goals of supporting these undertakings.

The presentation moved on to a colourful graphic representation of Canada's R&D activity with respect to other countries. The dynamic imagery showed how over the last several years these various players have changed in terms of their overall spending, Gross domestic Expenditure on R&D (GERD), and numbers of scientists and engineers participating in this work. Major changes in the status of some countries, notably South Korea and China, highlight the shifts taking place within about $2 trillion spent on R&D globally. "Canada is about 1.5% of that; we're about $31.6 billion, so we're really a small player in this whole scheme of things. But that's why we need to have our research community connected to what research is ongoing on a global basis, so we can attract it and make it useful for our particular purposes."

As for how that $31.6 billion is administered, Watters explained that there are six funders of R&D (federal, provincial, private, business, academic, and foreign) but just four performers of R&D: federal, academic, provincial, and business. Moreover, more than $28 billion of that performance is carried out by academia and business. A telling graph, however, outlines the nature of what Mark Henderson dubbed a "decade of darkness" between 2004 and 2014, when the average GERD amongst OECD countries rose from 2.13% to 2.4%, while Canada's GERD declined from 2.01% to 1.6%. In other words, while OECD competitors are accelerating in one direction, we are running the race in the opposite direction. "The question I have is: does the new government understand this? If they do understand it, what do they want to do about it?" The present gap between Canada's GERD and the OECD average GERD would take about five years to eliminate and add another $78 billion to Canada's R&D expenditures. "That's what you would have to spend just to become average," he said, noting that this outsized budget contributed only $1.3 billion to filling this hole. "We're still $76.7 billion short if our objective is to reach that OECD average figure."

He further unpacked this disparity, showing that GERD was 33% lower than the OECD average, while Business Expenditures on R&D (BERD), Higher Education Expenditures on R&D (HERD), and Government Expenditures on R&D (GovERD) were 51%, 55%, and 42% lower respectively than that average.

Looking specifically at higher education, Watters offered a detailed map, which showed that the cost of getting licensing revenue for innovations is $15 million. "You're only getting a net of $6 million, and that's on the basis of about $13 billion, so if you look at ROI, it's a tiny amount. And if you look at who the license is going to, more than half are actually going offshore." Nor should this exodus be unexpected, he added, given the opportunity of training people to work in R&D and keep them here. With that in mind, he cited a troubling drop in the number of people working in Canadian R&D, which has declined by some 13% from 2008-2012. In the private sector this decline was 23%,

while in higher education the number increased by 14%. "I find this to be a disturbing piece of data." As for where the remaining people work, some 58% are in the private sector, while only 33% are in higher education and the remaining 7% are in government. As another point of contrast, Watters displayed figures showing that 10% of all Canadian R&D is in the social sciences, but 64% of university graduates are in the social sciences. An even starker contrast is with Canadian colleges, which produce fully 42% of the graduates in higher education yet receive only 2.4% of federal research funding.

Looking at the private sector, Watters revisited the implications of the small number of larger firms, some 1,500 out of more than 1.1 million in the country. Statistics Canada even lumps in organizations like Canada Post or universities into this category, so the numbers drop even more when these public sector bodies are removed. Moreover, the real action in terms of employment and R&D activity remains with the SMEs, some 75% of which have just four employees.

The push to get Canada to participate in global markets is a reminder of how dependent we are on the US, which is the nearest and most accessible of these markets. The competition is daunting, he concluded, and in this regard far too much is expected of SMEs. "We expect these firms, between four and nine people, to get into the Chinese market or the Indian market. The complexity of doing that with a small firm is just stunning. This is a huge challenge where we really do need to have governments and the higher education sector working with the private sector to find solutions."

Returning to the notion of spending an extra $78 billion in order to bring Canada's GERD up to the OECD average, Watters estimated how much each sector would have to carry out in that regard. Since the private sector currently represents 49% of the total share of Canadian R&D, this would mean an extra $38.2 billion. "What would you have to do? It's got to come from increased revenue. You're not going to have the government bail you out; those revenues have to come from sales, predominantly in export markets." Since innovative firms spend about 3.5% of revenues on R&D annually; at that rate, these firms would have to increase their export sales — which are now about $623 billion — by another $1 trillion. That is an increase of about 175%. "That's why, in my view, an innovation strategy has to be an export strategy and so far I don't see the components of that having been put into place."

Watters suggested that metrics would become crucial to gauging the effectiveness of such policies in economic, social, and environmental terms. As for why Canada's innovation ecosystem has been performing poorly, he listed nine specific reasons:

1) a continuing decline in funding for innovation and R&D
2) a lack of national objectives. "We have not defined what it is we're trying to build and achieve here."

3) no industry sector strategies
4) an inadequate understanding of how the private sector is organized, including critical elements such as the fact that 75% of firms have just four employees and services now account for 78% of the economy
5) too narrow a focus on R&D, instead of a much broader definition of innovation activity
6) inappropriate focus on commercialization of university research rather than success of university researchers
7) little effective federal or federal-provincial coordination, which requires new expertise and time
8) inadequate data on innovation performance
9) little direct support to help firms approach global markets, especially the SMEs that need the most help

As for the way ahead, Watters insisted on the need to reinvest, rebalance, and redesign programs in order to get everyone aligned in the same way toward innovation. "I like the general direction this government is moving on this agenda, but I think they're going to need a huge amount of help."

Crelinsten asked for details about the three points that an innovation agenda should emphasize. Watters began with the importance of setting a clear goal. "We've been underinvesting in this area for such a long period that you've got to get a recognition by politicians and bureaucrats about the significant challenges and investments that are going to be required." Secondly, he stressed the major distinctions between different industrial sectors, which calls for equally distinct strategies. This is best accomplished by ongoing partnerships between the public sector, private sector, and academia, so that progress is monitored by all the participants.

Ron Freedman challenged Watters' emphasis on the ratio of GERD to GDP, because Canada's measurement of GDP is distinct from that of other countries. For example, Canada does not include research in business, the social sciences, or the humanities in its calculations, while others do. He then asked what was in the budget that would generate real results for Canada. Watters suggested that singling out 1,000 high-impact firms for support is a tangible step.