

NOVEMBER 7, 2008

# Canada's University Innovation Leaders

A SUPPLEMENT PREPARED BY RESEARCH INFOSOURCE INC., AN IMPACT GROUP COMPANY

**RESEARCH INCOME SLOWS** — Canada's Top 50 Research Universities recorded a pedestrian 3.5% growth in their total research income in Fiscal 2007. Total research income reached \$5.7 billion, up from \$5.5 billion in

## Canada's Top 50 Research Universities 2008

Rank		University	Sponsored Research Income			Full-time Faculty**	Research Intensity	Province
2007	2006		FY2007 \$000	FY2006 \$000	% Change 2006-2007	2006-2007 #	\$ per Full-time Faculty \$000	
1	1	University of Toronto* ++	\$854,759	\$763,541	11.9	2,379	\$359.3	Ontario
2	5	University of Alberta*	\$461,396	\$382,810	20.5	1,533	\$301.0	Alberta
3	2	Université de Montréal*	\$415,043	\$447,158	-7.2	1,911	\$217.2	Quebec
4	3	University of British Columbia*	\$401,267	\$421,993	-4.9	2,181	\$184.0	British Columbia
5	4	McGill University*	\$375,739	\$397,136	-5.4	1,557	\$241.3	Quebec
6	6	McMaster University*	\$346,280	\$331,575	4.4	1,176	\$294.5	Ontario
7	8	Université Laval*	\$268,313	\$258,948	3.6	1,344	\$199.6	Quebec
8	7	University of Calgary*	\$254,179	\$262,215	-3.1	1,470	\$172.9	Alberta
9	10	University of Western Ontario*	\$238,047	\$225,946	5.4	1,335	\$178.3	Ontario
10	9	University of Ottawa*	\$229,194	\$244,003	-6.1	1,104	\$207.6	Ontario
11	11	Queen's University*	\$213,047	\$173,696	22.7	813	\$262.1	Ontario
12	13	University of Manitoba*	\$154,946	\$139,646	11.0	1,200	\$129.1	Manitoba
13	16	University of Saskatchewan*	\$150,507	\$106,887	40.8	1,035	\$145.4	Saskatchewan
14	12	University of Guelph	\$132,947	\$149,640	-11.2	771	\$172.4	Ontario
15	14	University of Waterloo	\$121,604	\$127,472	-4.6	924	\$131.6	Ontario
16	15	Dalhousie University*	\$111,511	\$106,895	4.3	1,014	\$110.0	Nova Scotia
17	17	University of Victoria	\$89,292	\$100,030	-10.7	678	\$131.7	British Columbia
18	18	Université de Sherbrooke*	\$86,172	\$85,938	0.3	924	\$93.3	Quebec
19	20	Carleton University	\$84,817	\$74,086	14.5	687	\$123.5	Ontario
20	21	Simon Fraser University	\$77,586	\$69,013	12.4	774	\$100.2	British Columbia
21	19	Memorial University of Newfoundland*	\$75,674	\$77,189	-2.0	864	\$87.6	Newfoundland
22	22	Université du Québec à Montréal	\$66,981	\$66,331	1.0	1,023	\$65.5	Quebec
23	23	York University	\$60,906	\$54,990	10.8	1,335	\$45.6	Ontario
24	24	Institut national de la recherche scientifique+	\$55,671	\$44,585	24.9	153	\$363.9	Quebec
25	25	University of New Brunswick	\$46,591	\$44,030	5.8	561	\$83.0	New Brunswick
26	27	Concordia University	\$35,599	\$36,361	-2.1	816	\$43.6	Quebec
27	28	University of Windsor	\$25,909	\$26,018	-0.4	495	\$52.3	Ontario
28	30	University of Regina	\$21,497	\$22,901	-6.1	384	\$56.0	Saskatchewan
29	31	Royal Military College of Canada	\$20,209	\$20,190	0.1	145	\$139.4	Ontario
30	33	Lakehead University*	\$20,129	\$16,727	20.3	276	\$72.9	Ontario
31	39	Ryerson University	\$16,192	\$12,193	32.8	660	\$24.5	Ontario
32	40	Université du Québec à Trois-Rivières	\$16,150	\$12,165	32.8	327	\$49.4	Quebec
33	26	Laurentian University*	\$15,519	\$38,572	-59.8	432	\$35.9	Ontario
34	35	Brock University	\$14,881	\$15,626	-4.8	528	\$28.2	Ontario
35	37	Université du Québec à Chicoutimi	\$14,698	\$13,765	6.8	204	\$72.0	Quebec
36	29	École de technologie supérieure+	\$14,339	\$24,671	-41.9	150	\$95.6	Quebec
37	34	University of Northern British Columbia	\$13,798	\$15,909	-13.3	180	\$76.7	British Columbia
38	36	University of Lethbridge	\$13,663	\$13,857	-1.4	330	\$41.4	Alberta
39	38	University of Prince Edward Island	\$13,152	\$12,682	3.7	180	\$73.1	Prince Edward Island
40	43	St. Francis Xavier University	\$11,679	\$9,718	20.2	267	\$43.7	Nova Scotia
41	32	Trent University	\$11,142	\$18,008	-38.1	258	\$43.2	Ontario
42	42	Université du Québec à Rimouski	\$10,670	\$10,232	4.3	177	\$60.3	Quebec
43	41	Université du Québec en Abitibi-Témiscamingue	\$10,249	\$11,693	-12.3	105	\$97.6	Quebec
44	47	Saint Mary's University	\$9,775	\$6,634	47.3	234	\$41.8	Nova Scotia
45	45	Université de Moncton	\$9,692	\$8,690	11.5	342	\$28.3	New Brunswick
46	44	Wilfrid Laurier University	\$9,437	\$9,197	2.6	465	\$20.3	Ontario
47	46	Nova Scotia Agricultural College+	\$6,844	\$6,930	-1.2	60	\$114.1	Nova Scotia
48	nl	University of Ontario Institute of Technology+	\$6,086			87	\$70.0	Ontario
49	48	Acadia University	\$5,974	\$5,865	1.9	207	\$28.9	Nova Scotia
50	51	Université du Québec en Outaouais	\$5,156	\$3,905	32.0	174	\$29.6	Quebec

Notes:

1. Sponsored research income: includes funds to support research paid either in the form of a grant or by means of a contract from a source external to the institution.
2. Financial data were obtained from Statistics Canada.
3. Faculty data were obtained from Statistics Canada, Conférence des recteurs et des principaux des universités du Québec (CREPUQ) and the RESEARCH Infosource Canadian University R&D Database. For confidentiality reasons, Statistics Canada randomly rounds the figures either up or down by a multiple of "3".
4. Data are provided for the main university/college including its affiliated institutions, where applicable.
5. All institutions are members of the Canadian Association of University Business Officers (CAUBO).

\*Has a medical school

\*Not a full-service university

nl = New listing

\*\*Includes full, associate and assistant faculty only

++Sponsored research income administered by affiliated hospitals was reported one fiscal year in arrears

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## Research Universities of the Year 2008

Three universities gain RESEARCH Infosource's designation of *Research University of the Year* in their category for their performance on a balanced set of input, output and impact measures for FY2007. These full-service universities demonstrated superior achievement both in earning research income and in publishing research in leading scientific journals.

Rank	Medical /Doctoral	Score*	Rank	Comprehensive	Score*	Rank	Undergraduate	Score*
1	University of Toronto	100.0	1	University of Waterloo	91.1	1	Royal Military College of Canada	79.9
2	McGill University	69.5	2	University of Guelph	88.7	2	University of Northern British Columbia	73.3
3	University of Alberta	68.4	3	University of Victoria	74.0	3	Brock University	71.8

\*The Score in each category is out of a possible 100 points based on the following indicators and weighting: 2 input measures: total sponsored research income (20%) and faculty research intensity (20%); 2 output measures: total number of publications (20%) and publication intensity in leading journals (20%); and 1 impact measure: publication impact (20%). For each measure, the top ranking institution is assigned a score of 100 and the other institutions' scores are calculated as a percentage of the first ranking institution. See [www.researchinfosource.com](http://www.researchinfosource.com) for details.





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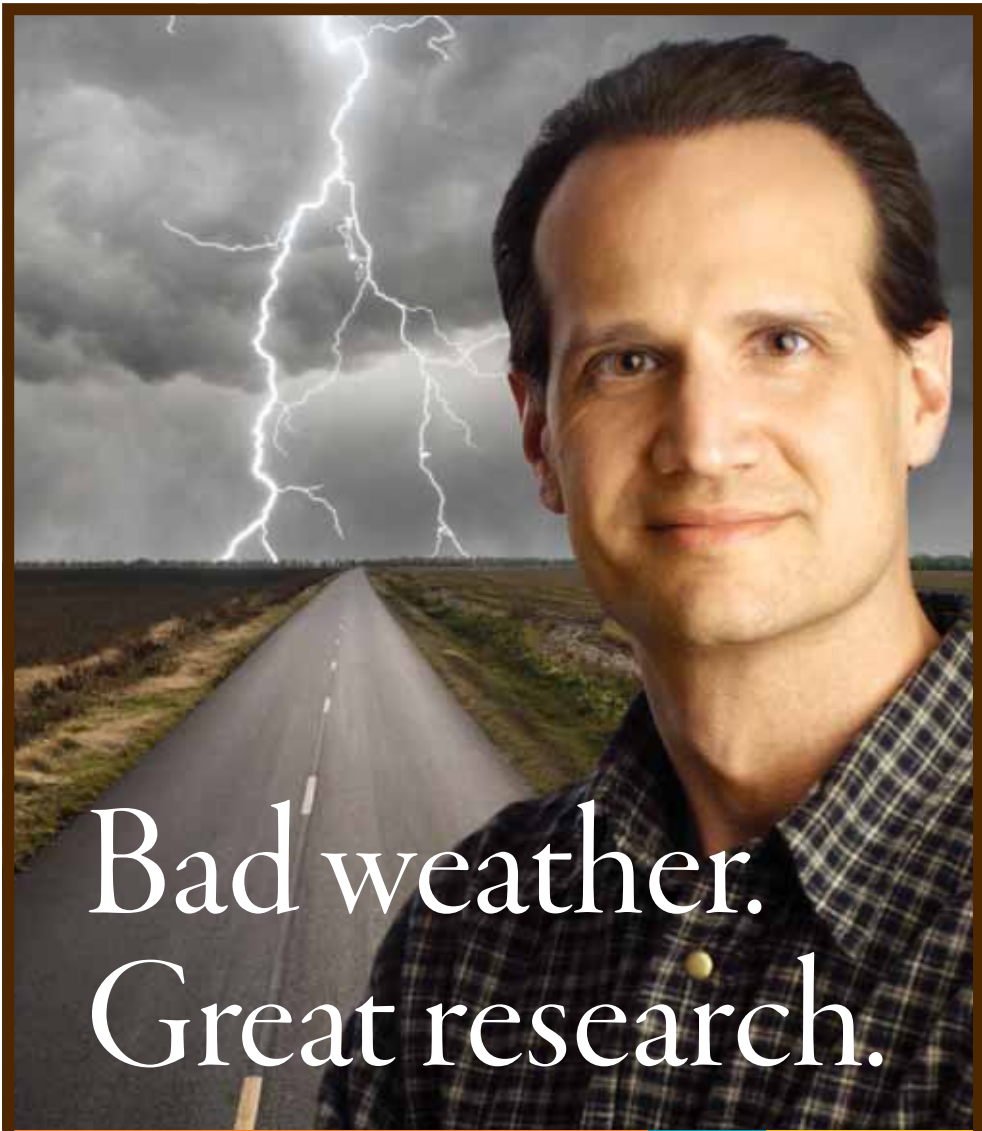
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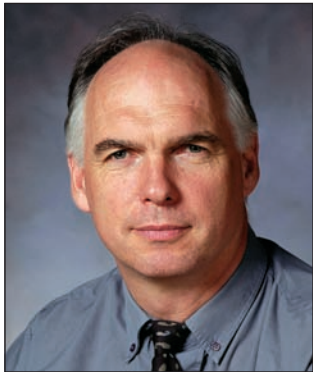
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# Score One for Clusters on 'The Island'



Rory Francis  
Executive Director  
Prince Edward Island BioAlliance Inc.

**IN SEPTEMBER**, the New York Islanders and Florida Panthers played the first-ever NHL game on Prince Edward Island, an exhibition contest that the Islanders won 4-2. Some might say any plausible comparison between PEI and the big urban areas of the NHL ends with that match.

Not so fast. PEI is rapidly becoming a major player in another area that is elevating our game to big-league status: our bioscience technology cluster. To help develop the cluster, the PEI BioAlliance was established in 2005 by community leaders to make biosciences a new pillar of the PEI economy.

The Harvard Business School defines clusters as “geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a nation or region.” There’s nothing in the definition about big cities per se, or even hockey teams.

Sure, Prince Edward Island seems far from the high-tech hubs of Boston and San Diego. But with a population a smidgen larger than Guelph, Ontario – which is part of the technology cluster that includes the acclaimed Research in Motion of blackberry fame – PEI is making great strides on its own scale.

Today, the PEI Bioscience Cluster employs 800 full and part-time people in 25 private companies and a dozen academic and research

organizations. Revenues now exceed \$63 million. Research and development has grown by more than 600% at the University of Prince Edward Island in five years and the number of bioscience companies has increased by 50% in just three years. We’re attracting bright minds in science and in business.

PEI has the capacity, the people, and the support to develop and export globally relevant science-based products. Our small size is an asset. It allows us to flexibly adapt to the challenges we face, and permits our society to respond as a single community to changes taking place regionally, nationally and around the world.

So what do you need for a successful cluster?

On the Island, our efforts are being driven by four key components. First, we have a shared economic vision. For PEI, the ‘status quo’ is not an option. Our leaders in government, research, and the private sector have recognized that new ‘legs’ must be built under the PEI economic platform. Second, we have strong leadership. The BioAlliance has brought together leaders from industry, government, and academic, research and financial communities to work together to ensure action, accountability, and results. Third, we have focus – the development and commercialization of bioactive compounds from marine and terrestrial sources, for human and animal health and nutrition. Finally, we have broad-based collaboration. Our road to success in the knowledge-based economy has demanded collaborative industry-research partnerships, and strong communication links among partners. All of the BioAlliance’s partners allocate their resources for maximum impact.

Our approach is working. In recent years, 25 business-research partnerships, supported by the Atlantic Canada Opportunities Agency’s Atlantic Innovation fund, have put over \$100 million worth of private and public sector investment into bioscience-based product development initiatives, with some

impressive results.

For example, BioVectra and its partners have developed PEGylation technology that can extend the half-life of protein drugs and improve their biological effectiveness. Novartis Animal Health, from their PEI base for global R&D and manufacturing of fish vaccines, registered the world’s first DNA vaccine to protect salmon raised in aquaculture systems. Boston-based Genzyme has made an important investment in PEI through an acquisition in the human health diagnostics manufacturing field.

Meanwhile, Neurodyn is producing products for early detection and treatment of neurological diseases. Nautilus Biosciences Canada is developing production methods and new drug leads derived from marine organisms. Other examples abound.

We’re just getting started. In April of 2008, the PEI government released an economic strategy that is designed, in part, to boost annual bioscience sales to \$300 million, increase full-time equivalent employment in the biosciences to 2,000, and ensure the province is recognized for its excellence in the development of bioactive-based health and nutrition products.

More work remains. PEI must, and will, continue to aggressively add key infrastructure and human resources to the cluster. Otherwise, we will not succeed in establishing a credible, competitive position in the Canadian- and global, bioscience landscape. The economic opportunity will be lost, and we will be once again relegated to a technology ‘purchaser’ rather than a technology ‘provider.’ That scenario is unacceptable.

Historically, the PEI economy has relied heavily on agriculture, the fishery, tourism, and the service sector. But thanks to initiatives like our bioscience cluster, new opportunities grace our shores, and are helping modernize our communities. World class research and development, and sophisticated business transactions are becoming a permanent fixture on the economic landscape, becoming – as we say locally – an integral part of the ‘Island Way.’

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Janusz Pawliszyn, a chemistry professor at the University of Waterloo, is the 2008 winner of the \$100,000 EnCana Principal Award from the Ernest C. Manning Awards Foundation. The award recognizes Canadian innovators who, like Pawliszyn, have made a significant impact in the world outside the lab. He invented solid-phase microextraction, a revolutionary technique that makes it possible to do medical and environmental testing and analysis on the spot.

Pawliszyn is just one of hundreds of researchers at Waterloo who operate at the frontier of innovation and discovery.

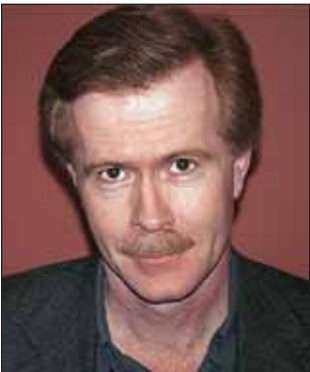
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## Ottawa Must Give Innovation a Higher Profile



Mark Henderson  
Editor  
RESEARCH MONEY

**CANADIANS CAN BE** forgiven if they're unaware of the critical importance that innovation can play in determining the nation's future well-being and prosperity. During the recent national election campaign, none of the party leaders gave more than lip service to innovation, research and development (R&D) or

science and technology (S&T), despite overwhelming evidence of their contributions to economic growth and competitiveness.

Political parties are reluctant to go beyond simplistic messages and deal with the key drivers of the knowledge economy, which most agree eventually must augment Canada's heavy reliance on generating wealth from natural resources. The political avoidance of issues pertinent to innovation frustrates those who appreciate the linkages between institutions that conduct fundamental, cutting edge research – primarily universities – and the private sector that takes that knowledge and turns it into products and processes to sell around the world. Falling even further off the political radar is the role of government laboratories, which serve as a crucial conduit between the other two.

Since taking power in early 2006, the Conservative government has

generally talked the talk when it comes to innovation but has achieved little in the way of expanding the federal commitment to innovation. The years of impressive increases to R&D under the Liberal governments of Jean Chrétien and Paul Martin have slowed to a crawl and the few new programs to fill gaps in the innovation cycle (prototype development, demonstration, etc) have yet to show results. For an issue that is taken seriously in other advanced nations, the low priority given to innovation by the Conservative government is perplexing.

While Canada has a relatively new federal S&T strategy, it doesn't have an innovation strategy that covers the continuum from fundamental research to the marketplace. Various provinces have pushed for such a strategy and there was a meeting earlier this year to explore the feasibility of such a move. But the federal government has yet to come to the table

and until such time, a fully coordinated effort is unlikely to emerge.

Some provinces have effectively given up waiting for federal leadership and are forging ahead with their own strategies and programs. Alberta and Ontario are showing effective leadership and devoting significant sums of money to stimulate the commercialization of knowledge and assist firms in their quest to find profitable niches in global markets.

The looming recession will almost certainly exacerbate an already serious situation as governments at all levels confront shrinking tax revenues. At the national level, the elimination of healthy annual budget surpluses further reduces any wiggle room the government might have. Surpluses of \$10 billion or more gave the former Liberal government the opportunity to fund laudable R&D initiatives such as the Canada Foundation for Innovation and Genome Canada

with year-end money. The Harper government elected to use that money for other priorities.

Over the years, Ottawa has occasionally recognized the value of collaborative R&D between universities and industry, government and industry and government and universities and has designed programs to stimulate these types of interactions. The Industrial Research Assistance Program is probably the most successful in encouraging smaller businesses to be more innovative. But its budget is too small to satisfy demand. This year, IRAP's annual budget was fully committed within three months, leaving hundreds of businesses high and dry. Another program – Technology Partnerships Canada – was killed and replaced by a new fund that helps only aerospace and defence firms, leaving companies engaged in biotechnology, information technology, communications and other sectors without any

government assistance for pre-competitive R&D.

So where to now? A good start would be federal participation in discussions with the provinces to forge a national innovation strategy. There's plenty of evidence that Canada can become a world leader in select technology niches if it can target programs effectively and ensure that colleges and universities provide young people with the appropriate skills. There needs to be a realization that applied research must be aligned with the needs of industry and its customers to have the desired effect.

Perhaps most importantly, S&T and R&D must have a voice at the Cabinet table where national decisions are ultimately made. Without a higher profile and greater clout within government, Canada will fall further behind its competitors and future generations will suffer the consequences.

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**INNOVATION IS GAINING** a sharp sense of urgency as an economic, social and environmental imperative for Canada. Before it can thrive, innovation that leads to economic development needs support from four key sectors: a region's business community; a municipality or regional authority acting through its economic development office; its post-secondary education community; and the major regional infrastructure, be it an airport, port, or energy grid.

That recipe comes from Mike Williams, Senior V.P. for Investment Attraction at the Toronto Region Research Alliance (TRRA). Informed opinion supports his menu for successful economic development, but getting the parts to work together has posed a very Canadian challenge.

"Our capabilities in science and technology are strong. Our capabilities in commerce are among the weakest in the developed world," comments Doug Barber, Distinguished Professor-in-Residence at McMaster University and co-Founder of Gennum Corporation.

That is changing. Williams comments, "Ten years ago, none of the four key sectors had serious interest in economic development in the Toronto area. The shift is dramatic. All four are interested now." Everyone is waking up – governments, regions, communities, academic and industrial sectors across Canada.

Twenty years ago the towns of Cambridge, Kitchener and Waterloo, Ontario, merged their economic

# Bettering Communities Through Innovation: Industry, Universities and Cities Working Together

development departments to create what John Tennant, the former CEO of Canada's Technology Triangle Inc., calls "a model public-private partnership attracting investment, new businesses and talent to the Waterloo region." The result: powerful innovation and growth.

"We collaborate closely," says Tennant, "with local government, with the second and third largest chambers of commerce in Ontario, with the region's technology organization; and our post-secondary institutions are a key part of our mix." These are the universities of Waterloo, Wilfrid Laurier and nearby Guelph (which collaborates especially in health sciences), and Conestoga College.

"Our city partners have made important strategic investments to attract satellite campuses and help develop think-tanks," Tennant adds. Success in the first generation now frames the second, fueled in part by private money from Research In Motion executives and others who made their fortunes and are paying back.

The private component in Waterloo Region's power alliance set up Communitech to represent the technology sector. Communitech works to assist early stage companies: "We mentor about 140 of them in the Waterloo region each year," says Avvey Peters, Executive Director of Government Relations. "Our overriding philosophy is that the entrepreneur-driven economy is what will be most helpful to Ontario and Canada. Innovative growth needs three supports: money, brains and culture." Access to capital and links with local academic institutions address "money and brains." The culture factor is intangible – and harder to instill. Waterloo Region's strong entrepreneurial background helps. "We are

less cautious here," says Peters. "This community readily accepts risk-taking and entrepreneurship."

It also celebrates entrepreneurs through the Accelerator Centre at the University of Waterloo's Research and Technology Park. Tom Corr, the Accelerator Centre's CEO and the university's Associate V.P. for Commercialization, calls this "a good example of the three levels of government working with industry, universities and venture capitalists to create a successful accelerator model. We will soon be expanding, bringing the Accelerator Centre to a total of 38,000 square feet."

Peter McKinnon, President of the University of Saskatchewan and a member of the Science and Technology Innovation Council, referred to the Competition Policy Review Panel's

ing to learn that while entrepreneurship is an attitude of mind and a capacity for risk, it also involves knowledge that can be learned." Meanwhile, thriving partnerships in Edmonton, Saskatoon and elsewhere are transforming innovative research to commercial success.

TEC Edmonton is an acceleration joint venture helping "inventors, entrepreneurs, spin-off/startup companies and investors access facilities, management and financing expertise to succeed in technology ventures." Collaboration among federal and provincial governments, the University of Alberta and the City of Edmonton helped locate TEC Edmonton's commercialization centre, the TEC Centre, "in the heart of downtown," says marketing and communications manager Nadia Andersen.

The word  
"accelerator"  
is as current as  
"innovation"

report, Compete to Win (June 2008), adding, "The framework we need to launch innovation and partnerships depends on leaders' attitudes, and on their determination to explore possibilities for partnerships, then work hard to engage the potential partners in ways that will lead to success. We're in a different world: to participate in our complex research and innovation development you can't succeed on your own. You need a much broader base of participation."

The word "accelerator" is as current as "innovation." The accelerator concept involves providing mentoring and skills, instilling essential skills that an entrepreneur needs to thrive. McKinnon comments, "It's reassur-

"Downtown" suggests parallels with Vancouver's Great North Way Campus, and the MaRS Discovery District in Toronto.

Set among major hospitals and universities, MaRS is central to one of North America's most concentrated research and innovation clusters. CEO Dr. Ilse Treurnicht describes a "market-facing" approach: MaRS provides scientists, technologists and social entrepreneurs with resources they need – expertise, programs, facilities, funding and networks – to accelerate the growth of successful Canadian enterprises.

In just three years, MaRS' network of seasoned advisors has provided hands-on business-building

services to over 300 early-stage ventures across Ontario, and across many sectors. The MaRS Centre has attracted 60 tenant organizations, from research labs to incubator ventures and mature companies. The Centre designed its conference facilities with an eye to promoting innovative collaborations.

The MaRS Centre is already growing. MaRS chose a California-based real estate company as a partner to expand its urban footprint by 2010. Dr. Treurnicht describes the promise of that expansion: "With a global partner like Alexandria [Real Estate Equities Inc.] Phase II puts MaRS and the region's technology community on the world stage."

That may be true of Edmonton, too. "Partnerships are the core of TEC Edmonton's success in technology commercialization," says CEO David Cox. "Our downtown location signals to business the possibilities of accessing technology, partnering with early-stage companies, and investing in new opportunities."

Edmonton's challenge is channeling booming economic growth, not creating it. Ron Gilbertson, CEO of the Edmonton Economic Development Corporation, speaks of steering strategy to create "higher quality jobs" because "we don't have enough people for the jobs we have. We're asking, 'Which sector clusters make sense now and into the future?'" Gilbertson quotes Wayne Gretzky's father, Walter: "Don't follow the puck into the corner. Figure where it'll come out – and be there!"

He describes Edmonton Research Park: "Phase One was low density, buildings separated by grass and trees. Phase Two is high density, all types of companies, from startups to multi-nationals. You put them in a collective environment to interact, because you're seeing technologies

converge. High density encourages open innovation."

Peter McKinnon also speaks of open innovation: "Our buildings' walls too often limit our conversations. We have to break those barriers to...expand our collaborations." Saskatoon, too, has an energetic Regional Economic Development Authority (SREDA). Some years ago, Saskatoon voted to help fund the Canadian Light Source synchrotron on the U of S campus. So did Saskatchewan. Local and provincial support clinched the deal. Associated activity has now reached the point where Saskatoon calls itself Science City. Total U of S research revenue grew 40 per cent to \$150.6 million in 2006-07.

Innovation Place, established adjacent to the University of Saskatchewan in 1980, claims to be "one of the most successful university-related research parks in North America." Companies—among them the large Bio Processing Centre – rely on the university's strengths in agriculture, information technology, environmental science, and life sciences. A visible symbol of the province's technological growth, Innovation Place now has 3,000 people working for 150 client groups.

The synchrotron and the nearly completed \$140 million International Vaccine Centre sit opposite Innovation Place. "Proximity is important," McKinnon reminds us. Stressing proximity seems paradoxical in the electronic age. But proximity delivers "open innovation," promising synergies that give rise to unpredictable and unanticipated benefits. Edmonton and Saskatoon demonstrate a multi-meshed academic, civic and industrial spirit of collaboration – and continuing growth.

Those successes bring to mind a parcel of former industrial land in the centre of Vancouver that now houses the Great Northern Way Campus. GNWC combines elements of the University of British Columbia, Simon Fraser University, the Emily Carr Institute of Art and Design and the British Columbia Institute of Technology. As well as academic and research facilities, GNWC will include residential and retail space.

Continued on page 8



At the University of Guelph . . .

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COMMERCIALIZATION IS THE KEY

# New Centre of Excellence Fine-tunes Efforts to Commercialize

Robert Fripp  
Senior Associate  
The Impact Group

**“OUR MISSION** at the Ontario Centres of Excellence (OCE) is to create prosperity through innovation and the development and commercialization of new technologies that respond to market demands,” says OCE President and CEO Mark Romoff.

OCE staffers travel across Ontario to meet university researchers and industry leaders who have the potential to turn intellectual property into commercial projects. “In the past year,” Romoff says, “we spun off 38 companies through OCE. “That would not be possible if OCE did not work hard to mentor and train prospective entrepreneurs and developers.”

In partnership with Ontario’s Ministry of Research and Innovation, OCE plays an important role in the development of the provinces “culture of innovation.” The success of OCE’s annual ‘Discovery’ conference, Canada’s premiere innovation forum, is witness to that. Attendee numbers broke through 1,500 this year. ‘Discovery’ brings communities together that otherwise would never mix,” he adds, “making ‘Discovery’ the largest conference of its kind in Canada.

OCE’s record of success no doubt helped it earn a new mandate in 2008 with the awarding of \$15 million from the National Centres of Excellence to create a new centre focused exclusively on commercialization. The Centre of Excellence for the Commercialization of Research (CCR) is one of 11 new federally funded centres across Canada. CCR is designed to ensure that technologies developed by research universities and colleges will become the basis for competitive products, services and new Canadian companies active in the global marketplace. CCR will build on OCE’s successful model and

offer a menu of commercialization services to make that happen.

In setting its course CCR has already won important votes of confidence. To date, fourteen organizations have pledged \$55 million to support its work through the next five years. That, added to the \$15 million from the federal government, launched CCR with an initial operating budget of \$70 million to the year 2012. The three key stakeholder groups, government, academia and private enterprise, are on side.

What are the new centre’s goals? “In the short-term we expect in six months to have commercialized a few projects successfully and to see tangible returns for our investors,” says Interim Managing Director Tony Eyton. “Then we will be able to attract other funding partners into our commercialization activity.”

Romoff adds, “In the longer term we will help create a new, innovative Canadian economy that will be globally competitive. In doing so, we will be training the next generation of Canada’s innovators, entrepreneurs and business leaders.”

CCR faces an uphill challenge. Too many start-up firms fail or get sold early; a weak entrepreneurship culture breeds CEOs preoccupied with technology and early sale rather than organic growth based on finding global customers.

OCE accepts those challenges, says Romoff, adding that CCR will not duplicate OCE’s existing commercialization services. “We will coordinate our activities to complement existing services. We will team our new commercialization managers with OCE’s existing business development managers who already know where a business’s needs lie.” CCR may be new, but its people tap long relationships in the innovation community.

Each engagement will generate a package addressing specific commercialization services for that client. OCE expects to fund many of

those needs under its existing market-readiness programs.

There will be exceptions. But CCR’s mandate is flexible. “In terms of reach, CCR’s mandate encourages us to work with the rest of Canada, and internationally,” says Romoff.

How will CCR measure success? Romoff is confident: “In five years we will have expanded our international partnerships to allow Canadian business to compete globally. And in the shorter-term we will attract private placement capital that we will manage and place.”

Another measure of CCR’s success will be the relationships it builds with the financial community. A significant problem is that startups exhaust their capital at key points, stranding promising projects while the quest for next-stage capital begins again. CCR is determined to smooth the supply.

Finally, CCR will focus on helping startup and small companies grow into successful advanced technology companies that will underpin economic growth across Ontario and Canada. The centre will emulate a number of successful international models which use collaborative partnerships as the key to establishing viable long term commercial success.

“OCE goes from strength to strength on the domestic front.” Eyton has no doubt that the Centres’ pattern for success “will work internationally,” too.

*OCE is an independent, non-profit corporation established in 1987. OCE works as an expert collaborator and skills developer, bridging private industry, academic research and public interests, applying specialized expertise to analyze new and emerging technologies, services and business models, as well as market need and opportunity within the economy’s most important sectors. OCE is funded in part by the government of Ontario, through the Ministry of Research and Innovation and is a key partner in delivering Ontario’s innovation strategy.*

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## Bettering Communities Through Innovation: Industry, Universities and Cities Working Together

Continued from page 7

The partners have successfully commercialized research, creating nearly 200 spin-off companies and attracting others, injecting over \$560 million into B.C.’s economy.

Across Georgia Strait, the University of Victoria’s Vancouver Island Technology Park (VITP) offers its own brand of open innovation. Fuel cell companies cohabit with companies in wireless, software, new media, life sciences, biotech, ocean technologies, ICT, pharmaceutical labs – and venture capitalists.

The term “economies of agglomeration” describes advantages companies derive by locating near each other. Those advantages still obtain. In Toronto, Mike Williams cites the example of an “American stem cell

organization” seeking contacts at MaRS. On two days’ notice the visitors met six out of seven top Canadian stem cell researchers. They took no taxis, walking to all their meetings.

“When we bring in an international contingent, we can get the right people for them.” That may sound like MaRS receiving a delegation, but the speaker is Rose Fitzpatrick, marketing manager for PEI BioAlliance Inc. in Charlottetown. Innovation cluster growth does not need a major city, just focused goals and collaboration. “Because we’re small we can access key people. It works because industry, federal and provincial governments and our academic institutions have committed to work together.” Adding financial institutions

defines BioAlliance, representing 25 bioscience companies – the number is growing – with nearly 800 employees. Executive Director Rory Francis finds BioAlliance “taking the province in new directions, growing businesses and sustaining communities.” Deputy Minister of Innovation Michael Mayne adds: “In the past, governments relied on tax measures and incentives to induce growth.” Now, he suggests, intangibles such as quality of life and culture attract “the highly skilled individuals that are the source of research excellence and business innovation.”

The University of Toronto’s Richard Florida calls those “highly skilled individuals” the “creative class.” Someone in Ottawa has been

studying such people in community prosperity models. In late August the federal government announced a new immigrant category: the Canadian Experience Class would let foreign graduates of Canadian universities establish residence in Canada without returning to their home countries. Where will these skilled individuals settle? Richard Florida has an answer: they will go to regions which upgrade quality of life “intangibles” – transit, daycare and infrastructure – while offering mentoring and open innovation.

The Ottawa Centre for Research and Innovation has been growing steadily, its 600 members moving forward under OCRI’s stated vision: “To make Ottawa recognized as one of the most innovative cities worldwide.”

Jeffrey Dale, OCRI’s CEO, comments: “We’re seeing a proliferation of start-ups. The small and medium-sized enterprise space has doubled in ten years.” He also sees “small companies going global right away.” Cana-

da’s small domestic market needs innovative companies to compete internationally. But first they must be equipped. Michelle Scarborough, OCRI’s VP. Investment and Commercialization, notes the importance of introducing early-stage companies to mentors and finance to prepare them for competition in the larger world. “These needs are much better understood now,” Scarborough adds. Mentoring and finance are significant factors on OCRI’s menu of supports.

A new project is taking shape on Montreal’s South Shore. Economic Development Canada is working with Montreal International and the Longueuil Agglomeration-Boucherville, Brossard, Saint-Bruno-de-Montarville and Saint-Lambert as well as Longueuil and three boroughs – to introduce “solid, strategic resources in innovation.” Jacques Spencer, of Développement économique Longueuil (DEL), explains: “Since companies are usually not familiar with the R&D done

at universities or research centres, DEL and the University of Sherbrooke have teamed in a partnership aimed at creating ties between businesses and universities, while encouraging SMEs to do business with the universities.”

DEL and the University of Sherbrooke have become effective facilitators, visiting companies to describe the work of researchers at “top-notch local research establishments” who could help move business projects forward. At the same time, the partners keep companies abreast of available funding programs. Since April they have paired companies in biofood, energy, aerospace and chemical sectors with university-based researchers.

On the evidence, Mike Williams’ recipe for success – the business community, municipality, post-secondary education community, and the major regional infrastructure – is beginning to catch on in Canada’s most innovative communities.



Tom Jenkins  
Chairman and Chief Strategy Officer  
Open Text Corporation

**THROUGH THE AGES** the simple decision by someone to make or do something better, has spurred innovations that have made people's lives easier, raised standards of living and expanded global markets. Today, the drive to innovate is stronger than ever: Many countries are focusing on ways to encourage new developments in clean energy, and industries such as pharmaceuticals and high-tech are turning out new innovations faster than ever.

For most companies the pace of innovation is accelerating. Catching up, keeping up, or getting (and staying) ahead in the global race to innovate is a top strategic issue for leaders in any business and in any market. Too often, however, companies set their sights on the short term, limiting their focus on innovation within their own walls and R&D budgets. Businesses today have natural allies in the drive to innovate: government, research and academic institutions. Public/private partnerships are critical in any country interested in seeding new industries, creating jobs and

# Accelerating Pace of Innovation Requires New Public/Private Partnerships

energizing the national economy. For businesses, the benefits of these partnerships are more than short term. Public/private collaboration can advance a long-term strategic and technological vision that can guide a company into the future.

At Open Text, public/private partnerships have become more important than that ever. Open Text began on the campus of the University of Waterloo in the late 80s and early 90s. A group of university researchers were working on a project to convert the entire Oxford Eng-

## We are in a race to innovate

lish Dictionary – all 60 million words – to electronic form, a major feat in the pre-Internet days. The work that went into this project formed the basis for the Internet's first search engine technology and it was soon adopted by Yahoo, one of Open Text's first customers. Open Text was officially founded in 1991, but continued its streak of innovations to become Canada's largest software company.

We're proud of what we've built, but we know we can't stand still in an industry that is changing and innovating very quickly. Our

success, more than ever, is dependent on Canada's own success as a centre for innovation in computers and software. It's also dependent on the success of our local communities and on our universities, so that we can attract and hire talented, highly qualified professionals. The recognition of this interdependence was a key reason we committed Open Text to a unique public/private partnership with the University of Waterloo, the Province of Ontario, the City of Stratford and the Canadian Federal Government to support the University's new Stratford Institute campus. This partnership offers a good case study in the kind of public/private partnerships that can speed innovation across Canada.

As part of the partnership, Open Text is committing \$10 million to create the Open Text Centre for Digital Media Research, one of the world's largest centres dedicated to research in digital media and Web 2.0 technologies for use in business, government and cultural applications. The Centre will be dedicated to research projects and commercialization of ground-breaking software applications, giving students an opportunity to apply their ideas to real-world business opportunities. Programs at the Centre will focus on creating graduates that combine business knowledge, with computer science and artistic content creation.

The Centre will benefit from a

campus that will combine the University's technology focus with Stratford, Ontario's well-known art, music and theatre traditions. The location provides a unique setting that will bring the worlds of business, art and the Internet together.

At Open Text, we view our commitment to the Stratford Institute as critical to our long-term success. We sell software that helps companies and their employees find, manage and use documents, emails, video and other content. But our customers are looking for better ways to integrate these technologies in the years to come and to adopt new applica-

tions as they evolve. Anything that helps organizations improve knowledge sharing and collaboration among employees will continue to be highly valued.

While the Open Text Centre will help drive long-term innovation for Open Text and help us find new, highly skilled recruits, the real value gets back to the issue of interdependence between government, communities, business, and university institutions. Our partners at the University of Waterloo view these public/private partnerships as being about far more than meeting the goals of the University. They view

these partnerships as having value for the nation as part of a national strategy to advance research and innovation. There's no question that's the right approach for Canada. We are in a race to innovate in an interconnected, competitive and fast-moving global economy – it's easier than ever for a company, an institution or a country to fall behind. Canada has the resources and institutions to be successful. By finding ways to work together to build strong partnerships for innovation, we will help ensure a future with a vibrant economy and new opportunities for a new generation.

Spotlight on Corporate R&D Spending Growth 2002-2007 Top 25					
Rank	Company	R&D Expenditures			Industry
		FY2007 \$000	FY2002 \$000	% Change 2002-2007	
1	Aspreva Pharmaceuticals Corporation**	\$47,646	\$25	190,484.0	Pharma/biotech
2	Akela Pharma Inc.*	\$19,071	\$779	2,348.1	Pharma/biotech
3	Petro-Canada	\$52,000	\$6,000	766.7	Energy/oil and gas
4	BioMS Medical Corp.	\$38,907	\$5,004	677.5	Pharma/biotech
5	Medicure Inc.	\$23,336	\$3,104	651.8	Pharma/biotech
6	Nexen Inc.	\$40,000	\$6,000	566.7	Energy/oil and gas
7	Azure Dynamics Corporation	\$17,800	\$2,975	498.3	Transportation
8	Cascades Inc.	\$44,500	\$7,500	493.3	Forest and paper products
9	Cardiome Pharma Corp.	\$56,793	\$10,147	459.7	Pharma/biotech
10	Trican Well Service Ltd.	\$14,637	\$2,827	417.8	Energy/oil and gas
11	Dorel Industries Inc.*	\$25,235	\$5,807	334.6	Other manufacturing
12	CGI Group Inc.	\$73,125	\$17,609	315.3	Software & computer services
13	Neurochem Inc.**	\$59,901	\$15,304	291.4	Pharma/biotech
14	Angiotech Pharmaceuticals, Inc.*	\$57,999	\$16,311	255.6	Pharma/biotech
15	Suncor Energy Inc.	\$50,000	\$15,000	233.3	Energy/oil and gas
16	Research In Motion Limited*	\$253,839	\$77,761	226.4	Comm/telecom equipment
17	Vale Inco Limited (fs)	\$76,800	\$26,697	187.7	Mining and metals
18	MEGA Brands Inc.*	\$23,914	\$8,895	168.8	Other manufacturing
19	MethylGene Inc.	\$34,505	\$13,200	161.4	Pharma/biotech
20	Novartis Pharmaceuticals Canada Inc. (fs)	\$86,000	\$35,000	145.7	Pharma/biotech
21	Labopharm Inc.	\$27,568	\$11,266	144.7	Pharma/biotech
22	Aastra Technologies Limited	\$55,129	\$23,058	139.1	Comm/telecom equipment
23	ratiopharm inc. (fs)	\$20,232	\$8,602	135.2	Pharma/biotech
24	Ontario Power Generation Inc.	\$88,000	\$39,000	125.6	Electrical power and utilities
25	Open Text Corporation*	\$84,977	\$37,801	124.8	Software & computer services

Notes:

- Based on companies on the 2008 Top 100 list with all 6 years of data (n=83).
- We have attempted, wherever possible, to provide gross R&D expenditures before deduction of investment tax credits or government grants.
- Canadian-owned company results include worldwide R&D expenditures; foreign subsidiaries (fs) include R&D expenditures for Canadian operations only.

\*Converted to CDN\$ at annual average 2007 = \$1.0748, 2002 = \$1.5704 (Bank of Canada)  
\*Not current name  
fs = Foreign subsidiary (includes R&D expenditures for Canadian operations only)

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# Our BERD in the Hand



Jeffrey Crellin  
Partner  
The Impact Group

**THE PRESENT CREDIT** crisis has catapulted the future of our economy to the top of people's concerns; but a long-standing problem has been undermining Canada's future prosperity far more insidiously.

Government policy makers have been trying to increase Canada's industrial R&D, also referred to as Business Enterprise Research and Development, or BERD. A higher BERD is an important measure if we want to know how we're faring in the knowledge economy; but, like happiness, it's an outcome not a means. All of our attempts are failing, because our beliefs and attitudes are sadly off the mark.

Conventional wisdom in policy circles is that in a knowledge economy, scientific and technological research drives innovation, which fuels economic growth. So, the simple prescription for economic success is more research, more science, and more technology. The phrase "from ideas to market" permeates the halls of government, academia and many parts of the private sector. This belief is deeply ingrained in our culture. Yet on the evidence, it is failing us. In 2007, Canada was still languishing in 12th place as measured by GERD/GDP – six years after the Chrétien government set a goal of getting into the top five by 2010!

Policy makers want to "encourage" firms to do more R&D in the hope that GERD/GDP will rise. They see Canada's low BERD as a lack of industry "receptor capacity" for ideas coming out of Canadian universities. This view misses the fact that firms get most of their ideas from customers and other firms. They mostly value universities for their graduates, not their research ideas.

Firms do not need "encouragement" to do R&D. If a customer has a problem that is worth solving, firms will do the R&D to solve it. That's how smart firms create value and grow revenue. Profitable revenue growth is the driver of economic growth and of BERD.

An illustrative analogy: affluent people tend to have more consumer technology in their homes than do people of modest means. Does this mean that governments can enhance the prosperity of less affluent citizens by encouraging the purchase of more consumer technology? Of course not! Help citizens become more prosperous and they will acquire more consumer products. Help companies grow and succeed, and they will do more R&D to create value for customers. Providing R&D incentives is looking through the wrong end of the telescope. Revenue supports R&D; not the reverse.

In a study of firms in Canada that applied for R&D tax credits between 1994 and 2001, we found that about 230 out of 10,000 companies were growing revenue profitably at about 13% per year. They were also growing employment and over 90% of their sales were exported. They were the only growing group. To sustain this value creation they invested about 12% of revenue in R&D. Even here we found some didn't know they had the right end of the telescope.

Interviews with CEOs in this small group indicated that succeeding in R&D intensive commerce in Canada is difficult. Postsecondary graduates have excellent technical knowledge but lack commerce skills such as sales, marketing and management. Customer consciousness is low. CEOs experienced an anti-commerce attitude throughout Canadian educational, government and cultural institutions. Many of them felt isolated, unappreciated and not respected.

If Canadians want to prosper in the knowledge economy, we need to eliminate the "hands off" and "tax the corporate bums" attitudes that make commerce and commercial skills shunned choices. Our political leaders cannot remain content to focus on supporting public sector research and hope that commercial activity will magically emerge. The enormous reticence to help existing firms to grow needs to be replaced by a united will to succeed in global knowledge-based commerce. While the U.S. and other countries create government programs that support domestic firms through strategic procurement, industrial research grants and tax incentives, Canada refuses to compete except on tax incentives. The left of the political spectrum is anti-corporate and the right is ideologically against government playing any role, so direct support programs are eschewed or minimally used. Canada is at an enormous disadvantage.

Canada must "back its players" so that winners can emerge. By supporting a hockey league, we're not picking winners. We're supporting

the players so that potential winners can become great. We need a similar approach to entrepreneurs and business. To excel in the knowledge economy, we need great companies, entrepreneurs who can grow them, and managers who can run them. They will know better than anyone else how to incorporate the R&D play. So let's work with the R&D-intensive companies we have – our BERD in the hand. Until Canadians embrace commerce and support our existing firms and entrepreneurs, Canada's future prosperity will be in jeopardy – credit crisis or not.



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Continued from page 12

Fiscal 2007<sup>1</sup>. This means that Top 100 R&D spending has declined 4 out of the past 6 years, whereas revenues have continued to increase. Revenues increased 9.2% (among 92 companies where data were available.) The pattern of falling R&D and increasing revenues contributed to eroding research intensity – R&D spending as a percent of revenues. Research intensity was 3.2%, down from 3.6% in Fiscal 2006, -12.0% decline.

However, the R&D landscape was not all together bleak. The national spending total is heavily influenced by two large firms – Nortel Networks and BCE Inc. Both companies posted sharp declines in R&D spending in Fiscal 2007 (-15.8% and -13.6% respectively). With the largest spenders omitted, R&D spending increased by a total of 3.3% at the 96 other companies where full data were available. However, with inflation taken into account, this means that spending was essentially flat over the period.

Overall, 61 firms increased their spending in Fiscal 2007, against 37 whose spending declined. However, the situation of the 25 largest R&D companies on the list (companies where two years of data were available) was less than encouraging; spending increased at the country's 13 biggest spenders, but declined at 12 others.

THE \$100 MILLION CLUB

In Fiscal 2007 only 19 companies claimed a place in RE\$EARCH Infosource's \$100 Million Club, an elite group of firms that spent over \$100 million each on R&D. This compares with 24 firms on the list last year. The \$100 Million Club includes a broad blend of technology, pharmaceutical/biotechnology, manufacturing, services and resource companies. The Club includes 10 Canadian companies and 9 foreign subsidiaries. Four companies on last year's list fell off (PMC Sierra, TELUS Corporation, EnCana Corporation and Tembec Inc.) and one firm returned (Hydro-Québec). Among the companies that were \$100 Million Club members for the past 2 years, 9 companies increased their R&D spending, versus 8 companies where spending declined.

The \$100 Million Club		
2007 Rank	Company	Industry
1	Nortel Networks	Comm/telecom equipment
2	BCE	Telecommunications services
3	Magna International	Automotive
4	Pratt & Whitney Canada (fs)	Aerospace
5	IBM Canada (fs)	Software and computer services
6	Atomic Energy of Canada	Energy/oil and gas
7	Research In Motion	Comm/telecom equipment
8	Alcatel-Lucent (fs)	Comm/telecom equipment
9	sanofi-aventis Group <sup>++</sup> (fs)	Pharmaceuticals/biotechnology
10	Apotex	Pharmaceuticals/biotechnology
11	AbitibiBowater (fs)	Forest and paper products
12	GlaxoSmithKline Canada (fs)	Pharmaceuticals/biotechnology
13	Bombardier	Aerospace
14	Ericsson Canada (fs)	Comm/telecom equipment
15	Cognos <sup>+</sup>	Software and computer services
16	Biovail	Pharmaceuticals/biotechnology
17	Pfizer Canada (fs)	Pharmaceuticals/biotechnology
18	Merck Frosst Canada (fs)	Pharmaceuticals/biotechnology
19	Hydro-Québec	Electrical power and utilities

fs = Foreign subsidiary (includes R&D expenditures for Canadian operations only)  
<sup>+</sup>Not current name    <sup>++</sup>Includes sanofi-aventis Canada Inc. and Sanofi Pasteur Limited

Club members accounted for only 67% of total Top 100 R&D spending in 2007, compared with 72% the previous year. These large R&D spenders suffered a steep -10.0% drop in spending, compared with a sharp increase of 15.3% for the companies spending less than \$100 million.

INDUSTRY PERFORMANCE

Information technology companies, spread across 5 sub-segments, dominated Top 100 spending in 2007, accounting for 51% of the Top 100 spending total, a drop from 53% of the total the year prior. The Communications/telecom equipment sub-sector continued to

Top 100 – Leading Industries	
Industry	R&D Spending (% of Total)
Communications/telecom (13)	27
Pharmaceuticals/biotechnology (32)	19
Telecommunications services (3)	13
Aerospace (5)	8
Software and computer services (8)	8
Automotive (2)	7
Energy/oil and gas (11)	7

dominate industry spending, accounting for 27% of the total, down from 28% in Fiscal 2006. Standouts were Research In Motion, where R&D spending jumped 42.0% in Fiscal 2007, and Alcatel-Lucent, where spending increased by 26.1% over the period. However, if Nortel Networks' result is omitted, this sector accounted for 11% of total spending in Fiscal 2007, versus 9% in Fiscal 2006. Three companies in the Telecommunication services sub-sector accounted for 13% of Top 100 spending, down from 15% of the total in 2006.

Taking up the slack were 32 companies in the Pharmaceutical/biotechnology sector, which accounted for 19% of total spending in Fiscal 2007, compared with 18% the prior year.

The sanofi-aventis Group<sup>2</sup> led, recording total R&D spending of \$207.2 million, surpassing Apotex with \$181.8 million. Without Nortel Networks in the mix, the Pharma/biotechnology sector accounted for 24% of Top 100 spending, up from 23% in Fiscal 2006.

Between Fiscal 2006 and Fiscal 2007, total R&D spending declined in 4 of the 7 leading sectors represented by the Top 100 performers.

THE TOP 10 R&D INTENSIVE FIRMS

Rising revenues and stagnant R&D spending led to an overall drop in research intensity this year. Intensity rose at 46 companies while an almost equal number (42 companies) had a drop in intensity between Fiscal 2006 and Fiscal 2007. (Comparable data were not available for the other companies, or revenues were less than \$1 million.) Predictably, Pharma/biotechnology companies tended to be the most research-intensive. In Fiscal 2007, 9 of the 10 most research-intensive firms were in this sector. Firms that are highly research intensive are typically startup or early-stage companies that are investing heavily in new products without a corresponding revenue stream.

GAINERS AND LOSERS

Natural resource companies were well represented among the 10 companies that had the strongest growth in R&D spending. Penn West Energy Trust led the pack with a 435.1% gain in spending. Teck Cominco (88.2%) and Petro-Canada (52.9%) also fared well. So too did a number of information technology firms, led by Corel Corporation (63.7%), Sandvine Corporation (57.9%), and MOSAID Technologies (52.3%).

Medicure Inc. (128.4%) led companies in the Pharma/biotechnology sector in growth.

A number of household names suffered substantial declines in R&D spending in Fiscal 2007, which is worrisome. EnCana and Tembec both reduced their spending by more than 40%, whereas TELUS, Suncor Energy and Axcan Pharma all had declines of over 30%.

LOOKING AHEAD

Companies are bracing for the impact of world financial and stock market melt-downs as this analysis is being written.

Suffice to say that there are bound to be major repercussions for corporate R&D spending next year. At this time everything is up for grabs. A number of leading firms may not be in existence next year. Others will seek mergers with competitors. Revenues are likely to decline across broad sectors of industry. All bets are off for predictions of industrial research in the year to come.

But what if the global economic crisis had not interceded? What would the prognosis for industrial research in Canada have been? Not positive. Even in the good economic times Canada enjoyed in recent years, corporate R&D spending stagnated – especially in real (inflation-adjusted) terms. Our R&D powerhouses, such as Nortel and BCE have sharply cut back on their spending. A few other firms, such as RIM, are moving up in the ranking, but their spending is still not at a level where it can meaningfully replace that of the leaders. The Pharma/biotechnology sector continues to spend at high levels, but overall spending in that sector is not substantially increasing.

It is true that more companies than ever claim to be conducting research (19,000 in 2005, compared with 11,000 in 2000), but most of these are small firms trying to grow into large ones, rather than large companies that have global market presence. In any event, most of these companies are occasional R&D performers, rather than committed companies.

Top 10 Research Intensive Companies*			
Research Intensity	2007 Rank Overall	Company	R&D as % of Revenue
1	36	Neurochem <sup>+</sup>	3,679.4
2	72	Isotechnika	1,272.0
3	40	Cardiome Pharma	1,164.0
4	89	Azure Dynamics	635.5
5	83	Medicure	392.5
6	65	MethylGene	222.6
7	92	ProMetic Life Sciences	190.6
8	74	Labopharm	145.1
9	88	Akela Pharma	140.5
10	55	AEterna Zentaris	93.3

\*\$1 million or more of revenue    \*Not current name

Even without the current uncertainties the outlook for corporate research was not strong. When the dust of the economic tsunami settles, policy makers at the federal and provincial levels need to quickly adjust their innovation strategies to account for the new realities. As for corporate leaders, the current crisis may well yield opportunities, but before that it will certainly extract a toll. Research and development will, however remain key to future competitiveness.

1 - Canada's Top 100 corporate R&D spending in Fiscal 2007 was \$10.5 billion. However, because 2 of the Top 100 companies were new, comparable Fiscal 2006 data does not exist. Therefore, the percent change between Fiscal 2007 and Fiscal 2006 was based on 98 companies.  
2 - Includes sanofi-aventis Canada Inc. and Sanofi Pasteur Limited.

Top 10 Companies by Growth			
R&D Growth	2007 Rank Overall	Company	% Change 2006-2007
1	87	Penn West Energy	435.1
2	83	Medicure	128.4
3	66	Teck Cominco	88.2
4	79	SNC-Lavalin	72.2
5	48	Corel	63.7
6	91	Sandvine	57.9
7	65	MethylGene	54.2
8	44	Petro-Canada	52.9
9	82	MOSAID Technologies	52.3
10	94	Evertz Technologies	48.8

Bottom 10 Companies by Growth			
R&D Growth	2007 Rank Overall	Company	% Change 2006-2007
1	31	EnCana	-48.8
2	33	Tembec	-44.7
3	26	TELUS	-34.6
4	46	Suncor Energy	-32.4
5	69	Axcan Pharma	-31.7
6	59	Nexen	-24.5
7	13	Bombardier	-23.9
8	47	QLT	-22.0
9	43	Syncrude Canada	-21.8
10	90	SR Telecom	-19.9

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# Canada's Corporate Innovation Leaders

A SUPPLEMENT PREPARED BY RESEARCH INFOSOURCE INC., AN IMPACT GROUP COMPANY

**R&D SPENDING RETREATS** — Corporate research and development (R&D) spending declined by a discouraging - 3.0% among Canada's Top Corporate R&D Spenders, from \$10.6 billion in Fiscal 2006 to \$10.3 billion in

## Canada's Top 100 Corporate R&D Spenders 2008

Rank		Company	R&D Expenditures			Revenue	Research Intensity	Industry
2007	2006		FY2007 \$000	FY2006 \$000	% Change 2006-2007	FY2007 \$000	R&D as % of Revenue**	
1	1	Nortel Networks Corporation*	\$1,851,880	\$2,199,020	-15.8	\$11,766,910	15.7	Comm/telecom equipment
2	2	BCE Inc.	\$1,260,000	\$1,459,000	-13.6	\$17,822,000	7.1	Telecommunications services
3	3	Magna International Inc.*	\$725,490	\$652,108	11.3	\$28,016,812	2.6	Automotive
4	4	Pratt & Whitney Canada Corp. (fs)	\$444,000	\$481,000	-7.7	\$3,300,000	13.5	Aerospace
5	6	IBM Canada Ltd. (fs)	\$377,000	\$360,000	4.7	nd		Software and computer services
6	8	Atomic Energy of Canada Limited	\$288,982	\$246,144	17.4	\$554,113	52.2	Energy/oil and gas
7	11	Research In Motion Limited*	\$253,839	\$178,767	42.0	\$3,264,278	7.8	Comm/telecom equipment
8	10	Alcatel-Lucent (fs)	\$236,000	\$187,167	26.1	nd		Comm/telecom equipment
9		sanofi-aventis Group** (fs)	\$207,156	\$216,987	-4.5	\$660,769	31.4	Pharmaceuticals/biotechnology
10	12	Apotex Inc.	\$181,818	\$178,757	1.7	\$1,021,900	17.8	Pharmaceuticals/biotechnology
11		AbitibiBowater Inc. (fs)	\$180,000	nc		nd		Forest and paper products
12	13	GlaxoSmithKline Canada (fs)	\$178,451	\$177,008	0.8	\$1,025,159	17.4	Pharmaceuticals/biotechnology
13	9	Bombardier Inc.*	\$149,397	\$196,199	-23.9	\$18,815,449	0.8	Aerospace
14	14	Ericsson Canada Inc. (fs)	\$147,000	\$152,000	-3.3	\$633,000	23.2	Comm/telecom equipment
15	18	Cognos Incorporated**	\$145,827	\$130,127	12.1	\$1,052,513	13.9	Software and computer services
16	22	Biovail Corporation*	\$126,952	\$108,283	17.2	\$905,861	14.0	Pharmaceuticals/biotechnology
17	17	Pfizer Canada Inc. (fs)	\$114,015	\$131,764	-13.5	\$2,356,941	4.8	Pharmaceuticals/biotechnology
18	21	Merck Frosst Canada Ltd. (fs)	\$109,876	\$114,137	-3.7	\$597,546	18.4	Pharmaceuticals/biotechnology
19	25	Hydro-Québec	\$100,000	\$98,000	2.0	\$12,330,000	0.8	Electrical power and utilities
20	24	PMC Sierra, Ltd.* (fs)	\$90,198	\$105,332	-14.4	\$206,697	43.6	Electronic parts and components
21	26	CAE Inc.	\$89,248	\$96,331	-7.4	\$1,250,700	7.1	Aerospace
22	30	Imperial Oil Limited	\$89,000	\$73,000	21.9	\$25,069,000	0.4	Energy/oil and gas
23		Ontario Power Generation Inc.	\$88,000	\$66,000	33.3	\$5,887,000	1.5	Electrical power and utilities
24	27	AstraZeneca Canada Inc. (fs)	\$86,373	\$89,931	-4.0	\$1,231,930	7.0	Pharmaceuticals/biotechnology
25	31	Novartis Pharmaceuticals Canada Inc. (fs)	\$86,000	\$69,000	24.6	nd		Pharmaceuticals/biotechnology
26	19	TELUS Corporation	\$85,000	\$130,000	-34.6	\$9,074,400	0.9	Telecommunications services
27	37	Open Text Corporation*	\$84,977	\$67,121	26.6	\$640,220	13.3	Software and computer services
28	36	Vale Inco Limited (fs)	\$76,800	\$67,800	13.3	\$14,135,000	0.5	Mining and metals
29	32	CGI Group Inc.	\$73,125	\$68,600	6.6	\$3,711,566	2.0	Software and computer services
30	40	MDS Inc.*	\$73,086	\$60,000	21.8	\$1,300,508	5.6	Health services
31	16	EnCana Corporation*	\$71,982	\$140,488	-48.8	\$23,050,161	0.3	Energy/oil and gas
32	33	Wyeth Pharmaceuticals (fs)	\$69,937	\$68,576	2.0	\$376,810	18.6	Pharmaceuticals/biotechnology
33	20	Tembec Inc.	\$65,807	\$118,900	-44.7	\$2,750,000	2.4	Forest and paper products
34	34	Honeywell Canada (fs)	\$65,445	\$68,061	-3.8	\$1,278,942	5.1	Aerospace
35	41	Ballard Power Systems Inc.*	\$62,852	\$59,284	6.0	\$70,434	89.2	Energy/oil and gas
36	42	Neurochem Inc.**	\$59,901	\$58,624	2.2	\$1,628	3,679.4	Pharmaceuticals/biotechnology
37		Rio Tinto Alcan* (fs)	\$58,343	nc		\$6,028,000	1.0	Mining and metals
38	47	Angiotech Pharmaceuticals, Inc.*	\$57,999	\$51,480	12.7	\$309,214	18.8	Pharmaceuticals/biotechnology
39	43	Janssen-Ortho Inc. (fs)	\$56,896	\$58,311	-2.4	\$676,061	8.4	Pharmaceuticals/biotechnology
40	56	Cardiome Pharma Corp.	\$56,793	\$43,438	30.7	\$4,879	1,164.0	Pharmaceuticals/biotechnology
41	39	Aastra Technologies Limited	\$55,129	\$60,431	-8.8	\$606,589	9.1	Comm/telecom equipment
42	44	NOVA Chemicals Corporation*	\$53,740	\$57,839	-7.1	\$7,235,554	0.7	Chemicals and materials
43	35	Syncrude Canada Ltd.	\$53,100	\$67,923	-21.8	nd		Energy/oil and gas
44	66	Petro-Canada	\$52,000	\$34,000	52.9	\$21,710,000	0.2	Energy/oil and gas
45	54	MacDonald, Dettwiler and Associates Ltd.	\$51,901	\$44,501	16.6	\$1,204,239	4.3	Aerospace
46	29	Suncor Energy Inc.	\$50,000	\$74,000	-32.4	\$17,903,000	0.3	Energy/oil and gas
47	38	QLT Inc.*	\$49,901	\$63,995	-22.0	\$137,472	36.3	Pharmaceuticals/biotechnology
48	70	Corel Corporation*	\$48,056	\$29,354	63.7	\$269,216	17.9	Software and computer services
49	45	Aspreva Pharmaceuticals Corporation**	\$47,646	\$54,381	-12.4	\$271,361	17.6	Pharmaceuticals/biotechnology
50	51	Novelis Inc.*	\$45,142	\$45,364	-0.5	\$11,837,847	0.4	Mining and metals
51	49	Mitel Networks Corporation*	\$44,819	\$50,014	-10.4	\$413,691	10.8	Comm/telecom equipment
52	50	Cascades Inc.	\$44,500	\$47,175	-5.7	\$3,929,000	1.1	Forest and paper products
53	53	Gennum Corporation	\$44,000	\$44,918	-2.0	\$139,561	31.5	Electronic parts and components
54	61	Boehringer Ingelheim (Canada) Ltd./Ltée. (fs)	\$43,000	\$39,000	10.3	\$314,172	13.7	Pharmaceuticals/biotechnology
55	68	AEterna Zentaris Inc.*	\$42,184	\$32,494	29.8	\$45,215	93.3	Pharmaceuticals/biotechnology
56	58	DALSA Corporation	\$41,874	\$41,918	-0.1	\$180,044	23.3	Electronic parts and components
57	63	Sierra Wireless, Inc.*	\$41,780	\$36,398	14.8	\$472,808	8.8	Electronic parts and components
58	59	Bayer Inc. (fs)	\$41,546	\$41,106	1.1	\$916,921	4.5	Pharmaceuticals/biotechnology
59	46	Nexen Inc.	\$40,000	\$53,000	-24.5	\$5,583,000	0.7	Energy/oil and gas
60	62	Constellation Software Inc.*	\$39,730	\$37,222	6.7	\$261,201	15.2	Software and computer services
61	65	BioMS Medical Corp.	\$38,907	\$35,185	10.6	\$0		Pharmaceuticals/biotechnology
62		Linamar Corporation	\$36,724	\$25,953	41.5	\$2,316,000	1.6	Automotive
63	57	Zarlink Semiconductor Inc.*	\$35,146	\$42,529	-17.4	\$153,266	22.9	Comm/telecom equipment
64	69	ConjuChem Biotechnologies Inc.	\$35,034	\$30,280	15.7	\$69		Pharmaceuticals/biotechnology
65	79	MethylGene Inc.	\$34,505	\$22,384	54.2	\$15,501	222.6	Pharmaceuticals/biotechnology
66	92	Teck Cominco Limited	\$32,000	\$17,000	88.2	\$6,371,000	0.5	Mining and metals
67	82	Theratechnologies Inc.	\$31,866	\$22,049	44.5	\$638		Pharmaceuticals/biotechnology
68	77	Husky Injection Molding Systems Ltd.*	\$31,384	\$23,136	35.7	\$1,157,135	2.7	Machinery
69	52	Axcan Pharma Inc.*	\$30,798	\$45,125	-31.7	\$375,048	8.2	Pharmaceuticals/biotechnology
70	64	Cangene Corporation	\$30,379	\$35,652	-14.8	\$92,396	32.9	Pharmaceuticals/biotechnology
71	75	Tundra Semiconductor Corporation	\$30,194	\$25,540	18.2	\$85,260	35.4	Electronic parts and components
72	80	Isotechnika Inc.	\$29,409	\$22,151	32.8	\$2,312	1,272.0	Pharmaceuticals/biotechnology
73	72	Psion Teklogix Inc. (fs)	\$28,672	\$27,500	4.3	\$445,725	6.4	Software and computer services
74	87	Labopharm Inc.	\$27,568	\$18,716	47.3	\$18,998	145.1	Pharmaceuticals/biotechnology
75	81	EXFO Electro-Optical Engineering Inc.*	\$27,086	\$22,101	22.6	\$164,373	16.5	Comm/telecom equipment
76	74	Westport Innovations Inc.	\$27,041	\$25,628	5.5	\$60,480	44.7	Transportation
77	73	Pharmascience Inc.	\$27,000	\$26,640	1.4	\$470,000	5.7	Pharmaceuticals/biotechnology
78	133	Dorel Industries Inc.*	\$25,235	\$21,318	18.4	\$1,949,335	1.3	Other manufacturing
79	101	SNC-Lavalin Group Inc.	\$25,064	\$14,558	72.2	\$6,731,464	0.4	Engineering services
80	85	MEGA Brands Inc.*	\$23,914	\$21,133	13.2	\$563,750	4.2	Other manufacturing
81		Bell Aliant Regional Communications LP	\$23,681	\$26,392	-10.3	\$2,860,189	0.8	Telecommunications services
82	96	MOSAID Technologies Incorporated	\$23,635	\$15,518	52.3	\$82,065	28.8	Comm/telecom equipment
83	124	Medicure Inc.	\$23,336	\$10,219	128.4	\$5,945	392.5	Pharmaceuticals/biotechnology
84	78	Xerox Canada Inc. (fs)	\$22,334	\$22,486	-0.7	\$1,145,087	2.0	Machinery
85	98	Xantrex Technology Inc.*	\$22,073	\$15,043	46.7	\$251,751	8.8	Energy/oil and gas
86	88	ratiopharm inc. (fs)	\$20,232	\$18,536	9.1	nd		Pharmaceuticals/biotechnology
87		Penn West Energy Trust	\$19,800	\$3,700	435.1	\$2,458,800	0.8	Energy/oil and gas
88	105	Akela Pharma Inc.*	\$19,071	\$13,488	41.4	\$13,577	140.5	Pharmaceuticals/biotechnology
89	91	Azure Dynamics Corporation	\$17,800	\$17,600	1.1	\$2,801	635.5	Transportation
90	83	SR Telecom Inc.	\$17,511	\$21,854	-19.9	\$75,682	23.1	Comm/telecom equipment
91	125	Sandvine Corporation	\$16,132	\$10,214	57.9	\$73,679	21.9	Comm/telecom equipment
92	93	ProMetic Life Sciences Inc.	\$16,082	\$16,098	-0.1	\$8,436	190.6	Pharmaceuticals/biotechnology
93	90	Rio Tinto Iron & Titanium Inc. (fs)	\$16,000	\$18,000	-11.1	\$970,000	1.6	Mining and metals
94	118	Evertz Technologies Limited	\$15,946	\$10,715	48.8	\$200,681	7.9	Computer equipment
95	103	ViXS Systems Inc.*	\$15,683	\$13,647	14.9	\$23,633	66.4	Comm/telecom equipment
96	97	Miranda Technologies Inc.	\$15,624	\$15,300	2.1	\$112,219	13.9	Computer equipment
97	127	COM DEV International Ltd.	\$14,971	\$10,108	48.1	\$164,330	9.1	Comm/telecom equipment
98	108	Bioniche Life Sciences Inc.	\$14,935	\$12,916	15.6	\$27,480	54.3	Pharmaceuticals/biotechnology
99	99	Trican Well Services Ltd.	\$14,637	\$14,831	-1.3	\$836,373	1.8	Energy/oil and gas
100	121	Bridgewater Systems Corporation	\$14,336	\$10,514	36.4	\$39,217	36.6	Software and computer services

Notes:

- We have attempted, wherever possible, to provide gross R&D expenditures before deduction of investment tax credits or government grants.
- FY2006 R&D expenditure figures may have been adjusted, as more accurate information became available.
- Canadian-owned company results include worldwide R&D expenditures; foreign subsidiaries (fs) include R&D expenditures for Canadian operations only.
- We have attempted, wherever possible, to provide revenue figures net of interest and investment income.

\*Converted to CDNS at annual average 2007 = \$1.0748, 2006 = 1.1341 (Bank of Canada)  
\*Not current name  
nd = Not disclosed  
nc = New company  
\*\*\$1 million or more of revenue  
fs = Foreign subsidiary (includes R&D expenditures for Canadian operations only)

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