CHAPTER 9

# The Innovation Society: Canada's Next Chapter

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The story of Canada's innovation strategy begins with two key measurements:

1. Since 1990, Canada has ranked first fully eight times in the United Nation's Human Development Index, which examines health, education and income indicators to assess overall quality of life (United Nations Development Programme, 1990-2007/08).
2. In 2008, Canada placed 13th out of 17 peer countries in innovation (Conference Board of Canada, 2008).

The tale is one of a great divide: how to protect the quality of life measured in the first index by tackling the problem captured in the second. This chapter examines Canada's innovation performance and strategies, and suggests some actions needed to turn Canada into a sustained Innovation Society. While emphasis is placed on the role of universities, they are not usefully considered in isolation. In today's hyperconnected world, innovation unfolds as part of local, national and international ecosystems. Universities, government at all levels and businesses interweave their benefits via primary roles, with NGOs, community groups, arts organizations and others all contributing to the process of innovation.

1 I would like to acknowledge, with gratitude, the contributions of my colleague, Susan Murley, Ph.D., Director of Strategic Communications, McGill University, in the preparation of this chapter.

There are many different definitions of innovation, but those that best capture its essence, I think, see innovation as a dynamic system, one that results not just in new products but also new ways of doing things along an iterating cycle with multiple players in the process. For example, in *Growing Ontario's Innovation System: The Strategic Role of University Research*, innovation is defined as, "the development of new knowledge and ideas, new processes and new methods, and applying these for economic and societal benefit" (Munroe-Blum, 1999), and that definition, though a decade old, still holds.

## THE CREATORS OF INNOVATION

Before analysing Canada's unique innovation system and assets, I would like to set the stage by quickly sketching some primary factors that lay the groundwork for a healthy innovation system:

- A highly educated, creative and adaptable workforce: Today, the talent pool needed for innovation to flourish runs far deeper than scientists and engineers, and includes managers, lawyers, designers and experts in the arts and culture. Creativity, multilingualism, entrepreneurship and international perspective are also key skills.
- Strong regional clusters that are globally connected: For all the buzz around Thomas L. Friedman's "flat" world, local clusters and city corridors remain vital to innovation. According to Richard Florida, 10 mega-regions, which together have only 6% of the world's population, "account for 43% of the planet's economic activity and more than half of its patented innovations and star scientists" (Florida, 2008). To become globally competitive, the best innovation strategy is built on collaboration with key partners, a high degree of activism and aspiration, and constant benchmarking of progress against national and international peers. Interestingly, this most often still entails the assembling of a critical mass of niche expertise locally but connected outward. High-profile international collaborations such as the Human Genome Project have been driven by distributed clusters of outstanding biomedical, genomics and computational teams, generally in universities and research institutes, but also in industry labs, connecting clusters of smart people to harness their collective strength for economic and human advantage.
- A strategic policy and business environment that encourage industry innovation in proximity to research universities: Multiple factors foster business innovation, such as access to venture capital, the availability of experienced managers and mentors for start-ups, an intelligent regulatory environment, indirect and direct government incentives in

support of business R&D, visionary procurement policies and progressive intellectual property protection frameworks.

- Research excellence as measured by the top international standards and fluid knowledge exchange: Highly qualified talent emanating from globally competitive research universities provides an absolutely vital foundation for promoting innovation in regions and countries, but alone it is not enough. To put knowledge to work, all players in the innovation system must interact proactively to build strong connections and trust.
- A mindset open to innovation: The importance of culture and attitude cannot be underestimated. Cities and centres will thrive in this globally driven market, where business, government and academic communities are incented to be competitively oriented, entrepreneurial and cognizant of the direct line between innovation, prosperity and quality of life.

## CANADIAN INNOVATION STRATEGIES

The mid-1990s were a rather grim period for research in Canada, due to an economic downturn. A drop in the competitiveness of funding programs for university research and post-secondary education in general led quickly to a loss of some of Canada's top talent across fields as wide-ranging as theoretical astrophysics, economics and genetics. However, governments quickly recognized the importance of supporting R&D at the dawn of the Information Age and began developing strategies that focused squarely on attracting and retaining top talent, reinvesting in research, and viewing universities and business R&D as major contributors to innovation and economic productivity. In the mid-1990s, the Government of Canada, with the collaboration of key university and industry leaders and advisory groups such as the National Advisory Board on Science and Technology, began to formulate a new strategy — one focused on "the creation of a more effective, integrated innovation system" (Government of Canada, 1996).

*Science and Technology for the New Century* (1996) laid the groundwork for Canada's ensuing innovation strategies, focusing on boosting partnerships and cooperation among universities, governments and business to encourage knowledge exchange. The federal government saw itself in "a new role: that of information analyst, knowledge disseminator and network builder". The 1996 strategy also emphasized return on investment, through increased emphasis on accountability, performance evaluation, coordination and smart management. For the first time, there was recognition that institutions and the governments of Canada's provinces must also choose their research/innovation niches. New funding programs such as the Canada Foundation for

Innovation, established in 1997, required universities to develop overall "institutional" research and academic strategies. Benchmarking of research and innovation indicators across jurisdictions within Canada, and between Canada and other nations, began in earnest. For example, *Growing Ontario's Innovation System* (Munroe-Blum, 1999) was the first comparison of university research policy and related innovation performance indicators across the large Canadian provinces. Also in 1999, the Conference Board of Canada published its first annual Innovation Report.

With its economic house back in order, the Government of Canada started in the later 1990s to heighten investments in university research, with much of the money targeted to creative new programs designed to support "pillars" of research excellence (people, infrastructure, operating support and indirect research costs) and to promote intersectoral partnerships. Programs such as the Networks of Centres of Excellence and the new Canada Foundation for Innovation (CFI) strongly encouraged collaboration across sectors. The CFI granted only 40% of a project's budget, requiring institutions to find the other 60% through their provincial governments, the private sector, foundations, their own investment and other sources such as philanthropy.

From 1996 to 2001, gross expenditures on R&D in Canada grew by an average of 10.77% each year, led by growth in the information and communications technology sector (before the dot-com bust) and the biopharma sector, along with an influx of government research funding to higher education. [2] In the decade from 1997 to 2007, federal investments in university research started to make up for the lost years of the early to mid-90s, growing by an average of 11% annually in constant dollars (Association of Universities and Colleges of Canada [AUCC], 2008).

## CURRENT SCIENCE, TECHNOLOGY AND INNOVATION STRATEGIES

In November 2006, Canada's federal government launched its most recent economic plan, *Advantage Canada*. Among other goals, it has aimed to upgrade the skills of Canada's workforce through post-secondary education and to maximize the value of Canada's public sector research "by focusing on

2 In comparison, the United States saw annual growth in gross expenditures on research and development of 7.08% and the U.K. 5.48% for this same period (real dollars). Information has been compiled from the statistics provided by the Government of Quebec's Institut de la statistique, the Association of Universities and Colleges of Canada (AUCC) *Momentum* report and Robert Dugal's article on "Pharmaceutical Research Investment". Note that the AUCC publishes a figure of 8.8% annual growth for Canada, but this figure is in constant dollars.

excellence and increased linkages with the private sector" (Government of Canada, 2006). The government built on the economic strategy with the release approximately six months later of *Mobilizing Science and Technology to Canada's Advantage* (Government of Canada, 2007). By promoting excellence, choosing priorities, encouraging partnerships and enhancing accountability, the science and technology strategy is designed to position Canada for global leadership. The agenda identifies three imperatives to fortify Canada's competitive advantage:

- An Entrepreneurial Advantage: "Canada must translate knowledge into commercial applications that generate wealth for Canadians and support the quality of life we all want."
- A Knowledge Advantage: "Canadians must be positioned at the leading edge of the important developments that generate health, environmental, societal and economic benefits."
- A People Advantage: "Canada must be a magnet for the highly skilled people we need to thrive in the modern global economy with the best-educated, most skilled and most flexible workforce in the world."

*Mobilizing Science and Technology to Canada's Advantage* targets four broad fields as federal priorities, and the Science, Technology and Innovation Council (STIC), created in 2007 as an advisory board to the federal government, later recommended specific areas as sub-priorities:

- "Environmental science and technologies
  Sub-priorities: Water (health, energy, security); cleaner methods of extracting, processing and using hydrocarbon fuels, including reduced consumption of these fuels.
- "Natural resources and energy
  Sub-priorities: Energy production in the oil sands; Arctic (resource production, climate change adaptation, monitoring); biofuels, fuel cells and nuclear energy.
- "Health and related life sciences and technologies
  Sub-priorities: Regenerative medicine; neuroscience; health in an aging population; biomedical engineering and medical technologies.
- "Information and communications technologies
  Sub-priorities: New media, animation and games; wireless networks and services; broadband networks; telecom equipment" (Industry Canada, 2008).

Given the significance of science, technology and innovation to regional competitiveness and the benefits of seeding priorities and quality locally to enhance competitiveness at the national and international levels (Munroe-Blum, 1999), many of Canada's provinces have also formulated their own pro-

ductivity and innovation strategies. They share common characteristics with each other and with *Mobilizing Science and Technology to Canada's Advantage*: increasing commercialization and knowledge exchange, intensifying excellence in research, attracting and fostering talent, and nurturing regional clusters.

In addition to substantial new provincial research support, the federal government's strategies have prompted new competitively allocated university research investments in four pillars:

- Talent: To attract and retain the best faculty, the Canada Research Chairs (CRC) program, created in 2000, supports 2,000 chairs for both established and emerging research stars through an annual budget of $300 million. [3] More than 30% of CRCs have been recruited from outside Canada. Applications are currently underway for 20 Canada Excellence Research Chairs (CERC), proposed via STIC and established by the federal government in 2008 to attract the world's best researchers in the government's priority areas related to science, technology and innovation. The Canada Graduate Scholarships program (established 2003) and Vanier Canada Graduate Scholarships (established 2008) both aim to attract top-level graduate talent. The Vaniers, which are worth a competitive $50,000 per year, are open to international as well as domestic graduate students, to attract the next generation of researchers to Canada. These scholarships, along with the CRCs and CERCs, are beginning to reverse an unproductive period of natural protectionism where provincial (state) and federal governments had barriers to international recruitment.
- Infrastructure: Reflecting, perhaps, Canada's particular constitutional idiosyncrasies, support for university research housing and major infrastructure fell between the cracks of provincial responsibility for post-secondary education and federal responsibility for the lion's share of university research. To strengthen cutting-edge research infrastructure, therefore, the Canada Foundation for Innovation has committed almost $4.5 billion to date for more than 6,000 projects at 129 institutions. Building on this as well, in its 2009 budget, the Government of Canada announced an impressive additional $2 billion in "stimulus funding" to upgrade facilities and infrastructure at universities and colleges.
- Research Operations: Over the past decade, federal and many provincial governments have raised the level of operating funding through research granting councils and other agencies. The Government of Canada has also invested $840 million in Genome Canada since the

3 All figures are in Canadian dollars unless otherwise noted.

program's establishment in 2000, to support genomics and proteomics research projects, again with an emphasis on stimulating partnerships and collaborations.

- Indirect Costs: In 2001, the federal government began to cover a percentage of universities' indirect costs or "overhead", though Canada still has a long way to go to keep pace with the U.S. and the U.K. Currently, the universities in Canada that perform the most research unfortunately receive the lowest percentage of return on their significant indirect costs.

## CANADA'S INNOVATION PERFORMANCE TODAY

The previous decade has seen not only significant investments to promote innovation and the development of strategic frameworks, but also a new focus on measuring innovation and productivity indicators and beginning to benchmark, albeit selectively, against national and international peers. *Canada's Science, Technology and Innovation System: State of the Nation 2008*, released by the Science, Technology and Innovation Council (STIC) in May of 2009, represented significant progress in creating a baseline for understanding where Canada stands and will allow a monitoring of progress over time on key performance indicators. And numerous organizations, both governmental and independent, such as the Conference Board of Canada and the Institute for Competitiveness and Prosperity, are closely tracking Canada's performance, analyzing weaknesses and proposing solutions. The Government of Canada has commissioned reports from several governmental and advisory bodies, including STIC's aforementioned report, the Competition Policy Review Panel's *Compete to Win* (2008), and the Council of Canadian Academies' *Innovation and Business Strategy: Why Canada Falls Short* (2009).

The proliferation of reports, which recognize Canada's plentiful assets, sends a strong coordinated signal that there is a serious need to improve competitiveness. There is a renewed energy for Canada to transform itself into an Innovation Society. Rather than summarize each report individually, I will draw on these and other sources to provide an overall picture of Canada's innovation performance.

The collective analysis shows that, despite a sincere commitment to enlarge innovation and R&D capacity, Canada has made only "modest improvement", remaining a "solid, middle-of-the-road performer" (STIC, 2009). Canada has not yet reached the OECD average of gross expenditures on R&D (GERD). GERD as a percentage of GDP (R&D intensity) fell from its peak of 2.09% in 2001 to 1.89% in 2007, placing it 12th out of OECD countries (OECD, 2008c and d). In fact, Canada was one of only six OECD members who saw a fall in research intensity since 2001. The Conference

Board scores Canada a "D" in innovation, ranking it 13th of 17 countries. In fact, to put per-capita income on par with the U.S. in 15 years (assuming the U.S. stays constant), Canada will have to quadruple its productivity growth (Conference Board of Canada, 2008).

Why the lackluster results in the face of real efforts to turn Canada around and preserve its quality of life? What are the factors influencing Canada's innovation performance? Certainly the nation faces some unique challenges in shaping a coherent innovation system, though it also boasts great assets. Canada's reputation and quality of life draw talented people from across the world. Internationally, Canada as a nation is well respected, seen as safe, honest and "family friendly". For the last three years, the world's most trusted companies have been based in Sweden, Germany and Canada, according to the 2009 *Edelman Trust Barometer*.

A central structural hurdle is Canada's population density, one of the lowest in the world. Its population of 33 million is spread out over the world's second largest country by area (Central Intelligence Agency, 2009), with a widely varied geography, a broad range of natural resources and very distinctive regional cultures. While the nation has developed some vibrant clusters (energy in Alberta; aerospace in Quebec; biotech and life sciences in Quebec, Ontario, Saskatchewan, and B.C.; information and communications technology in many provinces, to name just a few), its geography makes it difficult to connect these local initiatives to form the mega-regions that drive growth. Canada's status as a federation also hinders strategic coordination. As noted, research, for example, is a dominantly federal responsibility, though given the importance of R&D to regional growth, many provinces also have their own innovation/S&T strategies and funding mechanisms. Education is a provincial responsibility, though the federal government funds national scholarship programs.

Despite the difficulties that geography and a complex federated system raise, Canada's higher education system has developed quality institutions with varied missions: from those focused on a regional agenda to internationally ranked universities driving national and international innovation. According to the World Economic Forum's *The Global Competitiveness Report 2008-2009*, "[Canada's] educational system gets excellent marks for quality", with its scientific research institutions ranking fourth internationally (Porter & Schwab, 2008). Canada's researchers perform admirably in both the number and quality of publications. With only 2.8% of the population of OECD countries, Canada produces 4.8% of OECD publications (Government of Canada, 2007). Its Average Relative Impact Factor, a measure of "the national rate of publication in highly cited journals relative to the average international rate of publication", ranks sixth in the OECD (STIC, 2009). And it boasts a rate of international co-authorship fully double the world average (AUCC, 2008).

Canada leads OECD countries in the percentage of the population aged 25 to 64 who have completed some form of higher education (OECD, 2008a). However, while Canada's college graduation rates rank first in the OECD, only 24% of Canada's working-age population holds a university degree, a rate that lags 11% behind the U.S. (OECD, 2008a). In terms of Ph.D. graduates, the talent pool that dominantly drives the innovation economy, Canada places second-last amongst 17 peers in terms of number of Ph.D. graduates in 2006 per 100,000 population aged 20 to 39 (Conference Board of Canada, 2008). The education system possesses the capability to graduate more advanced degrees, but the receptor capacity of businesses in hiring or otherwise benefiting from these graduates remains problematic. "Canada's private sector does not provide strong enough incentives for students to strive for advanced S&T and business management skills. Canadian firms across most industries hire fewer university graduates as a percentage of their total workforce than do their counterparts in the United States, particularly fewer Ph.D. graduates" (Government of Canada, 2007). Canadian universities are attracting more international doctoral students than ever before, but since 2001, fewer are staying (AUCC, 2008), possibly because attractive employment opportunities are lacking.

Canada's business demographics hold part of the answer to this puzzle. Canada has a huge proportion of small- and medium-sized enterprises (SMEs), many successful nationally, but relatively few companies large enough or innovative enough to achieve and sustain a stable global profile. Some of those it had, such as Nortel and Alcan, no longer serve this role. SMEs traditionally conduct less R&D than larger corporations, and typically will not if they are not led by technologically and scientifically literate managers. The composition of Canada's R&D landscape demonstrates this. On average, businesses in OECD countries conduct 69% of a nation's R&D; Canadian businesses conduct 54%. As a result, Canada relies much more heavily on research stemming from universities than do other countries. Universities in Canada perform 36% of total R&D, much higher than the OECD average of 17% (OECD, 2008c). And Canada's business expenditures on R&D (BERD) sat at just 1.03% of Canada's GDP in 2007, two-thirds of the OECD average of 1.56% and about half the U.S. rate (OECD, 2008c).

The underlying reasons for the low business investment in research, apart from the high number of SMEs, are still being teased out. Preliminary research from a number of analyses, however, suggests the influence of the following factors:

- Industries centred around natural resources, of which Canada has a large proportion, have been been traditionally less R&D intensive. However, competing with emerging economies in today's world requires that natural resource-based companies have the capacity to

utilize high-tech identification and extraction processes, develop value-added products and manage complex social and political systems that foster environmentally friendly and socially responsible corporate behaviour.

- Historically, Canada has been a "branch plant" economy in sectors such as the auto and pharmaceutical industries, with R&D tending to take place in headquarters located outside of the country. Again, times are changing, and research is now more distributed globally, regardless of the location of head office. Canada has had some success in attracting multinational investment in biotechnology and aerospace research, to name two sectors.
- Canadian industries invest less in capital equipment, particular in information and communications technologies (ICT), which have been shown to drive innovation. Canadian firms tend to be, "with notable exceptions… technology followers, not leaders" (CCA, 2009), notwithstanding an early commitment on the part of the federal government to, "make Canada the most connected nation in the world" through building access to the Internet (Manley, 1999).
- Access to venture capital, particularly later-stage, is limited.
- Numerous analyses of Canada's innovation problem also point to a lack of "business ambition" in certain sectors, such as manufacturing, what the Canadian Council of Chief Executives called, "a culture of complacency… a sense that good is good enough" (Canadian Council of Chief Executives, 2008).

While the situation may sound dire, in fact there are some real rays of hope. Notwithstanding the branch plants, Canada's large number of SMEs tells the story of an entrepreneurial people who roll up their sleeves and start businesses wherever they see a niche. Canadian companies also have a good track record in creating new-to-market products (OECD, 2007). What is lacking is the support, knowledge and capacity to develop the critical mass to allow these innovative small businesses and smart ideas to compete internationally and remain Canadian. BERD, or any aggregate R&D spending measurement, also doesn't capture the full picture of innovation. The Canadian automotive sector, despite R&D expenditures that are about one-seventh the level of their American counterparts, is nonetheless more productive, due to process innovations not captured in BERD statistics (CCA, 2009).

In recent years, analyses have moved from blaming universities for insufficiently commercializing the products of their research to focusing Canada's innovation problem closer to the private sector. In fact, the problem is really that the country has not sufficiently mobilized the innovation system. Canada requires a leveraging of talent and innovation across sectors. The low level of business innovation suggests insufficient productive collaboration of universi-

ties, governments at the city, state and national levels, and industry. The World Economic Forum's *The Global Competitiveness Report 2008-2009* notes a lower level of business-university collaborations, and the OECD's *Science, Technology and Industry Scoreboard 2007* shows that only 11.8% of large Canadian firms collaborate in innovative activities with institutions of higher education, compared with 52.8% of large companies in Finland, the world leader. [4]

Encouraging is the fact that the share of Canadian university R&D financed by business is one of the highest in the world (OECD, 2008d) and the value of research contracts more than doubled from 1999 to 2006 (AUCC, 2008). Seemingly, a contradiction exists: Canadian companies are willing to sponsor research in universities, but it would appear that truly collaborative partnerships are not as prevalent as would be ideal. As the Science, Technology and Innovation Council points out in its recent report (2009), more study is needed to understand the reasons why.

## THE WAY FORWARD

Canada stands at a crossroads. It has taken large steps toward becoming an Innovation Society, but other nations are leaping forward faster. The new U.S. administration has a coherent vision for higher education, research and innovation and the will to achieve it. The competitive pressure from Canada's southern neighbour has already provoked fears of a new brain drain, but may instead have the positive effect of spurring the country to greater action. Noted American science policy advisor, James Duderstadt, has noted that while it can take, on average, a decade or more to build a research program of significance, just two to three years of neglect can stifle it. After all, momentum is hard to build, and to lose it is tragic.

So how can Canada quickly refine its strategy to become an innovation leader? What specific actions should it take? In broad terms, for Canada to succeed in this new global environment, all the key players in Canada's innovation ecosystem must collaborate. Canada is not big enough to accommodate one country, 10 provinces and three territories acting in isolation or actively working against each other, all hoping to capture the attention of institutions and regions around the world.

The core of any innovation strategy should be talent and knowledge, and in these areas Canada possesses a solid foundation to build on. In terms of talent, Canada is starting to move away from old-school thinking, that intellec-

4 Data for Canada includes the manufacturing sector only, and some differences in the survey methodology used in Canada mean that the true percentage of university-industry partnerships may not be fully captured. Nonetheless, the gap is striking.

tual protectionism that concentrates on only home-grown skills development. The federal government's new Canada Excellence Research Chairs and Vanier Scholarships provide an opportunity to attract high-level international stars and stars-in-training. In addition to initiatives to attract skilled people, Canada also needs to foster connections with students, faculty and business leaders who leave the country. A recent OECD study advises that, "The mobility of researchers… is not necessarily a zero-sum game in which receiving countries gain and sending countries lose" (OECD, 2008b). There exists an opportunity to advance distinctive international networks in areas of Canadian strength and continue to derive benefit from the flow of ideas and the uptake of new technologies and processes that speed innovation.

As well, we need to broaden our ideas of leadership, and ensure that organizations are growing more "distributed leadership", in which roles are shared across a group fluidly, according to the capabilities of individual members, allowing the best approaches to come forward. Increasingly, universities can support the development of global citizens, people who are comfortable moving freely across cultures and borders, who are scientifically and technologically literate, with nimble minds, tolerant attitudes and facility in more than one language.

As elsewhere, Canada must continue to invest in both basic and targeted research at levels that will allow the country to keep pace with, and in some fields lead, the G7. The right funding mix across the four pillars of research support (talent, infrastructure, operating and indirect costs) will help make the most of investment. Paradoxically, the influx of superb new talent to Canada, thanks to new programs such as the Canada Research Chairs, the Canada Foundation for Innovation and the Knowledge Infrastructure Program, has had the effect of stretching thin operating funding for research and discovery. Ongoing dialogue across levels of government and academia, as well as a real-time assessment of changing needs, will be required to ensure that the balance most conducive to innovation and retaining talent can be found.

Federal, provincial and business strategies, as well as the recent benchmarking reports referenced above, identify the need not only to fortify knowledge and talent, but to harness these assets to address the country's stubbornly persistent problem of business innovation; perhaps through a more constructive form of competetive federalism. And this problem isn't ours alone. Worldwide, nations are struggling to identify the best mechanisms to open up knowledge exchange across sectors. The issue is not straightforward because, at its heart, it is about social capital, what the OECD calls, "the norms and networks facilitating co-operation either within or between groups" (Box, 2009). The complex social context of innovation includes the different cultures in industry versus academia and goverment, interactions between people with distinct agendas, and levels of trust among the various actors. Outreach

and communication among all players in Canada's innovation ecosystem will be a start.

Aside from "soft" mechanisms to address co-operation, governments can also establish better frameworks to promote business innovation. For example, the Canadian government currently provides the richest government support of business R&D as a percentage of GDP of 13 OECD countries (STIC, 2009). With the highest level of support, however, Canada is getting some of the poorest results — a level of BERD well below the OECD average. The answer to this puzzle may be found in the nature of the support. Approximately 90% of government assistance is indirect, through non-refundable tax credits (STIC, 2009), and recent studies are suggesting that "subsidies [i.e. direct support] have a greater impact on small firms' R&D expenditures than those of large firms" (Box, 2009). Given the large concentration of SMEs, reviewing the balance of indirect and direct government aid to business R&D would be strongly advisable.

More direct support of business R&D would also allow governments to target a percentage of investment to their defined priority fields, as it currently does with academic research. The shared platform would provide a sense of common purpose for industry-university-government partnerships. We are missing the opportunity to forge strategic collaborations that would integrate cutting-edge knowledge, talent and research from universities into business and government in a way that creates and sustains results.

Happily, Canada is not just looking within its own borders for partnerships. Though Canada does not have a national framework for international research, it did launch the International Science and Technology Partnerships (ISTP) program in 2005 to advance international networks and fund international research projects with commercial potential. Over the last few years, the federal government has also negotiated individual bilateral agreements with countries such as India (2005), Israel (2006), China (2007) and Brazil (2008). But the future of high-impact international partnerships, I believe, lies in a new model: one where high performers in the key innovation sectors in Canada — from industry, government and universities — work in targeted partnerships with the key sectoral players in peer countries. Close competitors become close collaborators. The Canada-California Strategic Innovation Partnership, or CCSIP, is piloting this new model.

CCSIP was formed in 2005 to mobilize bilateral collaborative research, development and delivery in the two "innovation-intensive" regions of Canada and California. This is *not* the usual researcher-to-researcher collaboration. The CCSIP partnership champions new paradigms of cooperation and focuses on innovative areas with market potential that are strengths for both jurisdictions: stem cells and regenerative medicine, information and communications technologies, advanced transportation and energy, nanotechnology, infectious

diseases, venture capital, intellectual property, and the development of highly qualified personnel (Canada-California Strategic Innovation Partnership).

I see CCSIP as a promising model of research partnership because it takes an effective national strategy and makes it global. The partnerships revolve around the shared priorities and strengths of each jurisdiction, providing a focus for investment and connection. The joint initiatives are time-limited, jointly funded and have champions on the ground in both jurisdictions. This makes it easy to quickly identify and act upon critical research questions that align with industry needs. Because governments are involved from the ground up, they are motivated to smooth out obstacles and adjust policies to speed along results. And perhaps most importantly, CCSIP establishes a network of the most critical players — the organizations and people that, when brought together, are most likely to jumpstart innovation.

## CONCLUSION

Talent, research excellence, knowledge exchange, international connections — what could be missing to create the unbeatable strategy that will turn Canada into an Innovation Society? As your parents or teachers might have told you, attitude is everything. To most Canadians, innovation or productivity gaps are issues too abstract to capture their imagination, especially since the quality of life here is still strong. As well, Canada has experienced some buffering of the impact of the current economic turbulence owing in part to the smart regulatory framework governing the banking industry in Canada. As Robin V. Sears (2007) says in his informing and entertaining article, "Bridging the Political Productivity Gap", the, "not unreasonable query of the average Canadian," is: "If we are doing so badly why are we doing so well?"

But unless they heed the warning signs of recent benchmarking reports, Canadians risk losing the wonderful quality of life that has pushed the country to the top of the Human Development Index for so many years. Canada needs a new coherent vision, uniting the country behind a national dream of innovation, as it were. Together, Canadians can interweave wealth creation with strong social values, balancing concern for environmental impact, global health, and addressing growing disparities for the disenfranchised with innovation, education, economic stability and growth.

Today, Canada is prosperous. Will it be tomorrow?

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