

# Taking Public Universities Seriously

## Building Excellence: Graduate and Research Support

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Let me start by congratulating the University of Toronto and its President, Frank Iacobucci for this wonderful initiative and timely opportunity to address the issues surrounding public universities.

Allow me to focus my remarks on the issue of commercialization, or “bringing ideas to market”. I should preface my remarks by stating that I am an engineer by training. I have spent close to 10 years in the private sector and almost 25 years in academia. I have also had the opportunity to bring the results of my research to market.

I will start by asking a basic question “*How effective have we been in convincing the public, not that universities are important actors in the conduct of research, but how effective have we been in convincing the public of the value and relevance of the research universities are conducting?*”

## Introduction

For many, within and outside academe, the words “university” and “commercialization” are totally irreconcilable. In fact, many would argue, even today, that a university should focus exclusively on its core mission, i.e., learning, discovery and engagement. For some, the concept of bringing “innovation” to “market” is incompatible with the university mission.

When I became President of the University of Ottawa in 2001, I indicated that one of my objectives was to ensure that the University of Ottawa was a “responsive university”; i.e., responsive to the needs of its “publics”, including students, parents, governments, businesses, non-profit organizations and the community. In fact, “*each of these publics will judge the university in terms of the quality of their relationship with the university and the quality of the outcomes of these relationships*”<sup>1</sup>.

I would argue that to play this role, a university must “step-out of the Ivory Tower” and exercise leadership. It is critical that discoveries whether they be in the arts, the humanities or in the areas of science, technology or health be shared with Canadians. I would further argue that it is critical that ideas and discoveries be brought to market. Finally, universities have a critical role in fostering and encouraging the

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<sup>1</sup> Tierney, William G., Editor (1998). “The Responsive University: Restructuring for High Performance”. The John Hopkins University Press. 182 pp.

commercialization process. The purpose of this paper is to reflect on the role of universities in the drive towards commercialization of innovation.

## **Commercialization, Universities and the Canadian Federal Government**

In February 2002, the Federal Government presented its Innovation Strategy designed to build our economic and social foundation. At that time, the Minister of Industry said “We need to find new ways to create knowledge and bring it to market more quickly ... If Canada is to be successful globally, innovation must be everybody’s business.”

Including universities! By 2010, the objective for Canada is to:

- rank among the top five countries in the world in R&D performance (we currently rank 14<sup>th</sup>)
- at least double the Governments current investments in R&D
- rank among the world leaders in the share of private sector sales attributable to innovations
- raise venture capital investments per capita to prevailing US levels.

The March 2004 Federal Budget<sup>2</sup> reiterated this through a series of measures aimed at stimulating productivity, including in particular:

- Increased support to commercialize the results of research conducted at Canada’s universities, hospitals and research facilities.
- Providing more funds to support venture capital financing; this will trigger additional private sector investments.
- Improving Canada’s tax system and making it more competitive, in particular through increases to capital cost allowance rates for information and communications technology assets.

On research and innovation, the 2004 Federal Budget builds on these efforts by boosting the Government’s commitment in these crucial areas by adding:

- \$90 million annually to the budgets of Canada’s three federal granting councils: the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council of Canada, and the Social Sciences and Humanities Research Council of Canada.
- \$20 million a year to help Canada’s universities and research hospitals offset the indirect costs of research.
- \$60 million to Genome Canada to strengthen research in genomics, the study of the genetic code of people and other living things.

On commercialization of research, the 2004 Federal Budget builds on Canada’s existing efforts to bring research discoveries to the marketplace:

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<sup>2</sup> “The Budget Plan 2004: New Agenda for Achievement” Department of Finances. March 23, 2004. <http://www.fin.gc.ca/budget04/PDF/bp2004e.pdf>

- \$50 million over five years to improve the capacity for commercialization at universities, hospitals and other research facilities.
- \$25 million over five years to support proposals by federal science-based departments and agencies aimed at improving their research commercialization activities.
- \$5 million per year to the Industrial Research Assistance Program (IRAP) to strengthen its support for the regional innovation initiatives sponsored by the National Research Council (NRC).

On venture capital funding, the 2004 Federal Budget takes steps to enhance access to venture capital financing, by providing \$270 million for new investments in venture capital financing, including \$50 million to invest directly in innovative start-up and early-stage companies to further support the commercialization of enabling technologies.

Finally, on commercialization by universities, it is interesting to highlight some of the recent comments by The Honourable Joe Fontana<sup>3</sup> on commercialization by universities:

“Universities are starting to learn ... (some universities have) set-up commercialization (units) in their universities through technology transfer officers.”

“... we need to create partnerships to allow them to commercialize. ...”

“... I think it’s going to take a three-way partnership: the private sector, the academic community, and the government, all working together to create the economy that we want.”

James J. Duderstadt, former President of the University of Michigan states that:

“The key drivers of prosperity in a knowledge-driven economy are factors which contribute to innovation such as Federal R&D expenditures, the production of R&D personnel, ... the government university partnerships are not simply about the procurement of research results. It is also about nurturing and maintaining the human strengths of a great technological nation and sowing the seeds that will ultimately bear fruit in new products and processes to fuel our economy and improve our quality of life.”<sup>4</sup>

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<sup>3</sup> Quote from “THE HILL TIMES” Monday, February 16, 2004 by The Honourable Joe Fontana, Parliamentary Secretary for Science and Small Business

<sup>4</sup> James J. Duderstadt (2003) “A University for the 21<sup>st</sup> Century”. The University of Michigan Press.

## Universities and the Drive towards Commercialization!

Does the title of this section lead one to believe that Canadian universities are turning into commercial research establishments? Absolutely not!

Does the drive towards commercialization mean that we are abandoning our core mission and our *raison d'être*? Absolutely not!

Does the drive towards commercialization mean that we are depending less and less upon the traditional mechanisms for the funding of research? While new and creative sources of funding to support research is a noble goal in and of itself, the drive towards commercialization, is not necessarily aimed at generating new sources of revenues. Universities are not in this for the money. It is critical that universities support the concept of bringing ideas to market.

While one might argue that this concept is applicable only in science, technology or health, i.e., NSERC and CIHR, one should take a close look at the consultation framework on the transformation of the Social Sciences and Humanities Research Council<sup>5</sup> where one reads “*A new university landscape. [Universities] cannot be ivory towers, disengaged from their community or the knowledge economy. They are called to be at the heart of both.*” On the new research environment, the document states “*A new collective culture of “research entrepreneurship” is emerging as an important dimension of research activity in Canada.*”

Not every type of research is going to, or should have, commercial potential. Universities are institutions of learning and discovery; they are not *development* enterprises (i.e., the D in R&D).

Universities are often represented by a three-pillar Greco-Roman building supporting a vaulted roofline where each pillar depicts one of the core missions of the university, i.e., learning, discovery and engagement.

With the current buzz about commercialization one would be inclined to imagine that a fourth pillar should be added to support the roofline; while I support the drive towards the commercialization of innovation resulting from university research I would find that depiction to be incorrect. In fact, I would argue that the concept of bringing “*ideas to market*” transpires across all three pillars of the University mission.

### **Learning**

Many of our programs now include concepts of entrepreneurship and management, not only in the schools of management but across the spectrum of programs ranging from fine arts, engineering, law, science and health. There is a desire on the part of students to take courses that complement their education and/or their professional training and that

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<sup>5</sup> Social Sciences and Humanities Research Council (SSHRC). “From Granting Council to Knowledge Council”, Volume 1. Consultation Framework on SSHRC’s Transformation. January 2004

provides them with a more competitive skill-set before they enter the workforce. In response to these demands, faculties and departments have been flexible in their program structure and innovative in their modes of delivery.

Innovative teaching methods and curricula are also the object of commercialization. In short, bringing ideas to market is a growing element of academic programs.

## ***Engagement***

It is important to realize the extent to which universities are key economic and cultural engines of our communities. As an example, the direct and indirect economic benefits resulting from the operation of the University of Ottawa are in excess of \$1.6 billion per year.

With an enhanced commercialization focus we can now do more to give back to the communities that we service. We are able to assist new businesses with centres of learning and with services that are staffed with motivated students and faculty eager to put classroom lessons to work in real world situations.

We have researchers interacting with business and community leaders to find new ways to fund research and to solve the problems that local companies may be having with their existing products and/or services.

The fact that there is a much greater understanding of the issues surrounding commercialization only makes these community interactions more valuable for the businesses, organizations and individuals that take advantage of them on a regular basis.

## ***Discovery***

Does the drive towards commercialization mean that all research done on campus and funded by granting councils should be able to demonstrate commercial potential? Absolutely not! Basic research that tackles the larger questions in all disciplines is not only the primary goal of research in Canadian universities, it is the basis of discovery and innovation. Curiosity driven research is critical because it is the basis upon which future commercialization opportunities rest.

While businesses are not normally willing to entertain disruptive technologies that have the potential to render existing product lines obsolete or force wholesale changes in corporate direction, the discoveries that arise from “basic research” often have the effect of creating new business lines and new opportunities.

Curiosity driven research is critical to the *raison d'être* of a university; it must be encouraged and nurtured; it should not be sacrificed at the expense of a focus on commercialization. Having said that, it is also important that universities provide an environment where the results of curiosity driven research activities are assessed objectively as to their commercialization potential. Questions such as: “Can this

discovery benefit society? Should the commercial potential of this idea be explored further? Should this idea be brought to market?” should be posed and answered.

It is fair to say that commercialization in Canadian universities is at its infancy when compared to the commercialization activities in American universities. One only needs to look at the ratio Licensing Income to Research Expenditure (LI\_to\_RE Ratio) of the top 10 US universities (including the University of California System) compared to the situation in Canadian universities (Tables 1 and 2).<sup>6</sup>

Table 1. 2002 Licensing Income from US Universities

Rank	University	License Income	Research Expenditure	LI_to_RE Ratio
1	Columbia University	\$ 155,653,442.00	\$ 407,405,270.00	38.206%
2	New York University	\$ 62,700,209.00	\$ 179,727,000.00	34.886%
3	Florida State University	\$ 52,077,120.00	\$ 154,705,048.00	33.662%
4	University of Rochester	\$ 42,095,533.00	\$ 260,093,000.00	16.185%
5	Emory University	\$ 29,557,917.00	\$ 250,719,041.00	11.789%
6	Michigan State University	\$ 29,758,071.00	\$ 289,787,000.00	10.269%
7	Stanford University	\$ 50,176,009.00	\$ 573,416,214.00	8.750%
8	University of Florida	\$ 31,597,753.00	\$ 369,246,830.00	8.557%
9	Univ. of Wisconsin Madison	\$ 32,060,854.00	\$ 662,100,000.00	4.842%
10	UC System (10 campuses)	\$ 82,048,000.00	\$ 2,417,638,000.00	3.394%
11	MIT	\$ 26,346,992.00	\$ 898,989,000.00	2.931%

Source: Chronicle of Higher Education (2004)

<sup>6</sup> “ Unde the Bayh-Dole Act of 1980 nonprofit organizations-including universities--may patent and retain title to inventions created from research funded by the government. In general, the university must disclose each new invention to the federal funding agency within two months of the inventor disclosing it to the university, decide whether or not to retain title to the invention, and then file a **patent** application within one year of electing to seek title. Universities must **license** the rights to innovations to industry for commercial development; small businesses receive preference. The federal government also receives a nonexclusive, irrevocable license to the invention. Universities must share with the inventor any income eventually derived from the patent. Any remaining income, after technology management expenses, must support scientific research or education.”

Table 2. 2001 Licensing Income for Canadian Universities

Rank	University	License Income	Research Expenditure	LI_to_RE Ratio
1	Université de Sherbrooke	\$ 10,594,400.00	\$ 41,481,000.00	25.540%
2	University of British Columbia	\$ 5,585,186.00	\$ 193,432,000.00	2.887%
3	Queen's University	\$ 2,709,737.00	\$ 101,365,000.00	2.673%
4	McGill University	\$ 6,404,573.00	\$ 280,267,000.00	2.285%
5	University of Alberta	\$ 4,916,654.00	\$ 240,548,000.00	2.044%
6	University of Manitoba	\$ 1,222,755.00	\$ 101,570,000.00	1.204%
7	university of Calgary	\$ 1,964,752.00	\$ 172,101,000.00	1.142%
8	University of Waterloo	\$ 755,820.00	\$ 72,907,000.00	1.037%
9	Université de Montréal	\$ 2,766,826.00	\$ 349,542,000.00	0.792%
10	Simon Fraser University	\$ 170,050.00	\$ 25,414,000.00	0.669%
11	University of Saskatchewan	\$ 530,553.00	\$ 101,572,000.00	0.522%
12	Memorial University	\$ 145,350.00	\$ 34,278,000.00	0.424%
13	University of Toronto	\$ 1,926,033.00	\$ 470,062,000.00	0.410%
14	McMaster University	\$ 584,983.00	\$ 184,945,000.00	0.316%
15	Concordia University	\$ 31,008.00	\$ 20,675,000.00	0.150%
16	ETS	\$ 7,154.00	\$ 5,166,000.00	0.138%
17	University of Western Ontario	\$ 133,086.00	\$ 131,836,000.00	0.101%
18	University of New Brunswick	\$ 13,687.00	\$ 22,056,000.00	0.062%
19	Université Laval	\$ 108,879.00	\$ 187,383,000.00	0.058%
20	University of Ottawa	\$ 59,626.00	\$ 150,848,000.00	0.040%

Source: Ottawa Life Science Council (OLSC) Report (2003) [www.olsc.ca](http://www.olsc.ca)

Except for *Université de Sherbrooke* all other Canadian universities have a Licensing Income to Research Expenditure ratio that is less than any of top 20 US universities. Accordingly, if we are successful in developing a Canadian commercialization strategy for university based research, the potential payoff could be very significant for Canadians and for Canadian universities.

The remainder of this discussion will focus on the barriers and opportunities for universities engaged in fostering the commercialization of innovation.

## Potential Barriers to Commercialization

Universities are by definition centers of learning and of discovery where the frontiers of knowledge are pushed back on a daily basis. The role of universities in bringing ideas/innovation to market is a source of much debate on campuses.

Some reject outright the role of universities and of faculty members in the commercialization process. Some of the reasons invoked include:

- Commercialization will detract from the core mission of the university (learning, discovery and engagement)
- A focus on commercialization will undermine and diminish the importance of basic research
- As publicly-funded institutions (*at least in part*), universities should not compete with the private sector in bringing ideas to market

- Commercialization inevitably brings in partnerships with the corporate sector and it is believed that corporate science corrupts (Ralph Nader<sup>7</sup>)  
*... “The purpose of universities dedicated to truth becomes undermined. [Corporate and academic sciences] are not compatible. Corporate science is secretive due to more propaganda [and] power from the government. Academic science is open, part of the common, [and] tends to address the needs of the people”*
- As publicly-funded institutions, universities and faculty members should not profit from discoveries
- Graduate students and faculty members will be taken advantage of in the process.

Some of these points are valid and must be taken seriously. In fact, it is the responsibility of universities and its leadership, to ensure that mechanisms are in place to address these concerns.

On the other hand, there are those that while they are not fundamentally opposed to the commercialization of university-based innovation, feel that universities are ill-equipped to bring ideas to market. Here again, it is critical that we be able to develop models that maximize the commercialization potential of university-based discoveries.

## **Key Elements of a University-Based Commercialization Strategy**

By investing more than \$13-billion in the support of research and innovation over the past six years, the Federal Government has changed the university research landscape in Canada<sup>8</sup>. Universities have embraced that direction. The Association of Universities and Colleges of Canada (AUCC) has, on behalf of all Canadian universities, committed to tripling the commercialization output (e.g., licensing revenues) over a ten year period starting in 2001. I would argue that this goal is overly timid and that universities should strive to surpass this objective, if they wish to establish their credibility in the commercialization of innovation.

How do we achieve this objective? In our efforts to increase the commercialization potential of university research we have to

- be strategic;
- provide support and resources to researchers;
- bring people together and encourage multi- and trans-disciplinary initiatives;
- recognize and reward the contributions of faculty to innovation; and
- foster the development of partnerships between universities, the private sector and government.

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<sup>7</sup> Ralph Nader. “The Scholar and the State.” Graduate Student Association University of Ottawa, Multidisciplinary Conference. University of Ottawa February 20, 2004.

<sup>8</sup> Federal programs such as the Canada Foundation for Innovation (CFI), the Canada Research Chairs (CRC), Graduate scholarship programs have changed the research landscape in Canada.

There are two target audiences one has to consider when promoting the benefits of commercialization: researchers and corporations. On the researcher front we have to deliver the message that commercialization is different than basic research and that funds directed at achieving a commercial endpoint are not just another source of funding to support that work that is taking place in the labs. With businesses we have to strive to overcome the perception that universities know nothing about the business world that that if there is a commercial opportunity that it should be immediately removed from the university context, for the lowest possible price, and placed in the more sophisticated hands of business. The benefits that will flow from the commercialization of a particular technology must benefit those that have contributed to that discovery, its protection and its conversion into a product. No one party should be perceived as bringing the “secret sauce” to the mix and no one interest should be prejudiced by the interests of another. Universities, researchers and the financial/business partners must be satisfied that the process is fair and equitable.

## **Conclusion**

Universities play an important role in the economic, cultural and social development of their communities. It is critical that ideas and discoveries resulting from university-based research activities benefit the community and be brought to market. Universities have an important role to play in fostering and encouraging the commercialization process. This process is fundamental to the concept of wealth creation. It must however be recognized that curiosity-driven research is critical to the *raison d'être* of universities; accordingly, this role should not be sacrificed at the expense of an increase focus on commercialization.

In developing a university-based commercialization strategy it is important that we be strategic; that we provide the necessary support and resources; that we encourage multi-disciplinarity; that we recognize and reward the contributions of faculty members to innovation; and that we foster the development of partnerships between universities, the private sector and government.

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