

International Research Collaboration

As a core function of universities, research informs a wide array of activities on Canadian campuses. By its nature, research is a collaborative activity. Historically, this collaboration has always included a robust international dimension, which has influenced the research enterprise itself and enriched the internationalization of Canadian campuses.

Introduction

Researchers recognize the importance of collaborative work and often partner with colleagues abroad. With one fifth of the world's scientific papers co-authored internationally, there is a sustained move on the part of researchers throughout the world to engage collaboratively in the production of knowledge and innovation.¹ This is especially prominent in the Canadian context, where research collaboration, as measured by co-authorship, is twice the world average. More than 40 percent of academic publications by Canadians have co-authors from other countries – twice the rate of 15 years earlier. More recently, Canadian universities have increased their institutional engagement in international research collaboration, for example through international research networks, tech transfer agreements, and other cooperative arrangements. These activities represent a significant dimension of universities' overall efforts to internationalize their campuses and often serve as a platform for enhancing internationalization through other key activities such as student mobility and curriculum development.²

Definition

International research collaboration can take many different forms. At its most basic level, collaboration occurs when researchers engage informally in consultations, provide advice, participate in site visits, conferences or create complementary research agendas. Other, deeper forms of cooperation include

joint research projects, the sharing of research facilities and major infrastructure, allowing access to research data and discoveries, and the linking of research centres and virtual networks. Collaboration also plays a key role in the training and development of highly qualified personnel, for example through the co-supervision of Ph.D. students from other countries.

A number of factors have contributed to a trend towards increased collaboration. The growing complexity and cost of research, especially in disciplines requiring specialized instrumentation or facilities, tend to make collaboration an imperative. Similarly, interdisciplinary and multidisciplinary research has assumed greater significance, as new ideas are explored at the intersection of previously distinct fields and as public expectations about the outcome of research look to more holistic and global approaches to research challenges. Finally, issues such as climate change or global pandemic health challenges, which by their nature transcend national borders, demand international collaboration.

The Canadian Landscape

Canada has a long history of research collaboration with industrialized nations, particularly the United States, the United Kingdom, the European Union and Japan. In recent years, collaboration has also increased with other parts of the world,

notably Brazil, Russia, India and China. In part, this reflects the growing importance of non-OECD countries, both to the global economy and to global advances, in science and technology. Where other countries are continuing to increase efforts to collaborate internationally in matters of research and commercialization, Canadian researchers need to maximize their opportunities to tap into international research collaboration activities for the benefit of Canada's economy and society. Canadian participation in international research projects is important as it increases the likelihood that Canadian expertise and perspectives will be brought to bear on global and cross-border research issues, such as climate change or epidemiology as well as on pressing social issues such as poverty and conflict.

The federal government, through its S&T Strategy entitled *Mobilizing Science and Technology to Canada's Advantage*, has set out a framework for increased Canadian competitiveness and social prosperity through the mobilization of excellence in research and development and development of talent. One guiding principle of the strategy is to foster partnerships, including supporting international research and networks in areas of strategic importance to Canada.

A number of programs and initiatives support this principle. One example is support for international S&T cooperation through bilateral agreements. In addition to Germany, France, Japan and the

¹ Sachi Hatakenaka, "New Developments in International Research Collaboration" (www.bc.edu/bc_org/avp/soe/cihe/newsletter/Number50/p11_Hatakenaka.htm)

² For more information on the internationalization of Canadian universities, please read the report entitled *Internationalizing Canadian Campuses* and related fact sheets (www.aucc.ca/policy/research/international/survey_2007_e.html)

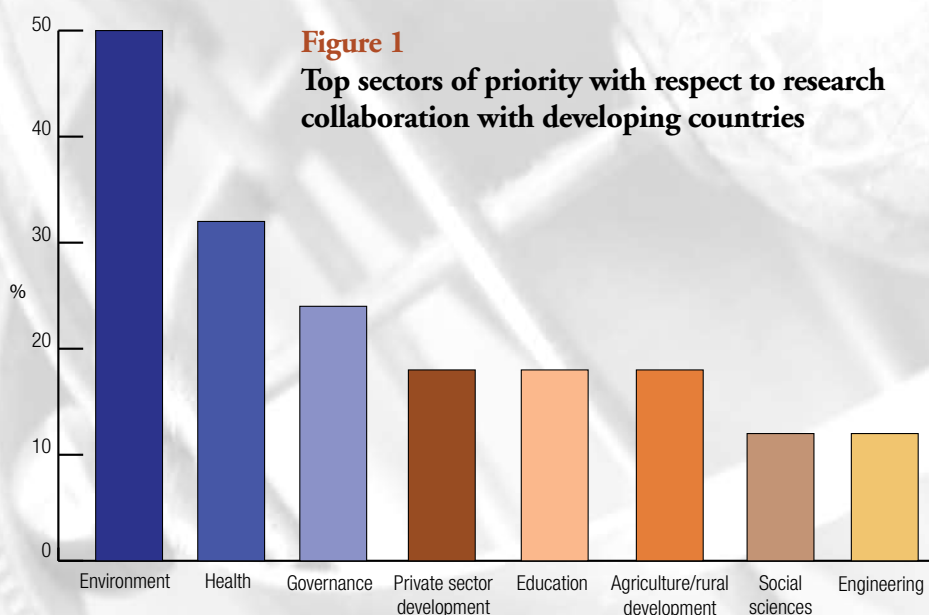
European Union, Canada has negotiated agreements with India, Brazil and China that have provided funding through the \$20 million International Science and Technology Partnership Program (ISTPP). Additionally, as part of its Global Commerce Strategy, the government plans to pursue new S&T agreements with additional partners as a means to forge stronger linkages between Canada's science and technology community and global innovation networks.

Each of the three granting agencies has developed policies and programs to encourage and enhance international collaboration within their programs. For example, the **Canadian Institutes of Health Research (CIHR)** funded approximately 2,300 grants and awards with linkages involving over 50 countries between April 2000 and March 2008, representing some 7.2 percent of all grants and awards, and partners with over 150 sister organizations throughout the world in joint funding, joint workshops and symposia and other activities. The **Social Sciences and Humanities**

Research Council of Canada's (SSHRC) International Opportunities Fund provides \$2.5 million in funding for two competitions over two years to support developmental activities such as workshops, seminars and planning meetings, and to help secure Canadian participation or leadership in current or planned international research initiatives/ networks. The fund has provided seed money for 112 projects in more than 50 countries over the last three fiscal years from 2005-06 to 2007-08. In addition, SSHRC has revised its eligibility criteria to allow foreign collaborators for certain programs. In 2007-08, the **Natural Sciences and Engineering Research Council of Canada's (NSERC)** Special Research Opportunity Program provided \$8 million in project funding, with 85 percent of projects involving international collaborations. To complement federal, provincial and university initiatives that attract foreign talent to Canada, NSERC has also revised the eligibility criteria of some scholarship and fellowship programs to increase support available for international students.³

Other support of international research collaboration activities includes the **Department of Foreign Affairs and International Trade's (DFAIT)** Going Global S&T Fund. Since 2000, it has helped Canadian researchers from almost 170 private sector companies and universities in identifying and establishing new collaborative R&D initiatives with foreign partners. The **Canada Foundation for Innovation (CFI)** has also invested in international research collaboration, approximately \$200 million between 2002 and 2007 to help Canadian institutions to participate in multinational projects. For its part, **Genome Canada** also supports a number of international initiatives, notably the Canadian-led Structural Genomics Consortium.

In terms of support for researchers, the Canada Excellence Research Chairs program, managed by the **Canada Research Chairs Secretariat** in partnership with the granting agencies, targets the very top tier of world-class researchers with dedicated funding of \$10 million over seven years to each chair holder (up to 20) and their research teams. Chairs will conduct research in areas of strategic importance to Canada. Support for the next generation of researchers is available through the **Graduate Students' Exchange Program (GSEP)** and the prestigious **Vanier Canada Graduate Scholarships**. GSEP (up to \$10,000 per student) provides opportunities for international students to conduct research at a Canadian university while the Vanier scholarships (\$50,000 a year for up to three years) are intended to attract 500 of the best doctoral students from both Canada and the rest of the world to study at Canadian universities. In addition to this, many of the granting agencies' master's and doctoral scholarship programs are tenable abroad and both Canada Graduate Scholarship and Vanier scholarship recipients are eligible for Foreign Study Supplements of up to



³ Please refer to *Momentum: The 2008 report on university research and knowledge mobilization* (pp.97-98) for more information on granting agency efforts.

\$6,000, to help offset the costs, including travel and accommodation, of undertaking research studies outside Canada for a period of four to six months.

International Research Collaboration for Development

An important dimension of international research collaboration concerns the creation and application of new knowledge for and with the developing world, especially in the context of such United Nations Millennium Development Goals as reducing poverty, reducing child mortality rates and fighting epidemics such as AIDS. In recent years, Canadian researchers have significantly increased co-publication rates with emerging and developing countries, from 3.4 percent in 1992 to 6.4 percent in 2003. Increasingly, these countries' prosperity and quality of life depend on strong partnerships with research outcomes that have a direct benefit to its citizens. Through knowledge sharing and other collaborative undertakings, both developing countries and Canada achieve mutual benefits and ultimately enhance their own research capacity and excellence.

The Canadian government addresses international research collaboration for development chiefly through the **International Development Research Centre (IDRC)**, whose mission is to support applied research and build research capacity in developing countries, in part by working in partnership with the granting agencies. For its part, the **Canadian International Development Agency (CIDA)**, while not a direct funder of research, provides indirect support for applied research activities by providing funding to Canadian universities for institutional capacity building initiatives centred on key issues in development.

The IDRC Research Partnerships Challenge Fund is a new mechanism at IDRC to catalyze research consortia to tackle global issues or those of particular relevance to developing regions of the world. It does so through supporting larger-scale research programs in collaboration with Canadian and international funding agencies.

In collaboration with the Canada Research Chairs program, IDRC launched the International Research Chairs Initiative, establishing eight research partnerships between Canada Research Chair holders and their counterparts in developing countries. IDRC and SSHRC have launched an International Community-University Research Alliance Program, which is investing over \$8 million over six years to help postsecondary institutions and community organizations to work together to address development challenges of mutual interest. The International Partnership Initiative, launched with the Networks of Centres of Excellence (NCEs) in 2006, provides \$7 million over two years to develop and enhance linkages between Canadian and developing country researchers. The Teasdale-Corti Global Health Research Partnership Program, a component of the Global Health Research Initiative (GHRI), provides nearly \$20 million over five years to a suite of activities, including innovative "team grants" focused on developing and implementing programs that combine applied research, knowledge translation and capacity building to solve pressing problems in Low and Middle Income Countries (LMICs). This suite of programs has generated tremendous interest in Canada and internationally. In all cases, the funding partners have increased the funding in response to the quality and unanticipated quantity of proposals. Currently, from over 140 applications for pilot project and development and planning grants, some 14 international

teams composed of Canadian university and LMIC researchers and research users benefit from these grants.

Finally, international private donors, such as the Gates and Ford foundations, also contribute significantly to international research collaboration for development in the Canadian context.

Survey Findings

Findings from AUCC's 2006 survey on internationalization demonstrate that research figures strongly among the top reasons for promoting an international dimension to an institution's activities. These include the need to ensure that research and scholarship address international and national issues and the need to help maintain economic, scientific and technological competitiveness. In addition, the proportion of universities that include an international dimension, including international research collaboration, in their strategic planning processes grew from 84 percent in 2000 to 95 percent in 2006.

From the point of view of faculty members and researchers, some of the key benefits of internationalization include the development of international networks for joint initiatives and information exchange (91 percent of respondents list this as among their top three benefits); increased opportunities, funding, partners and facilities for scholarship and research (82 percent); and professional development through exchanges and sabbaticals abroad (55 percent). To facilitate faculty participation in international research collaboration, the vast majority of respondents agree that institutional agreements for faculty exchange are necessary (73 percent) and that funds or seed grants for international teaching, study, research or other activities are necessary (67 percent).

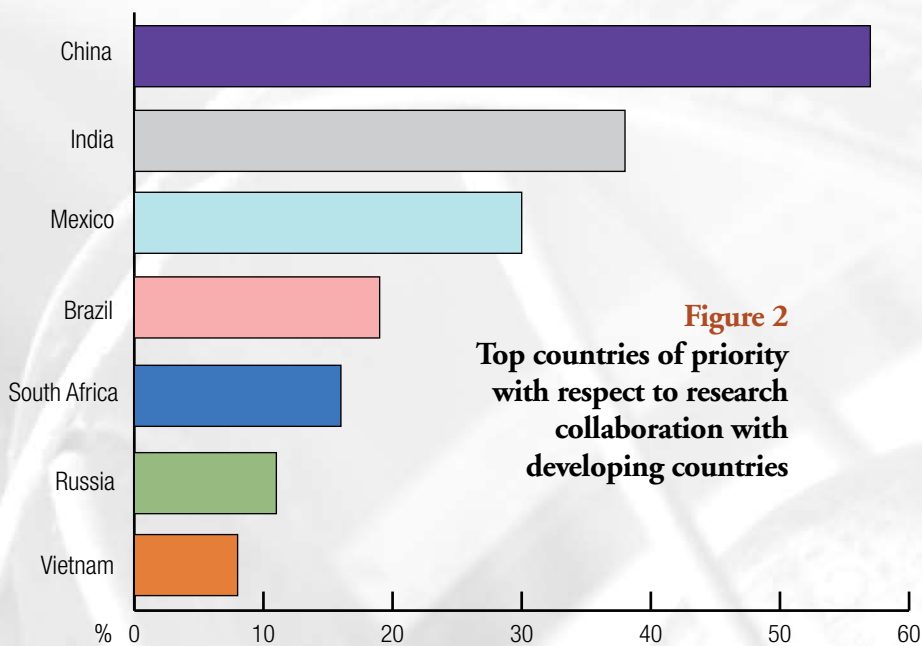


Figure 2
Top countries of priority
with respect to research
collaboration with
developing countries

The survey results demonstrate that there are some barriers to faculty engagement in research collaboration with developing country partners, including lack of funding, lack of institutional recognition of faculty members' efforts (including formal and informal methods of reward), the absence of a coherent government policy framework expressly in support of research collaboration for development, competition with domestic research priorities, and a lack of internal institutional support.

However, a significant number of respondents also reported strong interest in fields such as private sector development, education, and agriculture/rural development. Almost two-thirds of respondents reported an increasing level of interest in research collaboration with developing country partners, while a similar proportion reported an increasing interest among Canadian faculty to engage in research on global issues that have an impact on developing countries as well as Canada. In terms of Canadian faculty,

63 percent reported an increasing interest in engaging in research collaboration with developing country partners, while 65 percent report an increasing interest in engaging in research on "global issues."

Conclusion

In recent years, Canadian universities' interest and engagement in international research collaboration have evolved considerably. As other countries are also increasing their activity on this front, global opportunities are emerging for Canada to further engage in collaborative research abroad, and thus position research excellence as a centrepiece of Canadian universities' overall internationalization efforts.

While modest in scope, recent federal investments in international research collaboration have created opportunities for Canadian university researchers to develop research and talent networks. As one Canadian university notes, "these networks leverage financial and human resources, increase the profile of Canadian researchers

and universities, promote our outstanding programs and related economic and service sectors, support international recruitment and retention of talented researchers, attract bright international students and provide international opportunities for Canadian students."⁴

However, challenges remain. Competitor countries such as the United Kingdom, the United States and Australia are not standing still and are looking to expand their international partnerships and attract the best and brightest researchers. The BRIC countries (Brazil, Russia, India, and China) are also becoming important players in today's knowledge economy and they constitute both a challenge and an opportunity for Canada, given that they increasingly invest in the elements that are driving this knowledge economy.

Despite the existence of funding programs like ISTPCanada, funding provided by the granting agencies, the CFI and other agencies and departments to facilitate international research collaboration is rather limited and, according to some, is lacking coordination.

The press release of the *State of the Nation Report 2008: Canada's Science, Technology and Innovation System* called for collective action in several areas including that Canada will have to "aggressively pursue strategic international science, technology and innovation partnerships to advance Canadian interests."

In order for Canada to achieve this, targeted, sustainable and predictable funding will be required, coupled with a coordinated effort on behalf of those involved in funding, supporting, and engaging in international research collaboration.

For further information on AUCC's internationalization survey, go to www.aucc.ca/internationalization

⁴ McGill University submission to House of Commons Standing Committee on Finance, August 15, 2008.