Submission to the Standing Committee on Science and Research

Study on the Distribution of Federal Government Funding Among Canada's Post-Secondary Institutions

Submitted by U15 Canada

April 4, 2024

Introduction

Over many decades, Canada has been made more prosperous, resilient, and successful thanks to a longstanding commitment to science and research that supports the best ideas and the best people based on independent assessment by experts. Canadians are rightly proud of a research ecosystem that has cherished excellence and the non-partisan pursuit of knowledge for the benefit of all.

To build on this success in the spirit of continuous improvement, fifteen leading research-intensive universities came together in 2012 to create an organization focused on ways to enhance federal research policies and programs in the challenging and competitive global context. Located across the country, U15 members play leading roles domestically and internationally. As central pillars and regional research hubs, they employ half of the country's full-time university teaching staff who teach graduate and undergraduate students—64% and 45%, respectively, of all university students.[1]

In their key roles within Canada's diversified post-secondary landscape, leading research-intensive universities collaborate with near-by as well as distant institutions and partners across society. For example, three quarters of industry-sponsored research with higher education each year characteristically occurs at U15 universities. Similarly, U15-led research projects usually involve researchers and students across multiple institutions and organizations, locally and globally.

Not surprisingly, therefore, U15 universities play a similar role for the Canadian research ecosystem as their counterparts do in other leading countries. When calculated annually, selection committee decisions in Canada usually reflect those familiar in other jurisdictions. Universities who compose groups such as the American Association of Universities (AAU) in the U.S., Australia's Group of Eight (Go8), and the UK's Russell Group, are characteristically awarded by selection committees 64%, 67% and 75% of federal/national funding, respectively. [2][3][4]

Research funding from the federal government is awarded to scholars across various post-secondary institutions via a competitive grant process, which is reliant on impartial and expert external evaluations. Members of the selection committees that undertake each assessment are selected for their deep expertise, broad and detailed domain knowledge, and good judgment. As a result, Canadians are proud that the selection of committee members and the assessment process itself are recognized globally for their use of best practices, as detailed below.

However, Canada now faces the challenge of stagnant federal research support, which significantly hinders the country's research ecosystem. This stagnation restricts the ability of researchers at all post-secondary institutions to engage in high-quality research activities. At risk is Canada's commitment to be a leader locally and globally in research and innovation for the benefit of all.

---

[1] CAUBO Graduate Enrollments: https://www.caubo.ca/knowledge-centre/dashboards/data-dashboards/fte-based-dashboards/

[2] AAU Sponsored Research Income: https://www.aau.edu/sites/default/files/AAU-Files/Who-We-Are/Research-BTN-23.pdf

[3] Go8 Sponsored Research Income: https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp2122/Quick_Guides/UniversityResearchFunding

[4] Russell Group Impact: https://russellgroup.ac.uk/about/the-economic-impact-of-our-universities/; https://russellgroup.ac.uk/media/5524/rg_text_june2017_updated.pdf

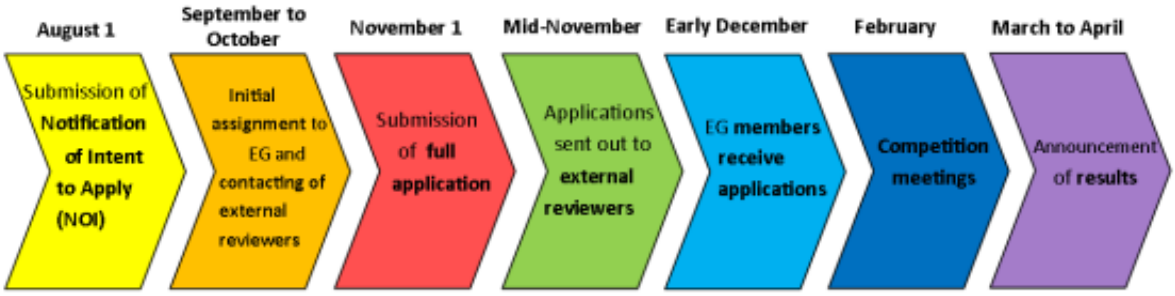
An Impartial Expert Review System

In Canada, federally funded grants are awarded through a rigorous, competitive process that is founded on impartial and robust expert assessments from institutions of all types. This impartial process is consistently employed at NSERC, SSHRC, CIHR, and CFI

The NSERC Discovery Grants Program serves as an example of the rigour of this internationally tested system. During 2023-2024, selection committees for NSERC's Discovery Grants Program awarded $367 million, along with $68 million for COVID-19 extensions, to support 1,635 grants administered at institutions across Canada.[5]

The review process for Discovery Grant applications (illustrated below in Figure 1) utilizes the expert review approach, engaging scientists, and engineers from across academia, industry, and government within twelve discipline-specific Evaluation Groups (EGs).[6] These merit review committees provide quality assessment and funding recommendations on grant, scholarship and prize applications assigned to them by NSERC.

Figure 1: NSERC Discovery Grant Review Process



All NSERC's selection committee members are selected through a comprehensive process that values expertise, inclusivity, and diverse institutional and regional representation. With suggestions from the research community, nominees are chosen for their knowledge, understanding of Canadian research, and capacity for insightful judgment, in and beyond their field. Importantly, NSERC's guidelines make clear that committee members or nominees do not need to be NSERC grant recipients.[7] Similar policies exist across the federal granting councils to ensure diverse participation on selection committees. For example, the current Discovery Grant Evaluation Group for Biological Systems and Functions composes 72 individuals from 43 academic institutions, scientific organizations, and government departments.[8]

Selection committees rigorously evaluate applications on scientific excellence, proposal merit, and contributions to training highly qualified personnel, employing detailed sub-criteria for comprehensive assessment. Discussions, justifications, and votes on ratings during expert review meetings further

[5] NSERC Competition Statistics: https://app.powerbi.com/view?r=eyJrIjoiZDg2MjNhMTMtN2I4ZS00NmFjLThhNWQtNjc1Y2ExNWQ2NzU4IiwidCI6ImZiZWYwNzk4LTIwZTMtNGJlNy1iZGM4LTM3MjAzMjYxMGY2NSJ9

[6] Discovery Grant Review Process: https://www.nserc-crsng.gc.ca/_doc/Reviewers-Examinateurs/CompleteManual-ManualEvalComplet_eng.pdf

[7] NSERC Guidelines for Peer Review Committees: https://www.nserc-crsng.gc.ca/NSERC-CRSNG/Policies-Politiques/committeemembers-membrescomite_eng.asp

[8] NSERC Biological Systems and Functions Peer Review Committee: https://www.nserc-crsng.gc.ca/NSERC-CRSNG/committees-comites/Biological-Biologiques_eng.asp

enhance the assessment's depth, fostering an unbiased approach that negates any preference based on research focus, institutional reputation, or the applicant's personal characteristics.[9]

In keeping with best practices, the selection process for the awarding of research funding has undergone continual scrutiny to ensure and improve its integrity and effectiveness. For example, an international Blue-Ribbon Panel assessed SSHRC's merit review practices in 2008. The panel praised SSHRC's evaluation and selection process and suggested additional ways to enhance certain features. SSHRC acted on each and every recommendation and thus remains at the forefront of global best practice.[10]

Similarly, NSERC, SSHRC, CIHR, and CFI collectively endorsed the San Francisco Declaration on Research Assessment (DORA) in November 2019. This global initiative promotes best practices in the assessment of scholarly research by encouraging use of a broader range of metrics to capture the value and impact of all research outputs.[11]

Not surprisingly, therefore, there is no evidence of institutional discrimination or bias in the merit review process. The ongoing and constant effort to refine and improve the evaluation mechanism ensures that Canada's research ecosystem remains dynamic, equitable, and globally competitive.

Research Excellence Benefits All Canadians

Based on the success of their applicants in merit review processes, in 2022, U15 universities were awarded $3.3 billion in federal research grants, complemented by an additional $3.6 billion from various alternative sources such as provincial governments and industry. This funding supports researchers and students at many organizations and institutions both in the short and longer terms. As beacons of global excellence and domestic innovation, Canada's research-intensive universities are key to attracting leading scholars to the country, serving as critical research hubs for a wide array of organizations embarking on research and innovation endeavors. Canada's research ecosystem has been built on the promotion of partnerships and academic networks across institutions and U15 universities have been champions for an engaged and collaborative research community that builds on the diversity of strengths across the ecosystem.

For example, Canada is considered to be the birthplace of artificial intelligence, driven by the pioneering work of Dr Geoffrey Hinton at the University of Toronto and Dr. Yoshua Bengio at the Université de Montreal, joint recipients of the Turing Award in 2018. Their work on artificial neural networks and deep learning not only helped make the AI revolution possible, but it has fostered globally competitive hubs with industry and positioned Canada as a global leader in the responsible adoption of AI technologies. While nurtured at leading research-intensive universities, the results of this work involve and affect communities across Canada.

Similarly, Dr. Pieter Cullis' long-standing research at UBC into lipid nanoparticles set the stage for the rapid development of mRNA vaccines during the COVID-19 pandemic, saving countless lives and making Canada central to the future expansion of this technology for other diseases. This research activity has involved partners domestically and globally for the benefit of all Canadians.

---

[9] To learn more about the Discovery Grants selection criteria, see: https://www.nserc-crsng.gc.ca/_doc/Reviewers-Examinateurs/CompleteManual-ManuelEvalComplet_eng.pdf

[10] International Blue-Ribbon Panel on SSHRC Peer Review System: https://www.sshrc-crsh.gc.ca/about-au_sujet/publications/peer-pairs_e.pdf

[11] SF DORA: https://sfdora.org/read/

These examples and many more like them are not just remarkable stories of individual collective genius. They are built on decades of investment in advanced infrastructure and equipment, hardworking teams of research assistants and students and universities which had fostered world-leading excellence in specific fields over many years of visionary support that has reached many institutions and communities.

To understand the vital contribution of research-intensive universities within Canada's research landscape, it's important to recognize that most of the Canadian Institutes of Health Research (CIHR) funding is directed to health researchers at the nation's 17 accredited medical schools, 14 of which are within U15 universities, along with their affiliated research hospitals. These entities play a vital role in driving significant health research advancements throughout the country, such as the University of Toronto's Toronto Academic Health Science Network (TAHSN).

TAHSN researchers have made significant strides, including the development of lab-created heart ventricles for therapy testing, long-lasting pain management hydrogels, and an AI platform for early diabetes prediction. These innovations have propelled TAHSN into the global top 3 health research centers, underscoring the pivotal role of research-intensive institutions in advancing Canada's leadership in health research and bolstering the vibrant life sciences sectors.[12]

An additional consideration that is essential for understanding the extent of Canada's diversified research landscape is the federal policy that typically requires that research funds be formally awarded to a single principal investigator for financial accountability purposes. This requirement distorts and minimizes the active engagement of other researchers and institutions, masking the true extent of collaboration and the distributed nature of research efforts across the country, often led by research-intensive universities.

In the 2022/2023 cycle, NSERC awarded 21,994 grants that involved 389 lead organizations and 5,413 co-applicants, along with a myriad of other collaborative partners. For example, the Common Ground Canada Network (CGCN) at Dalhousie University was awarded a $2 million SSHRC grant to enhance sustainable agriculture and food systems, aiding Canada's shift towards a net-zero economy. This grant that is formally administered at Dalhousie encompasses 49 academics from over twelve institutions and 22 non-profit organizations.

Such widespread participation in major research initiatives has expanded in recent decades as a result of specific federal efforts to increase Canada's research capacity at smaller institutions. For example, the Canada Research Chairs program was established in 2000 to boost Canada's position in the competitive global context while also building capacity at smaller institutions. The program provides a special allocation of 137 Chairs for institutions receiving 1% or less of the total funding from the three federal granting councils over the preceding three years. This flexible allocation, not restricted by research area, permits institutions to strategically utilize Chairs to increase their research capacity.[13]

Complementing this effort, the Research Support Fund (RSF) now awards over $450 million for cutting-edge laboratories, safeguarding research integrity, enhancing access to the latest knowledge resources, and bolstering research management. The allocation of RSF funds is based on a tiered model that considers average revenues from CIHR, NSERC, and SSHRC grants. One objective is to provide relatively greater support for institutions that have less success in federal funding competitions in order to bolster research

[12] TASHN Impact: https://gro.utoronto.ca/wp-content/uploads/2023/10/Shift-Health_TAHSN-Report_Dec2023.pdf
[13] CRC Special Allocation: https://www.chairs-chaires.gc.ca/program-programme/allocation-attribution-eng.aspx#:~:text=Tier%202%2C%20etc.-,Special%20Allocations,the%20year%20of%20the%20allocation.

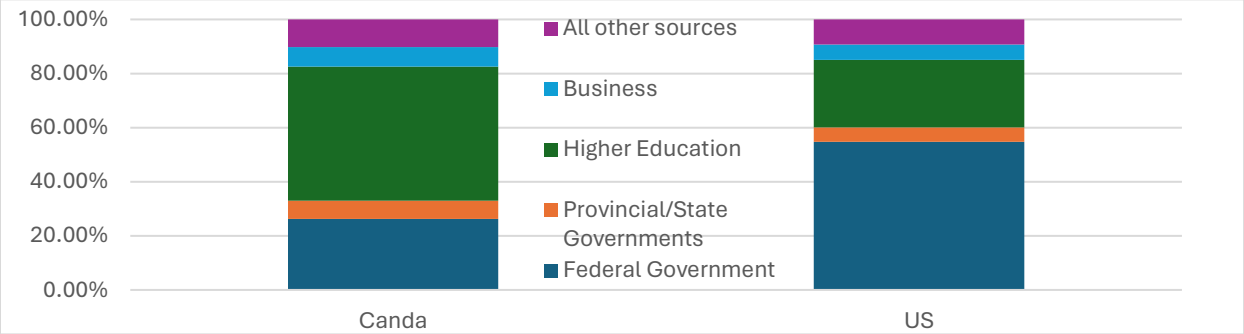
capacity at smaller colleges and universities at the expense of larger research-intensive universities. The RSF provides to institutions 80% funding for the first $100,000, 50% for the next $900,000, 40% for revenues up to $7 million, and variable rates for amounts exceeding $7 million.[14]

While the growth in targeted research support has led to increased funding success for applicants from a broader range of institutions in Canada, particularly in the social sciences—evidenced by the rise in SSHRC grant funding to non-U15 institutions from 33% in 2001 to 40% in 2022—this trend underscores a significant divergence in funding models between Canada and the United States.[15]

In contrast, US Federal Government funding amounted to 55% of total research funding across higher education, regardless of the size of institutions.[16] Overall, Canada's federal support amounts to only 26% of the funding for higher education research and development.

This discrepancy has forced increased reliance on institutional funds to support research and development activities in Canada, especially for salaries.

Figure 2: HERD Funding Share by Stakeholder Group (2021)

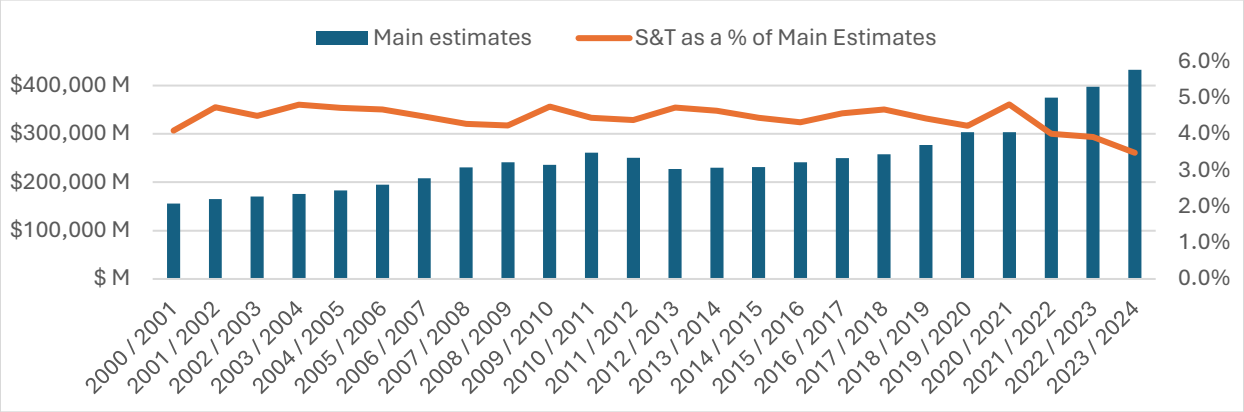


Unlike systems where federal grants significantly cover researcher salaries, this responsibility in Canada falls on the institution, exacerbating the financial burden and hindering the development of a more dynamic research environment.

For all institutions, however, the erosion of federal support for Canada's research enterprise is putting Canada's position at risk. With federal investment in science and technology reaching its lowest level in over two decades at only 3.5% of the federal budget in 2023/24, and a 15.5% drop in inflation-adjusted federal support for higher education research between 2020 and 2022, the need for a strategic pivot is evident.[17] [18] This situation contrasts sharply with peer nations like the United States, Japan, and the UK, which are significantly increasing their research investments, showcasing a global trend towards bolstering research and innovation as a central component of a high-growth strategy for economic sovereignty.

[14] Research Support Fund: https://www.rsf-fsr.gc.ca/apply-demande/calculations-eng.aspx
[15] CAUBO – Sponsored Research Income: https://www.caubo.ca/knowledge-centre/dashboards/data-dashboards/financial-dashboard/
[16] US HERD: https://ncses.nsf.gov/surveys/higher-education-research-development/2021#data: Canadian HERD: https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=2710027301. It should also be noted that specific agency initiatives seek to increase research capacity at smaller institutions such as NSERC's XXX and SSHRC's YYYYY.
[17] Federal Expenditures on S&T: https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=2710000501
[18] Federal Funding for Higher Ed. R&D: https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=2710027301

Figure 3: Federal S&T Investments as a Share of Governmental Expenditure Plan



The result is a constrained environment for Canada's research institutions, where researchers compete for limited funds, impeding the country's ability to engage fully in research and innovation and risking its position on the global stage.

Following an extensive review of the federal research support system, the federal government's advisory panel identified the impact of inflation and international competition on stagnant funding as a major challenge for Canada's research system, recommending an increase to the core budgets of the federal granting councils by 10% per year for five years. Even with the existing constraints within the research support system, the advisory panel found that Canada has notably achieved research success across various disciplines, highlighting how the granting councils have effectively fulfilled their fundamental goals of fostering knowledge creation and talent development.

For this reason and in line with the government's own advisory panel report, U15 Canada has recommended that the federal government increase the annual core granting budgets of the granting councils (SSHRC, NSERC, CIHR) and CFI by at least 10% per year for the next five years.[19] This investment would ensure that there are more robust funding opportunities accessible to all types of institutions.

Similarly**,** U15 Canada has recommended a 50% increase in the value of federally funded graduate scholarships, doctoral and post-doctoral fellowships, and a doubling of the number of these scholarships. Subsequently, the value of these awards should be adjusted for inflation. An increase in these vital supports for Canada's best research talent would enhance equity, diversity and inclusion while countering the ongoing decline in their value and availability. The result would help Canadian institutions of all types attract and retain highly qualified talent crucial for Canada's future success.

Concluding Remarks

Canada's research-intensive universities, including U15 Canada members, are foundational contributors to the pan-Canadian research and innovation ecosystem. These institutions not only cultivate academic excellence and robust collaboration but also act as vital connectors between academia, industry, and the international knowledge community. By facilitating the development of robust research networks across

[19] Bouchard Report: https://ised-isde.canada.ca/site/panel-federal-research-support/en/report-advisory-panel-federal-research-support-system

the country, they ensure Canada's prominent position in global innovation and research, while also enhancing domestic capacity.

In recent years, however, the entire ecosystem has been falling behind the global competition and thereby putting Canada at serious risk. Enhanced support opportunities from the federal government based on Canada's acclaimed expert review system would increase accessibility to research support for all deserving applicants, expand participation and maximize the effectiveness and impact of the country's research enterprise.

Recommendations

1. Maintain the principle of the independent expert review process for research grant applications, based on the established excellence and rigour of the federal granting councils.
2. Invest in the core funding budgets of the federal granting councils (SSHRC, NSERC, and CIHR) and CFI by at least 10% per year for five years, reflecting the recommendations of the Bouchard Report and making renewed research funding available to more researchers across institutions.
3. Increase federal funding for graduate scholarships, doctoral and post-doctoral fellowships by 50% and a doubling of the number of graduate scholarships, subsequently indexed for inflation, to support highly-qualified talent and respond to the declining value and accessibility.
4. Implement the governance advancements to the research support system proposed in the Bouchard Report to improve coordination of interdisciplinary international, and mission-driven research while avoiding unnecessary disruption to the research ecosystem.

Appendix: Leveraging Canada's World-Leading Research Hubs

From groundbreaking developments in the life sciences to the establishment of significant research centers like the world's first United Nations University (UNU) Hub focusing on water at the University of Calgary, research-intensive universities play an essential role in advancing Canadian research and innovation for the benefit of all.

A prime example of the U15 universities' catalyst position in Canada's research ecosystem is the Canada First Research Excellence Fund (CFREF). By fostering excellence, CFREF leverages the strengths of research-intensive universities to encourage wide-reaching collaborations and industry partnerships, enriching Canada's entire research and innovation landscape. In 2022, CFREF funded 11 projects, with six involving U15 institutions in partnership with 18 other entities, demonstrating their key role in cultivating robust research networks.[20]

The project "Transforming Climate Action: Addressing the Missing Ocean" serves as a standout illustration of how CFREF underpins significant research initiatives by leveraging institutional capabilities. This endeavor, led by Dalhousie University in collaboration with Memorial University of Newfoundland, Université du Québec à Rimouski, and Université Laval, showcases the strategic use of CFREF to foster world-leading research networks. This project focuses on the ocean's critical climate role, leveraging extensive collaborations with Indigenous communities, government, industry, and international partners.

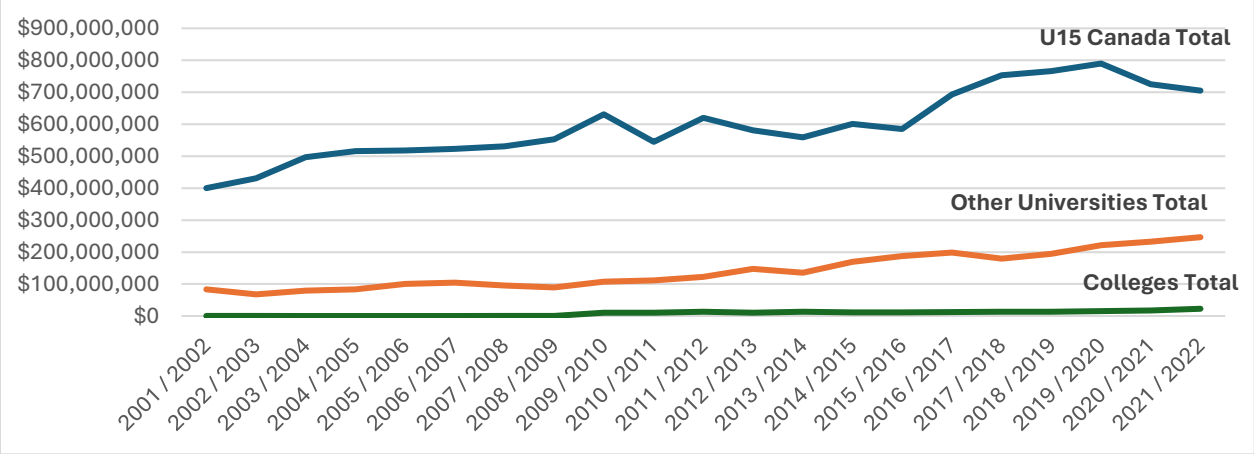
[20] Canada First Research Excellence Fund: https://www.cfref-apogee.gc.ca/results-resultats/index-eng.aspx

It aims to sharpen climate budget estimates, develop innovative climate mitigation strategies, and promote equity in ocean-climate-human nexus adaptation efforts.[21]

Similarly, strategic investments through the Canada Biomedical Research Fund and the Biosciences Research Infrastructure Fund are designed to bolster cross-sector partnerships and expedite the development of essential vaccines and treatments, thereby enhancing Canada's readiness for pandemics. In the inaugural round of the CBRF, five U15 Canada universities were designated as critical research hubs, coordinating a network of 225 partners to strengthen research, training, and infrastructural capabilities in health innovation. [22]

Moreover, U15 Canada members play a leading role in bridging the gap between academia and industry, facilitating the transfer of knowledge, technology, and talent crucial for innovation. In the 2021/2022 period, they attracted $783 million in grants and donations, representing 74% of the nearly $1.1 billion in industry-sponsored research income at higher education institutions, highlighting their indispensable contribution to the development of Canada's innovation ecosystem.[2324]

Figure 4: Industry Sponsored Research: Grant Income Across Higher Education



About U15 Canada

The U15 Group of Canadian Research Universities is a collective of Canada's leading research-intensive universities. Although each institution advances its own research and education mandate, U15 Canada works for the collective interest of all our members and the Canadian research ecosystem. We foster the development and delivery of long-term, sustainable higher education and research policy, in Canada and around the world, to the benefit of all Canadians.

[21] Transforming Climate Action: https://www.ofi.ca/programs/transform-climate-action
[22] CBRF Research Hubs: https://www.sshrc-crsh.gc.ca/funding-financement/cbrf-frbc/stage1-etape1/award_recipients-titulaires_subvention-eng.aspx
[23] CAUBO Industry Sponsored Research Income: https://www.caubo.ca/knowledge-centre/analytics-and-reports/fiuc-reports/#squelch-taas-accordion-shortcode-content-4
[24] Statistics Canada – College Sponsored Research Income: https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3710002801