U15 Canada

Developing Talent

Canada's Leading Research Universities and How We Close the Talent Gap

November 2024

Introduction

People are the cornerstone of an innovative and productive economy, now more than ever. Economic competitiveness increasingly relies on a country's ability to develop, attract, and retain highly qualified talent. As the global race for talent intensifies, countries are vying to secure the right people to drive innovation, boost productivity, and support R&D-intensive sectors like advanced manufacturing, healthcare, and clean energy.

In this changing world, Canada is falling behind. A talent gap is widening between Canada and other advanced economies. Without a strong pool of highly qualified talent, Canada is lagging in innovation and economic growth.

Canada's leading research universities are pivotal in closing this gap. They not only provide advanced education but also serve as hubs for hands-on collaboration with industry, healthcare providers, and innovators.

U15 universities develop the next generation of skilled professionals through graduate programs, research assistantships, and partnerships with industry, preparing highly qualified talent to lead in established and emerging fields. In doing so, U15 universities support Canada's innovation ecosystem and help bridge the country's talent and skills gap.

Prioritizing talent development, expanding graduate education, strengthening university-industry partnerships, and attracting global talent will help reverse Canada's current trajectory. Investing in highly skilled talent will empower Canadian firms to innovate, commercialize groundbreaking solutions, and position Canada as a leader in the global knowledge economy. By nurturing and attracting top talent, Canada can build a resilient and competitive innovation ecosystem that drives long-term prosperity on the world stage.

Talent as a Competitive Edge

The Global Talent Competitiveness Index predicts that global competition for talent will intensify over the coming decade, driven by domestic labour market pressures and a refocusing on domestic industrial strategies.[i] This trend is likely to result in a prolonged race for talent.

For instance, the U.S. has emphasized the urgent need for more STEM professionals to maintain its competitive edge in science, technology, and innovation. A 2022 U.S. Bureau of Labor Statistics report projects that an additional one million STEM professionals will be needed by 2030 to meet demand in sectors like technology, healthcare, and engineering.[ii] This is not unique to the U.S.; Japan's Ministry of Economy anticipates a shortfall of over 700,000 engineers by 2030, while the German Economic Institute reported a shortage of 320,000 STEM specialists as of April 2022.[iii] Similarly, in 2023, 46% of the 934,000 job vacancies in the UK were in STEM disciplines.[iv]

This growing demand for highly skilled STEM professionals is matched by the critical need for talent in the social sciences, humanities, and arts (SSHA), which complements technical expertise by addressing societal challenges and fostering innovation. In the UK, a 2023 report by the Higher Education Policy Institute revealed that eight of the ten fastest-growing sectors employ more SSHA graduates than those from other disciplines.[v] These graduates bring essential skills such as analytical thinking, effective communication, and cultural awareness,

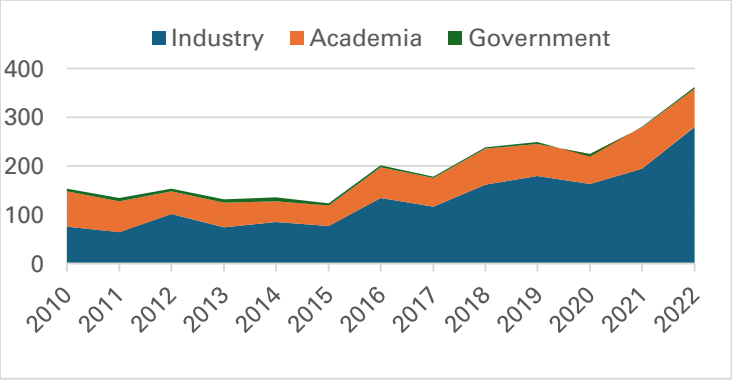
which are indispensable for navigating the complexities of a rapidly evolving global landscape. Together, STEM and SSHA talent drive innovation, economic growth, and the development of solutions to today's most pressing challenges. This is why the acronym STEAM (science, technology, engineering, art and math) has gained currency to express the inherent importance of people-centered initiatives across all sectors.

Ultimately, a highly educated workforce is essential for economic growth, as it drives innovation, enhances productivity, and supports the growth of new industries and more opportunities in fast-growing and R&D-intensive sectors from AI to battery manufacturing. According to the OECD, improving the quality of human capital, not just its quantity, could significantly boost productivity—a key hurdle for Canada's economic growth.[vi]

Globally, countries are positioning themselves to attract highly educated workers, as they fuel high-value innovation and strengthen economic competitiveness. In June 2024, a U.S. presidential candidate proposed granting green cards to graduates of U.S. universities to retain top talent, highlighting the growing global competition for highly educated workers.[vii] Given nearly 70% of U.S. triadic patent holders hold at least a master's degree, with 45% holding a PhD, MD, or equivalent, retaining more talent is clearly an increasing economic necessity.[viii]

These highly qualified individuals also foster entrepreneurship and innovation. For example, in Canada, a survey of 585 founders of Canadian tech startups found that 95.4% of founders hold a bachelor's degree, with 50.9% holding advanced degrees (46% of whom are PhDs).[ix] Similarly, 97% of unicorn startup founders hold at least a bachelor's degree, with 10% holding a PhD.[x] Canada has taken steps, such as AI initiatives, to strengthen its talent base and foster innovation in key sectors.

Figure 1: Sectoral Employment of New AI PhDs in the U.S. and Canada



The Pan-Canadian Artificial Intelligence Strategy, launched in 2017 in partnership with CIFAR, demonstrates how prioritizing talent can drive the development of key sectors.[xi] Phase one of the strategy focused on building a strong talent pool of researchers and students while establishing a robust AI ecosystem through national AI institutes. Building on this foundation, phase two expanded the strategy to drive AI adoption across Canada's economy and society, connecting world-class talent and research capacity with programs supporting commercialization, knowledge mobilization, and industry applications.

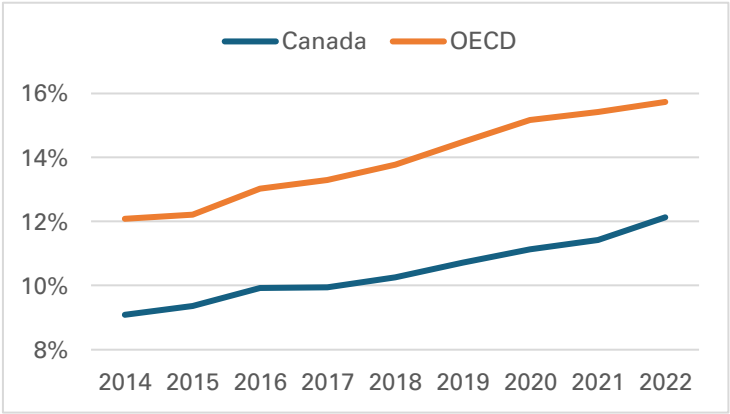
This talent pipeline is evident in the trend of AI PhDs increasingly moving to industry in both Canada and the U.S. In 2011, nearly equal shares of new AI PhDs entered industry (40.9%) and academia (41.6%). By 2022, however, 70.7% chose industry positions, with only 20% joining academia.[xii]

Make no mistake, Canada is in a fierce global competition for the best and brightest. While the focus on cultivating talent has positioned Canada among the top countries for AI talent concentration, skills penetration, private investment, and newly funded AI companies, we have yet to fully prioritize human capital development across a range of sectors that will be central to the economic success of leading countries over the coming decades.[xiii] Canada's broader talent landscape remains concerning, with critical shortages and gaps that undermine our ability to stay competitive on the world stage.

Canada's Talent Shortage: Navigating a Growing Talent Gap

Canada is often touted as one of the most educated countries globally, but Canada lags significantly in the proportion of individuals holding advanced degrees. We currently rank 27th among OECD countries and last in the G7 (excluding Japan), with only 12.1% of the Canadian population holding a Master's or Doctoral degree.[xiv] To reach just the OECD average of 15.7% (let alone more innovative economies like the U.S., UK and South Korea), Canada would need over 681,000 additional advanced graduates—a 41% increase from current totals.

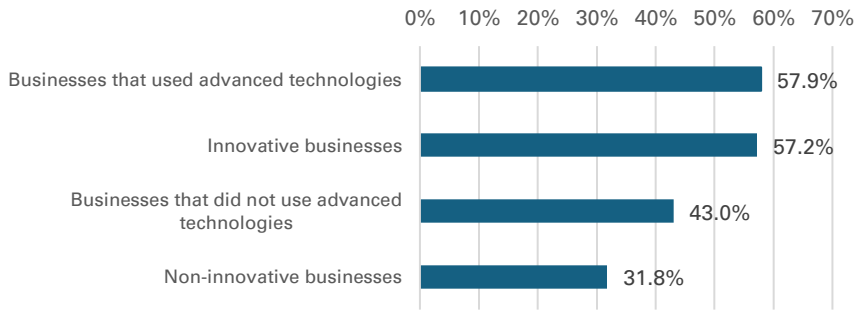
Figure 2: Share of Population, 25-64, with a Master's or Doctoral Degree/Equivalent (%)



Innovation heavily relies on this highly qualified, talented workforce to drive technological advancements, and without a sufficient pool of individuals to lead research and development, Canada will struggle to compete with the world's most innovative economies. This is especially evident in the business R&D sector, where Canadian businesses are desperately seeking talent. In 2022, 17,550 companies employed over 211,000 R&D personnel, with 68% of the $30.4 billion spent on in-house business R&D allocated to wages—underscoring the high demand for talent.[xv]

However, Canadian industry, especially SMEs, often lacks the R&D expertise critical for technological advancement and adoption. This skills gap was reported as the top barrier to innovation experienced by businesses in Canada in 2019 and 2022 (excluding impacts from COVID-19), with innovative businesses and advanced technology users facing greater talent shortages.[xvi] As a result, Canadian companies, particularly in high-growth sectors, are struggling to

Figure 3: Percentage of Canadian Businesses Experiencing a Talent Shortage (2022)



fill critical roles, which hampers their ability to innovate, scale, and compete globally. Canada's investments into R&D are relatively low, sitting at just 1.71% of GDP compared to the OECD average of 2.73%. Successive governments' efforts to address this have been hindered by this shortage of the people we need to innovate.[xvii]

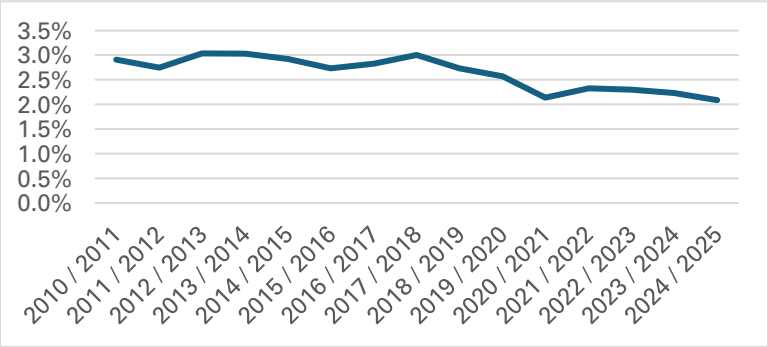
This continuing shortage of highly skilled talent is not only impacting businesses today but is projected to intensify over the next five years. The World Economic Forum's 2023 Future of Jobs Report predicts further declines in talent availability, development, and retention in Canada.[xviii] By 2023, Canada dropped from 5th to 10th in the OECD for attracting highly educated workers, placing the economic growth and industry innovation at risk.[xix]

Canada's ongoing underinvestment in R&D and talent development has weakened its ability to expand an innovative talent pipeline and therefore to enable innovation initiatives in the private and public sectors. The federal government supports talent development primarily through funding from the three granting councils—providing both direct scholarships and indirect research support to many trainees and early-career researchers. In 2020-2021, the granting councils supported over 75,000 graduate students—approximately one-third of Canada's graduate population—mainly through assistantships tied to research grants.[xx]

However, years of federal underinvestment in these core supports are restricting the capacity to build the future workforce Canada needs to stay competitive. For example, critical support levels for the Canada Graduate Scholarship remained stagnant for two decades before recent Budget 2024 top-ups, seriously damaging the ability of research universities to recruit and retain highly qualified talent and shutting off the opportunities for personal advancement offered by an advanced education.

Prior to the investments in Budget 2024, federal funding for R&D had sharply declined—dropping by over 15% between 2020 and 2022 (adjusted for inflation) and declining as a share of government expenditures to the lowest levels since 2010.[xxi]

Figure 4: Government R&D Expenditures as a Share of Main Estimates (%)



In this context, recent immigration policy changes have further reduced Canada's talent pipeline. While understandably addressing concerns about unchecked growth in certain institutions, alarmingly these policy changes have also undermined the ability of research universities to attract the world's best talent. These universities have responsibly managed international enrollment, maintaining high standards for admission and then providing wrap-around support including housing services. For these reasons, immigration policies should support responsible growth—not further restrict entry—so that Canada remains competitive in the race for top talent. Encouraging the responsible attraction of global top talent is strategic, as over 50% of international master's and doctoral students become landed immigrants within 10 years.[xxii]

Expanding the pipeline of highly qualified talent is crucial therefore for individual advancement and prosperity as well as for enhancing Canada's productivity, global competitiveness and industrial innovation. To achieve this, Canada must prioritize the training and deployment of a world-class R&D talent pool rooted in excellence.

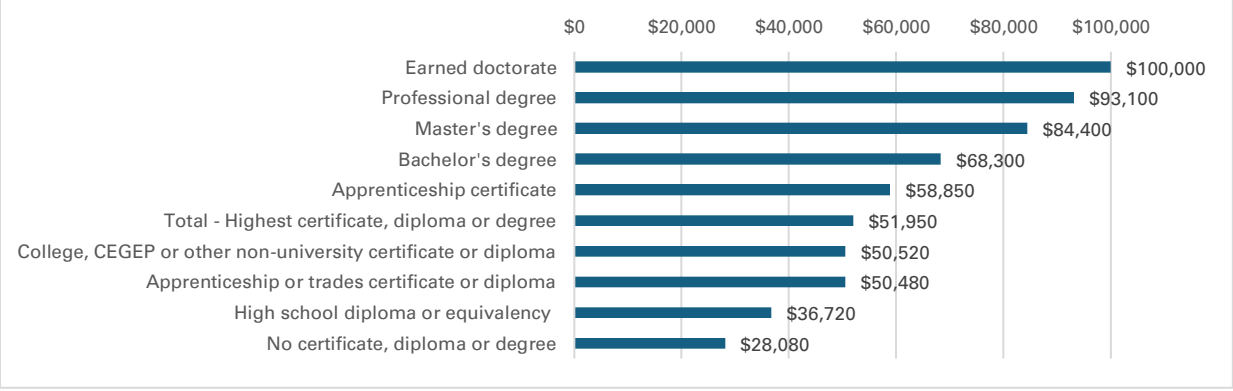
The Role of Leading Research Universities

Canada's leading research universities are uniquely positioned to help meet this need by providing advanced education and hands-on research training to highly qualified talent. Under mentorship of top-class researchers, graduate students engage in cutting-edge projects in an extensive range of fields, many of which will be critical to future growth and innovation, like AI, engineering, and biomedical science. The research experience, technical expertise, and broad-based skills developed at leading research universities is providing a talent pipeline with the ability to drive economic growth, offer solutions to industry and address pressing societal challenges.

These experiences prepare individuals to lead in innovative fields, often resulting in the development of technologies or founding of companies like the University of British Columbia spinouts, which have raised over $3 billion in the last two decades.[xxiii] Alternatively, many PhD graduates, such as those tracked by the University of Toronto, go on to bolster industrial R&D, with 65% of the 4,000 PhDs working in the private sector remaining in Canada and many working in biotechnology and pharmaceuticals (27%), engineering and computer technology (13%), and information technology (9%).[xxiv]

Advanced degrees also boost individual economic outcomes: the average employment income for Canadians with a master's degree is $84,400, rising to $100,000 for doctoral graduates, compared to the national average of $52,000.[xxv] Graduate degree holders consistently enjoy the highest employment and lowest unemployment rates in the country, underscoring the economic value of advanced education and the potential for social mobility and individual prosperity.[xxvi]

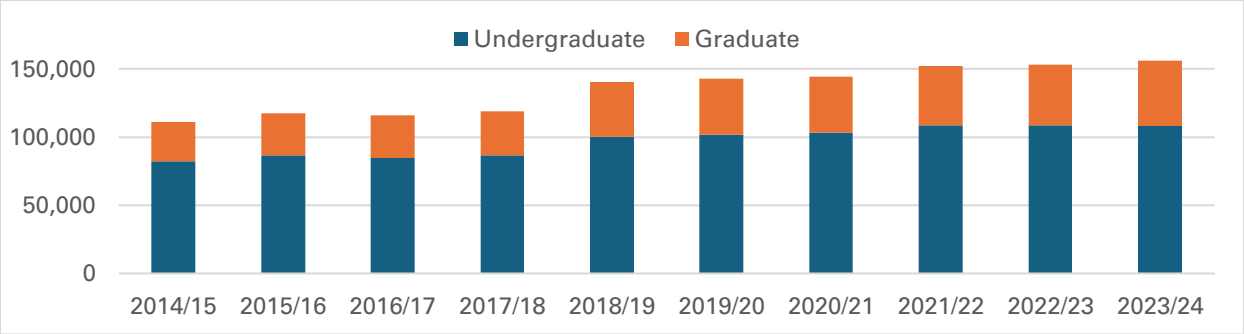
Figure 5: Average Earnings in Canada by Highest Level of Education (2020)



U15 universities provide world-class education and serve as essential talent hubs for research and innovation. In 2023/24, U15 universities enrolled over 687,000 students, including 138,000 graduate students, representing nearly 60% of Canada's total graduate enrollments. These students are pursuing research in critical areas across all disciplines. U15 universities also

graduated over 156,000 individuals, including 48,000 graduate students—an increase of approximately 66% since 2014/15—demonstrating these institutions' capacity to help meet Canada's growing demand for highly qualified talent.[xxvii]

Figure 6: U15 Canada Graduates by Level and Year



In addition to developing highly qualified Canadian talent, leading research universities play a crucial role in attracting and retaining top global talent. U15 universities employ nearly 50% of Canada's full-time university faculty. Among these, U15 Canada institutions host over 77% of Canada Excellence Research Chairs that attract world-renowned researchers to lead ambitious research programs, further reinforcing Canada's reputation as a global education and research destination.[xxviii]

Setting Priorities: Expanding Canada's Innovative Talent Pool

Canada must act to close the growing talent gap and secure highly qualified talent in Canada if we hope to strengthen our innovation capacity and realize robust economic growth. Leading research universities can play a pivotal role in expanding the pool of highly qualified talent needed to drive economic growth and maintain global competitiveness. We are ready to work with any government to realize the potential of the next generation of talent and maintain a vibrant pipeline of Canadian innovators. The following outline how leading research universities can be further leveraged to contribute effectively to address Canada's evolving talent needs:

- **Support Graduate Education through Research Investments**: Canada's leading research universities play a pivotal role in equipping students with the advanced skills necessary to thrive and innovate in both emerging fields such as AI, quantum technologies, and biopharmaceuticals, as well as existing sectors like agriculture, manufacturing, and natural resource industries. Building on existing strengths in research and training, there is an opportunity to further incentivize and support students in pursuing advanced education. While Budget 2024's investments in direct scholarships and indirect research grants are important steps forward, closing the talent gap and turning it into a "Talent Advantage" will require building on these investments to sustain and expand Canada's capacity to develop the next generation of talent—those who will lead breakthroughs, develop transformative technologies, and launch the innovative companies of tomorrow.

- **Rebuild Canada's International Reputation by Attracting and Retaining Global Talent:** Canada's leading research universities are central to attracting top international talent, which is essential to meeting critical talent needs across key industries. To address shortages, Canada must prioritize the recruitment and retention of highly qualified international graduate students. Recent policy changes that cap or restrict enrollment risk undermining Canada's reputation as a welcoming destination for excellence. Rebuilding a managed talent pipeline that emphasizes attracting the best and brightest, while reassuring international students that they are valued, will be crucial to restoring Canada's standing in the global race for talent.
- **Foster University-Industry Collaboration to Bridge Talent Gaps:** Expanding partnerships between universities and industry is critical to addressing the growing talent shortages faced by Canadian businesses. With Canadian companies already investing close to $1.2 billion in sponsored research at universities, there is a strong foundation to build on. By supercharging these connections—particularly with small and medium-sized enterprises—leading research universities can help businesses gain access to the top talent they need to innovate and grow. Strengthening these collaborations will enable Canadian companies to overcome skill shortages, adopt advanced technologies, and maintain a competitive edge, ultimately contributing to a robust, innovative economy.

In the end, it will be people—our innovators, researchers, and highly skilled graduates—who drive Canada's future economic prosperity. By fostering and investing in top talent, Canada can secure its place as a global leader in innovation, driving prosperity and resilience for decades to come.

End Notes

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