Submission to the Standing Committee on Science and Research

Study on Innovation and Scientific Research Concerning Artificial Intelligence

Submitted by U15 Canada

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Summary of Recommendations

To strengthen Canada's AI ecosystem and preserve Canada's global leadership in responsible, advanced AI, U15 Canada recommends that Phase 3 of the Pan-Canadian AI Strategy should continue to advance the foundational principles that built Canada's early success and:

1. **Scale and Connect Canada's Leading Hubs of Excellence.** Establish a coherent national architecture that connects AI research, talent development, compute, data, commercialization, and adoption. Concentrate investments in centres of critical mass while linking them through national infrastructure, data networks, DRAC, CANARIE, AI institutes, universities, industry, and regional partners.

2. **Mobilize AI for Advanced Industries, Mission-Critical Sectors, and National Prosperity.** Deploy Canada's AI research capabilities strategically across sectors where Canada can build or sustain global advantage—such as energy, agriculture, advanced manufacturing, health, and dual-use applications.

3. **Accelerate Commercialization and Protect Canadian Intellectual Property.** Expand partnerships and pathways between universities and industry to translate AI research into companies, technologies, and applications anchored in Canada.

Introduction

U15 Canada appreciates the opportunity to provide input to the committee's important study on artificial intelligence and welcomes the committee's attention to the needs and challenges of research universities as part of the study. This comes at an important moment for Canada. As the federal government engages with the research community through the AI Strategy Task Force on the development of Phase 3 of the Pan-Canadian AI Strategy, now is the moment to build on Canada's deep research excellence, expand its pipeline of highly qualified talent, and strengthen the innovation ecosystems that enable discovery, deployment, and commercialization—areas where Canada's leading research universities play an indispensable role.

Artificial intelligence represents one of the most significant technological transformations of our lifetimes. The OECD estimates that widespread AI adoption could raise productivity growth by 1.1% annually over the next decade, reshaping every sector of the economy and driving new sources of social and economic value. To succeed through this transformation and to remain internationally competitive, Canada's leading research universities can play a crucial role in driving innovation, supporting the adoption of AI tools by Canadian industry and developing talent trained in the responsible, ethical and appropriate use of AI.

Across the country, leading research universities anchor Canada's most advanced AI research and talent development capacity. These institutions serve as engines of discovery and innovation—producing tens of thousands of publications, filing more than 18,000 invention disclosures and 11,000 patent applications, and launching over 1,100 research-based startups since 2010, including nearly 120 in 2023 alone. At the same time, universities are training the next generation of AI professionals, supporting commercialization through industry partnerships, and working closely with government and civil society to ensure that AI is developed and deployed responsibly.

Canada's early global leadership in AI was built in university labs. The pioneering research of Yoshua Bengio, Geoffrey Hinton, and Richard Sutton—supported by federal funding and anchored in strong university research environments—laid the scientific foundations for modern machine learning and positioned Canada as a world leader in neural networks and reinforcement learning. Federal investments through phases one and two of the Pan-Canadian AI Strategy accelerated this momentum, enabling research universities to develop and attract top global talent, scale training programs, and strengthen Canada's three national AI institutes.

Together, these efforts established a strong foundation for Canadian leadership. The next phase represents a defining opportunity to move to coordinated national impact—ensuring that advances in AI translate into productivity growth, public-sector capacity, social well-being, and resilient sovereign capability. Leading research universities will be central to that transition.

Research and Talent: The Foundation of Canada's AI Leadership

Canada's leadership in artificial intelligence has been driven by internationally recognized research excellence and the talent fostered at Canada's leading research universities. The Pan-Canadian Artificial Intelligence Strategy, launched in 2017 with CIFAR, demonstrated how prioritizing people—researchers, trainees, and interdisciplinary teams—can build national strength in a critical sector. Through sustained federal investment, the national AI institutes (Mila, Amii, Vector) and Canada's leading research universities have attracted world-class faculty, created globally

competitive graduate programs, and established training environments that now anchor one of the strongest AI talent pipelines in the world.

Canada's AI talent pipeline at our leading research universities now anchors one of the strongest concentrations of AI expertise in the world. Over the past five years, Canada's AI talent pool has expanded rapidly—growing at an annual rate of 38%—and the country now ranks third globally in AI talent concentration. Canada is also home to 10% of the world's top tier AI researchers (top 0.5% by impact), the majority embedded within university-based research institutes. These researchers create the advanced training environments that produce thousands of highly qualified talent each year and underpin Canada's wider innovation economy.

Figure 1: Sectoral Employment of New AI PhDs in the U.S. and Canada
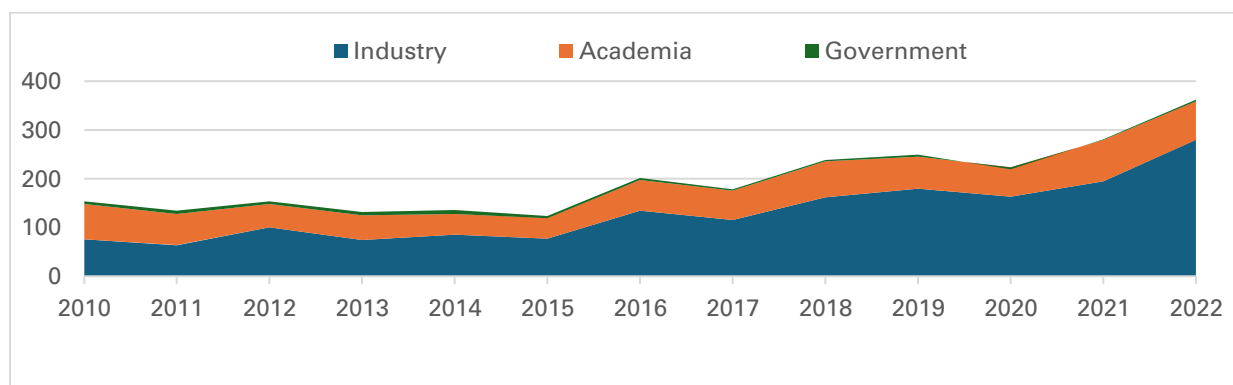
Moreover, the majority of new AI PhDs now enter industry—rising from 40.9% in 2011 to 70.7% in 2022—reflecting both intense demand and the central role leading research universities play in supplying the highly qualified talent that starts companies, drives adoption of AI technologies, and develops new applications across sectors. Retention is strong: for example, 92% of graduates from Vector-recognized AI master's programs remain in Ontario, and similar patterns exist at Mila and Amii, demonstrating that federal investments in talent translate directly into a long-term labour market to grow the Canadian economy and provide industry with the expertise they need.

Yet demand continues to outpace supply. Canadian industry—especially SMEs—reports the lack of talent as the top barrier to innovation and advance technology adoption. This talent gap contributes to slower AI adoption—although 97% of SMEs using AI report efficiency gains, only 6.1% of Canadian firms use AI, citing high costs, difficulty recruiting skilled workers, and integration challenges. Leading research universities are helping bridge these gaps through applied collaborations and commercialization supports—such as Mila, Amii, and Vector's FastLane programs—which help firms access expertise, de-risk adoption, and integrate AI into their operations.

Figure 2: Percentage of Canadian Businesses Experiencing a Talent Shortage (2022)
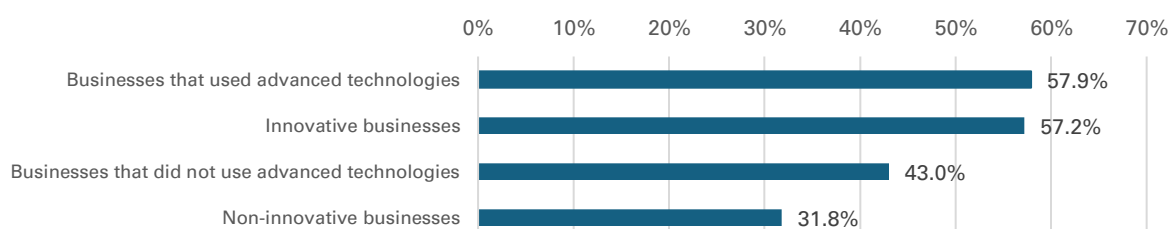
Federal research support remains essential to maintaining this pipeline of highly qualified talent. More than 75,000 graduate students—one-third of all graduate students in Canada—are supported annually through the granting councils, and these research environments are where the next generation of AI talent is trained. As global competition intensifies, Canada's leading research universities remain one of the country's most effective assets. They anchor the research chairs, national AI institutes, advanced computing infrastructure, and interdisciplinary partnerships that collectively sustain Canada's AI advantage.

Continued investment in research-based training is critical to ensure Canada can produce new discoveries while developing the talent needed to drive innovation, productivity, and responsible AI development across society.

Responsible Integration and Adoption of AI Tools in Higher Education

U15 universities are developing talent with advanced research skills in AI and experience applying AI tools across other research fields. This excellence in research and teaching will help position Canada with the talent pipe for success in future economic opportunities.

At the same time, our universities are ensuring that this talent is trained in a manner that upholds the responsible use of AI in teaching and learning. The widespread adoption of generative AI tools presents potentially significant benefits to further enhance teaching and learning in academic education and beyond. However, these tools also raise ethical and practical challenges including transparency, accuracy and integrity.

U15 universities are helping to lead in developing guidance and support for students and teachers to adopt to the impact of these technologies in the classroom. In 2024, U15 Canada published Navigating AI in Teaching and Learning: Values, Principles and Leading Practices, which establishes values, principles and best practices to assist academics, teachers and students in the responsible, ethical and appropriate use of AI.

In addition, many U15 universities have crafted statements of position, established advisory groups to assess the current state and future directions, and developed guidance and support resources, for both faculty and students, within their own institution. This work reflects existing principles adopted by the Government of Canada on the use of generative AI and the continued evolution in best practices across our institutions. U15 Canada remains committed to advancing the highest standards within research universities for the use of AI in teaching and learning.

Foundational Principles for a Renewed AI Strategy

Canada's AI research and talent pipeline is an important foundation, but realizing its full potential will require a coordinated national strategy that connects research, talent development, compute, commercialization, and adoption. The principles that follow set out the core elements needed for a successful and coherent Phase 3 of the national AI strategy.

1. **Recognize and Fund Excellence at Scale:** Canada's early successes in AI were built on a foundation of scientific excellence supported through long-term federal and provincial investments. The strategy should continue to prioritize excellence as a guiding principle, and at scale—expanding the talent pipelines, institutional capacity, and partnerships that deliver world-class research and innovation.

2. **Scale Canada's Hubs of Excellence into a Nationally Integrated Network.** Canada must concentrate investment in centres of critical mass while ensuring they are connected through national infrastructure, data networks, talent pipelines, and industry partnerships. A coordinated system of hubs—linked across leading research universities, national AI institutes, DRAC, CANARIE, and regional innovation ecosystems—will reduce duplication, amplify strengths, and accelerate commercialization and adoption.

3. **Mobilize AI for Advanced Industries and Mission-Critical Sectors.** AI is a strategic enabler of productivity, competitiveness, and innovation across Canada's advanced industries. Phase 3 should focus on deploying AI to areas where Canada can build or strengthen global advantage—such as mining, energy, agriculture, transportation, advanced manufacturing, health, climate resilience, and dual-use defence applications. Connecting leading AI research capabilities with domain expertise will accelerate discovery, drive adoption, and expand problem-solving capacity across the economy.

4. **Accelerate Commercialization and Protect Canadian Intellectual Property.** Canada's economic success depends on the ability to translate research into companies, technologies, and applications that remain anchored here. Phase 3 should expand university–industry pathways, proof-of-concept and scale-up mechanisms, and access to market-relevant datasets and testing environments. Strengthening national IP frameworks will help Canada capture the full value of publicly funded AI innovation.

5. **Build a Coherent National Architecture for Compute, Data, and Governance.** Canada requires an integrated backbone that links sovereign compute capacity, secure and interoperable data infrastructure, and coordinated governance frameworks. This architecture should connect higher education, national digital research organizations, AI institutes, government, and industry to ensure predictable access to compute and high-quality data, harmonized data governance, and a federated system capable of competing internationally.

Conclusion

Canada's leading research universities were central to building the country's early AI advantage, and they will be essential to expanding national capabilities in the years ahead. Federal investments in fundamental and applied research—delivered through federal granting councils, the national AI institutes, and major research infrastructure programs—have been the catalyst for Canada's AI success. Continued federal commitment to research excellence is the enabling condition for discovery, talent development, commercialization, and responsible AI deployment.

Canada enters this next phase from a position of strength, but several challenges must be addressed to sustain and scale its leadership. Fragmented coordination, limited sovereign compute and data infrastructure, intensifying global competition for talent, and gaps in commercialization and data governance all constrain Canada's ability to compete globally. By amplifying strengths and addressing barriers through a coherent and coordinated strategy, we can strengthen our position as a trusted global leader in AI research and innovation. U15 Canada is ready to work as a partner with government to realize this ambition.

About U15 Canada

U15 Canada is an association of fifteen leading research universities across Canada. U15 Canada works to optimize research and innovation policies and programs that advance knowledge, develop highly qualified leaders for all sectors, and mobilize knowledge for the benefit of all Canadians.