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TORONTO'S AI ADVANTAGE: INTENSIVE RESEARCH HUB OR DYNAMIC INNOVATION CLUSTER?

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Executive Summary

This report provides the first comprehensive analysis of the current state of Toronto's artificial intelligence cluster. Drawing on an original set of interviews with founders, venture capitalists, researchers, institutional leaders, and government officials—as well as quantitative data on investment, patents, labour markets, and firm formation—it analyses the forces underlying the cluster's emergence and growth, assesses its current strengths and vulnerabilities, and offers policy recommendations to sustain its trajectory. The central question the report poses is whether Toronto's AI cluster is functioning primarily as an intensive research hub or whether it has the institutional and market conditions needed to evolve into a fully dynamic innovation cluster capable of generating, retaining, and scaling globally competitive firms.

Origins and Institutional Foundations

Toronto's AI cluster did not emerge in a vacuum. It grew out of the broader maturation of the region's ICT cluster, which evolved from a base of multinational enterprise branch plants in hardware and sales offices into a more dynamic ecosystem of domestically founded start-ups and scale-ups, supported by cloud computing, mobile applications, and a profusion of incubators, accelerators, and networking organisations such as TechToronto and the Creative Destruction Lab (CDL). The pattern of development of this earlier ICT cluster is critical for understanding the conditions that enabled AI to emerge as a distinct and globally competitive specialisation within the Toronto region.

The AI cluster itself is rooted in a decades-long investment in foundational research, catalysed by three critical institutions: the University of Toronto, the Canadian Institute for Advanced Research (CIFAR), and the Natural Sciences and Engineering Research Council of Canada (NSERC). CIFAR's willingness to fund the then-unfashionable field of neural networks from 1983 onward, and particularly its support for Geoffrey Hinton's research through the Neural Computation and Adaptive Perception (NCAP) programme from 2004, created the scientific base from which modern deep learning emerged. The NCAP Summer School, launched in 2005, has trained over 2,700 alumni globally, and the programme's members include many of the field's most prominent figures. Hinton's foundational work at the University of Toronto, alongside

collaborators and students who went on to found or lead major global AI companies established Toronto's reputation as the birthplace of modern AI research in deep learning.

The launch of the Pan-Canadian AI Strategy in 2017 and the founding of the Vector Institute marked a second institutional phase. Vector was financed through a partnership between the federal and Ontario governments, the University of Toronto, and over 30 industry sponsors with a total investment of $200 million over three successive rounds. It operates as a talent pipeline and quality filter, supporting over 960 researchers and offering programmes that bridge academic training and industry application, including 28 AI-focused master's programmes across Ontario. Together, the University of Toronto and the Vector Institute constitute the research node of the cluster, driving knowledge circulation, talent development, and firm attraction. Their complementary relationship— with the University of Toronto providing foundational research capacity and Vector accelerating applied research and industry engagement—has proven more impactful than either institution could achieve independently.

Current State of the Cluster

Quantitative indicators confirm Toronto's position as Canada's preeminent AI cluster and one of the most significant globally. Toronto ranks 12th in the world for AI ecosystems (StartupBlink 2024), 3rd globally for tech talent (CBRE 2025), and is home to North America's fourth-largest AI talent pool of nearly 24,000 workers. The city accounts for the highest proportion of AI start-ups in Canada and over 30 per cent of all Canadian AI-related patents. Investment in the cluster reached nearly $2 billion in 2024, with the average deal size increasing, underscored by landmark funding rounds from Cohere and Waabi. Demand for AI skills in the Toronto labour market is double the national average, and the city is one of only six Canadian metropolitan areas where demand for AI skills substantially exceeds the national baseline.

Research, talent, and interdisciplinary strength. The University of Toronto remains the foundational anchor of the cluster. Its interdisciplinary research strengths extend well beyond computer science into health (through proximity to major research hospitals in the Toronto Academic Health Sciences Network), materials science (through the Acceleration Consortium's "self-driving labs"), and AI safety and ethics (through the Schwartz Reisman Institute). The Vector

Institute operates as a talent pipeline and quality filter, supporting over 700 researchers and offering programmes that bridge academic training and industry application, including 28 AI-focused master's programmes across Ontario. Toronto's talent pool is characterised by depth across career stages, global circulation rather than brain drain, and a culture of loyalty and mission-driven work that distinguishes it from the high-turnover environment of Silicon Valley. However, some interviewees expressed concern about the future visibility of globally recognised AI researchers in the post-Hinton era, warning that without a continued pipeline of prominent academic leaders, the cluster's ability to attract the next generation of students, researchers, and entrepreneurs is at risk.

Diversity as a competitive asset. Toronto's demographic, disciplinary, and cognitive diversity was consistently identified as a core competitive strength. Interviewees described the city's openness and multiculturalism as critical factors in assembling global research teams, attracting talent who prefer an inclusive environment, and supporting AI models—particularly in health—that reflect diverse global populations. This advantage is amplified by current political conditions in other countries, which are prompting some highly skilled individuals to seek alternatives. Multiple interviewees emphasised that Toronto's diversity should be more deliberately leveraged in its global branding to attract talent, firms, and investment.

Sectoral strengths. The report identifies financial services and life sciences as two sectors where Toronto's AI cluster has depth. Major banks—including RBC and TD—have invested heavily in in-house AI capabilities, with RBC's Borealis Institute deploying a 550-person AI team and TD's Layer 6 growing from 15 to over 200 employees since acquisition, increasing TD's patent portfolio by 110 per cent. In healthcare, the proximity of the University of Toronto to major research hospitals, combined with Canada's universal healthcare system and ethnically diverse patient populations, creates exceptional potential for AI-driven health innovation. The report also profiles the growth of scaling firms such as Cohere, Waabi, and Blue J Legal, and emerging ventures including Xatoms and Ideogram, as evidence of a maturing entrepreneurial base anchored in the University of Toronto's research environment.

Entrepreneurial ecosystem and compute access. The cluster benefits from a dense network of entrepreneurial support organisations, including Vector's FastLane program for early-stage firms, the Creative Destruction Lab, AXL Venture Studio, and MaRS, which provide stage-appropriate support from early technical translation through to market validation and investor engagement. On compute access, the report presents a nuanced picture: early-stage firms and researchers rely on a mix of ecosystem-based GPU clusters, academic infrastructure, and cloud credits; scaling companies transition toward commercial cloud providers and private GPU markets; and the largest actors face the full infrastructural challenges of in-house compute. The core policy challenge is not just increasing aggregate supply but ensuring continuity across these layers so that firms can scale from subsidised access to sustained infrastructure without exiting the Canadian ecosystem. Ontario's hydroelectric grid and leadership in small modular nuclear reactors were highlighted as strategic energy assets for supporting future high-compute AI growth.

Key Challenges

Despite these strengths, the report identifies a key paradox: Toronto excels at producing talent and generating ideas but has proved less successful at converting these assets into domestically anchored, globally competitive firms. The binding constraint is not just the availability of capital but the absence of sufficient domestic demand. Canada's oligopolistic market structure dampens the competitive pressure that drives early adoption of new technologies, and risk aversion among large institutional buyers—compounded by fragmented data governance and regulatory caution—means that many of the most promising companies created in Toronto seek their first customers, and eventually their headquarters, abroad. This dynamic sets up a feedback loop: without domestic validation, firms lack credibility in international markets; without credible scale-ups, the ecosystem cannot retain the senior talent and investment it needs to mature.

Additional challenges include a shortage of mid-to-senior level talent, which forces scaling firms to recruit from the United States; a compensation structure that lags global competitors, with Canadian banks resisting pay parity for AI talent despite offering comparable salaries to investment bankers; and unresolved questions about computing infrastructure at scale. Access to

regulated, high-value data—particularly health data—remains a significant barrier, with Ontario's centralised health records underutilised. Most critically, the report finds that Toronto cluster lacks a cluster coordinating organization. The city possesses a remarkable density of accelerators, research institutes, hospitals, government agencies, and investor networks, but no central cluster management organisation (CMO) exists to align their strategies, link demand from industry with supply from research and start-ups or raise the profile of the ecosystem globally. Governance remains largely voluntary and relationship-based, creating strategic ambiguity for founders and established firms navigating the landscape.

Policy Recommendations

The report advances four interdependent recommendations designed to address the structural constraints identified across the interviews and quantitative analysis.

1. **A Toronto AI Procurement Compact.** The single most consistent finding of the study is that domestic demand is the binding constraint on ecosystem growth. A multi-sector AI Procurement Compact would bring together major financial institutions, hospitals and health networks, government agencies, and large employers around a shared commitment to procure and pilot Canadian-built AI, thereby addressing the credibility gap that currently pushes firms to seek first customers outside Canada. The Compact should be coordinated with existing federal instruments—SR&ED, IRAP, and the new AI strategy—to ensure that procurement incentives align with and reinforce R&D supports already available to SMEs.
2. **Recommendation II: A Coordinated Toronto AI Cluster Management Organisation.** A dedicated CMO—an AI 'Hub'—would function as an integrative framework linking five elements: talent development, procurement (through the Compact), governance expertise, professional services, and data access. It would provide the connective tissue that the ecosystem lacks, creating a single, accessible pathway from research commercialisation through to firm scaling. None of the key organisations involved in the cluster can perform this role under their current mandates.

3. **A Regional Data Access Strategy.** A coordinated strategy for regulated, high-value data—health data in particular—would create clear pathways for unlocking the commercial potential of Ontario's rich datasets while maintaining robust privacy protections. The strategy should embed Canadian values of trust and public purpose, positioning responsible data governance not as a constraint on innovation but as a competitive differentiator in global markets. Parallel attention to compute access can ensure that improved data access translates into firm growth within the Canadian system.

4. **A Talent Circulation and Retention Framework.** Policy should embrace the model of global talent circulation—rather than pursuing permanent retention as an end—while addressing persistent gaps through continued investment in immigration pathways such as the Global Talent Stream, targeted incentives to reduce the effective cost of retaining senior talent domestically, expanded programmes bridging academic training and industry roles, and sustained investment in foundational research and academic leadership to anchor the next generation of researchers in Toronto.

Collectively, these recommendations address the tension at the heart of Toronto's AI cluster: the region has built one of the world's most productive AI talent ecosystems but lacks the institutional architecture needed to retain the economic value that the cluster generates. Their value lies in their intersection—as a coordinated programme that moves the region from producing ideas to scaling them, from exporting talent to circulating it, and from fragmented institutional strength to a legible, globally competitive AI cluster.

1. Introduction

Artificial intelligence is recognized as an emerging technology field in which Canada is well positioned to excel, due to the foundational role of Canadian researchers in developing large language model (LLM) technology. Over the past two decades, supported the federal government's Pan-Canadian AI Strategy, the Vector Institute in Toronto, jointly with the University of Toronto (U of T), Toronto has come to be viewed as one of the top AI research clusters in the world. Its global status is rooted in a dense concentration of talent, research breakthroughs and a culture shaped by Canadian values of trust and public purpose (Gul 2025). However, the pace of AI development has accelerated dramatically since 2023 with observers suggesting that the current generation of LLMs is increasing computational capabilities and workplace transformation at a faster pace than was anticipated (Wang 2025). According to the recently released national AI strategy, the global AI market is projected to be valued at $4.8 trillion USD by 2033 (ISED 2026b).

The current acceleration of LLM development places Toronto's AI cluster at a pivotal moment. A generation of homegrown AI researchers, entrepreneurs, and venture capitalists is ready to scale the Toronto AI cluster to its next level of development. Given the Toronto cluster's current state and its degree of global recognition, the implications of its future trajectory extend beyond the Greater Toronto region to Canada as a whole. An analysis of the full potential of the AI cluster and what is needed to realize that potential requires a detailed understanding of the forces that have driven its growth to date and the obstacles to be surmounted. This report examines the dynamics that have sustained the region as a global AI cluster and offers insights into what is needed to achieve its full potential. Building on previous research on cluster dynamics across Canada (Wolfe 2009, Spencer et al. 2009), we offer the first comprehensive analysis of the current state of Toronto's AI cluster.

1.1 Cluster Dynamics in Urban and Regional Economies

Since the pathbreaking work of the 1990s, cluster policy has emerged as a key instrument in the innovation policy mix. A growing body of research documents the numerous ways in which clusters generate positive benefits for their constituent firms and the regional and local economies in which they are embedded. Michael Porter defines clusters as "geographic concentrations of

interconnected companies, specialized suppliers, service providers, in related industries, and associated institutions (for example, trade associations, universities, standards agencies) in a particular field that compete but also cooperate" (1998). Nauwelaers and Wintjes elaborate on this by specifying that clusters involve a critical mass of firms in geographic concentrations specializing in an interrelated area of economic activity, involving both market and non-market-based relations that contribute to innovation and the economic benefit of both the firms and the broader territory (2008, 247).

A substantial body of research documents the economic benefits of industry clustering. Evidence demonstrates that a firm's presence in a cluster is associated with higher productivity than similar firms located elsewhere. Firms located in clusters in the United Kingdom, the United States, and Canada are more inventive and innovative than those not located in a cluster. Clusters support new firm formation and entrepreneurship—industries in regions with strong clusters experience higher rates of new business start-ups and employment growth. Firms co-located with others in the same industry also experience higher rates of productivity growth. City-regions with a higher percentage of employment in clusters perform better overall in terms of income levels and employment growth than places with a lower concentration of cluster-based employment (Delgado 2020; Ketels and Protsiv 2021; Muro and Katz 2010; Delgado, Porter, and Stern 2010; Spencer et al. 2010).

Clusters have thus come to be viewed as an effective means for providing innovation policy support to a broad cross-section of firms on a collective basis. A key benefit of cluster policy is deploying existing instruments in a focused way to facilitate coordination, dialogue, and interaction among constituent elements of the cluster—especially cluster firms. Cluster initiatives afford policymakers a lens through which to address a range of business needs in a collective fashion and ensure a cost-effective means of delivering programmes to a critical mass of recipients (Landabaso and Rosenfeld 2009). They promote linkages between firms, universities, and research institutes and provide a basis for firms to capitalize on market opportunities, as well as create opportunities for small and medium-sized firms to connect with larger partners and multinational firms (OECD 2007).

Cluster research highlights the contribution of organisational and governance processes for cluster dynamics, most often through the role of cluster management organisations (CMOs). Institutionalised CMOs constitute a means of support for high-tech firms seeking to scale by facilitating learning through peer mentoring and networking activities and by contributing to the development of needed technological infrastructure, labour market skills, and access to capital to support firms across the cluster (Denney, Southin, and Wolfe 2021; Creutzberg, Ornston, and Wolfe 2024a; Feldman, Francis, and Bercovitz 2005). The ability of cluster managers to serve as network facilitators is a critical factor in improving outcomes from cluster initiatives. Evidence from cluster evaluations provide support for the use of cluster policies. Consequently, cluster policies have become an integral part of the innovation policy mix in many jurisdictions around the world (Uyarra and Ramlogan 2016; Elola and Wilson 2025).

Recognition of the relevance of institutional CMOs for industry clusters suggests that cluster policy be viewed as an organisational innovation in the policy domain rather than simply another policy instrument for governments to choose from. Cluster policy enhances the interaction effects between existing instruments within the overall policy mix and interaction between policymakers and cluster actors. In this sense, it is "an organizational or institutional innovation, a governance mechanism that incorporates both the soft- and hardware needed to generate cluster benefits" (Nauwelaers and Wintjes 2008, 261). This distinction underscores the complementary nature of research and innovation policies to support the growth of clusters and those designed to support the governance institutions for the cluster. Investing in governance capacity through the intermediary organisations, participatory processes, and monitoring mechanisms may yield additional benefits to the direct funding provided to cluster firms. Governance arrangements represent a constitutive element of policy effectiveness: the same policy framework can produce divergent outcomes depending on the quality and depth of collaborative governance at the point of implementation.

2 Background on Toronto's Innovation Economy

Since the mid-twentieth century, Toronto has experienced four distinct periods of economic growth. Its economy has transitioned from one centred on traditional manufacturing to one driven by digital technological innovation and the provision of highly skilled professional services. During the first era from the end of the Second World War to 1965, Toronto's role in Canada's urban system was secondary to that of Montreal, the dominant commercial and industrial hub. The second era, ushered in by the signing of the Auto Pact in 1965, stimulated the expansion of the auto sector in southern Ontario, growth in the number of US branch plants, and an increase in Toronto's role as host to corporate headquarters. These trends accelerated in the mid-1970s as many leading financial institutions shifted their headquarters to Toronto, consolidating its position as the country's primary financial centre.

The third era originated in the 1990s with the replacement of traditional manufacturing by high-tech manufacturing—such as aerospace—and rapidly expanding financial and business services industries. New creative and cultural industries also emerged, including entertainment, digital media, and publishing. The current, fourth era in the 200s is marked by the rise of digital technologies. Where manufacturing persists, it has evolved to harness technological innovation, including AI, with all sectors of the economy relying on information and communication technology (ICT). Leading sectors are found in knowledge- and design-intensive domains: business and financial services, core manufacturing sectors such automotive and computing, the biopharmaceutical and biotechnology sectors, and the cultural, creative, and design-intensive sectors. Over the past two decades, Toronto has ranked as one of the largest technology clusters in North America, acting as a magnet for highly skilled and educated individuals.

2.1 Localisation of Global Networks

The current wave of technological innovation in the global economy has reshaped MNE investment strategies in host economies, and the Toronto region is no exception. Firms engage with the region by accessing local knowledge and information sources to diversify the locational base of their R&D activities and by tying their research activities into local innovation systems to support growth in emerging technologies and new industry niches. This represents a shift from an investment model

based on "competence- exploiting" to one based on "competence-creating strategies" (Cantwell 2017). These strategies access the region's knowledge base through the recruitment of top-quality graduates and research collaborations with post-secondary institutions. MNEs in Toronto are engaging with local knowledge and talent to expand and diversify their R&D activities, though the extent to which the broader Toronto economy will benefit from this shift—or whether the gains remain concentrated within MNEs headquartered elsewhere—is not yet clear (Wolfe, DiFrancesco and Denney 2022).

2.2 Maturation of Toronto's ICT Cluster

The 21st century has witnessed the growth of sectors in Toronto that develop digital technologies, alongside the application of those technologies across a range of other industries, including financial services and manufacturing. A strong ICT cluster has been central to Toronto's economic growth. The pattern of development of the ICT cluster is critical provides the context for the emergence of the AI cluster, as many of the factors that influenced the trajectory of ICT are relevant to the emergence and evolution of AI.

Toronto's ICT cluster was initially centred on the marketing and sales offices of foreign (usually American) multinational enterprises (MNEs). This dominance of foreign companies was a legacy of policies designed to make Toronto attractive to foreign investment (Britton 2003; Creutzberg 2005). Since the turn of the millennium, cluster evolution has produced a more dynamic ecosystem that supports service-based domestic start-ups and emerging scale-ups. Much of this change can be attributed to cloud computing and mobile applications, which lowered financial and geographical barriers to entry for start-up enterprises (Denney, Southin and Wolfe 2021).

2.2.1 From MNE Entrepôt to Dynamic Startup Scene

In the 1970s, the GTA was primarily home to the national offices of leading multinationals. Federal programmes encouraged these firms to extend their R&D efforts in computer technology, further expanding the technological capabilities of the cluster. A subsequent program in the 1980s to support university research centres provided the research expertise at U of T that supplied the graphics chip firm ATI Technologies with some of its first microchip designs, in effect operating as

the research arm for the GTA's largest semiconductor firm before it was acquired by AMD (Creutzberg 2005). From the 1980s through the 2000s, the Toronto region became the Canadian headquarters for several world-class companies, including IBM Canada, Xerox, Hewlett-Packard Canada, and Celestica. Other major players in personal computing and enterprise servers maintained a presence in the GTA (TRRA 2007; City of Toronto 2011). However, unlike financial services, where firms tend to be large, most ICT firms tend to be smaller, with fewer than 50 employees (City of Toronto 2011; Denney et al. 2021).

2.2.2 Evolution of Toronto's Cluster

Although leading enterprises in Toronto's ICT cluster were predominantly multinational subsidiaries in the hardware subsector, rather than domestic start-ups or software companies, this began to change in the 1990s with the emergence of locally owned firms such as Delrina and Workbrain, that paved the way for the next generation of successful entrepreneurs. Other notable innovations after 2000 were the emergence of local organizations to support software development and local start-ups, such as Extreme Venture Labs and the Creative Destruction Lab (CDL) at U of T. These changes coincided with the expansion of the Canadian and local venture capital industry.

Consistent with the development of other high-technology clusters, the emergence of a local high-technology industry was associated with the entrepreneur-led development of social connections through collaborative networks and organisations (Denney et al. 2021). In addition to a profusion of incubators, accelerators, and other intermediaries, Toronto benefited from boundary-spanning organisations leading to the creation of TechToronto in 2014, a networking organisation that runs regular meetups of over 500 people. Its efforts are coordinated with other Toronto region organizations such as the OneEleven incubator and CDO, with which it collaborates. TechToronto links technology firms to complementary services, most notably investment, as well as local, advanced demand through the development of industry-specific meetings corresponding to existing local verticals such as FinTechTO, HealthTechTO, and SalesTO. While the emergence of these organizations transformed the landscape for the ICT sector across the Toronto region (Denney et al 2021), there is no comparable organization guiding the development of the AI cluster. We return to a discussion of this issue in Section 6.

3 The Emergence of Toronto's AI Cluster

3.1 The Role of CIFAR and NSERC

The roots of Toronto's AI cluster lie in the pivotal role played by three key institutions: the University of Toronto, the Canadian Institute for Advanced Research (CIFAR), and the Natural Sciences and Engineering Research Council of Canada (NSERC). The University of Toronto provided a welcoming and hospitable environment for Geoffrey Hinton to pursue his pathbreaking research on neural networks when he decided to move to Canada in the 1980s, while CIFAR and NSERC each provided the research funding that underwrote his seminal research leading to the Nobel Prize (Gul 2025).

Both Hinton's success and Toronto's status as an AI cluster are rooted in the pioneering model of CIFAR, which originated with the work of a group of Canadian researchers who perceived the need to compensate for the dispersion of Canada's research strengths across the vast geography of the country. The government-funded research organisation was established in 1982 with a mandate to assemble teams of researchers across the world, creating a "university without walls," to address critical questions in science and the humanities through individual research programmes (The Economist 2017, Brown 2007). Early recognition of the potentially transformative impact of AI, led CIFAR to launch its first program in Artificial Intelligence, Robotics and Society (AIRS) in 1983, which over the next decade contributed to the "fields of computer vision and knowledge representation" (CIFAR, n.d., 1). Among the initial members of the program was Geoffrey Hinton, who joined in 1987 and began work on the nascent field of neural networks. Hinton attributed his reason for moving to Toronto to a combination of factors, including disillusionment with US military funding for AI, an affinity for Canadian society, and the CIFAR funding to support his basic research. With his position at U of T, as well as funding from CIFAR and NSERC, Hinton was able to advance his research during the "AI Winters," a period of widespread scepticism and low funding in AI (Sandusky 2024; Sorensen 2017; Gul 2025, Wang 2025).

3.1.1 Scientific and Commercial Foresight

While the AIRS program was foundational for Canada's international standing in neural networks and subsequently deep learning, it also had spinoff implications for the emerging field of robotics.

Canadarm2 is internationally recognized as the Canadian robotic arm on the International Space Station. What is less well known is the contribution of CIFAR's support for AI in catalysing this project. In 1985, CIFAR president, Fraser Mustard, and U of T, President James Ham, made a case for creating a national space agency to the House of Commons, highlighting the importance of AI and robotics research for the space station project as well as for Canadian society and the economy (Kleiner 2014). Dr. Mustard was also instrumental in convincing the Ontario provincial government to launch its Centres of Excellence program in 1987 and subsequently the federal Networks of Centres of Excellence (NCE) Program.

Despite the cancellation of the AIRS program for financial reasons in 1995, it led to the establishment of the Pre-Competitive Applied Research Network (Precarn) and the Institute for Robotics and Intelligent Systems (IRIS), which continued the work of AIRS. IRIS laid the groundwork for industry–university collaboration as the manager of the early NCE, while Precarn struck collaborative agreements with CANARIE, the Canadian Space Agency, and other federal agencies, departments, and provincial governments. Precarn grew rapidly, expanding from 15 member companies to 37 by 1992. A CIFAR founder stated that Precarn "raised the profile of Canadians in the field [of AI] and has drawn graduate students of high calibre into Canadian universities" (CIFAR, n.d.)

3.1.2 NCAP Programme and Summer School: Training the Next Generation

In 2004, Hinton and his collaborators, including Yoshua Bengio, David Fleet, and others, expressed interest in launching a program to understand how the brain learns, with the goal of applying those insights to develop computer systems capable of human-like learning. With CIFAR support, they launched the Neural Computation and Adaptive Perception program (NCAP, now called Learning in Machines and Brains, or LMB), which Hinton led as program director for the next decade. The program brought together leading researchers in neural networks, with CIFAR being acknowledged by Yoshua Bengio as "play[ing] a key role at a time" when their "approach [neural networks]…was not popular."

The NCAP Summer School was launched in 2005 and subsequently evolved into the Deep Learning + Reinforcement Learning Summer School (DLRL 2024), aiming "to jump-start a new

generation of AI research." The previous year, CIFAR committed $2.5 million over five years for a program proposed by Hinton that would support and connect researchers in the field—at a time when "it was the depth of the neural net winter, as most computer scientists pursued other AI techniques." U of T hosted the inaugural summer school in 2005, and again in 2006 and 2010. Hinton's persistence in following his line of research in neural networks through this period was critical for the subsequent evolution of what is currently perceived as AI (Wang 2025). It also solidified U of T's international standing in the field as deep learning was not yet a core part of the university curriculum and "was not well represented at AI conferences" (Bawagan 2018). In a 2013 external review, CIFAR was acknowledged for "putting together a stellar team of scientists—in a field which had begun to show promise, but had not realized it yet," while Hinton and David Lowe (UBC) were recognised for transforming their respective fields and placing Canada in an "enviable position in Machine Learning and Machine Vision" (CIFAR, n.d., 4).

At the outset, there were just 28 attendees in a U of T lecture hall. By 2024, the program's latest cohort included 190 global graduate and doctoral students, bringing total alumni to more than 2,700. Attendee interest has evolved from creating general neural network architectures to applying deep reinforcement learning across diverse fields, "ranging from ecology and epidemiology to finance and physics" (Hemmadi 2024). The foresightedness of CIFAR's seminal investment in the controversial approach of neural networks was instrumental in laying the basis for Canada, and Toronto's, current standing as a leading global hub for AI research and development.

3.1.3 Rippling Impact

Despite its modest funding, NCAP was crucial in encouraging scientific research, fostering project collaborations, and nurturing the early generation of AI talent that became instrumental in both AI research and the emergence of the industry (CIFAR 2018 Expert Review Panel report, p. 14, cited in CIFAR, n.d.). "The list of early NCAP members reads as a who's who of today's leading scientists in the field," including Yoshua Bengio and Yann LeCun, who alongside Hinton received the 2018 ACM A.M. Turing Award for their work in deep learning (Sandusky, 2024). Many of the program's first members went on to become future CIFAR program members, CIFAR Azrieli Global Scholars, and leaders in the field—including Raquel Urtasun, Graham Taylor, Hugo Larochelle, Nicolas Le Roux,

Michalis Titsias (Google DeepMind), Josh Susskind (Apple AI Research), and Vinod Nair (Google DeepMind). Later NCAP students also made national and international marks, including Ilya Sutskever (co-founder of OpenAI), Vlad and Andriy Mnih (core researchers at DeepMind), and Alex Cui (who co-founded GPTZero).

The program's talent was eagerly sought by leading technology companies. Google, Microsoft, Yahoo, Facebook, and Apple were, as CIFAR noted, "avidly utilizing the fruits of NCAP's labor and snatching up their trainees." Andrew Ng, then at Stanford, recruited students from the NCAP programme for the Google Brain team, with the aim of leveraging "the deep learning methods developed at NCAP" (CIFAR, n.d.). In 2009, Alex Krizhevsky, a U of T student, produced the CIFAR-10 dataset, a collection of images used to train machine learning models that played an instrumental role in the early years of the field, acknowledged for its importance "in the developments leading to the deep learning revolution" (Sacchetti, 2024).

Another pivotal contribution was the publication of the dropout methodology by Srivastava, Hinton, and colleagues from U of T's Department of Computer Science. The breakthrough was attributed to the "intellectual focus provided by the program [NCAP]" and lauded as "one of the most important new ideas in machine learning in the past 30 years" (CIFAR Expert Review Panel Report, cited in CIFAR, n.d.). The high-quality work, collaborations, and talent emerging from the NCAP programme and CIFAR have shaped the shape of the local AI cluster and advanced AI research nationally and globally.

People interested in working on cutting-edge AI research are drawn to Toronto because of its reputation as the 'birthplace' of modern AI research in machine learning and deep, which signals the underlying strength of its technical expertise and a strong intellectual tradition (INS6). Hinton's presence created a lasting reputational cachet that continues to attract researchers, students, and firms reinforcing Toronto's and the University's reputation (VC2; ORG6). In the words of the University's former President,

> In the years since Dr. Hinton's arrival in Toronto, he has taught and supervised a long list of students and postdoctoral scholars, many of whom have become leaders in AI research or

> successful entrepreneurs . . . . Dr. Hinton's presence has also helped attract other bright minds from abroad, and they, too, have become luminaries in AI (Gertler 2025).

3.2 Pan-Canadian AI Strategy and the Vector Institute

Breakthroughs in AI research have led to a surge in investment to develop the infrastructure needed to foster AI innovation, specifically in talent and research, commercialisation, and adoption. While different national policies were introduced to support the AI ecosystem, the government has signalled its intention to focus on a select few initiatives with the greatest impact on innovation and economic growth, with Toronto serving as a clear example of their success (Prime Minister of Canada 2024).

Recognising both the value of AI to the economy and the risk of losing AI talent as technology giants began to recruit from Canadian universities, the Government of Canada asked CIFAR to formulate the $125-million Pan-Canadian AI Strategy (Innovation, Science and Economic Development Canada 2026a.). Unveiled in 2017, the strategy was aimed at connecting talent and research to drive commercialisation and AI adoption (Innovation, Science and Economic Development Canada n.d.; Bernstein 2018; INS2). As part of the strategy, CIFAR helped establish three independent national AI research institutes: Amii in Edmonton, Mila in Montreal, and the Vector Institute in Toronto.

In 2017, the federal government and the Government of Ontario (GovON) partnered with U of T and its faculty—Geoffrey Hinton, Raquel Urtasun, and Brendan Frey—to launch the Vector Institute (Kalanick 2017; U of T n.d.). The institute emerged from existing research activity at the university. As one interviewee noted, "Vector didn't really come out of CIFAR... it came from U of T" (INS2). In addition to government funding, the institute attracted over 30 industry sponsors (Vector Institute 2018), including Google, NVIDIA, RBC, TD Bank, and Reuters (Reuters 2017). Vector was financed through a partnership between the federal and Ontario governments, U of T, and over 30 industry sponsors with a total investment of $200 million over three successive rounds. For its part, Ontario allocated $50 million to the Vector Institute and $10 million to increase to support engineers, research and AI professionals, and small and medium-sized enterprises (SMEs) in adopting AI and enhancing their market position (Brookfield II& E 2018; Government of Ontario

2023). As part of the national AI strategy released in June 2026, the federal government announced an increase in the number of AI Chairs from 130 to nearly 200 and provide an additional $130 million to support the commercialization of research from the three national AI research institutes (ISED 2026b).

Vector's mission is to advance AI application, adoption, and commercialisation in Canada. It collaborates with industry and academic partners, training programs such as boot camps on natural language processing (NLP) and computer vision, and talent services to help companies recruit skilled professionals (Alcaraz 2023b). Since its inception, the institute has grown from 220 researchers to over 700, including students, postdoctoral fellows, and faculty, fostering a strong AI and machine learning research community (Vector Institute 2023). It provides research and internship opportunities that position students for employment after graduation (Uzunovic 2023). Vector has partnered with other Ontario universities to establish 28 AI-focused master's programmes, including 8 programmes at three institutions in the Toronto Region (Toronto Metropolitan University, U of T, and York University). The program's impact is reflected in strong provincial employment and retention rates of 92% and 91% respectively (Vector Institute n.d.).

In addition to funding for AI research through the Pan-Canadian AI Strategy, several other government programs provide support for AI research. As of 2023, the federal government has invested $284 million in the Scale AI Innovation SuperCluster—one of Canada's Global Innovation Clusters—to position the country as a global AI hub for "business productivity and intelligent supply chain" by helping businesses across industries adopt AI (Government of Canada 2026). Scale AI, in turn, has funded more than 120 industrial projects, involving investments of $600 million to support AI adoption project (Scale AI 2024).

Through funding in the 2021 federal budget, the Digital Research Alliance of Canada has provided $40 million for dedicated computing capacity for AI researchers across Canada. (Innovation, Science and Economic Development Canada n.d.). In 2024, the Alliance and the Ontario government funded upgrades to advanced research computing systems at U of T and the University of Waterloo, with U of T using its $52.4-million allocation to update its Niagara system, operated by SciNet (Digital Research Alliance of Canada 2024).

3.3 Impact of Hinton and the University of Toronto

From being home to start-ups like Waabi and Cohere—both of which featured on the Forbes AI 50 list (Uzunović 2023)—to helping launch spaces for AI research and commercialisation, U of T's talent pervades the Toronto AI ecosystem. In 2012, Hinton and his graduate students Alex Krizhevsky and Ilya Sutskever (who later co-founded OpenAI) released the seminal paper on neural networks, which has been cited over 140,000 times and forged the way for deep learning (Sandusky 2023). Their company, DNNresearch, was acquired by Google the following year (CBC News 2013), leading to the creation of Google Brain in Toronto, led by Hinton (Etherington 2017). In 2024, Hinton and John Hopfield were awarded the Nobel Prize in Physics for "foundational discoveries and inventions that enable machine learning with artificial neural networks," further solidifying both the university and Toronto's reputation as leading centres of AI research globally.

The enduring impact of Hinton's legacy lies in the international visibility and credibility it has provided the city. Recognition of Hinton's research contribution has positioned Toronto as a global AI hub, generating a halo effect that benefits the wider cluster (ORG3). As one interviewee observed, the university should never forget that most of the leading AI companies globally were started by students who worked with Hinton or at U of T, because the rest of the world is well aware of that fact (VC1; Gul 2025; Hemmadi 2024).

4 Current State of Toronto's AI Cluster

Despite Toronto's past contribution to the emergence and development of the AI sector, the region currently faces several issues in maintaining its leading edge in the field. Toronto's ability to retain and develop its strong talent base is challenged by increasing global competition, salary pressures, and a domestic market that generates insufficient demand for AI adoption. The challenge is to translate its leading-edge research base into a strong cohort of local startup and scale-up firms, as well as promote the diffusion of AI technology across other sectors of the economy. In addition to the lead enjoyed by Silicon Valley firms, other countries, particularly China, the UK, and France, have made significant investments in building the capacity of their AI clusters. The next sections of the report assess the status of these aspects of the cluster and the obstacles that must be surmounted to sustain its growth.

4.1 The Comparative State of Toronto's AI Cluster

As noted in Section 4, the roots of Toronto's AI cluster lie in the groundbreaking research at U of T supported by both CIFAR and NSERC over the past four decades, which was recognized with the establishment of the Vector Institute in 2018. Vector is one of three national institutes established under the Pan-Canadian AI strategy, alongside MILA in Montreal and AMII in Edmonton. MILA and Montreal's AI cluster have been analysed in several academic articles (Doloreux and Turkina 2021; Gherhes et al. 2021; Sultana, Turkina and Cohendet 2023; Doloreux and Turkina 2023). To read these, one would never know that Montreal is not the largest AI cluster in Canada.

To assess the overall strength of Toronto's AI cluster, we analyzed business, innovation and labour market data from several sources. The figures referenced in this section are found in Appendix D: Statistical Analysis. Recent reports highlight Toronto and Canada's position as a leading location for AI activity in a global context. For example, the latest version of Startup Genome's report on AI Startup Cities notes that Toronto made a dramatic jump in the rankings and now sits at 7th in the world, and 3rd in North America after Silicon Valley and New York. The report notes that a driving force in improving its global standing has been the Vector Institute – whose role in moving AI research-to-commercialization has helped produce leading unicorns such as Cohere and Waabi (Startup Genome 2026). Similarly, Toronto is consistently highly ranked as a centre for

global tech talent; Toronto ranks 3rd globally for tech talent (CBRE 2025, 2023). The Vector Institute also publishes an annual snapshot of AI activity, however, data are reported at the provincial level and there are some variations in definitions and data sources compared to the analysis presented here (see Vector Institute 2024).

Other data sources corroborate Toronto's position as Canada's leading AI cluster. Toronto accounts for the highest proportion of AI start-ups, well ahead of Canada's other large cities, including Montreal and Vancouver, as well as Canada's specialized tech centres, such as Ottawa and Kitchener-Waterloo (Figure 1). This is consistent with Toronto's rankings as a highly competitive global tech ecosystem, with the Toronto-Waterloo innovation corridor ranking amongst the top 20 global tech ecosystems (Startup Genome 2024).

Our analysis of investment in Toronto's AI cluster from 2005 to 2024 shows that investment – measured by capital and numbers of deals – in Toronto's AI cluster began to accelerate beginning in the early 2010s (Figure 2). Investment has continued to accelerate, reaching a total of almost $2 billion in 2024, aligning with similar analysis of AI activity in Ontario (Vector Institute 2024). Similarly, the number of venture capital deals increased steadily from 2005 to 2022, when there was a slight decline in the number of deals. Together with data on the levels of capital invested, this suggests that while there are relatively fewer deals, the average size of venture capital deals is beginning to increase.

Excluding US megadeals, Canada's venture capital investments grew 29 per cent year-over-year in 2025 — outpacing hubs like the UK and Singapore—largely due to big AI deals such as Waabi's $1B CAD and Cohere's $600M USD rounds (McLauchlan, 2026a). However, large investments ($400B US expected from top Silicon Valley companies in 2025) have created fears of a financial bubble (VC2, Young, 2025). Using data from Crunchbase, we trace the number of new AI firms established on an annual basis up until 2024. These data show rapid growth in the number of AI start-ups between 2010 and 2017, followed by a levelling off and then a decline in the number of new AI start-ups (Figure 3). Some of this decline can be attributed to the influence of the pandemic and may also reflect the maturing of the AI cluster as it transitions from into a new phase of cluster development. It is also possible that the decisions of large multinational enterprises, including Google, NVIDIA, and Bosch, to establish AI-related research centres in the region may be

contributing the slowing of growth in the number of start-ups, as AI talent is absorbed by these MNEs rather than creating new AI-related ventures. In terms of firm size, Toronto's AI cluster is dominated by small and mid-sized enterprises (SMEs) meaning it has a similar profile to other technology clusters (Figure 4). Slightly over half of the firms (50.9%) have fewer than 10 employees.

Standard measures of innovation, such as patents, scientific publication and concentrations of highly qualified personnel (HQP) further corroborate Toronto's strength as a centre for AI research and scientific output. The Vector Institute reports that there are more than 860 world-class researchers driving AI-related scientific discoveries and innovation, producing more than 360 publications in top-tier global conferences (Vector Institute 2023-24). Our analysis of patent activity reinforces Toronto's standing as a leading centre for AI discovery in Canada. The analysis of patenting activity between 1990 and 2021 (the last year for which data were available) shows substantial growth in the number of AI-related patents, with a substantial uptick in patents beginning in the mid-2000s (Figure 5). These findings align with other analyses that finds that the number of patents awarded to Canadian inventors have grown by 10% year-over-year in Ontario (Vector Institute 2024). We also examined the distribution of patenting activity across Canadian cities (Figure 6). Toronto accounts for slightly more than 30% of all AI-related patents in Canada reflecting its status as a centre for AI research. Toronto has close to double the proportion of patents compared to Ottawa and Vancouver and almost triple the proportion of patents compared to Montreal.

Finally, we examine how the demand for AI skills has changed in the labour market over the past decade. First, we use job postings data to compare the demand for AI skills in Toronto to overall national trends. Like the analysis of other metrics, demand for AI skills in Toronto outpaces the Canadian labour market overall. There is a substantial uptick in demand for AI skills between 2022 and 2025, reflecting the broader adoption and use of AI across industries (Figure 7). Second, we compare the proportion of jobs requiring AI skills across Canada's urban system in the past three years, during the period of substantial growth in the demand for AI skills. Using location quotients to standardize differences in city size, we examine the proportion of job postings requiring AI skills amongst the 25 largest city-regions in Canada (Figure 8). Toronto is one of only

six Canadian city-regions where there is out-sized demand for AI skills and ranks first amongst Canadian cities, with a demand for AI skills that is double the national average.

Overall, our analysis of data on investments, patents, demand for talent and other metrics found in Appendix D confirms Toronto's position as Canada's preeminent AI cluster. The analysis of our qualitative interviews (44 in total) in the rest of this section provides a more nuanced interpretation of the status of Toronto's AI cluster, its potential for future growth and the challenges it must surmount to achieve that potential. Subsequent sections of this part of the report discuss:

- the continuing contribution of the University of Toronto to the AI cluster
- the nature of its ongoing collaboration with the Vector Institute
- the contribution of Toronto's dense labour market for AI to the overall strength of the cluster
- how the diversity of Toronto's demographic composition contributes to the underlying strength of the cluster
- how the institutional environment of Toronto's AI cluster, including entrepreneurial support organizations, contributes to the emergence and growth of start-up and more established firms
- the importance of adoption and diffusion of AI technologies across other industries and sectors

4.2 The Role of the University of Toronto in Toronto's AI Cluster

The University of Toronto, with strong support from institutions like the Vector Institute, is the central anchor that grounds the regional AI cluster (VC3). As discussed in Section 4, the university underpinned the cluster's growth through world-class research, attracting and developing top researchers and talent, providing key infrastructure like compute and labs, offering institutional leadership, supporting commercialization, and creating ongoing spillovers to industry, startups, and intermediary organizations. It is credited for having the "genius" to prioritize the AI field long before it became mainstream (COM11) and recruiting the "right" members to set-up effective programs across computer science (COM3). Its technology transfer and commercialization organizations support the start-up journey through UTEST, TIAP, OCI and CDL, extending its influence beyond direct research outputs to shaping networks and organizations across the cluster.

4.2.1 "World-class research" and Hinton's legacy

U of T is recognized as a world-class research institution and leader in AI research, particularly in machine learning (ML) and deep learning. Toronto is known for its strong research that is "pushing technological frontiers in many areas," (VC3) with U of T at the core of this strength (VC1, VC3). Our interviews credited Geoffrey Hinton's pioneering work, along with that of his students and colleagues, with building the critical mass of AI research talent at U of T and in Toronto (INS2). Interviewees described the current AI cluster in Toronto as "predicated on the innovation that happened in computer science starting in the 1990s," (ORG2) with U of T's Computer Science Department serving as the initial "seed corn" of research, talent and funding that laid the foundation for subsequent organizations like the Vector Institute (VC3).

While interviewees note that many of Hinton's former students have left to work outside Canada, "they are still part of the fabric of what started here" (ORG6), emphasizing that a new generation of talent has been trained under him and his students. This has created a strong talent pool, including many skilled engineers, and dense knowledge diffusion and networks across successive generations of faculty and alumni, resulting in a path-dependent innovation cluster that is highly productive (ORG5). People in Toronto's tech cluster, including professors, advisors, and investors, have a strong sense of current trends in AI, possibly as good as or better than the US. This results from the fact that U of T has a wide range of activity in AI and attracts global talent to the region. Even if they eventually recirculate to the US, it means that Toronto hears about new ideas early in the dissemination process. The advisors and mentors are also experienced operators, many with ties to US companies, which adds to their market knowledge (COM21). This expertise is reflected in a 2019 global university ranking where U of T placed 23rd and its Computer Science department was ranked 9th by CS Ranking (UofT MScAC Program, n.d.).

4.2.2 Interdisciplinary Research Strength

U of T plays an outsized role in Toronto's AI cluster by driving AI research forward across multiple domains (INS1). The university recognized the strategic significance of the field early on, recruited key talent, and built a range of programs, allowing it to train students across computer science, molecular biology, and genetics (COM3). As a result, Its contribution extends well beyond the discipline of computer science and is rooted in the ability to integrate AI research across a range of

disciplines, including health, medicine, biology, materials science, and safety/ ethics. What began as a strong base in bioinformatics has since evolved into broader strengths in computational biology and machine learning. "Toronto is an international talent hub . . . with the university being a spark for that talent, that once it's here, it can be leveraged by private enterprises" (VC2).

4.2.2.1 Health

A defining feature of Toronto's AI ecosystem is the proximity between U of T and the major research hospitals in the Toronto Academic Health Sciences Network (TAHSN), including SickKids, University Health Network, Mount Sinai Hospital and St. Michael's Hospital. Researchers said that proximity to these hospitals influenced their decision to locate in Toronto. Being nearby enabled them to conduct AI research in health and build collaborations that even led to the creation of start-ups (COM9). Many ventures originated directly from academic or clinical projects, such as spin-offs combining infectious disease and NLP (COM4) or joint ventures between U of T and SickKids supported by their technology transfer offices (COM3). U of T's interdisciplinary strength is reflected in projects such as AI for Diabetes Prevention and Prediction, funded by CIFAR at the Dalla Lana School of Public Health and which integrates public health and AI research. These examples illustrate how institutional proximity enables interdisciplinary research collaboration and potentially leading to commercialization. Proximity continues to benefit companies after incorporation, as ventures remain embedded in the broader cluster and collaborate with institutions such as Vector for ongoing support (COM9). Coordinated access to complementary institutions strengthens Toronto's AI cluster, with U of T leading foundational research and organizations like Vector, CIFAR, and Mitacs supporting applied and industry-focused work (INS2).

4.2.2.2 Acceleration Consortium

The Acceleration Consortium is a prime example of U of T's interdisciplinary capabilities. It is a U of T–led initiative that translates AI research into applications across disciplines including, but not limited to, materials science, health, and sustainability through the development of "self-driving labs" (INS1). It has assembled researchers from multiple disciplines including AI, biology, chemistry, engineering, and economics. The integrated structure of the Consortium allows AI-driven research to extend into domains such as materials discovery while maintaining strong ties to university-based expertise. Affiliations with organizations such as the Structural Genomics

Consortium and the Vector Institute, reinforce dense cross-institutional linkages and strengthen knowledge spillovers (INS1).

4.2.2.3 Schwartz Reisman Institute

The Schwartz Reisman also supports interdisciplinary research, with roughly equal representation from STEM disciplines and the social sciences and humanities. Researchers collaborate across a range of fields such as philosophers working on AI ethics with computer scientists, economists on regulatory impacts, or computer scientists on system alignment – with the primary focus of the Institute on AI safety, an issue of ever greater importance as the generative AI models rapidly expand their capabilities. Many researchers have also worked in industry AI labs, gaining access to applied data, tools, and problems. They bring this experience back to the university, strengthening research capacity and talent pipelines between academia and industry. The Institute also helps to attract top international researchers, strengthening Toronto's global research profile while also communicating insights in academia, industry, and policy contexts (INS4).

The preceding examples illustrate the fact that U of T's strength lies not only in technical excellence, but in its ability to embed AI research into diverse application domains and connect the research outcomes to industry. This dense institutional structure allows research to move easily across academic and commercial settings, reinforcing Toronto's capacity for innovation while maintaining close ties to the research frontier.

4.3 Vector and U of T as a Joint Engine for Research and Talent

U of T and the Vector Institute constitute reinforcing pillars of Toronto's AI cluster. Rather than functioning as parallel institutions, they operate in a sequential and complementary fashion: U of T provides the foundational research capacity ("Act 1"), while Vector operates as a second-stage institutional layer ("Act 2") that concentrates talent, accelerates applied research, and connects academia to industry,

> And so, if U of T was Act 1, Vector is Act 2 and has also been just pivotal and critical in attracting the best and brightest to Canada and to Toronto. And so, without them, also none of this would kind of exist. So, I still kind of, when I say there's 300 people in Canada that

> matter, you know, U of T and Vector have 150 of them. So, it really is probably the most important ingredient in the clustering (VC3).

The creation of the Vector Institute enabled U of T to expand its AI capacity while preserving its disciplinary range, creating a structure reinforced by shared faculty appointments that extend the university's research environment,

> Vector allowed the university to bring in top tier researchers in AI without turning our computer science department into an AI department, while still supporting the university's other academic priorities rather than displacing them (ORG2).

Together, U of T and Vector cultivate and concentrate top researchers on par with Stanford and other global research centres, creating a dense research environment that attracts students, postdocs, international talent, and firms (COM22). One founder described the decision to relocate both their company and family from the United States to Toronto, citing Canada's role in machine learning and Vector's central position in the ecosystem as a key factor (INS6). Another interviewee confirmed the trend, moving his family back to Toronto to take up a lead position at an innovative startup firm (COM1).

Jointly, U of T and Vector function as central nodes that both anchor expertise and attract firms, and their synergistic relationship has a greater impact on the scale and quality of the Toronto AI cluster than either could achieve on its own. Vector also functions as a talent pipeline and quality filter, streamlining recruitment and speeding hiring decisions by assuring a consistently high baseline of expertise (COM9). A large, established firm noted the benefits of Vector in nurturing the regional talent pool but observed that their company does not engage in joint research with Vector, viewing it as peripheral to their day-to-day operations (COM22). This suggests that Vector's contribution is different for different sized-firms but may be more important for early-stage companies that are seeking talent to embed advanced AI capabilities into their products and operations. U of T anchors fundamental research and faculty talent, while Vector mobilizes that talent through applied research, industry programs, and the dissemination of specialized knowledge to a broader range of firms. Combined, they constitute the node that drives knowledge circulation, talent development, and firm attraction in Toronto's AI cluster.

Toronto has produced not just a large AI talent pool, but high-quality talent for an extended period. U of T's engineering school has been working on neural networks "longer than almost anywhere else," offering AI-related courses not only to specialized researchers but also to engineers (ORG5). The hands-on experience U of T students gain through projects at Vector, as well as Mitacs-funded projects, and U of T's Computer Science Department, contributes to the robust talent pipeline in the region (INS2). Relatively few places globally have a comparable level of long-standing university training in AI, and U of T has been a key draw, offering courses "unique from places in the world" (ORG5).

4.3.1 Sustaining Research Leadership and Global Recognition

Despite general agreement on the continuing importance of Toronto's research base, some interviewees express concern about the future visibility of globally recognized AI researchers in Toronto. Toronto appears as a default option for foreign companies and international students considering where to locate AI labs or pursue training. Its reputation ensures it is included on initial shortlists before more detailed assessments of talent, space, and infrastructure (ORG5). At the same time, one interviewee suggests that Toronto may be losing its position as a "gravity well" for top researchers, pointing to recent departures from Vector and the exit of some of Hinton's former students (INS3).

A long-time participant in the cluster stressed the importance of maintaining a "top ten" AI academic group to maintain its prestige and continue attracting high-calibre researchers, though they view Vector as among the world's leading AI institutions (INS10). Another warned that without a continued pipeline of prominent researchers comparable to Hinton, Toronto risks weakening its ability to attract the next generation of students, researchers and entrepreneurs who later become founders and sustain ecosystem renewal (ORG5). These perspectives underline the importance of sustained global recognition and visible academic leadership in attracting the next generation of researchers and entrepreneurs.

At the same time, some interviewees pointed out that with respect to more applied research or applications of the pure research, Toronto is performing at a middling level; it does not

directly translate its research expertise into commercial applications. The places that Toronto is competing with for talent and commercial opportunities have more software companies and therefore a greater number of jobs and more opportunities (COM1). However, others stressed that deep pools of engineering talent remain in the region, suggesting that there is substantial depth in Toronto's AI talent pool on the applied side. One interviewee suggested that large language models (LLMs) will increasingly function as infrastructure, the underlying pipes of the platform economy, with the real value residing in the applications built on top of them. This includes bespoke models developed within large firms like RBC or Manulife, as well as applications created by startups emerging from specialized AI incubators and accelerators. As they put it, "Ultimately, does Toronto want to be known as the home of the AT&T of the AI economy, or the next Facebook?" (ASS2)

4.4 Talent Density

Toronto benefits from a dense talent pool of people at various career stages, including a new generation drawn to the region by its cultural and academic diversity. They are connected globally to similarly situated people in other AI clusters and are constantly evaluating employment opportunities in this region against global opportunities. Many interviewees have worked in California and have returned, or plan to circulate to another location in the future. A key insight from the interviews is the high degree of global talent circulation between Toronto and other AI clusters that provides a constant flow of new ideas and people to and from the region.

4.4.1 Global Hub Status

Interviewees stressed that Toronto's strongest asset is the depth and diversity of its talent pool, which supports the ambitions of both upcoming AI start-ups and well established MNEs from around the globe, such as Roche, Unilever, Facebook, Amazon, Nvidia, and Groq (AI chip company)— who have established offices and AI labs in the city (INS5, COM1). Firms are attracted to the region's reliable pipeline of high-calibre, cost-effective talent. With world-class universities producing graduates in computer science and related AI degrees at every level, Toronto has built a workforce that consistently punches above its weight (INS6, ORG2, ORG6). Its standing as an international talent hub is widely echoed in industry circles, where Toronto is cited alongside major hubs like San Francisco, New York, and Paris as a critical center for AI talent (ORG4). CBRE's 2025

report notes the accelerated adoption of AI within major firms has increased the demand for specialized talent around the globe. This shift propelled Toronto, home to North America's fourth-largest AI talent pool of 23,936 workers, to the No. 3 spot overall – rising in the ranks for a second year in a row -- outpacing New York City and trailing only San Francisco and Seattle (Riehl 2026c; CBRE 2025). This is significant as with growing AI adoption, "the ability to train and retain AI talent will be a critical determinant of economic success" (Eslava et al. 2025).

4.4.2 Engineering Talent

While high-profile researchers and institutions attract talent, companies, and research collaborations to the city, the main engine of growth has been the steady stream of well-trained engineers emerging from local postsecondary institutions (COM2). Although a number of students trained by Hinton and others have left Canada, the deep talent remains (COM22). Considering the recent emergence of AI, few places globally have long-standing AI training in universities. While many places have recently entered AI as a "hot topic," Toronto's depth of experience allows the region to deploy AI effectively, ensuring talent has a strong grasp of "LLM development, selecting the right type of AI solution, and experiences with projects, even if they didn't go into production" (COM14).

Further evidence of the quality of the talent pool is found in recent "acqui-hires": local companies acquired by US firms that retained their original teams and a physical presence in Toronto, primarily due to the strength of the local talent (COM3). These examples illustrate the fact that Toronto's talent pool sustains it as a hub for entrepreneurship and applied AI innovation.

4.4.3 Circulation of Talent

While concerns about a brain drain persist, Toronto remains one of the largest importers of talent, attracting many individuals who come to the region initially for education and often stay to take advantage of employment opportunities (INS10). A more accurate description of talent mobility to and from the region is not one of brain drain but rather talent circulation, in which skilled individuals move across borders through physical relocation or international hiring. Interviewees describe cross-border mobility not as a permanent loss of talent, but as a process of circulation in which experience gained in the United States frequently returns to Toronto to take up new

employment opportunities, strengthening local firms and institutions in the process. One interviewee noted that while many skilled workers remain in the US, political conditions, immigration constraints, and personal considerations often prompt others to relocate back to Canada or remain domestically rather than pursuing US-based opportunities (COM17, COM3; INS6).

Some firms facilitate talent circulation by not requiring permanent relocation to Toronto. One founder returned to Canada from the US to work as a data scientist for a US company in Toronto. He subsequently spun out his own firm, with the support of the company's board. However, his firm was subsequently acquired by a US public company. The prevailing cross-border structures allow firms to access US markets while anchoring research, technical, and data science talent in Canada (COM3). Institutions such as Vector and U of T function as anchors for attracting entrepreneurs back to Canada, including those relocating families and entire companies (INS6).

Founders also noted that the economic calculus for hiring internationally has shifted. While a cost gap once incentivized outsourcing, government incentives such as SR&ED and Mitacs now make the cost of a Toronto-based engineer comparable to one from Southeast Asia, prompting some founders to establish their companies locally rather than abroad (COM11). Another interviewee stated, "it might not be the same volume of cash coming from our neighbors down South, but it's a lot more reliable and less subject to change" (COM2). Both start-ups and larger established firms noted that they builT their teams by supplementing the local talent pool with more specialized international hires who work remotely (COM15). Despite the strong pull towards the US market, a clear pattern of mobile, circulating talent is evident across Toronto's AI cluster.

4.4.4 Mid to Senior Level Skills

Although Toronto consistently produces a considerable volume of strong junior talent (especially in engineering) through local universities, interviewees reported that MNEs and some domestic firms experience a shortage of mid-to-senior level talent needed to build well rounded teams. While early-stage talent is abundant, the pool "drops off as it gets to more mid to senior level," which is problematic for both international firms setting up in the city, as well as established Canadian firms who need these experienced professionals (ORG6).

Despite Toronto's status as a global hub for AI engineering, specific sectoral gaps exist in senior-level recruitment, particularly within specialized fields like biotech. For companies building interdisciplinary teams to develop these products the difficulty in finding senior talent lies not in the computational or AI aspects of the work, but rather on the biology side. One interviewee stated that for senior biology expertise, they often "have to find out the talent elsewhere, not in Toronto" (COM12). While programs like the Global Talent Stream can bring international talent to Canada, policies and market conditions change over time and cannot be fully relied on. Another interviewee also noted a perceived shortage of marketing and business talent in Canada but emphasized that this is not a failure of the local cluster -- the challenge exists globally, including in the US (COM14). Any gaps in talent are addressed through international hiring, allowing companies to maintain teams across multiple countries rather than rely solely on the Toronto market.

The challenge of scaling firms domestically is closely tied to the lack of mid-to-senior level managerial talent. This creates a cycle where the lack of scaling companies limits the opportunities for talent to gain the experience needed to scale companies. Some also note the need for effective business mentorship, including guidance in finance, legal, commercialization, customer discovery, and business model development, especially for teams with primarily scientific backgrounds (COM17, VC3). Early mentorship programs, such as H2I at U of T, help founders avoid costly mistakes and build sustainable companies (COM1).

The local shortage of experienced leadership and more senior level programming talent is not just a recruitment issue but may also reflect the lack of VC funding in the region (COM21). Because Toronto lacks the depth of talent needed to support companies as they scale, many firms reach a critical growth point where they are pushed to establish operations in places like San Francisco to access both the capital and talent required to expand. This creates a "circular problem" where the inability to raise domestic venture capital for competitive salaries accelerates the circulation of the cluster's professionals (COM21). Without the retention of more senior levels of talent and visible AI "winning" companies that attract and retain investors and talent to the cluster, there is a risk the cluster will not achieve its full growth potential (COM6, COM15).

Specialized programs like the MSc in Applied Computing (MScAC) at U of T was praised for the ability to facilitate the transition between academia and applied work through industry

placements as one way to address the need to train mid to-senior levels of talent (ORG6). However, companies still look abroad to fill senior positions that cannot be found locally. Recognizing the contribution of talent circulation to the dynamism of Toronto's AI cluster is an important policy route to explore, rather than a strategy of permanent retention. To support this strategy, the region must create more mid-level, applied roles to allow top researchers and engineers to build their careers here.

4.4.5 Cheap Talent: The Trade-Off

Toronto's cluster benefits from the salary differential between its local AI talent pool, many of whom earns lower salaries compared to the US. This relative cost advantage has been recognized as a benefit by companies of all sizes; however, an early-stage start-up founder expressed the view that attracting and retaining talent can be difficult for a start-up like theirs if compensation level falls below market rates (COM7). Hiring outcomes are closely tied to business performance and the amount of capital a company can raise. As a result, strong Canadian companies turn to the US to raise funding to compete and scale effectively (COM7).

Furthermore, compensation expectations can influence career decisions. Some students earn their degrees in Canada but express a wish to move to California, drawn by higher salaries, better opportunities, and the presence of major firms like Google and Microsoft. Canadian companies often struggle to build world-class firms because the key talent needed to scale a firm is drawn to higher paying opportunities in the US (ORG2, COM17). While interviewees believe that Canada has the research capacity and academic institutions to compete, they suggest that continued investment in research and more competitive salaries might help attract and retain talent (COM9).

The availability of lower-cost talent thus operates as a double-edged sword. Although it attracts MNEs to Toronto in the short term and facilitates start-ups, it can weaken talent retention over the longer term if salaries remain uncompetitive. Even before taxes, Canadian compensation frequently lags US levels, making it difficult to retain elite talent (ORG2). A recent study showed that highly educated immigrants to the US earn more than both native-born Americans and similarly skilled immigrants in Canada. This makes the US is more attractive to top-tier highly

skilled immigrants, owing to lower tax rates for top earners and the concentration of leading technology firms (Gordon 2025).

One interviewee pointed out that Canadian banks resist paying AI talent at US levels due to their internal salary structures, despite paying comparable salaries to investment bankers (ORG2). He argued that if AI talent generates similar value, firms should compensate accordingly (ORG2). This observation was echoed by another who mentioned that Canada lacks urgency in responding to the global talent war, particularly as US firms continue to offer exceptionally high salaries to top-tier talent (COM16).

4.5 Diversity

The cultural diversity of Toronto's population and the region's underlying Canadian values were cited repeatedly as key assets that attract global talent looking for an open, ethical environment in which to learn, and build AI firms. Most participants identified our open, tolerant, diverse community, and high quality of life as a core strength of the cluster, which contributes to the talent pool that draws firms and investments to the area (ORG2, ORG4, VC1). Many individuals who enter Canada to pursue educational opportunities find employment here, contribute to firms, and form long-term ties to the city (COM5, COM9). Canada's immigration policies and Toronto's reputation as diverse and welcoming are key talent attractors, especially given current political tensions in other parts of the world. As hostility toward immigrants and minority groups increases elsewhere, Canada's commitment to diversity affords a clear advantage in attracting global talent. One interviewee noted that Toronto is the largest importer of talent in North America. As such, the cluster should pursue a focused strategy of attracting students, retaining them through work opportunities, and creating an environment where they will place their roots (INS10).

4.5.1 Diversity of Thought

Toronto's advantage lies not only in its demographic diversity, but also in the region's diversity of thought, spanning academic disciplines. Firms value access to interdisciplinary talent that combines computational expertise with other disciplines such as biological, social, and geophysical knowledge (COM16). Leading firms working on AI applications look for people with adjacent experience such as those who have expertise in data science at

financial institutions (COM22). Hence, it just its strength in AI that differentiates Toronto, but the presence of a range of related disciplines that enable firms to hire across functions. Diversity of thought is viewed as important for firms with respect to innovation quality, problem-solving capacity, and long-term adaptability (ORG6).

4.5.2 Diversity as an Economic Asset

Inclusive values are seen as both region-level and firm-level advantages. Many interviewees suggested that Toronto could more deliberately leverage this in its global branding to attract talent looking for an open, ethical environment in which to build their AI research programs or start their firms. One interviewee underlined this point, saying, "And that's how we got one of our top quantum AI chemists. He left Harvard and he came to us, right? That's what we got to do. We got to be more open. We only get the best talent" (COM10), showing how openness and diversity can help recruit world-class researchers.

The emphasis on the diversity of Toronto's population and the openness to cultural differences reinforces findings of a previous study on why MNEs' preference for building advanced research teams in the Toronto over other research-intensive regions, such as Silicon Valley. A senior executive at an MNE that was rapidly expanding its research base in the Toronto region explained the company found it easier to convince highly qualified research talent to move to Toronto than other locations. It was easier to assemble a multicultural team from different parts of the world and get them to collaborate effectively than other research centres in which it operated. They felt Toronto's openness and diversity should be a key message used in branding the benefit of building global research teams in the region. "You want to recruit from around the world, you want to put 10 people from around the world together, that's a stoplight in Toronto. You can't walk anywhere without a team being a global team. That's how we function, that's what Toronto is all about. I think that's a potentially huge selling point" (COM23).

4.5.3 Loyalty

The attractiveness of the region generates a strong sense of loyalty and a determination to remain here, resulting in a more collaborative environment compared to Silicon Valley. Founders genuinely support each other, sharing knowledge and resources in the belief that collective

success benefits everyone (COM2). Institutions like Vector and U of T reinforce this, with experts openly sharing ideas rather than gatekeeping access. While Canadians are sometimes seen as too nice for the start-up world, the interviewee saw this as a strength that gives smaller companies a better chance to survive and grow (COM2). There is a sense that many people would prefer to remain in Toronto. However, market pressures such as availability of funding and lack of uptake can make it difficult, impelling some companies to look to the U.S. or other markets (ORG6).

One interviewee expressed a strong desire to build their company and have an impact in Canada, having grown up, studied, and trained here, but noted that the domestic market is unwelcoming to its own innovators. This slowly draws companies toward more receptive markets globally, not through a conscious decision but through gradual drift, as revenue and investors build up elsewhere. They noted that the US market is often more receptive and easier to scale in, which can push companies to relocate south of the border despite the founders' intentions to remain in Canada. Their own decision to remain is driven by personal and family reasons more than business ones (COM4).

However, the concerns above were offset by the feeling of some interviewees that Toronto's AI cluster has a "sticky" talent pool, which exhibits higher degrees of loyalty internally compared to the high-turnover rates of Silicon Valley (ORG6). While Silicon Valley is noted for professionals jumping ship after only six months, Toronto's start-up community benefits from a culture where talent stays longer and forms deeper roots (ORG6). Furthermore, there is a strong emphasis on mission-driven work; founders observed that the opportunity to impact lives—such as improving healthcare outcomes—constitutes an important retention tool, sometimes even more than matching the salaries of foreign tech giants (COM3, COM4, COM9, INS 5). Hence, the degree of loyalty that people feel to Toronto's cluster is likely a balance of reasonable pay, professional but friendly work environments, and the "meaning" people find in the work itself.

4.5.4 Suggested Improvements

Canada's immigration policies have played a central role in attracting global talent but are no longer viewed as effective as they once were. There is a call for more thoughtful programs to ease the arrival of skilled workers and create confidence in long-term settlement opportunities

(ORG6). One interviewee suggested revamping the Ontario Immigrant Nominee Program to reduce friction for both talent and their families in settling in the province (ORG3). The general view was that getting immigration policy right is essential for attracting and retaining highly skilled individuals across research, academia, government, healthcare, and industry (COM22; McCormack 2025). Restrictive immigration policies in the US present a unique opportunity for Canada to compete for the "best and brightest" (McCormack 2025). In response to these concerns, the recent national AI strategy announced measures to expand the Global Talent Stream program to facilitate the entry of highly-skilled AI workers and improve the process for them to attain permanent residency to help keep more of the talent recruited in Canada (ISED 2026b). As argued in previous cluster research on Canada, the dynamism of the underlying labour market remains one of the most critical factors that grounds and secures the dynamism of clusters across virtually all industrial sectors in Canada (Wolfe 2009; Malmberg and Power 2006).

4.6 Sectoral Strengths and Cluster Supports

Toronto's position as an AI hub is characterized by a combination of global talent attraction, urban attractiveness, institutional density, and strategic location. As noted in the previous section, the city is seen as an attractive place to live and work (INS4). Interviewees identified its tolerance, diversity, quality of life (including universal healthcare), and vibrant culture, alongside its food scene and urban amenities, as factors that help attract talent beyond purely technical considerations (INS4, COM9). Toronto also functions as a national hub, drawing companies, researchers, venture capital, and academic insights from beyond the region in line with its position as the dominant city in the Canadian urban system (Bourne 2011). Its geographic position and time zone support market expansion (into Europe) without the need to relocate (COM13), and facilitate cross-national collaboration, enabling real-time coordination across North American teams (COM 16).

The city's digital and electrical infrastructure constitute another advantage. High-performance networking through the Toronto Internet Exchange and a reliable, largely hydroelectric power grid, with clean energy availability constitute key locational factors for large firms (COM8). Most importantly, Toronto brings together a dense concentration of universities, hospitals, research institutes, firms, and diverse industries within a relatively compact urban area

(INS2). This layered cluster—comprising academia and research, knowledge translation and commercialization, and early funding organizations—provides a strong launching point for new innovative firms, while also attracting large corporations. The combination of institutional density, infrastructure, and urban attractiveness reinforces Toronto's reputation as an appealing location for globally connected AI research and innovation.

4.6.1 Leveraging Sectoral Strengths

Equally significant for Toronto's locational advantage is the fact that advances in Generative AI are demonstrating its potential for application across a wide range of industrial sectors from finance and telecommunications to retail and drug development. This trend plays directly to the sectoral diversity of the Toronto regions' urban economy as outlined in Section 3. There is a growing recognition that the city can build on its existing sectoral strengths — particularly in finance and life sciences — and strategically integrate AI into these industries, positioning Toronto as the leading AI hub in targeted niches. While recent federal initiatives to support AI provide grounds for optimism, unlocking Toronto's potential will require continued policy support, including stronger data access frameworks across its core sectors, especially finance and life sciences (ORG2, INS5).

4.6.1.1 Financial Sector

Toronto is Canada's business and financial capital and the second-largest financial services centre in North America (City of Toronto, n.d.). It hosts one of the highest concentrations of financial services headquarters in the Americas, making finance a possible central anchor of the city's AI cluster. Previous research has documented the close links between the city's information technology firms and the financial service sector (Wolfe et al., 2011). Financial services such as banks and insurance companies are among the most data-intensive and highly regulated sectors. Toronto is home to the major Canadian banks—Scotiabank, CIBC, TD, BMO, and RBC—many of which are globally recognized for AI adoption across metrics such as talent, innovation, leadership, and transparency. According to Evident's 2025 report on the state of AI in banking, three of Canada's Big Six banks rank among the top 10 globally for the number of AI researchers hired (Evident Insights 2025). RBC has ranked first nationally and third globally for AI maturity in financial services for four consecutive years (RBC 2025).

Toronto's financial institutions have emerged as significant drivers of the city's AI cluster, moving well beyond passive sponsorship to develop substantial in-house applied AI capabilities. TD Bank's acquisition of Layer 6 in 2018 — a company founded by University of Toronto-affiliated researchers — exemplifies this trajectory: the lab has grown from 15 to over 200 employees, contributing to a 110 per cent increase in TD's patent portfolio, and now operates more than 60 generative AI solutions for customer service and internal operations. RBC's Borealis AI institute, led by U of T alumna Dr. Foteini Agrafioti, has similarly evolved from a dedicated research unit into an enterprise-scale AI operation encompassing a 550-person team, the internally developed Lumina data platform and ATOM foundation model, and a target of generating $1 billion in AI-related business value.

Since the start of 2026, the banks have set aggressive targets to achieve AI-related productivity gains. At RBC's CEO conference in January, Harry Culham said CIBC is investing close to 20 per cent of its expense base in technology, including AI. Meanwhile, TD CEO Raymond Chun said the bank is on track to generate $1 billion in value from its in-house AI initiatives. BMO and Scotiabank round out the picture, with BMO establishing an Institute for Applied Artificial Intelligence and Quantum under a dedicated chief AI and data officer, and Scotiabank fostering talent development through academic partnerships such as the Institute for Management and Innovation's BigDataAIHub Case Competition at the University of Toronto Mississauga.

Collectively, these developments signal a qualitative shift in the role of Canada's financial sector within the AI cluster: the banks are not merely consumers of AI talent and research but active participants in generating, retaining, and commercializing it. By establishing in-house labs, building proprietary compute infrastructure, partnering with domestic AI firms such as Cohere, and aligning their strategies with federal sovereign AI initiatives, Toronto's financial institutions are reinforcing the cluster's talent pipeline, strengthening its institutional thickness, and anchoring AI development within the region.

Challenges in Applying AI in Financial Services

A key challenge for banks working on AI is that their data is typically siloed across internal departments, with access requiring formal approvals that can take six to eight months—a process

that is far from transparent to outside organizations such as start-ups or academic researchers (COM10). This obstacle compounds the broader challenge of Canada's highly regulated financial services sector, where oversight by OSFI and others has fostered deep risk aversion toward "adopting new technology beyond a PoC, a proof of concept" (COM14). Strict rules and internal approval processes create substantial obstacles to moving AI models into production, frequently leading the banks to keep their tools internal and subject to human review. While this limits institutional risk, it also constrains demand for AI infrastructure: although cloud services are available, major providers have invested less in GPU capacity in Canadian regions, and data privacy and residency rules discourage use of US-based cloud infrastructure—a chicken-and-egg problem that has slowed AI growth more broadly (COM16). This situation has begun to change in the past six months, some of the banks have announced their intent to align their efforts with the federal government's sovereign data strategy and major telecom providers, such as BCE, announced significant data centre build-outs across the country.

In sum, financial institutions in Toronto face notable constraints related to risk aversion, regulatory requirements, and data governance, which reinforce demand for secure, enterprise-focused AI solutions. The increased pace of AI adoption and scaleup by leading financial institutions such as RBC, TD, and Manulife indicates this situation is changing, suggesting that the path is opening to scaling AI adoption, with potential benefits for other sectors of the economy. Noteworthy is the fact that Manulife was recently reported to be one of only three insurance firms globally that report their return on AI investments (Balakrishnan 2026). Shared regulatory pressures and similar operational challenges create opportunities for financial institutions to learn from other research areas. Further details on current developments in the sector are provided in Appendix A.

4.6.1.2 Life Science and Healthcare

Toronto's healthcare and life sciences sector represents one of the AI cluster's most promising domains, underpinned by an unusually dense concentration of hospitals, research institutes, and universities in close geographic proximity. Institutions such as University Health Network, SickKids, Mt. Sinai, and St. Michael's maintain strong ties to the University of Toronto and the Vector Institute, creating conditions in which research can move relatively rapidly from the lab into

applied clinical settings. As one firm expressed it, "access to problems that healthcare faces is far more transparent and observable in Toronto that you wouldn't get necessarily anywhere else" (COM2).

One-quarter to one-third of firms in Vector's portfolio are in health tech or biotech, and dedicated programs such as Vector's Health Spark initiative actively support start-ups in navigating clinical partnerships and commercialization pathways. The University of Toronto's Temerty Centre for AI Research and Education in Medicine (T-CAIREM) further anchors the sector through its Health Data Nexus, a secure repository of de-identified clinical data from multiple hospital partners, while Canada's universal healthcare system in principle offers large longitudinal datasets and a demographically diverse population well-suited to training globally relevant AI models. Additional information on the application of AI in the healthcare and life sciences sector are available in Appendix B.

Despite these structural advantages, the sector faces significant constraints that limit its commercial potential. Access to health data remains highly restricted, with fragmented provincial systems, stringent governance regimes, and cultural risk-aversion within the healthcare system collectively impeding firms' ability to translate research assets into market-ready products—in some cases pushing talent to seek opportunities elsewhere. While Ontario logs nearly every healthcare interaction in centralized databases, strict rules around commercialization prevent the full exploitation of this resource. Interviewees nonetheless identified Toronto's demographic diversity—described by one participant as a "microcosm of the planet"—as a distinctive and underutilized asset for validating health AI tools across varied populations. Realizing the sector's potential will require less additional spending than sustained political and public commitment to pan-Canadian data sharing frameworks and reformed governance arrangements that allow Canada's research strengths to be translated into commercial and social benefit. Together, these features position the healthcare sector as both one of Toronto's strongest AI sectors and one where policy and data access reforms could significantly unlock future growth potential (ORG2). Other countries are already using their health data to gain advantages, creating a risk that Canada will be left behind (Razak and Verma 2025). Recognizing the importance of building on sectoral strengths to contribute to improved social outcomes for Canadians, the recent federal AI strategy

launched a new AI Missions Program to advance, high-impact projects with the first mission committing $200 million to improving health outcomes in Canada. In addition, it also granted $100 million to St. Michael's Hospital in Toronto to allow researchers to work with anonymized health data (ISED 2026b). More information on the Life Sciences sector in Toronto's AI cluster is available in Appendix B.

4.6.2 Scaling and Emerging AI Firms

Toronto's AI cluster has produced a cohort of scaling firms whose trajectories illustrate how the cluster's core assets—deep research institutions, diverse talent, and a growing entrepreneurial ecosystem—translate into globally competitive companies. Cohere, founded in 2019 by University of Toronto graduates, has become Canada's pre-eminent foundational AI company, with over US$240 million in annual recurring revenue, a valuation of approximately US$7 billion following a US$600 million Series E round anchored by Germany's Schwarz Group, and a recently announced merger with German firm Aleph Alpha to create a transatlantic alternative to US and Chinese hyperscalers. On May 19, 2026, Cohere announced an additional of the Montreal firm, Reliant AI, to bolster its capacity in the pharmaceutical sector, as part of a strategy to expand into more specialized markets. Waabi, led by University of Toronto professor Raquel Urtasun, raised what is reported to be the largest private financing round in Canadian history—up to US$1 billion—to advance its simulation-based autonomous driving platform for long-haul trucking and robotaxi deployment. Blue J Legal, launched by U of T law faculty, tripled annual recurring revenue for two consecutive years following its integration of large language models, demonstrating that competitive advantage can be built by combining domain expertise with third-party AI tools rather than developing foundational models in-house.

Alongside these established scaling firms, a new generation of early-stage companies is broadening the cluster's scope into domains such as generative image AI (Ideogram) and quantum-chemistry-based water purification (Xatoms), the latter applying AI to pressing environmental challenges in partnership with communities in North America and Africa. The common thread across these cases is the foundational role played by the university and the Vector Institute in training founders, generating intellectual property, and providing access to incubation

and accelerator infrastructure. At the same time, the continued difficulty in securing early-stage domestic capital, the risk of talent and IP migration to US-based firms, and the concentration of Canada's AI ambitions in a small number of scaling companies underscore the systemic vulnerabilities that the cluster must address if it is to sustain its competitive position. Another source of tension noted by several interviewees and commentators is the competition for talent between domestic start-up and scaling firms and the MNEs opening research labs in the region to capitalize on its wellspring of AI talent. Increased support for the AI cluster's emerging and scaling firms represents one of the most significant improvements included in the recent national AI strategy. The strategy establishes a $500 million Canadian Tech Growth Fund to provide flexible growth capital and investment for Canada's most promising AI firms and allows the federal government to take equity stakes in those firms. The strategy also indicated that the government will leverage the $1.75 billion in Budget 2025 to foster private sector investment in venture capital and address access to capital gaps for innovative companies, including AI firms (ISED 2026b).

In Canada generally, and Toronto specifically, there remains uncertainty about what niches the AI sector can compete in globally. While companies such as Cohere, OpenAI, and Anthropic started from similar positions in 2023, access to large amounts of capital has shaped their paths in different directions. Cohere has shifted toward serving large corporate clients such as financial service firms and telcos, where security and data control matter more than speed. There is clearly a tension between the current use of internally developed systems by the banks themselves and Canadian firms versus the rapid pace of model development by leading global companies (COM16). Recent moves by the federal government, as well as large companies such as Bell Canada, to build their internal capabilities on Cohere's product offerings send an important signal about the way domestic procurement and demand can be used to support the growth of Canada's own foundational firm. The national AI strategy builds on these earlier steps by mandating the federal government to act "as a strategic anchor customer and leverage the Buy Canadian policy to provide domestic scale-ups with the revenue and validation they need to successfully export their solutions globally" (ISED 2026b, 40).

However, there remains an underlying tension in the cluster between the emerging and scaling firms noted here and the MNE's who have expanded into the cluster to tap into the deep

talent base. This tension is evidenced in the competition for specialized talent and reflects a long-standing issue with Canadian technology firms. Further details on Toronto's emerging and scaling AI firms are presented in Appendix C.

4.7 Entrepreneurial Supports for the Cluster

Beyond established sectors such as financial services and life sciences, there is also significant growth in the range of start-up, scaling and more established firms developing AI tools for the broader economy. Many of these firms are beneficiaries of the institutional underpinnings of the cluster, which have evolved to provide increased levels of support for current entrepreneurs and potential ones to obtain guidance for the best avenues to pursue to support their ventures. However, the wide range of events and supports may make it difficult for founders to identify the ones are most relevant to them. It also means identifying researchers who don't necessarily want to be founders and connecting them with corporate partners who can fund their work without forcing them into start-up models like "labs" (VC2). The absence of a dedicated cluster management organization (CMO) to help them navigate this landscape compounds the challenge, as elaborated in the next Section.

AI Business Catalyst by Toronto Region Board of Trade (TRBoT)

The Toronto Region Board of Trade received $2.4 million to launch the AI Business Catalyst (AIBC) program, aimed at helping SMEs adopt AI. Delivered through World Trade Centre Toronto, the program can support 75 businesses and 460 participants with practical tools, expert guidance, and hands-on support to implement AI solutions, improve productivity, reduce costs, and strengthen global competitiveness (Federal Economic Development Agency for Southern Ontario 2025; Toronto Region Board of Trade 2025).

Vector: Start-up Support

The Vector Institute plays a distinct and complementary role within Toronto's AI cluster by functioning not only as a research institute, but as a translational hub that supports the adoption and implementation of advanced computational methods within firms. Rather than focusing exclusively on spinout creation or venture acceleration, Vector's contribution lies in its close

connection to leading researchers and its ability to translate research into applied, firm-level technical support (ORG4, INS9).

Vector's positioning as a research institute keeps it closely informed of advances in machine learning and artificial intelligence, enabling it to support the translation of academic research into applied technical solutions in start-up, SME, and enterprise contexts (INS9). Through programs such as FastLane, early-stage companies engage Vector free-of-cost to develop initial models, clarify data requirements, and test, train, and deploy machine-learning systems at stages when they often lack the in-house expertise to do it on their own. The program allows start-ups to test frameworks, refine early prototypes, and anchor conceptual ideas in applied technical solutions, including in areas such as natural language processing (COM6, INS6). These efforts are supported by access to specialized computing resources, including GPUs and cloud credits made available through Vector and its partnerships with providers, such as Google Cloud, supporting founders in experimentation and early model development (INS6, COM9).

Vector's start-up programs draw benefits across the entire organization. Researchers and AI engineers teach problem-solving, and provide hands-on support, while the AI engineering team help build out program delivery and provide technical guidance. Each term they hire 20–30 graduate students to work directly with start-ups, supported by researchers, engineers, and teams handling product, project, and account management, including funding and operational issues. Start-ups and scale-ups are supported by the full Vector community through a coordinated, organization-wide effort rather than the work of a single team (INS6).

Through this model, Vector supports AI adoption across firm sizes while complementing the role of accelerators, such as CDL, which focus on firm growth rather than technical translation, thus highlighting a stage-based progression within the cluster (INS9). Companies across health, biotechnology, manufacturing, and digital services described using Vector's applied technical guidance and compute access to improve system performance, refine technical approaches, and move from early prototypes to deployable products. In several cases, this support was associated with faster time to market, revenue growth, and regulatory progress, with founders consistently pointing to the value of hands-on technical support, access to graduate-level talent, and the credibility that came from working with Vector.

These experiences suggest that Vector plays a critical role for early-stage firms that have data and/or domain expertise but lack the internal capacity and infrastructure required to operationalize advanced computational methods on their own. Vector also supports firms outside formal programs through open events and workshops, including sessions on intellectual property, patents, and technical topics, which participants reported as useful for identifying opportunities and strengthening internal capacity (COM12).

Vector and Mature Firms

More mature firms and MNEs partner with Vector to strengthen internal AI capacity, democratize AI knowledge across their organizations, and recruit high-quality research talent, with one large firm describing Vector as helping both "raise the ceiling" of advanced research and "raise the floor" of organization-wide AI literacy (COM20). This helps lower barriers to AI adoption, particularly for firms that have data but lack in-house AI expertise. Vector's partnership model—which requires corporate partners to establish a local presence—strengthens domestic IP creation and talent retention by anchoring high-quality research in the region (INS10). Partnerships with large domestic enterprises, such as RBC's Borealis Institute and TELUS, extend its impact by supporting internal capability building, talent development, and applied research, including open-source initiatives with public-interest objectives (INS6).

Vector: Cluster Collaboration

Vector's positioning enables it to work closely with other cluster actors including university entrepreneurship offices and accelerators such as UTEST, MaRS, TMU, and Schulich Y-Space, which refer companies to it as they move toward commercialization. In parallel, Vector supports other players by running co-curricular activities and programming as seen with NEXT AI (ORG4, INS9). Moreover, there are crossovers in members, where Vector researchers also partake in AI initiatives individually in initiatives like the Acceleration Consortium (INS1).

The institute engages with the City of Toronto through AI roundtables and public-sector panels, as well as partnering with Toronto Global on investment attraction (GOV1, ORG6). They work with hospitals in Toronto and help start-ups with commercialization by tailoring products to hospital partners of Vector. Vector exists at the intersection of universities, industry, and

government, reinforcing its role as a key institution enabling AI adoption across Toronto and beyond (INS6, INS9).

Creative Destruction Lab

The Vector Institute also works closely with the Creative Destruction Lab (CDL), formerly part of the Rotman School of Management at U of T and now a stand-alone organization. Vector often hands off start-up AI firms to enter the CDL acceleration program and receive the specialized support needed to get those firms to the next stage of their development (INS9). CDL is widely recognized as one of the most effective accelerators in the technology sector. It plays a distinct role in Toronto's innovation economy by focusing on market formation, venture scaling, and founder development. While initially open to a wide range of technology start-ups, CDL made a deliberate shift by creating a dedicated deep learning stream, which to their knowledge is the first of its kind in any incubator globally. The rationale for a focused AI stream was to remain at the scientific frontier, since specialization is necessary to commercialize deep technologies effectively. By aligning mentors, scientists, and founders around cutting-edge research, the AI stream allowed CDL to support ventures whose value depends on advances in machine learning and research-based AI innovation rather than general AI application (ORG2).

CDL helps companies scale by providing support for founders to develop a go-to-market lens, refine product-market fit, and connect with early adopters, scientific (important for technical validation) and business mentors, and international investors (COM14, COM15). Its mentorship-based model, which emphasizes milestone-setting and repeated exposure to experienced operators and investors helps firms adopt a scaling mindset and secure early adopters and external funding (ORG2). One founder noted, "CDL has also really helped in bringing in external money. I think if that hadn't been the case, we would have very likely have had to become an American company" (COM14). Participants credit the program with incubating their ventures, connecting them to investors, and providing critical mentorship (COM15).

CDL and Vector play complimentary and mutually supportive roles within the Toronto cluster's entrepreneurial support system. While CDL focuses on commercialization, market validation, and investor engagement, Vector addresses technical development needs. Companies often move between CDL and Vector as their needs evolve, reinforcing CDL's position as a central

commercialization and scaling engine in Toronto's AI cluster (INS9). This reflects another way in which the university has contributed to the growth of the cluster by supporting start-ups whose origins may lie beyond the walls of the university in other parts of the cluster.

AXL Venture Studio

University of Toronto professor Daniel Wigdor, former director at Meta's Reality Labs Research, launched AXL, a Toronto-based venture studio aiming to build 50 AI-enabled companies over five years to strengthen Canada's research-to-commercialization pipeline (Santos 2025; Riehl 2026). Rather than creating foundational AI models, AXL focuses on applications built on existing AI, leveraging academic research and assigning entrepreneurs to tackle validated problems with ready delivery channels.

Located in the Schwartz-Reisman Innovation Campus alongside the Vector Institute and U of T's Computer Science Department, AXL's goal is to retain Canadian AI talent, protect intellectual property, and develop globally competitive firms. The studio has secured a $15 million venture fund and partners with corporate, accounting, consulting, and IT firms through the AXL Catalyst Program to scale AI solutions efficiently (Santos 2025; Riehl 2026; Business Wire 2025). Each venture starts with a confirmed first customer and strategic investor. Wigdor highlights a "go-to-market gap," emphasizing the importance of validating market needs before building solutions—a point echoed by interviewees, suggesting entrepreneurship education should focus on identifying real market gaps before product development (COM18).

4.8 Adoption, dissemination, and diffusion

There is growing evidence that a key challenge for the AI cluster in Toronto specifically and across Canada may be the adoption and diffusion of AI across other sectors of the economy. Some observers believe that the ultimate success of the AI cluster will depend not just on the number of new scale-ups and spinoffs generating AI applications, but on the pace of diffusion throughout the rest of the economy--in other words it must be demand driven. Companies need to obtain early deals with large domestic purchasers or a supportive government to demonstrate that their product works effectively. For this reason, the adoption and diffusion of AI technology has become an increasing focus of the Vector Institute's activities.

4.8.1 Market Access and Customer Adoption

The disadvantage associated with Canada's smaller market size for growing domestic AI firms is exacerbated by the culture of risk aversion among Canadian buyers, making it difficult to sell domestically. In fact, many Canadian tech companies make a significant portion of their revenue through foreign clients, especially the US. The lack of domestic support limits the potential for domestic firms to grow without gaining their initial customers in international markets. Several founders noted that the lack of domestic adoption makes it difficult to validate products and build early use cases for their products. In some instances, even Canadian institutions with an ownership stake in the local start-up declined to adopt homegrown solutions, undermining the company's credibility with international customers (COM4). The challenge is greater for domestic companies trying to sell to foreign governments when they are asked why Canada's own government is not buying their product, thus undermining their global credibility (COM4). This risk aversion is amplified by the oligopolistic nature of the Canadian market. Since large enterprises face less competitive pressure than US firms, there is "no urgency to be an early adopter of technology," making the issue fundamentally "a function of the market" (VC2).

Post-pandemic norms around remote work makes it feasible to build globally competitive AI companies from Toronto (COM14). Although the possibility of working remotely makes co-location with customers less essential, especially with respect to certain types of technology, the lack of proximity to major tech hubs such as San Francisco places firms in Toronto at a relative disadvantage due to weaker network effects, fewer informal interactions, and potentially reduced opportunities for collaboration. Companies compensate for this distance effect by travelling to attend key industry events (COM5).

4.8.2 Need for Adoption and Increased AI Trust

Convincing Canadian SMEs to adopt and use domestic AI applications also depends on diffusing the requisite skills to support AI adoption and making it easier to use (City of Toronto n.d.). Skilling and demystifying are crucial, especially in Canada since it has the lowest trust in AI in the G7 (COM8). Another interviewee suggested that university courses should focus on a "problem-first" approach, requiring students to validate a problem through interviews before creating a product,

focusing not on the product but on how you're going to distribute it, who your client is and who's willing to pay for the product (COM18).

The federal government recently addressed the challenge of SME adoption. In 2025, the Business Development Bank of Canada (BDC) launched its LIFT (Lead with Innovation and Focus on Technology) initiative, a $500-million loan program directed at firms with annual revenues above $1 million. Through LIFT, eligible businesses can access financing ranging from $25,000 to $5 million at a preferred interest rate and repayment terms designed to reduce the short-term burden of technology investment. The program pairs recipients with expert AI advisors, and prioritizes Canadian-developed tools and equipment, embedding an element of domestic procurement within the incentive structure. BDC anticipates that the LIFT program will support more than 1,000 SMEs and held address the productivity gap for Canadian SMEs (BDC 2026). Whether programs of this scale are sufficient to shift adoption rates meaningfully across a diverse and risk-averse SME base remains an open question, but LIFT represents a recognition at the federal level that diffusion cannot be left to market forces alone. The recent national AI strategy builds on the LIFT program with the announcement that it will add $500 million to the $200 million previously allocated to the Regional Development Agencies to accelerate the adoption and use of AI in firms across the country. It will also utilize the SR&ED tax credit and the Budget 2025 Productivity Super-Deduction support private sector investment in AI (ISED 2026b).

4.8.3 Availability of Capital and VC Environment

While Canada excels at producing AI talent and is doing well at stimulating start-up firms, it faces a fundamental challenge with respect to domestic firms gaining traction, which limits the growth of globally scalable firms. While some, especially start-up founders, argue the cluster suffers from a lack of local venture capital investment, others note that funding is accessible through global investors, including those in the US, who invest regardless of location. One local investor points out that VCs are typically seeking companies with potential billion-dollar outcomes, something Canada has yet to produce in substantial numbers (VC2). This implies that the local market for AI products is not large enough to support the growth of VC-backed companies and creates the perception that it is easier to grow and scale companies in the US than Canada. While initial funding can be obtained in Canada, larger, follow-on rounds of investment often require US

participation (COM10). Although companies may secure US investment while based in Canada, the market pull often draws them into the US, influenced by the availability of investment capital and the location of their leading customers (COM4, COM13). For any company to grow and scale, it must have a clear path to sales (ORG3), which leads firm founders and investors to advise other founders to avoid focusing principally on the Canadian market, and in some cases, to relocate entirely to the US or other countries (COM4, COM21).

4.9 Compute Access

An underlying issue that cuts across many of the preceding themes is access to the computing power needed to run AI programs, whether in a research environment, for start-up companies or larger, established companies, both domestic and MNEs. Interviewees offered insights into the simplified assertions about the availability of computing power. Compute is a primary pillar for talent retention alongside data access and access to interesting problems. Inadequate compute directly threatens the cluster's ability to attract and retain world-class researchers (INS5).

4.9.1 Insufficient Investment

Many interviewees maintained that the current $2.4B in public investment is insufficient to sustain or grow Canada's global position in AI (ORG2, INS3). While federal efforts to expand access to computing power were acknowledged, the Ontario government was criticized for its failure to invest sufficiently in compute access, potentially undermining the capacity of Vector's facilities (INS5). In addition, some felt Canada faces gaps in the physical infrastructure needed to scale compute, including energy generation, transmission, and data centres (ORG6).

A firm that is building a GPU farm explains that newer compute-intensive workloads require more specialized infrastructure, particularly related to energy, cooling, and data centre capacity. Where teams previously focused on data and basic storage needs, they must now consider the full infrastructure stack from power supply to facility design, highlighting the impact of longer supply chains and tighter physical constraints. Current and future generations of AI chips are expected to demand levels of power that few data centres can support, making access to affordable, reliable energy and supporting infrastructure critical for sustaining AI adoption and scaling (COM16).

As AI workloads become more compute- and energy-intensive, limited capacity risks constraining talent attraction, firm growth, and research activity, potentially increasing the need for Toronto's researchers and companies to rely on other countries (ORG6). One interviewee highlighted the potential value for AI compute of Ontario's "largely hydroelectric grid," which provides a clean and reliable power source (COM8). In addition, Ontario is leading developments in new nuclear technologies by building the first small modular reactor in a G7 nation at the Darlington site, which is potentially valuable for continued growth in high-compute capabilities (COM8). Another interviewee suggested that jurisdictions with reliable, low-cost power sources, such as hydro or nuclear energy, may enjoy a competitive advantage in attracting AI infrastructure investment. While GPUs may be available on the market, deploying them effectively requires physical, energy, and operational capacities that are unevenly distributed. Ontario's hydroelectric grid and leadership in small modular nuclear reactors were highlighted as strategic strengths for supporting future high-compute AI growth (COM9).

Leading global firms have already moved to secure long-term energy agreements with power providers in the United States, recognizing that inadequate energy access represents one of the primary constraints on scaling AI computing. Canada's existing energy assets could therefore position it favourably, though this potential remains largely unrealized (COM16; Mullin and Khan 2026). The presence of these critical infrastructural resources, combined with recent efforts by Canadian telcos to expand the presence of compute data facilities suggests the AI cluster has access to a key input needed for its continued success.

4.9.2 Scaling Compute: Clouds, GPU Markets, and Strategic Choice

Toronto's AI cluster relies on a diversified mix of compute sources rather than a single centralized system. Vector operates its own GPU cluster, meanwhile Compute Canada provides research clusters for academic labs with one housed at U of T known as SciNet (INS2). Start-ups and researchers access compute through a combination of Vector's on-premises GPU clusters (INS6, COM9), cloud providers such as Google Cloud Platform (GCP) (COM13), AWS, and Azure (COM17). This has created a "pick your adventure" model, in which organizations choose between building in-house, relying on dedicated AI farms, or pre-committing to hyperscalers (i.e. AWS, Azure, GCP) at scale (COM16). In some instances, large institutions negotiate long-term

commitments that mirror the construction of a data centre, without owning the physical infrastructure itself.

For pre-seed and seed-stage companies, it is less about access to compute and more about affordability, timing, and strategic use of available resources. Early-stage firms often rely on intermediaries, especially the Vector Institute, which provides access to compute facilities through partnerships with companies like Google Cloud Platform, and its on-premises GPU infrastructure to support initial model development and deployment (INS6). A researcher-turned-founder reflected that access to Vector's GPUs and high-memory machines during their PhD made it possible to run models that were impossible to run on laptops, supporting early experimentation and pipeline development that later led to a company spin-out. This form of subsidized access is important during the transition from experimentation to early market deployment. This access is embedded within a broader institutional environment (e.g. Vector and U of T) that combines compute resources with mentorship, technical learning, and peer interaction. Hence, the value of Vector to these companies lies not only in the hardware but with the surrounding research community, lecture series, and networking opportunities that support their development as researchers and entrepreneurs (COM9).

Academic institutions such as U of T play an important role through shared clusters connected to national facilities like Compute Canada (INS2), though capacity constraints and queue times limit their usefulness for firms, reinforcing their role as research-focused infrastructure rather than a long-term commercial solution for these companies (COM4). This limitation may be addressed by recent investments in U of T's AI infrastructure with the university receiving $42.5 million in federal funding Canadian Sovereign AI Compute Strategy via the Digital Research Alliance of Canada's National AI Compute – Rapid Deployment initiative (Kalvapalle 2025).

As companies mature, compute access shifts decisively toward commercial providers. Larger firms increasingly rely on hyperscalers, dedicated AI farms, or pre-purchased cloud capacity that effectively replicates private data centre scale without owning physical infrastructure (COM16). Some companies explicitly described using Google Cloud for R&D work conducted with

Vector and relying on cloud platforms, suggesting continuity rather than a break between early-stage and scaling compute strategies (COM13).

4.9.3 The Skeptics

Despite this emphasis on the importance of compute, these concerns were raised primarily by supporting organizations. Start-ups rarely cited access to computing power as a limiting factor, focusing instead on sector-specific issues, such as funding, or domestic customer acquisition. Some interviewees suggested that compute may not be as big a barrier as assumed, since many companies only need access, regardless of where the hardware is located, such as GPUs via AWS or Google (ORG5, COM19). One start-up founder noted that by leveraging cloud platforms like Azure, they could scale compute on demand, avoiding university queues, and emphasized that compute availability was not their primary constraint. This was partly contingent on having already raised capital to fund those cloud resources (COM4).

Compute needs vary widely by company stage, with large firms like Cohere facing very different requirements than early-stage start-ups (INS6). Most companies are not operating at hyperscale, suggesting that the compute debate, especially around developing data centres, may reflect the needs of a small number of frontier firms. Given that public investment is unlikely to match the scale of large tech firms, interviewees suggested making better use of existing assets, improved data access, and stronger support from industry and community organizations, might provide a more effective solution rather than just focusing on the federal government (ORG2, INS3).

4.9.4 Reconciling the Debate

The Toronto AI cluster does not reflect a single compute deficit, but different access points at various company stages. Early-stage firms and researchers rely on a mix of cluster-based GPU clusters, academic infrastructure, and cloud credits. Scaling companies transition toward commercial cloud providers and private GPU markets. Only the largest actors deal with the full infrastructural challenges of in-house compute. This layered structure explains why interviewees suggested there was growing pressure around compute access, while rejecting the idea that early-stage innovation is being blocked. The core policy challenge is not simply increasing aggregate

compute supply, but ensuring continuity across these layers, so that firms can scale from subsidized and shared access to sustained infrastructure without exiting the Canadian ecosystem.

A recent study by Munk researchers found that cloud infrastructure and compute hardware represent the most acute vulnerabilities to Canada's AI sovereignty (Mullin and Khan 2026). The sovereignty dimension of compute infrastructure has begun to attract private-sector responses. In April 2026, Bell Canada and Celestica announced a joint undertaking to develop a sovereign Canadian AI infrastructure stack. Bell is contributing its national fibre network, data centre infrastructure, cloud capabilities, and professional services, while Celestica is supplying the hardware components—switching, storage, rack integration, thermal management, and power infrastructure. The aim of their collaboration is to provide governments and regulated industries with an infrastructure environment in which sensitive AI workloads remain under Canadian jurisdictional control (Bell Canada 2026). The venture reflects a broader recognition, shared by policymakers and industry, that data sovereignty requires a domestic infrastructure layer capable of supporting it. The national AI strategy addressed these issues with measures support the construction of large-scale AI data centres that can scale to at least 100 megawatts (MW), designed to serve a cross section of Canadian firms (ISED 2026b).

4.9.5 Conclusions

Toronto's AI cluster is multi-layered, with compute access varying by firm stage. Researchers draw on on-premises facilities such as Vector and SciNet at U of T, while early-stage researchers and start-ups rely on shared academic clusters and cloud credits. As firms scale, they transition to commercial cloud providers and private GPU markets, with only the largest actors facing the full challenges of in-house infrastructure. This structure helps explain why compute demand is rising without uniformly constraining early-stage innovation. As such there needs to be continuity across the various layers of development so firms can scale from access to sustained infrastructure without leaving the support provided within the cluster.

5 Governance Institutions for Toronto's AI cluster

As noted in Section 3, the cluster literature identifies the governance dimension as a key contributor to the sustained success of individual clusters (Porter 1998), especially the role of cluster management organizations or CMOs (Elola and Wilson 2025). Governance arrangements, in turn, depend on the presence of strong, dynamic industry leaders with the ability to forge a broad and inclusive CMO. Cluster management organizations that frame collaborative approaches to solving collective challenges faced by different segments of the cluster constitute a key factor for their success. In addition to mobilizing or deploying resources, CMOs shape the institutional environment in which they operate, taking the form of what Porter et al. call 'institutions for collaboration' (2001, 33). The establishment of collaborative networks between elements of the business and civic communities, including research-intensive universities, can have a significant impact of the evolution of a cluster,

> The presence of *collaborative institutions and organizations*, such as cluster organizations, professional networks, research-industry consortia and entrepreneurial support networks, greatly facilitates this environment. These alliances, networks and other relationship-building mechanisms create connections and linkages vital to economic development in a technology-driven world. . . . Relationships matter (Montana, et al. 2001, 10).

Of relevance for this study is the potential role that the university's involvement in its local industrial cluster can play. Perceived as critical enablers, or 'animateurs', of regional development broadly, and cluster development more specifically, engaged and entrepreneurial universities embed a strong regional focus in their missions. Activities targeted towards this goal are delivered in conjunction with a broad-based coalition of other actors in the cluster. Embedded universities have a greater focus on adaptive responses to regional needs, which facilitates closer alignment between the functions of the university and trajectories of regional development. This suggests the need to conceive of "the civic university engaged across a wide range of disciplines with an equally wide range of stakeholders in a diverse external environment" (Goddard and Vallance 2014, 148). Civic universities operating in this manner serve as 'good community players' that facilitate local linkages and networks (Wolfe 2005; Betts and Lee 2005).

5.1 Governance of Toronto's AI Cluster

While Toronto's economy witnessed considerable economic expansion through the fourth era of growth discussed in section 3 of the report, civic governance failed to keep pace. There is no shortage of entrepreneurial civic leadership or organisational presence, but the lack of coordination across the region's 29 municipalities and the absence of broader governance structures at the regional level impede its development. Responsibility for regional development rests with a multiplicity of organisations at the federal, provincial, regional, and municipal levels, with overlapping and conflicting mandates. The absence of coordinated leadership and fragmented governance structures in the absence of CMOs or comparable organizations undermine the opportunity to leverage investments in research and talent (Bramwell and Wolfe 2016). Addressing this issue—especially with respect to Toronto's leading-edge cluster in AI—would allow the region to harness its deep pool of talent, unleash entrepreneurial potential, and secure more sustainable economic growth.

The report thus far has demonstrated that the constituent elements of a dynamic and growing industrial cluster are present in Toronto's AI cluster. But the literature on industrial clusters suggests the constitutive elements of the cluster would perform at a higher level if they were connected through a collaborative organization in the form of a CMO. Many of the elements of this organization are active in the cluster including U of T, the Vector Institute, MaRS, the TRBoT, Toronto Global, CDO, and other entrepreneurial support organizations. They meet periodically to coordinate efforts to support the cluster but lack the presence of a continuing organization to sustain those efforts.

Collaboration has strengthened over the past decade (ORG4), but coordination remains largely voluntary and relationship-based creating strategic ambiguity. One founder noted that in the early days of the cluster there were very few support options available (COM4). Today, however, the challenge is the opposite. With the expansion of programs, there are now "too many doors" to navigate. A venture capitalist similarly emphasized that universities must ensure entrepreneurs are aware of the appropriate pathways and resources should they choose to seek it out (VC2). Another interviewee described the cluster as fragmented, with many initiatives operating in parallel and limited coordination between academia and innovation hubs. U of T is

perceived as somewhat disconnected from other elements of the cluster (GOV1), however observationally, one sees an integrated system in which entrepreneurial talent flows from U of T into surrounding programs such as NEXTCanada. Efforts such as *Ecosystem Connects* by the City of Toronto aim to reduce silos by using the City's convening power to bring academia, incubators, and accelerators together (though this is not specific to AI).

The City of Toronto, through the Action Plan for Toronto's Economy, and a table at TRBoT initiated the creation of the *AI Competitiveness Coalition*, bringing together senior leaders from U of T, the Board of Trade, the City of Toronto, and Toronto Global. Its initial focus was helping SMEs adopt AI to stay competitive, representing an early step toward coordinated cluster governance, though perhaps with a limited representation from the diverse set of stakeholders across the local AI cluster.

As noted throughout the report, U of T sits at the centre of the cluster, functioning as an institutional anchor and source of legitimacy, talent, and research capacity. The University is an important lever as the origin point for many start-ups and through its partnerships with local actors and government. Closely connected is the Vector Institute, which operates as a hub linking academia, industry, and government (connects with Toronto Global for FDI). Vector participates in municipal roundtables and collaborates with other institutions. There is also an intentionality between organizations such as Vector and SRI to differentiate their roles which signals a maturing cluster where actors are coordinating their roles in a complementary fashion.

Economic development bodies further reinforce this collaborative architecture. Toronto Global, with its overlapping advisory roles and regular inter-organizational calls (i.e. with Vector), indicates that governance occurs through relational networks and shared objectives, especially around firm attraction and cluster growth. At the same time, concerns expressed above about limited provincial investment point to the vertical fragmentation across federal, provincial, and municipal levels, suggesting the need for stronger intergovernmental coordination to support local cluster organizations. One interviewee points to an expectation that federal leadership (the federal Minister responsible for AI) should step in with dedicated funding, clear pathways, and training programs to help businesses adopt AI (GOV1).

Overall, the interview evidence points to a model of distributed, collaborative, and institutionally anchored cluster governance. Governance occurs through overlapping advisory roles, partnerships, coalitions, and regular inter-organizational engagement rather than through a more integrated coordinating organization. While initiatives are broadly aligned, coordination depends on informal trust, overlapping leadership circles, and intergovernmental cooperation rather than an overarching framework that would be provided by a cluster management organization.

6 Conclusion and Policy Recommendations

The current state of Toronto's AI cluster is the outcome of two decades of institutional investment, world-class research, and a growing concentration of specialized talent. Several themes emerge from the study: the first is the foundational role of UofT in the emergence and growth of the cluster and its continuing importance for the cluster's global visibility, ensuring that Toronto is widely recognized as a leading AI centre. The University, together with the Vector Institute, CIFAR, and a dense network of research hospitals, accelerators, and intermediary organizations, has provided a pipeline of researchers and engineers whose influence extends well beyond the cluster's boundaries. Successive generations of faculty and alumni—from Geoff Hinton's foundational work in deep learning through to today's cohort of founder-researchers—have made the city a default reference point for firms, students, and investors assessing where to locate AI capacity. One interviewee expressed this better than anyone else:

> Just the sheer number of researchers who have come out of Toronto. Although they may have moved on to other places, they are still part of the fabric of what started here. And that's still why a lot of companies are looking to come and invest in the Toronto region and in Toronto because they know that even though that person may not be here anymore for whatever reason . . . they've left behind researchers and students, and they've left behind the people that have worked with them along the way. And just having access to that nature growth within the ecosystem has been really important (VC1).

Yet the evidence reported here also reveals a paradox at the heart of Toronto's cluster. The region excels at producing talent and generating ideas but has proved less successful in converting these assets into domestically anchored, globally competitive firms. The limiting factor is not capital formation in isolation; it is the absence of sufficient domestic demand and the availability of experienced talent at mid- to senior management levels. Canada's oligopolistic market structure across a range of sectors dampens the competitive pressure that drives early adoption of new technologies. Risk aversion among large institutional buyers, compounded by fragmented data governance and regulatory caution, means that many of the most promising companies built in Toronto seek their first customers, and eventually their headquarters, abroad. This dynamic

creates a feedback loop: without domestic validation, firms lack credibility in international markets; without credible scale-ups, the ecosystem cannot retain the senior talent and investment it needs to mature. The internal competition for talent and support between emerging and scaling domestic companies and MNEs represents a further tension at the heart of the cluster. This tension is part of a broader problem underlying Canada's tech sector – the absence of a clear and consistent government strategy to support the growth of Canadian scale-up firms. However, as the cases of start-up and scale-up firms suggest, there is recent evidence that this dynamic is changing. The future of a sovereign, Canadian-based cohort of AI companies will clearly depend, in part, on a resolution of this broader issue (Denney, Southin and Wolfe 2023). The recently released national AI strategy provides further evidence that the federal government recognizes the importance of this gap and is taking steps to address it (2026b).

Interviewees point to a deeper structural challenge: the absence of coordination across the cluster's many institutions. Toronto possesses a remarkable density of accelerators, research institutes, hospitals, government agencies, and investor networks, but no central mechanism exists to align their strategies, link demand from industry with supply from research and start-ups or raise the profile of the ecosystem globally. This fragmentation is felt acutely by founders navigating a landscape of overlapping but disconnected supports, and by established firms uncertain of where to enter the ecosystem.

At the same time, the study reveals strengths that no other city in North America can easily replicate. Toronto's diversity—demographic, disciplinary, and cognitive—functions as an attractor for students, researchers, and firms as a preeminent location in which to study, conduct leading-edge research, start a new firm or grow and expand the AI capabilities of an existing firm, as documented in Section 5. There are few places in the world with a higher proportion of the population born outside of the region. In an era when more countries are seen as closing their borders to newcomers, this remains a critical advantage making Toronto an ideal site to undertake AI activities. Supporters of Toronto's AI need to double down on this as a critical part of the narrative of Toronto's attractiveness.

Viewed historically, Toronto's AI cluster has evolved through three broad phases: an era of emergence as a global powerhouse, based on the historical research strengths at U of T and

supported by CIFAR and NSERC, catalysed by the Pan-Canadian AI Strategy and the founding of the Vector Institute; a period of pandemic-era disruption that drew talent and start-ups south; and the current period of renewed energy from a new generation of founders, tempered by frustration with the structural limits of building and scaling in Canada. The recommendations that follow address the constraints identified across all three periods and to create the preconditions for a sustained fourth phase of coordinated growth, recognizing the contribution made by the recent national AI strategy referenced throughout this report.

6.1 Policy Recommendations

Recommendation I: A Toronto AI Procurement Compact

The single most consistent finding of this study is that domestic demand, not capital availability, is the binding constraint on cluster growth. A multi-sector AI Procurement Compact would bring together the institutions best positioned to generate that demand—major financial institutions, hospitals and health networks, provincial and municipal agencies, large employers and service providers, and global-facing Canadian enterprises—around a shared commitment to procure and test Canadian-built AI. Participating institutions would co-develop use cases with start-ups and researchers, support validation and pilot environments, and publish learnings to accelerate broader adoption. The Compact should be coordinated with elements of current federal instruments, SR&ED, IRAP and the new AI strategy, to ensure that procurement incentives align with and reinforce R&D supports already available to SMEs. By creating a visible, reliable base of early adopters, the Compact would address the credibility gap that currently pushes firms to seek first customers outside Canada. The recently released report by Informanos on procurement pathways for AI solutions in Toronto provides additional recommendations on this point (Informanos 2026).

Recommendation II: A Coordinated Toronto AI CMO

Interviewees across career stages and sectors described an ecosystem rich in organizations but lacking in connective tissue. A coordinated Toronto CMO, the AI 'Hub', would function as an integrative framework linking five interdependent elements: talent development, procurement (through the Compact above), governance expertise, professional services, and data access. At

present, founders navigate a fragmented landscape of fractional contracts and disconnected advisory networks; researchers and start-ups operate within smaller communities that are only loosely connected to one another. The Hub would draw on the model of collaborative institutions found in some of the world's most dynamic clusters, creating a single, accessible pathway from research commercialization through to firm scaling. Establishing a dedicated CMO to manage these linkages, align incentives across organizations, and raise the global profile of the ecosystem is essential. Neither the City of Toronto, in its current capacity, nor any of the relevant organizations in the cluster can perform this role given their current mandates, hence the need for a dedicated AI CMO.

Recommendation III: A Regional Data Access Strategy

Toronto's AI ecosystem would benefit substantially from a coordinated strategy for regulated, high-value data—health data in particular—that provides clear pathways to unlocking the commercial potential of Level 4 datasets while maintaining robust privacy protections. Ontario's universal healthcare system logs nearly every patient interaction in centralized databases, and the region's demographic diversity could support AI models trained on data representative of global populations. Yet access to these data is restricted by fragmented systems, provincial regulations, and institutional risk aversion around commercialization. A regional data access strategy should be developed in consultation with existing non-profit and institutional initiatives and in dialogue with the Ontario government on the province's evolving AI regulatory framework. The strategy should embed Canadian values of trust and public purpose, positioning responsible data governance not as a constraint on innovation but as a competitive differentiator in global markets. Parallel attention to compute access—ensuring continuity from subsidized, ecosystem-based infrastructure through to commercial-scale cloud and GPU capacity—is necessary to ensure that improved data access translates into firm growth within the Canadian system. The recently announced federal $100 million initiative to launch the Health Sector Data Space, with theCanadian Institute for Health Information (CIHI), to link existing datasets to strengthen clinical trials, health services research is a first step in this direction ((SED 2026b).

Recommendation IV: A Talent Circulation and Retention Framework

The evidence from the study suggests that talent mobility in Toronto's AI cluster is better understood as circulation rather than as drain. Many of the region's most accomplished researchers and founders have spent time in California or other global hubs and returned, bringing networks, capital, and operational experience to Canada. Policy should embrace this model of circulation rather than pursuing permanent retention as an end. At the same time, the cluster must address two persistent gaps: a shortage of mid-to-senior level talent, which forces scaling firms to recruit from the United States; and a compensation structure that benchmarks AI salaries to financial services norms rather than to globally competitive rates. Concrete measures should include continued investment in immigration pathways such as the Global Talent Stream; targeted incentives—through Mitacs, SR&ED, IRAP, and complementary provincial instruments—to reduce the effective cost of retaining senior talent domestically; expanded programs, such as UofT's MScAC, that bridge the gap between academic training and applied industry roles; and sustained investment in foundational research and academic leadership to ensure the next generation of researchers anchor their careers in Toronto. The recent national AI strategy introduces a number of welcome measures to address this issue (ISED 2026b).

Collectively, these recommendations address the tension identified across the interviews: Toronto has built one of the world's most productive AI talent-based clusters, but lacks the institutional architecture needed to retain the economic value the cluster generates. The Procurement Compact targets the demand side; the AI Hub targets coordination; the Data Access Strategy targets the regulatory and infrastructural foundations; and the Talent Framework targets the human capital pipeline. None of these measures alone is sufficient. Their value lies in their intersection—as a coordinated program that moves the region from producing ideas to scaling them, from exporting talent to circulating it, and from fragmented institutional strength to a legible, globally competitive AI cluster.

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Appendix A: Financial Sector Cases

Case Study: TD Bank and the Financial Sector

TD Bank occupies a central place in Toronto's AI cluster as a founding sponsor of the Vector Institute and through its in-house AI research lab, Layer 6 (TD Bank Group 2022). Acquired in 2018 from its founders—Jordan Jacobs, Tomi Poutanen, and Maksims Volkovs, all affiliated with U of T—Layer 6 was purchased to leverage Canada's AI talent and signifies a major investment by TD in building its applied AI capacity and position the bank as a technology leader (Galang 2018). Recognised for superior real-time personalisation and prediction, Layer 6 is currently led Maksims Volkovs and headquartered in the MaRS Innovation District. Since the acquisition, the team has grown from 15 to over 200 employees under Volkovs' leadership, and TD's patent portfolio has increased by 110 per cent, with 20 per cent of the patents related to AI (Rolfe 2024). TD has also hired 57 AI specialists through the Vector Institute's network (TD Bank Group 2022). In 2022, TD extended its sponsorship of the Vector Institute through to 2027, reinforcing its long-term support for the talent pipeline, industry-focused AI training, and applied AI research that Vector provides (TD Bank Group 2022).

TD's Layer 6 is opening its first office outside Toronto, in NYC, to support the bank's US operations and develop AI products (Scott, 2025a). Since the launch of ChatGPT, Layer 6 has allocated major resources to deploy generative AI and currently offers 60+ AI solutions for customer services and internal operation (Scott, 2025a). They also have a dedicated team focused on AI governance and safety to ensure risk management, and regulatory compliance to embed guardrails into all applications (Scott, 2025a).

Case Study: RBC and the Borealis Institute

The rapidly growing AI expertise of Canadian banks also reflected in the creation of in-house AI labs. RBC's Borealis, established in 2016 and led by U of T alum Dr. Foteini Agrafioti, originated as a dedicated AI research institute (RBC, 2025). According to Dr. Agrafioti in a presentation to the All-IN conference in Montreal in November 2025, RBC aims to grow the value of its AI related business by $1 billion. It created the Borealis institute to access the value of knowledge or talent in the bank. The bank centralized all its datasets hosted on a platform. It created Lumina as a platform to house

the data and now has the tools needed to harvest the data. It has also developed large language modules to harvest their transaction data. Many of RBC's AI models are rooted in retail banking, such as ATOM—the bank's Asynchronous Temporal Model—which uses transaction data from credit cards, accounts, and rewards programs to determine client's credit worthiness.

RBC is deploying this capacity to improve direct service to clients, to book greater efficiencies within operations, and to improve risk management activities in the bank. Generative AI is being used to reduce call handling times by 30 per cent. They are using AI to adjust credit to leverage internal data and better understand the risk tolerance of clients, enabling the bank to extend more loans to clients in a way that was not possible previously. While generative AI and transformer models have driven strategic pivots over the past two years, this represents a continuation of existing efforts. Working with Toronto firm Cohere has accelerated the diffusion of AI to RBC employees.

As AI has become more central to core banking operations at RBC, Borealis has shifted toward enterprise-level challenges. In total, there is a 550-person team working on AI related applications within the bank but about 200 are primarily focused on AI research and data science. RBC has developed the Lumina platform and its foundation model ATOM, while also leveraging generative AI to enhance client services, deliver market insights, and support workforce development through its AI Academy (RBC, 2025). Anyone with a technical skill set has become valuable to the bank because the team working on AI applications inside the bank are using models that RBC has developed to deliver services (COM16). According to AI benchmarking and intelligence platform, Evident AI's *2025 State of AI Research in Banking* report, RBC is Canada's highest-scoring bank for AI maturity in its index of 50 international banks and ranks third globally (Evident Insights 2025).

In February 2026 RBC appointed Bruce Ross as the head of its AI group, reporting directly to the bank's CEO, Dave McKay. The bank's in-house research lab, Borealis was folded in under this group. Ross said the bank is building much of its computing capacity in-house to safeguard sensitive client data rather than relying on public cloud providers. "We have the largest GPU farm outside of the federal government," Ross said. "That's on [premises] in RBC-owned data centres, and that's sitting in Ontario." RBC's AI strategy is depicted in terms of three stages: boosting

employee productivity; improving operational efficiency to accelerate routine processes; and developing new business solutions to improve how runs its core operations to serve clients (Choukiekh, 2026).

Another leading financial institution, BMO, established its own Institute for Applied Artificial Intelligence & Quantum, a centre of excellence that cuts across all the institution's lines of business to focus on responsible innovation, the governance of AI and the development of quantum capabilities. The Institute integrates the bank's expertise across several areas expertise to develop its quantum strategy, increase productivity and support long-term growth. The Bank appointed Kristin Milchanowski, its chief AI and data officer as founding director of the BMO Institute for Applied Artificial Intelligence & Quantum (BMO Financial Group 2026).

Scotiabank, in turn, is leveraging its academic partnerships by hosting the BigDataAIHub Case Competition at U of T Mississauga, which provides students with practical experience working with big data and AI using real-world datasets (U of T 2022). Investments by Toronto's leading banks in AI research are enhancing customer service and operations while solidifying both their reputation and Toronto's as innovators in finance. They are also ensuring the cultivation and retention of local talent through career-enhancing opportunities and by placing local AI professionals in leadership roles.

Appendix B: Life Sciences Sector

Healthcare is another area where Toronto's AI cluster excels. The city has an unusually dense network of hospitals, research institutes, and universities located in proximity, creating frequent interaction between clinicians, researchers, and AI developers. Institutions such as University Health Network, SickKids, Mt. Sinai and St. Michael's are closely tied to the U of T and the Vector Institute, making it easier for research ideas to move from the lab into applied settings (COM3, COM8). As one firm expressed it, "access to problems that healthcare faces is far more transparent and observable in Toronto that you wouldn't get necessarily anywhere else" (COM2).

Roughly one-quarter to one-third of the companies in Vector's portfolio are in health tech or biotech, reflecting both the sector's overall strength. Programs such as Vector's Health Spark initiative assist starts-ups and scale-ups at a stable growth stage in clinical partnerships and commercialization pathways (INS6). Vector also received $4M in provincial funding to improve efficiency in provincial healthcare by securing computing environments to support health research and application, support ML adoption across Ontario, and collaborate with clinicians to build on Unity Health Toronto's GEMINI data from 30+ hospitals to develop new AI-driven healthcare insights and tools (Vector 2022). To show how AI can improve healthcare, the Vector Institute launched Pathfinder projects with hospitals and institutions. One project with Public Health Ontario uses AI to quickly identify ticks that may carry Lyme disease, replace a slow manual process, allowing doctors to make faster, better-informed decisions (Vector 2022).

Strong academic links continue to drive firm formation, with many startups emerging directly from university research and maintaining close relationships with academic institutions as they mature (COM9). U of T's Temerty Centre for AI Research and Education in Medicine (T-CAIREM) offers Health Data Nexus (HDN), a secure, AI-ready repository of de-identified health data from hospitals (Peters 2025). By combining diverse data sets ranging from clinical records to imaging to wearables, researchers can create insights across disciplines that a lone institution would be unable to do so (Peters 2025). "It's a uniquely Canadian model – secure, collaborative, and built on trust – that's changing how we interact with data and accelerating discoveries that benefit people everywhere" (Peters 2025).

Canada's universal healthcare system strengthens this position by generating large datasets that capture patient interactions over time. In principle, this provides a strong foundation for AI development, as Toronto's diversity could support models trained on data that better reflect global populations (COM4). However, access to health data remains a major barrier, mostly benefiting research, while remaining difficult to apply for commercial use (ORG2). "Fortunately, these barriers are surmountable. We already have a strategy for pan-Canadian health data sharing, and national agencies that can hold data across provinces and have expertise in data interoperability" (Razak and Verma 2025). Large amounts of health data, such as medical records and imaging, remain underused because of fragmented systems, provincial regulations, and outdated governance. Making this data accessible could speed up research, support AI development, attract investment, and ensure Canadians benefit first from new technologies (Razak and Verma 2025). While Ontario logs nearly every healthcare interaction in centralized database, strict rules around data use and commercialization limit firms' ability to turn this data into market-ready products—In some cases, pushing even research talent to seek opportunities elsewhere (ORG2). This reflects the fact that there is a level of risk averseness in the healthcare system due to the nature of work and unease with commercializing health in the Canadian context (COM4).

Canada has highly skilled researchers and AI experts, along with a diverse and inclusive population, giving the country the potential to create a health database of global significance (Razak and Verma 2025). The diversity of Toronto's population and the interdisciplinary nature of its approach to AI development was seen as economically beneficial, something that could be leveraged, especially in the health innovation space. Interviewees describe Toronto as a "microcosm of the planet" (COM4), which reflects the diversity of the planet and can be leveraged for validating and developing health treatments (COM12). One participant wanted to partner with U of T itself since nearly 35 per cent of its student population is international and non-native English speaker (COM37). This high proportion of international students, linguistic diversity, and cultural heterogeneity across U of T's tri-campus system can help test products across a wide range of user needs.

Appendix C: Scaling and Emerging Firms

Past investments by CIFAR and the Vector Institute in funding research in the region are driving the growth of Toronto's AI cluster by supporting research, start-ups, SMEs, and critical AI infrastructure, accelerating innovation and adoption. Toronto leads the country in AI start-ups, hosting 210 of Canada's 650 AI start-ups, and is home to 11 investor groups, 6 incubators and accelerators, and public research labs. Toronto is ranked fifth in North America as the fastest-growing city for technology talent (CBRE Ranking 2023) and twelfth on a global list of top cities for AI start-ups, having climbed five spots from the previous year (Startup Blink 2024).

Toronto's innovation record, as discussed in Section 5, demonstrates the innovation capacity of the cluster, reflecting the combination of underlying factors that underpin the region's AI cluster – strong academic institutions, supportive early entrepreneurial ecosystem, global VC investor attraction, and a place for diverse talent to congregate and create globally recognized products. This is evident in the global recognition that the cluster has received: in CB Insights, five Canadian companies were named among the world's top 100 AI companies, four of which originated in Toronto—Cohere, Untether AI, Waabi, and Private AI (Alcaraz 2022). Firms such as Cohere, Waabi, and Blue J Legal reflect a consistent pattern in the city's technology landscape: talent drawn from around the world, strong links to the U of T, and companies that are trying to grow while remaining anchored in Toronto.

In 2023, US venture capital firm Forum Ventures expanded its AI-focused venture studio in Toronto, raising $21.5 million USD across two funds to build AI-native B2B SaaS startups from inception (Scott 2025b). The firm chose Toronto for its strong tech talent base and ecosystem growth, but also because of a shortage of early-stage, high-risk capital. The firm has launched 17 of a planned 30 startups, with 63% raising follow-on funding within 12 months. The move signals continued US investor confidence in Toronto's AI ecosystem and highlights venture studios as a strategy to accelerate AI commercialization in Canada (Scott 2025b). Canada's VC ecosystem is growing, but new fund managers face difficulties getting capital because LPs prefer established firms, even though smaller funds can perform very well over time (McLauchlan 2026).

Scaling Firm: Cohere

Founded in 2019 by University of Toronto graduates Aidan Gomez, Ivan Zhang, and Nick Frosst, Cohere has emerged as one of Toronto's most prominent AI companies (Maclean's, 2024). Frosst's prior work with Geoffrey Hinton at Google Brain points to the role of mentorship and U of T's research environment in shaping early talent (Maclean's, 2024). Often described as the "Canadian equivalent of OpenAI," Cohere has taken a different path from major US competitors by focusing on enterprise and government use cases rather than consumer-facing tools, (Maclean's 2024; Sobowale 2025; Riehl 2026c).

Cohere's strategy emphasizes security, compliance, and integration into regulated industries. Its customers include RBC, Dell, Bell, LG CNS, and Ensemble Health Partners, and more recently ThyssenKrupp Marine Systems, which is integrating Cohere's AI into Canada's Patrol Submarine Program. The company's AI supports decision-making and information management in sensitive environments (e.g. finance, healthcare, and energy), reinforcing its positioning relative to US-based AI providers (fathom4sight n.d.; Riehl 2026c; McLauchlan 2025a).

The company has raised significant capital to support this growth. In 2024, Cohere secured US$500 million in Series D funding from investors including AMD, NVIDIA, Oracle, and Cisco, while also adding former Meta and Uber executives (Canadian computer scientist Joelle Pineau as its first chief AI officer and Francois Chadwick as the company's first CFO) (Scott and McLauchlan 2025b). A subsequent US$100 million extension round valued the company at roughly US$7 billion (fathom4sight n.d.) "making it one of Canada's best funded and most valuable private technology companies" (McLauchlan 2025a). Revenue surpassed US$240 million in annual recurring revenue in 2025 and is now more geographically diversified than in earlier years (Scott and McLauchlan 2025). Cohere has indicated it expects to become profitable before 2029 and has not ruled out listing outside Canada if access to capital requires it (Riehl 2025a).

Cohere's partnership with Bell Canada further embeds the company in the domestic innovation system. Under the agreement, Cohere's models will be trained and hosted in Canada, with Bell acting as its preferred Canadian AI infrastructure provider through the Bell AI Fabric initiative. The deal complements Bell's plan to build six hydro-powered AI data centres in BC (McLauchlan 2025c). Cohere has also signed a non-financial agreement with the federal

government to explore applications of Canadian-built AI tools in public services (Karadeglija 2025). At the same time, the company is expanding internationally, with offices planned or operating in New York, Paris, South Korea, and Montreal (McLauchlan 2025b; Scott 2025a).

To increase powerful computing resources, the federal government committed $240M to support the company in building a $725 million data centre in Cambridge, Ontario in partnership with CoreWeave (a popular US AI infrastructure company) as part of the $2 billion Canadian Sovereign AI Compute AI strategy (Sobowale 2025). Gomez insisted in a June conference that for the domestic tech sector growth, "entrepreneurs had to resist the lure of US acquisition" (Sobowale, 2025).

Cohere recently secured a major contract from Innovation, Science and Economic Development Canada (ISED) to provide up to 1,400 departmental staff with access to its enterprise AI platform, North. The agreement will enable users to deploy AI agents to carry out a range of administrative functions, including document summarization, report drafting, and task automation. The deal is notable both as a commercial milestone for the company and as a concrete expression of the federal government's stated commitment to procuring technology from Canadian firms. A spokesperson for AI Minister Evan Solomon described it as "a real-world, at-scale deployment of Canadian AI inside the federal government," while Cohere characterized the contract as marking its entry into civilian federal operations (Hemmadi 2026).

Shortly after the ISED announcement, Cohere announced a merger with the German AI company Aleph Alpha, forming a transatlantic partnership intended to offer governments and enterprises outside the United States and China a viable alternative to the growing market concentration among the leading hyperscalers in those countries. The combined firm will retain the Cohere name and remain Canadian-owned and headquartered, while drawing on Aleph Alpha's research capabilities and established relationships with European public institutions. The goal of the merger is to accelerate the development of next-generation frontier models and to provide corporate and government clients with a secure, sovereign AI option tailored to highly regulated sectors—including the public sector, finance, defence, energy, manufacturing, telecommunications, and health care—without dependence on any single vendor. The deal is

backed by Germany's Schwarz Group, which has committed US$600 million (€500 million) in Series E structured financing as lead investor (Cohere 2026).

Scaling Firm: Waabi

Founded in 2021, Waabi has grown to approximately 250 employees under the leadership of Raquel Urtasun, a University of Toronto professor, co-founder of the Vector Institute, and former chief scientist of Uber's self-driving division (Bock 2026; Scott 2026; Bloomberg 2025). The company develops autonomous driving systems for long-haul trucking and, more recently, robotaxis (Scott 2026). Unlike many competitors, Waabi relies heavily on simulation to train its systems, using its proprietary "Waabi World" platform, which the company says can replicate real-world driving conditions with high accuracy (Bloomberg 2025; Wasson 2025).

Waabi has raised substantial funding from a mix of Canadian and international investors, including Uber, NVIDIA, Volvo Group, Porsche, BlackRock, Radical Ventures, BDC Capital's women focused Thrive Venture Fund and Export Development Canada (Bock 2026; Scott 2026). In 2026, the company reportedly raised up to US$1 billion if it is able to hit certain undisclosed milestones, consisting of a US$750 million Series C round and a US$250 million milestone-based investment from Uber, making it the largest private financing round in Canadian history (Kahn 2026; Bock 2026). New investors included Telus Global Ventures, BMO Global Asset Management, BlackRock-managed funds and accounts, and a subsidiary of the Abu Dhabi Investment Authority (Scott 2026).

The funding supports Waabi's commercial operations, including autonomous freight operations in Texas and a partnership with Uber to deploy up to 25,000 robotaxis over time, although no deployment timeline has been disclosed (Bock 2026; Scott 2026). Waabi also maintains an investment and strategic partnership with Uber Freight and operates a unified physical AI model across both trucking and robotaxi platforms, allowing advancements in one application to directly translate into performance gains in the other (Wasson 2025; Scott 2026). Waabi highlights the thriving academic environment that has attracted and supported global talent in creating pioneering technologies that are making headlines worldwide.

Scaling Firm: Blue J Legal

Blue J Legal, founded in 2015, provides AI-enabled tax research software for professionals in the United States, Canada, and the United Kingdom (Toronto Life 2018). The company was launched by University of Toronto law professors Ben Alarie, Anthony Niblett, and Albert Yoon, in addition to Brett Jansen (CTO) drawing directly on academic expertise in tax law and legal reasoning (Toronto Life 2018; Riehl 2025b).

In 2023, Blue J undertook a strategic pivot by integrating LLMs from OpenAI to create a GPT-powered system capable of answering a much broader variety of tax questions (Nunez 2025). The results were significant. Blue J tripled annual recurring revenue for two consecutive years, expanded its customer base from roughly 200 organizations in 2021 to nearly 2,500 by 2025, and secured $122 million in Series D funding at a valuation of about $300 million (Riehl 2025b; Nunez 2025). Clients include major accounting firms such as KPMG, RSM, and Crowe, and the company is now the preferred partner for CPA.com and CPA Canada, which together represent more than 600,000 CPAs across North America (Riehl 2025b).

Companies that integrate AI into existing products (e.g., fintech and legal tech firms) are attracting strong investor interest (McLauchlan 2026). Blue J Legal's growth demonstrates that success in Canada's AI sector does not necessarily require building foundational models in-house. The company achieved competitive advantage by adopting and integrating third-party AI technology with domain expertise, licensed tax content, and a continuous feedback loop from millions of queries. This allowed the platform to become more comprehensive, reliable, and widely adopted by tax professionals.

Emerging Firm: Xatoms

Toronto firms are not just serving the private sector but using it for social good, as is evident with the rising star Xatoms. The firm was co-founded by U of T students Diana Virgovicova, Kerem Topal Ismail Oglou, with a background in computer engineering and social impact, and Shirley (Yue Ming) Zhong, whose expertise spans water, sustainability, and software engineering. They met through the Cansbridge Fellowship program, reflecting the capable and diverse backgrounds attracted to the region and expertise cultivated within the region (Virgovicova 2025). The company uses

quantum chemistry and AI to develop technologies that purify water, inspired by Virgovicova's experiences witnessing water scarcity in India (U of T 2024).

Since its founding, Xatoms has raised $3M in pre-seed funding ($2 million in VC funding and $1 million in non-dilutive funding) from domestic and global investors, including Quantacet (Quebec), Genesis Ventures (European Union), BDC's Thrive Lab, and even received grant support from Alexis Ohanian, founder of Reddit, through the 776 Climate Fellowship (McLauchlan 2025g; Riehl 2026b). The company has secured 8 patents and is running pilot projects in Texas, Kenya, and South Africa, with plans to collaborate with First Nations communities in Northern Ontario (Riehl 2026).

Xatoms has gained recognition domestically and globally, winning multiple prizes at Startupfest, as well as UpLink's Water Resilience Challenge at the 2025 World Economic Forum (WEF) in Davos, placing in the top 10 out of over 300 global applicants (U of T 2024). The team's co-founders were also named Forbes 30 Under 30 in Manufacturing & Industry in North America, and the company was a top 14 finalist out of 9,400 teams for the Hult Prize (Forbes 2025; U of T 2024).

The company's roots in U of T's Bridge Accelerator (Scarborough) and SpinUp wet lab incubator (UTM) demonstrate the university's role in supporting early-stage innovation (U of T 2024). Xatoms' team confirms that Toronto's diverse talent that arrives from around the world is well reflected in their team which has 11 members including eight women and five PhD-trained scientists, and expertise spanning engineering, sustainability, and social impact (McLauchlan 2025g). According to Virgovicova, early investment was challenging, but the company is now "oversubscribed", signaling strong confidence in its growth and potential (McLauchlan 2025g). Xatoms' journey highlights Toronto's ability to attract global talent and investment, leverage world-class research institutions and their entrepreneurial support programs, and develop solutions that have social impact.

Emerging Firm: Ideogram

Talent circulation in Toronto's AI cluster is clearly evident at Ideogram, a Toronto-based company co-founded by University of Toronto alumnus Mohammad Norouzi alongside Jonathan Ho, William

Chan (CTO), and Chitwan Saharia—a team that collectively "led AI projects at UofT, Google Brain, and UC Berkeley" (Castaldo 2023; Alcaraz 2023a). Norouzi completed his PhD at UofT under David Fleet, supported by a Google PhD fellowship, before joining Google Brain in 2016 as a senior staff research scientist, where he worked alongside Geoffrey Hinton. He returned to Toronto in 2018, and the founding team subsequently came together through their shared work on Google's Imagen text-to-image model, which they left to build a faster and more accessible generative AI platform (Castaldo 2023; GitHub n.d.; Web Summit Vancouver, n.d.).

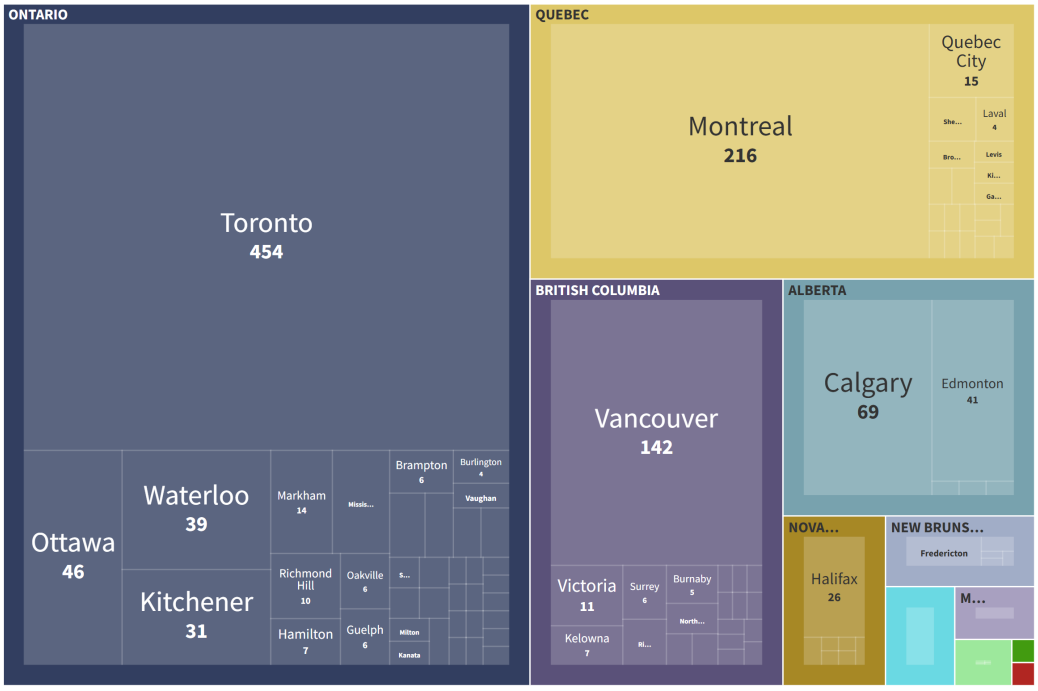
Operating from a small downtown office with seven employees and interns, Ideogram has attracted substantial investment, raising $22.3 million CDN in seed funding from Andreessen Horowitz, Index Ventures, and other notable investors, including UofT professor Raquel Urtasun, Sarah Guo, and Tom Preston-Werner (Alcaraz 2023a). Led by Andreessen Horowitz, Ideogram's $80 million USD Series A round coincided with the launch of Ideogram 1.0 and a subscription service, with the funding intended to accelerate company growth and further development of its generative AI models (Riehl, 2024). Ideogram also maintains a New York office where one of the founders is based, illustrating how Canadian firms can strategically leverage US-based talent while anchoring its leadership and research in Toronto.

From the outset, Ideogram has focused on improving the readability of text in generated images, an area where competitors such as Midjourney, often struggle (Riehl, 2024). It also developed Magic Prompt, which expands simple inputs or emojis into more detailed prompts for more accurate outputs (Riehl, 2024). The company aims to make creative expression more accessible through generative AI, supporting user creativity while maintaining a strong focus on trust, safety, and responsible use (Alcaraz 2023a). Ideogram's trajectory illustrates how UofT alumni are leveraging their academic training and professional networks to create innovative, globally competitive AI firms anchored in Toronto.

These cases indicate the presence of a strong entrepreneurial bent is present in the Toronto region's AI cluster. Existing institutions ranging from U of T and the Vector Institute to other entrepreneurial support organizations support scaling firms in areas of current strength, while startups are emerging in sectors where the region has not traditionally demonstrated strength.

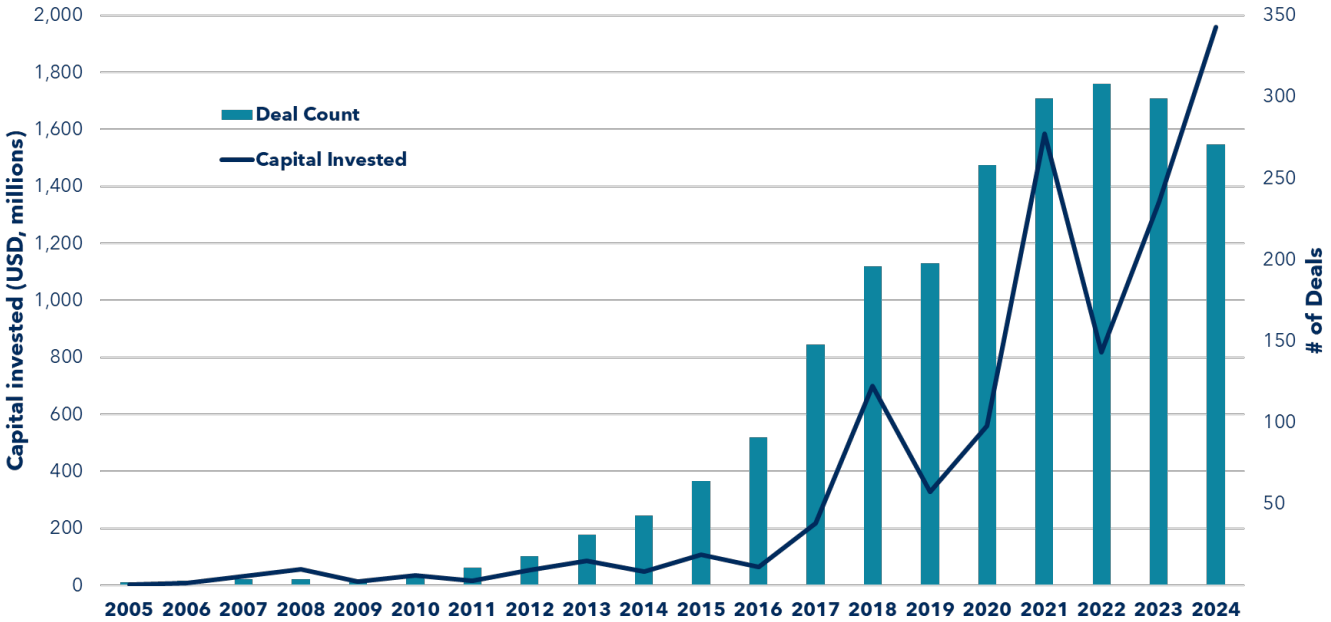
Appendix D: Statistical Analysis

Figure 1: Canadian AI Startups by Headquarter Location



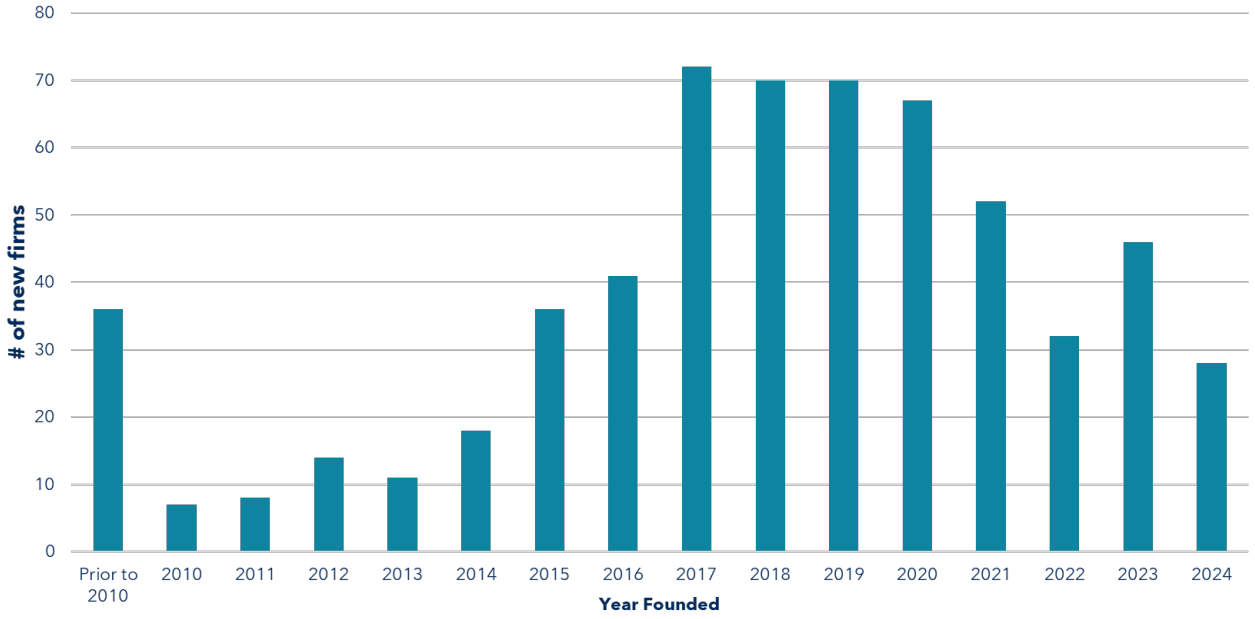
Source: Mapping the Growth of AI in Canada Through Investment https://central.cvca.ca/data-analysis/mapping-the-growth-of-ai-in-canada-through-investment/ *Note: Based on data from Pitchbook. Boxes sized by number of AI startups that received venture capital investment as of 21 August 2024.*

Figure 2: Investment in Toronto's AI Cluster, 2005-2024



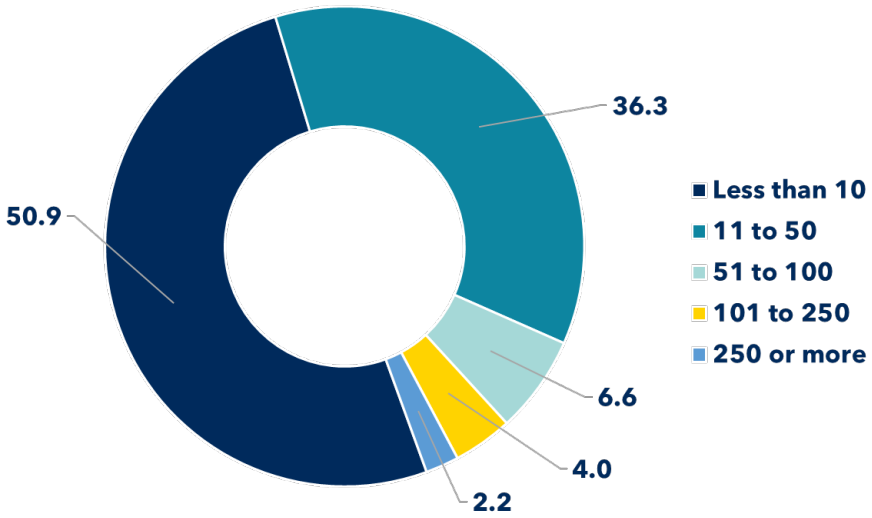
Source: Pitchbook [Authors' calculations]

Figure 3: New firm formation in Toronto's AI cluster



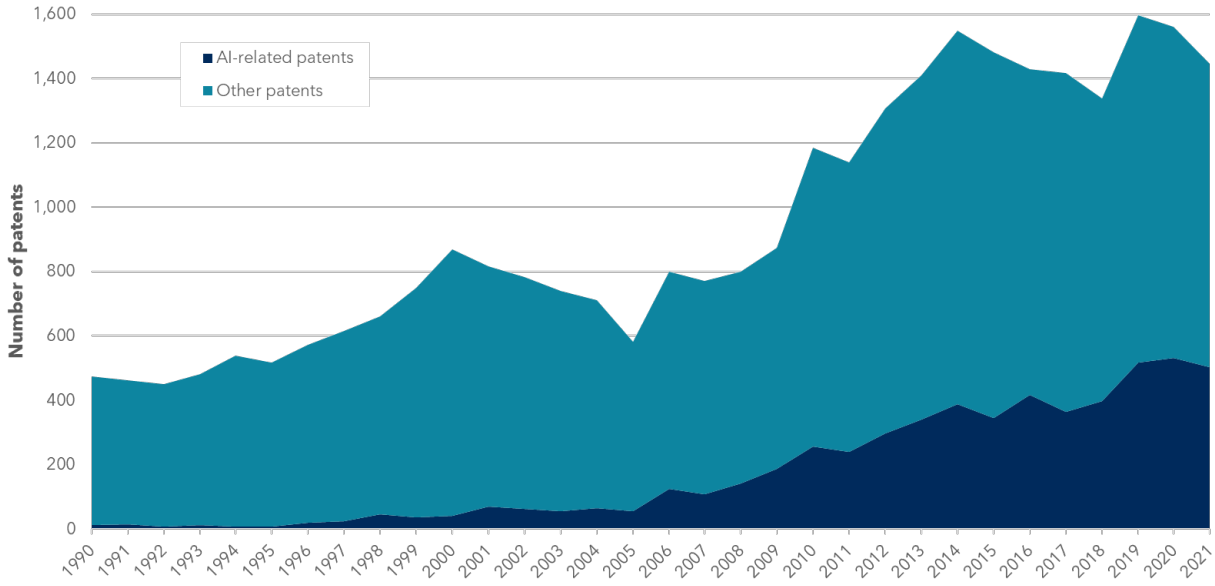
Source: Crunchbase [Authors' calculations]

Figure 4: AI cluster firms in Toronto by employment size



Source: Crunchbase [Authors' calculations]

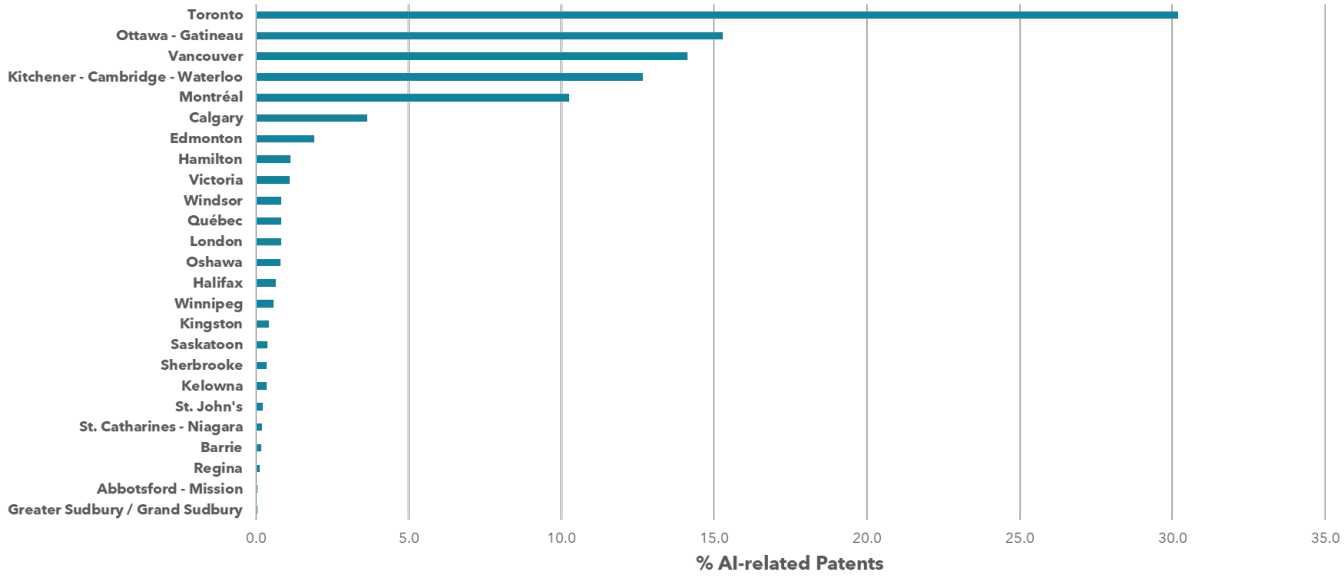
Figure 5: AI-related patents in Toronto, 1990-2021



Source: United States Patent and Trademark Office / Dieter Kogler, University College Dublin [Authors' calculations]

Note: Based on 86% threshold of patent being AI related. See Giczy, A.V., Pairolero, N.A. & Toole, A.A. 2022. Identifying artificial intelligence (AI) invention: A novel AI patent dataset. *Journal of Technology Transfer* 47: 476–505

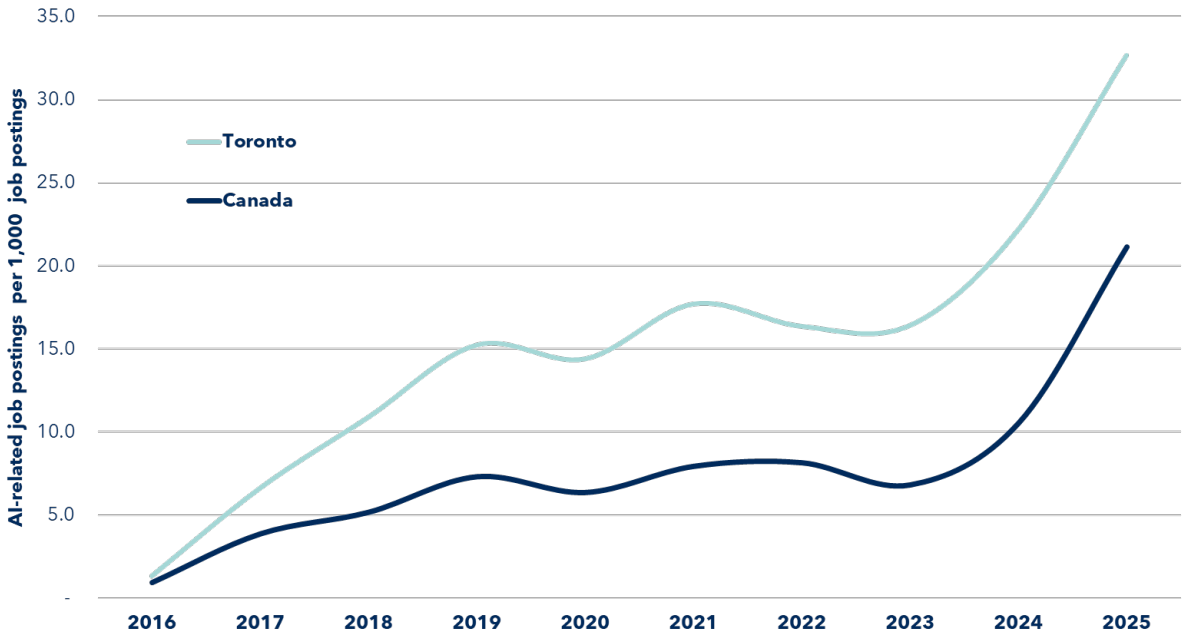
Figure 6: AI-related patents in Canadian cities, 1990-2021



Source: United States Patent and Trademark Office / Dieter Kogler, University College Dublin [Authors' calculations]

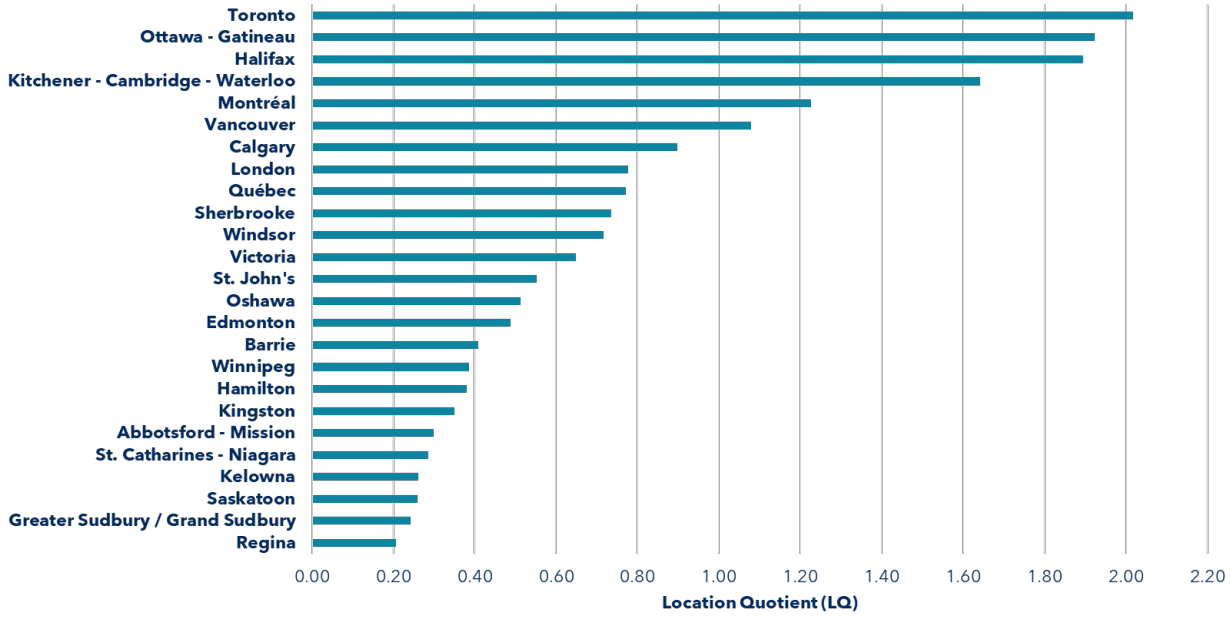
Note: Based on 86% threshold of patent being AI related. See Giczy, A.V., Pairolero, N.A. & Toole, A.A. 2022. Identifying artificial intelligence (AI) invention: A novel AI patent dataset. *Journal of Technology Transfer* 47: 476–505

Figure 7: Demand for AI Talent: Toronto vs. Canada, 2016-2025



Source: Signal49 Research (formerly Vicinity Jobs and Conference Board of Canada) [Authors' calculations]

Figure 8: Demand for AI Talent in Canadian cities



Source: Signal49 Research (formerly Vicinity Jobs and Conference Board of Canada) [Authors' calculations]