



August 2022

GLOBAL INNOVATION ECOSYSTEMS REVIEW

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INTRODUCTION

As we embrace technology and innovative thinking to create solutions to some of the world's greatest challenges, Calgary's growing innovation ecosystem will play a critical role.

In 2021, Calgary Economic Development tested the economic strategy, [*Calgary in the New Economy*](#), against key global trends and competitive jurisdictions worldwide. The intention was to refine the strategy and set a path forward toward a more diverse and resilient economy that is inclusive and accessible for all.

The strategy is now focused on five drivers of economic growth and advancement: talent, innovation, livability, business environment and brand. It supports City Council's Strategic Direction 2023-2026 to prioritize economic, social and climate resilience in planning for our future and sets out an ambitious vision for the city:

Calgary is the place where bright minds and big ideas come together with an unmatched spirit to help solve global challenges.



To deliver on the economic strategy, Calgary Economic Development engaged RSM Canada to conduct research on a path to accelerate the advancement of the innovation ecosystem in Calgary. That research is the basis of a three-part report released by Calgary Economic Development in 2022.

Brief 1: [*The State of Calgary's Innovation Ecosystem*](#)
(June 2022)

Brief 2: Global Innovation Ecosystems Review
(August 2022)

Brief 3: Lessons for Calgary's Innovation Ecosystem
(September 2022)

This report, Brief 2, highlights RSM's jurisdictional review and trajectory analysis of leading innovation ecosystems. It provides examples and insights from leading jurisdictions on how Calgary can strengthen its innovation ecosystem to unlock the opportunities for more sustainable growth.

RSM identified comparable jurisdictions worldwide, their key assets, how the assets have been leveraged and how they have contributed to advancement of the innovation ecosystem. From the 12 jurisdictions initially identified, five were selected for comprehensive analysis and review:

- **Austin, Texas**
- **Greater Helsinki, Finland**
- **Tel-Aviv, Israel**
- **Toronto-Waterloo**
- **Montreal**

Each location was assessed on four of the fundamental elements of an effective ecosystem: Capacity for Ecosystem Growth, Entrepreneurial Capability and Culture, Creation and Diffusion of Knowledge and Access to Finance.

METHODOLOGY

The 12 global jurisdictions identified by RSM (Figure 1) had attributes comparable to Calgary, with a similar makeup of innovation assets identified in the current state assessment. These were detailed in the [first brief of this series](#). RSM then conducted a comprehensive analysis of five of the 12 jurisdictions, including strengths, weaknesses, opportunities and threats, as well as a review of the makeup of each innovation ecosystem.

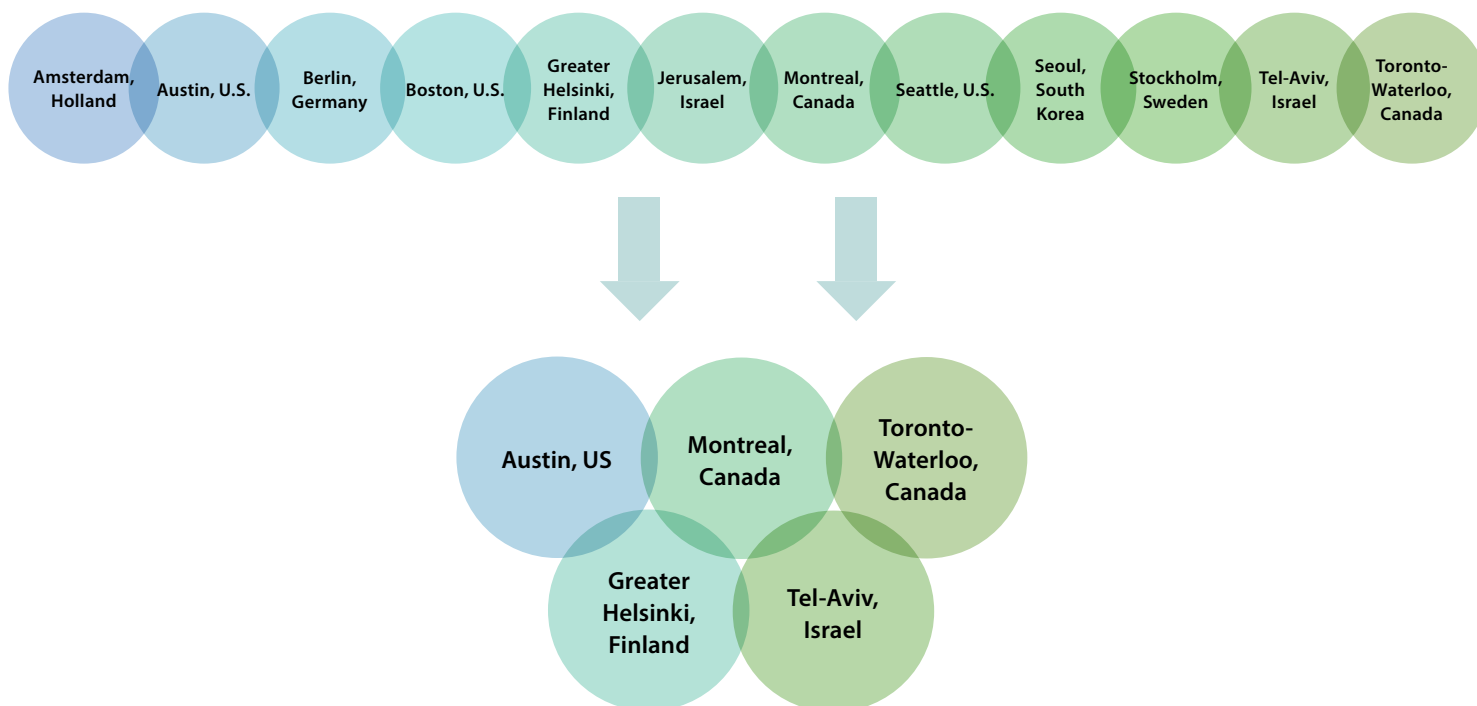


Figure 1. Selection of Comparable Jurisdictions

A rationale for selection was developed for each jurisdiction (Figure 2). The five were chosen based on the maturity of their innovation ecosystems, industry makeup, global reach and population. Two top innovation ecosystems in Canada were assessed along with three of the leading global innovation ecosystems.

<p>AUSTIN, TEXAS</p> <ul style="list-style-type: none"> • Chosen due to its ties to the Oil & Gas industry initially and success in pivoting towards a focus on technological sectors. • It is in the <i>late globalization phase</i> and thus will provide an understanding of how this pivot enabled the ecosystem to advance. • It has lower population to Calgary but more than 3 times the firm density making it a strong case study for Calgary. 	<p>GREATER HELSINKI, FINLAND</p> <ul style="list-style-type: none"> • It is similar to Calgary in terms of being a northern city. • It is in the <i>early globalization phase</i> and thus it will be useful to understand their policies and ecosystem to advance Calgary to the next phase. • Despite having a similar population to Calgary in size, the ecosystem value of Helsinki is 4.5 times (\$5.8 billion) that of Calgary. 	<p>TEL-AVIV, ISRAEL</p> <ul style="list-style-type: none"> • Chosen as a foreign jurisdiction who had a history of turning adverse situation to their advantage. • It is the most advanced ecosystem among the chosen jurisdictions and is in the Attraction phase. • Even though Tel-Aviv has a similar number of firms as Calgary, it has been able to produce 5 times as many unicorns. 	<p>TORONTO-WATERLOO, CANADA</p> <ul style="list-style-type: none"> • Chosen as a domestic comparator (i.e. similar federal laws, corporate culture). • It is in the <i>late globalization phase</i>. • It has a lower Median Seed round funding to that of Calgary. However, it has approximately 3.5 times the number of startups per year since 2016. 	<p>MONTREAL, CANADA</p> <ul style="list-style-type: none"> • Chosen as a domestic competitor (i.e. similar federal laws). • It is in the <i>early globalization phase</i>, which is one stage more advanced than that of Calgary. • Despite it having a lower number of firms and startups (in the last 5 years) than Calgary, it has an ecosystem value that is more than 7 times (\$8.7 billion) that of Calgary.
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Figure 2. Overview of why the final five innovation ecosystems were selected



KEY FINDINGS BY JURISDICTION

AUSTIN, TEXAS

Austin is one of the earliest innovation ecosystems in the United States. It was historically known as a government and university city with strong ties to the state's oil and gas industry. Today, it is a leader in areas such as cleantech and cybersecurity. The ecosystem is known as a growth market given market opportunities and access to capital. It has been among the top ranked U.S. cities in terms of population growth and attraction, job creation and density of high-growth firms. The city has a large number of IT firms, business incubators and leading corporations.

It also hosts well-known events such as South by Southwest (SXSW), which attracts a global tech audience and encourages deep collaboration between arts and technology.

Capacity for Ecosystem Growth

The University of Texas, Austin (UTA) is a key component of the growth and sustainability of Austin's innovation ecosystem¹. Prior to 1982, UTA had fewer than 50 endowed research chairs. Today, it has more than 300 and continues to grow. UTA's research expenditure has grown significantly due in large part to federal government funding from the Department of Defense, National Science Foundation, Department of Energy and NASA².

On a state level, the low-tax environment, including no personal income tax and a widely promoted pro-business environment are routinely cited as critical to economic growth and development in Texas³.

Entrepreneurial Capability and Culture

A 2017 report for the U.S. Chamber of Commerce Foundation titled *Innovation that Matters* ranked the top centres of innovation in the United States – with Austin fifth overall and first in talent. It noted Austin has the available workforce that businesses need, and startups can fill job vacancies with quality talent. For example, the city's innovation culture led the U.S. Army to choose Austin for its new Army Futures Command⁴.

The Austin Technology Incubator at UTA is cited as a key catalyst to Austin's innovation ecosystem. The city is also home to a leading accelerator, Capital Factory, which is seen as the entrepreneurial centre of gravity in Austin. The two have an influx of best-in-class accelerators such as TechStars⁵.

Creation and Diffusion of Knowledge

Austin has transformed from a university and government town to a fast growing, globally competitive hotspot for tech. The transformation has been driven by several visionary organizations, programs and people, rather than a single entity. The ability of influencers to make decisions, connect and leverage otherwise unconnected, and at times competing, sectors has enabled the innovation community to come together⁶. Influencers are central in the innovation ecosystem in Austin. (Figure 3).

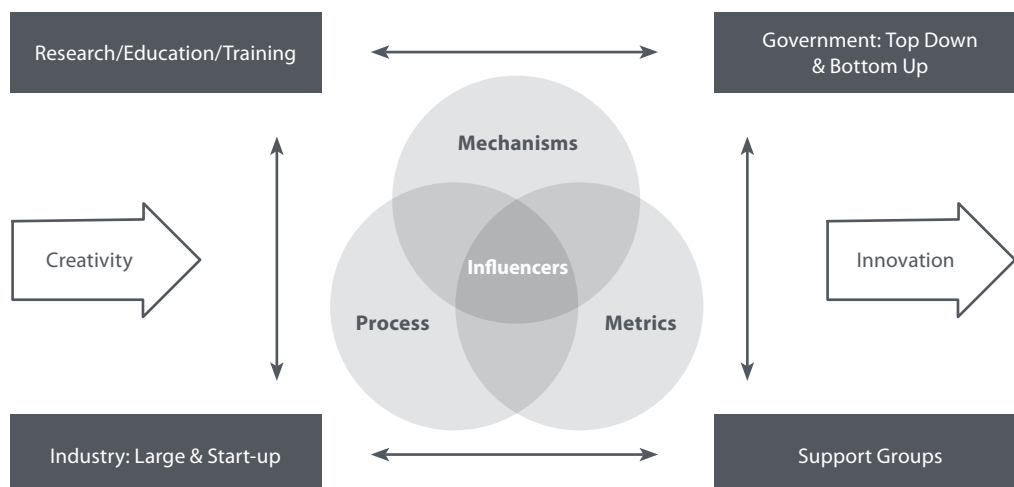


Figure 3. Regional Innovation Ecosystem: The Case of Austin⁸

¹Gibson, D. V. (2013). Sustaining the Technopolis: The Case of Austin Texas. *World Technopolis Review*, 74.
²Gibson, D. V. (2013). Sustaining the Technopolis: The Case of Austin Texas. *World Technopolis Review*, 74. Hereinafter referred to as Gibson, D. V. (2013).
³Texas Economic Development. (n.d.) Why Texas? Retrieved from <https://gov.texas.gov/business/page/why-texas>
⁴U.S. CHAMBER OF COMMERCE FOUNDATION. (n.d.). Innovation that Matters. Retrieved from <https://www.uschamberfoundation.org/sites/default/files/media-uploads/ITM%202017.pdf>

⁵Judson, J. (2018, July 13). Why the Army picked Austin for Futures Command. Retrieved from <https://www.defensenews.com/> <https://www.defensenews.com/land/2018/07/13/why-the-army-picked-austin-for-futures-command/>
⁶Capital Factory - The Center of Gravity for Entrepreneurs in Texas. (n.d.). Mission. Retrieved from <https://www.capitalfactory.com/> <https://www.capitalfactory.com/mission/>
⁷Gibson, D. V. (2013).

The influencers create the momentum for successful regional cooperative activity through formal and informal collaboration, coordination and cooperation. One example is Dell. The tech giant is headquartered in Austin and is the second largest employer in Texas¹⁰. Dell is a major reason why 65,000 people a year relocate to Austin, making it one of the fastest growing large metropolitan areas in the United States. With Dell's success, Austin was able to draw top talent from elite post-secondaries and Silicon Valley. This influx of talent created a rich breeding ground for new technology companies, for example, Trilogy.

Austin is now a recognized global hub in tech and innovation. It holds multiple events every year, including SXSW; a collaboration between tech, film, music, education and culture¹¹. It is also home to the Capital City Innovation District, focused on creating "an inclusive community where Austinites collaborate to create new models of health and economic growth for all"¹².

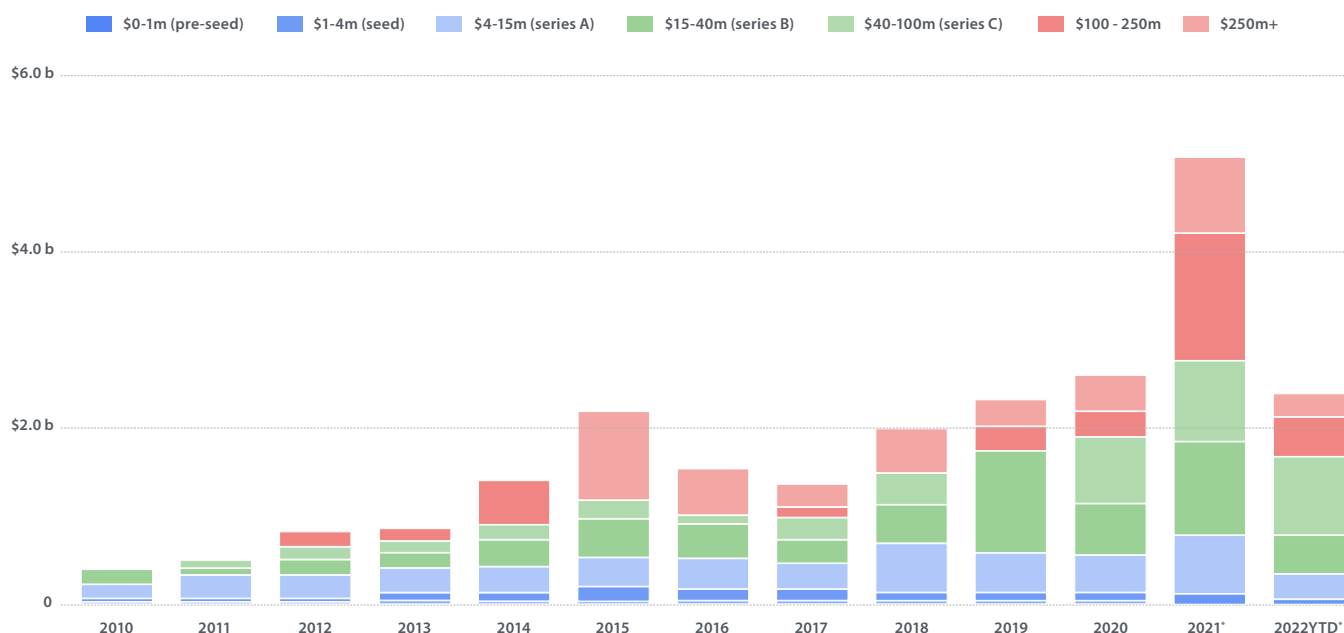


Access to Finance

One element of Austin's growth as an innovation ecosystem has been state economic development initiatives such as the Texas Enterprise Fund created in 2003. The Fund has invested more than \$443 million US, closed deals on projects generating more than 62,000 new jobs and attracted more than \$15 billion in capital investment in the state¹⁴. It awards grants to companies considering projects where Texas sites are competing with out-of-state sites. The Fund is a performance-based financial incentive for companies whose projects would contribute significant capital investment and jobs to the state.

Texas also created the Emerging Technology Fund in 2005 to provide funding for the research, development and commercialization of emerging technologies¹⁵.

Between 2007 and 2017, venture capital investment into Austin nearly doubled. Although far smaller than Houston and Dallas, Austin accounts for 61 per cent of Texas's total venture funding¹⁶.



Note: due to reporting lag, the last 12 months are systematically under reporting on rounds especially small rounds. Contact us for corrected estimates.

Figure 4. Funding rounds by year in Austin, Texas¹⁷

¹⁰Gibson, D. V. (2013).

¹¹Austin Business Journal (2017). Dell is no longer Austin's largest employer. Retrieved from <https://www.bizjournals.com/austin/news/2017/07/21/dell-is-no-longer-austins-largest-employer.html>

¹²South by Southwest. (n.d.). ABOUT SXSW. Retrieved from <https://www.sxsw.com/>

¹³Capital City Innovation. About Capital City Innovation & Austin's Health Innovation District. Retrieved from <https://www.capitalcityinnovation.org/about>

¹⁴The University of Texas at Austin. (n.d.) Impacting Health From Downtown Austin. Retrieved from <https://delmed.utexas.edu/about/partners/innovation-district>

¹⁵Gibson, D. V. (2013).

¹⁶Gibson, D. V. (2013).

¹⁷Sowell, J. 3 Reasons Austin, TX is One of the Most Innovative Cities in the U.S., Q2 2018 Eagle's Nest. Retrieved from <https://aquilacommercial.com/learning-center/reasons-austin-tx-one-most-innovative-cities-us/>

¹⁸https://app.dealroom.co/transactions/rounds/?growth_stages=not_mature/rounds/not_GRANT_SPAC%20PRIVATE%20PLACEMENT&ug_locations=anyof_austin_cl-tags/not_outside%20tech/showStats=YEAR&statsType=rounds

GREATER HELSINKI, FINLAND

Helsinki is at the forefront of innovation in Scandinavia with startup success stories such as Nokia, Rovio and Wolt. It has the advantage of offering a relatively low cost of living for Scandinavia. Another highlight of the Helsinki innovation ecosystem is hosting Slush, one of the largest gatherings of venture capitalists in Europe.

Capacity for Ecosystem Growth

Finland's economic transformation started in the 1970s when it started expanding its higher education in engineering and sciences. In the 1980s, there was a shift to knowledge-based innovation and sectors such as information and communication technology (ICT), machinery and chemicals and significant investment in human capital¹⁸.

With this transformation, Finland transitioned from a natural resource intensive economy to a high tech, exporting country. Since the 1990s, Finland invested more than other countries in education. Higher education expenditure for research and development (R&D) accounted for 0.73 per cent of GDP in 2014¹⁹. As well as R&D, efforts were also made to improve the quality of the workforce and reforms were introduced to expand public investment in education²⁰.

In 2010, Aalto University was created from a merger of three Finnish universities: The Helsinki School of Economics, Helsinki University of Technology and The University of Art and Design Helsinki. Its aim is to create and encourage connections between industries in various competitive sectors, creating economic and spillover effects.

Creation and Diffusion of Knowledge

Helsinki's innovation ecosystem is heavily linked to the history of NOKIA, which was one of the first firms in the world to apply the concept of open innovation. The Bridge Program was launched by NOKIA in 2011 and, before it concluded, contributed to the creation of more than 400 companies in Finland and around 500 entrepreneurs²². It offered financial support and training to outgoing employees of NOKIA. The training was often offered in completely new professions which enabled employees to find new employers or start their own companies²³.

NOKIA also made major investments outside the telecommunications industry. For instance, Finland is known as one of the world's hubs in medical technology. NOKIA played a key role in this success, investing heavily into health care technologies. These technologies are coming to life with startups such as Lifesum, receiving a \$10 million US funding round led in part by Nokia Growth Partners²⁴.

Entrepreneurial Capability and Culture

There is a high level of trust in public administration in Finland, which translates to a high level of trust in innovation ecosystem partners²¹. This creates openness in the Finnish innovation system which fosters networking to find suitable partners and clients. In addition, due to its small population, there is an innate need to compete and succeed internationally, manifesting not only in companies but also in academia.



¹⁸Organisations for Economic Co-operation and Development (OECD), (2017). OECD Reviews of Innovation Policy: Finland 2017. Paris: OECD. Hereinafter referred to as Organisations for Economic Co-operation and Development (OECD). (2017).
¹⁹Organisations for Economic Co-operation and Development (OECD), (2017).
²⁰UNESCO, AI, (n.d.). Finnish Innovation Ecosystem: Trust, Openness and NOKIA. Retrieved from <https://unicef.ai/blog/16/?language=en>

²¹Bosworth, M. (2014, January 31). The upside to being let go by Nokia. Retrieved from <https://www.bbc.com/news/magazine-25965140>. Hereinafter referred to as Bosworth, M. (2014, January 31).
²²Bosworth, M. (2014, January 31).
²³Butcher, M. (2016). "Health startup Lifesum raises \$10M round led by Nokia Growth Partners." Retrieved from <https://techcrunch.com/2016/07/18/health-startup-lifesum-raises-10m-led-by-nokia-growth-partners/>



Access to Finance

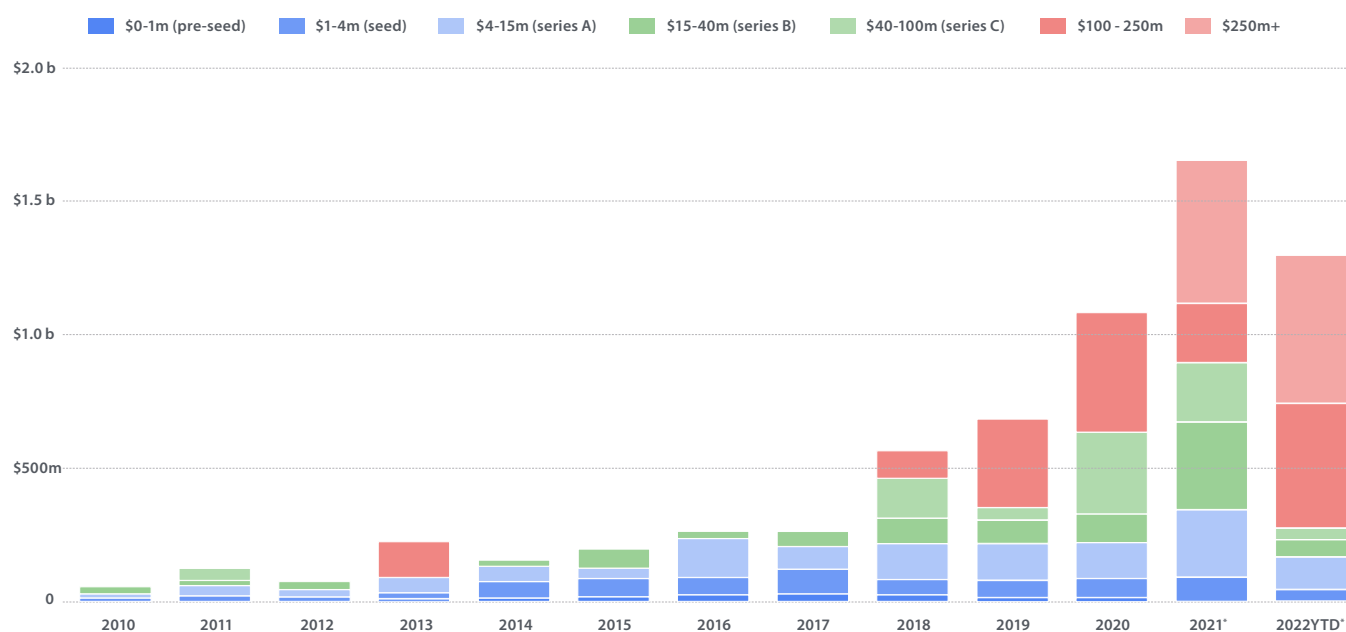
Finnish startups receive the most venture capital per capita in Europe²⁵. In addition, Finland is home to one of the largest and most active business angel investor networks²⁶.

Business Finland is a portal providing startups with funding options, including international funding opportunities and connections with global investors.

The Finnish government provides financing to startups to de-risk their development journey. For very early-stage entrepreneurs, the Finnish Startup Grant provides income for up to 18 months for aspiring entrepreneurs to launch and establish a full-time business.

Finnvera, the Export Credit Agency of Finland, also provides financing including loans, venture capital investment and export credit guarantees to startups from an early stage for export and international growth.

The number and size of funding rounds have grown significantly in Helsinki since 2010 (Figure 5). In the past five years they have shifted from concentrating on pre-seed funding to later stage rounds (e.g. Series B, Series C and some greater than \$100 million euros)²⁷.



Note: due to reporting lag, the last 12 months are systematically under reporting on rounds especially small rounds. Contact us for corrected estimates.

Figure 5. Funding rounds by year in Helsinki, Finland²⁸

²⁵Startup Genome. (n.d.). Greater Helsinki. Retrieved from <https://startupgenome.com/>; <https://startupgenome.com/ecosystems/greater-helsinki>. Hereinafter referred to as Startup Genome. (n.d.).
²⁶Startup Genome. (n.d.).
²⁷https://app.dealroom.co/transactions/rounds/?growth_stages/not_mature/regions/anyof_Greater%20Helsinki%20Area/rounds/not_GRANT_SPAC%20PRIVATE%20PLACEMENT/tags/not_outside%20tech?howStats=YEAR&statsType=rounds

²⁸https://app.dealroom.co/transactions/rounds/?growth_stages/not_mature/regions/anyof_Greater%20Helsinki%20Area/rounds/not_GRANT_SPAC%20PRIVATE%20PLACEMENT/tags/not_outside%20tech?howStats=YEAR&statsType=rounds

TEL-AVIV, ISRAEL

Tel-Aviv is the economic and technological centre of “Startup Nation” in Israel and is home to the most startups per capita in the world. The Israeli government has invested heavily in the startup environment and is a major reason for the advances of the ecosystem. Israel also has one of the largest concentrations of local and international R&D labs in the world including the synthetic biology R&D lab by HyLabs, the Interdisciplinary Center Herzilya and Accenture’s Cybersecurity R&D Lab.

Capacity for Ecosystem Growth

Israel invests 4.2 per cent of its GDP into R&D, which is the highest in the world. Thirty per cent of the investment is channeled through its universities²⁹.

Entrepreneurial Capability and Culture

The Organization for Economic Corporation and Development report, *Education at a Glance 2014*, found 46 per cent of Israel’s adult population had completed tertiary education, with half majoring in Science, Technology, Engineering and Mathematics (STEM)³⁰.

The entrepreneurial culture encourages an ability to think independently and challenge the status quo, commonly known as “chutzpah.” The belief there’s always a different and better way of doing things has led to more innovative products and ideas³¹.

A key driver in the startup scene is the strong interconnectedness of its people, promoting collaboration and exchange of ideas. Much of it is driven through shared experiences from Israel’s mandatory military service requirements³². It’s common in Israel to have careers in academia, military, entrepreneurship, R&D, policymaking and venture capital, simultaneously.

With a small local market, Israeli companies think globally³³. Israel has also turned vulnerabilities into competitive advantages. For example, with its lack of freshwater resources, Israel is an emerging leader in desert agriculture and desalinization.



Creation and Diffusion of Knowledge

A major player in the ecosystem is the Israel Innovation Authority. The arms-length agency of the government was established over 50 years ago to foster innovation by working with industry to define innovation policies and collaborating with international partners on R&D³⁴. One of its areas of focus is supporting organizations in the “valleys of death” or the gap between ideation to commercial application.

The Technological Incubators Program is also a major initiative. Established in 1991, the Program is designed in part to provide skilled immigrants with the capital and resources to become successful entrepreneurs. It targets disruptive, early-stage ideas deemed too risky for private investors. Of its more than 1,500 graduate companies, 60 per cent have attracted private investments of \$3.5 billion US and 40 per cent are still in operation³⁵.

Another key government program is Yozma. It was established in 1993 and invested around \$80 million US for a 40 per cent equity stake in 10 new venture capital funds, while offering insurance covering 80 per cent of any downside risk. This encouraged entrepreneurs to be less risk adverse. Each had the option to buy-out the government’s share within five years, which eight of the 10 exercised³⁶. Yozma also has a \$20 million fund that invests directly in companies with focus on early-stage initial investments typically ranging between \$1 million US and \$6 million US³⁷.

There is proximity of innovation institutions, where people in innovation can work alongside each other. Campus Tel Aviv started an open space for meetups, which quickly grew to a vibrant hub of activity, hosting events such as hackathons. In its first four years, the space has hosted over 100,000 people and 1,500 events³⁸, providing a forum for local innovators to exchange ideas.

²⁹Yin, D. (2016, June 05). Secrets To Israel's Innovative Edge. Retrieved from <https://www.forbes.com/sites/davidyin/2016/06/05/secrets-to-israels-innovative-edge/?h=5b0e5e34a0c>. Hereinafter referred to as Yin, D. (2016, June 05).

³⁰Yin, D. (2016, June 05).

³¹Yin, D. (2016, June 05).

³²Yin, D. (2016, June 05).

³³Yin, D. (2016, June 05).

³⁴Yin, D. (2017, January 09). What Makes Israel's Innovation Ecosystem So Successful. Retrieved from <https://www.forbes.com/sites/davidyin/2017/01/09/what-makes-israels-innovation-ecosystem-so-successful/?h=5c294cb70e4>. Hereinafter referred to as Yin, D. (2017, January 09).

³⁵Yin, D. (2017, January 09).

³⁶Yin, D. (2017, January 09).

³⁷Yin, D. (2017, January 09).

³⁸Yin, D. (2017, January 09).



Access to Finance

Most funding for companies in the last five years came from foreign investment (Figure 6) with American and European investors facing growing competition from Chinese investors. Israel startups have been a powerhouse in raising venture capital funding, behind only the United States, China and India. A significant majority of the funding goes to three sectors – software, internet and life sciences⁴⁰. In 2020, approximately 40 per cent of the scaleup companies jointly secured approximately \$4.1 billion US, at an average of \$66 million US per deal⁴¹.

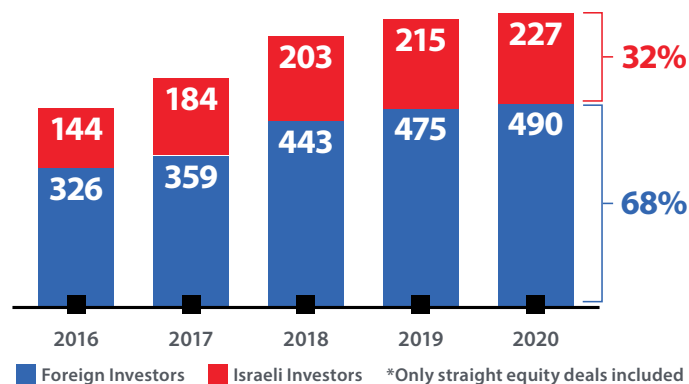
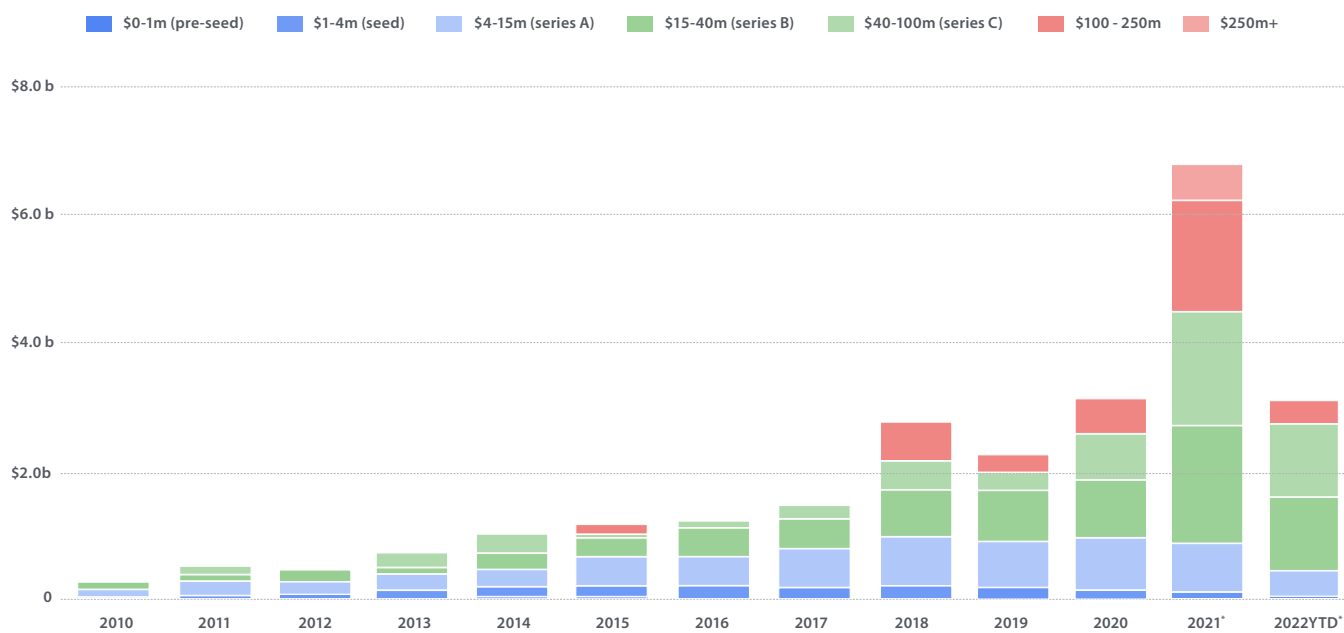


Figure 6. Number of foreign vs. Israeli investors that invested in Tel Aviv companies³⁹



Note: due to reporting lag, the last 12 months are systematically under reporting on rounds especially small rounds. Contact us for corrected estimates.

Figure 7. Funding rounds by year in Tel Aviv, Israel⁴²

³⁹Government of Tel Aviv. (n.d.). 2020 Tel Aviv Innovation Ecosystem Report: Resilience & Growth. Retrieved from <https://www.tel-aviv.gov.il/en/https://www.tel-aviv.gov.il/en/Documents/Innovation%20Ecosystem%20Report%20English.pdf>. Hereinafter referred to as Government of Tel Aviv. (n.d.).

⁴⁰Government of Tel Aviv. (n.d.).

⁴¹Government of Tel Aviv. (n.d.).

⁴²https://app.dealroom.co/transactions/rounds/f/growth_stages/not_mature/rounds/not_GRANT_SPAC%20PRIVATE%20PLACEMENT/alg_locations/anyof_-tel_aviv_district_1-/tags/not_outside%20tech/showStats=YEAR&statsType=rounds



TORONTO-WATERLOO, CANADA

This region is considered a leading global innovation ecosystem and is well known for its talent and density of startups. The Toronto-Waterloo region is one the fastest growing corridors for tech companies⁴³. Between 2013 and 2018, the region created more employment in the tech sector than New York, Boston and Seattle combined⁴⁴. Between 2019 and 2020, Toronto-Waterloo was considered the largest technology cluster in North America, outside of Silicon Valley⁴⁵.

Capacity for Ecosystem Growth

The region is one of the most innovative in Canada. In addition to the University of Toronto, York University and Toronto Metropolitan University, the region is home to the University of Waterloo (UW), Wilfrid Laurier University and several community colleges. The University of Toronto and UW are internationally renowned institutions.

UW is seen as a catalyst in advancing the region's innovation efforts⁴⁶. Its co-op program is focused on the "reciprocal nature of student embodied knowledge transfer" and emphasizes the importance of real-world experience coupled with technical expertise⁴⁷.

One of the main drivers of entrepreneurship and innovation in Waterloo is UW's intellectual property (IP) policy. It allows the creator, rather than the institution, to retain the IP. This encourages commercialization of ideas and drives high potential startups⁴⁸. This policy and the co-op program have driven establishment of many high-profile startups and spin-offs in the region⁴⁹.

More than 150 leading research centres perform R&D and enable world-class expertise coupled with facilities. They range from quantum computing, advanced cryptography, autonomous vehicles and advanced manufacturing.

Entrepreneurial Capability and Culture

Blackberry is a renowned firm that established Waterloo as a tech centre while growing the talent pool. It continues to stimulate innovation through associations and partnerships with other firms and universities. It has partnered with the UW for a Joint Innovation Program that accelerates research-powered innovation in Canada⁵⁰.

It also has an annual \$10,000 Blackberry Cybersecurity and Privacy Excellence Scholarship with the UW's Cybersecurity and Privacy Institute. It is a founding member of the Gateway for Enterprises to Discover Innovation at the UW to create partnerships between academia and the corporate world⁵¹.

⁴³Waterloo EDC. (November 17, 2021). Waterloo well-represented on Deloitte Technology Fast 50. Retrieved from <https://blog.waterlooeDC.ca/waterloo-deloitte-technology-2021>
⁴⁴Waterloo EDC. (February 17, 2022). What is the Toronto-Waterloo Corridor? Retrieved from <https://blog.waterlooeDC.ca/what-is-toronto-waterloo-> Hereinafter referred to as Waterloo EDC. (February 17, 2022). [corridor?text=The%20Toronto%20Waterloo%20Corridor%20is%20a%20an%20exception](https://blog.waterlooeDC.ca/what-is-toronto-waterloo-).
⁴⁵Waterloo EDC. (February 17, 2022).
⁴⁶Bramwell, A., Hepburn, N., & Wolfe, D. A. (2012). Growing Innovation Ecosystems: University-Industry Knowledge Transfer and Regional Economic Development in Canada. Toronto: University of Toronto. Hereinafter referred to as Bramwell, A., Hepburn, N., & Wolfe, D. A. (2012).

⁴⁷Bramwell, A., Hepburn, N., & Wolfe, D. A. (2012).
⁴⁸Bramwell, A., Hepburn, N., & Wolfe, D. A. (2012).
⁴⁹Bramwell, A., Hepburn, N., & Wolfe, D. A. (2012).
⁵⁰University of Waterloo. (2021, May 12). BlackBerry and the University of Waterloo Expand Partnership to Create First Ever Joint Innovation Program. Retrieved from <https://uwaterloo.ca/>
⁵¹University of Waterloo. (2021, May 12).

Creation and Diffusion of Knowledge

The growth of the Toronto startup ecosystem in the last half decade was driven by several factors. One was the emergence of affordable scalability of software-driven products and services at the earliest stages of development through cloud computing and mobile platforms⁵².

The onset of cloud computing lowered the cost of entry and increased startup formation for software firms but also hardware companies. There was also the emergence of incubators, which further facilitated startup creation. U.S. venture capital increased with the influx of leading accelerators, including 500 Startups and Techstars.

MaRS is a not-for-profit corporation founded in 2000 by the private and public sector to improve the commercial outcomes from science, technology and innovation⁵³. It started as an ecosystem connector but has evolved to offer advice, market intelligence, entrepreneurial education, seed capital, access to talent and testing of new technology with established partners in government, industry and the community.

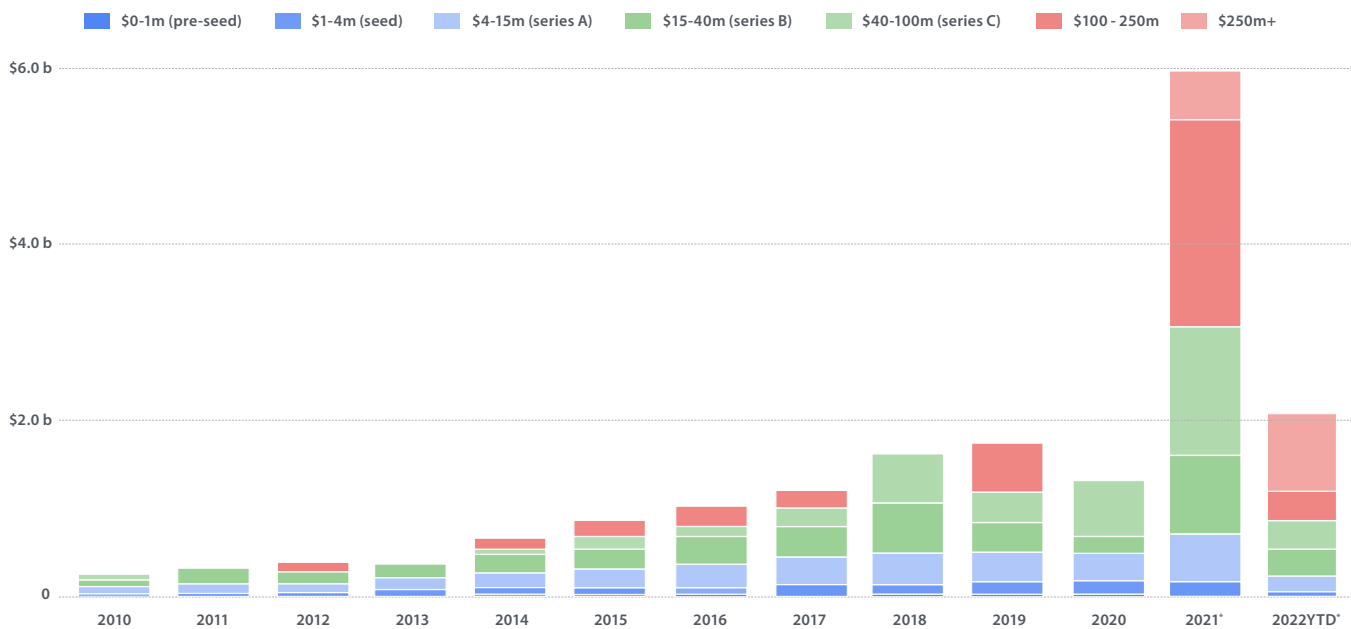
The Waterloo innovation ecosystem provides an interface for people and organizations in a variety of sectors, including students and faculty from post-secondary institutions; staff from the 150 research institutes; an established venture capital community, and enabling organizations like Communtech Hub and Accelerator Centre⁵⁴.

In 2009, the Government of Ontario invested \$26.4 million and the Government of Canada added \$5 million to create the Communtech Hub in Kitchener. The Hub provides allocation for entrepreneurs, companies and academic institutions to interact in a 30,000 square foot building. The Hub also houses students from the UW VeloCity program, its entrepreneurial residence program⁵⁵.

Access to Finance

There was a significant increase in venture capital investment in 2021 from the previous five years (Figure 8) to \$14.1 billion US. Toronto accounted for the largest number of deals and 39 per cent of the total funding⁵⁶.

MaRS' funding has had a major impact on the innovation ecosystem in Toronto. In 2020, it generated \$2.4 billion in capital and \$1.5 billion in revenue. Since its inception, MaRS-supported ventures have raised \$7.1 billion⁵⁷.



Note: due to reporting lag, the last 12 months are systematically under reporting on rounds especially small rounds. Contact us for corrected estimates.

Figure 8. Funding rounds by year in Toronto and Waterloo, Canada⁵⁸

⁵²Denney, S., Southin, T., & Wolfe, D. A. (n.d.). Entrepreneurs and the Evolution of Toronto's ICT Cluster: Insights and Lessons Learned. Retrieved from <https://munkschool.utoronto.ca/>

⁵³https://munkschool.utoronto.ca/wp/files/2019/04/Denney-Southin-Wolfe_CDO-research-summary_final.pdf

⁵⁴MaRS. (n.d.). We help innovators change the world. Retrieved from <https://www.marsdd.com/>; <https://www.marsdd.com/>

⁵⁵Bramwell, A., Hepburn, N., & Wolfe, D. A. (2012).

⁵⁶Bramwell, A., Hepburn, N., & Wolfe, D. A. (2012).

⁵⁷Khan, S. (2017, October 23). TORONTO REGION - A MAGNET FOR CANADIAN AND FOREIGN TECH COMPANIES. Retrieved from <https://torontoglobal.ca/>; <https://torontoglobal.ca/>

⁵⁸TG-Blog/October-2018/Toronto-Region-A-Magnet-for-Canadian-and-Foreign

⁵⁹MaRS. (2021). Meaning Innovation Impact Report. Retrieved from <https://www.marsdd.com/wp-content/uploads/2019/03/MaRS-Impact-Report-Dec-2021-1.pdf>

⁶⁰https://app.deloitte.com/transactions/rounds/growth_stages/seed_mature/rounds/seed_mature/SPAC%20PRIVATE%20PLACEMENT%20LOCATIONS/nyof_toronto_4_-_waterloo/tags/not_outside%20tech/howStats=YEAR&statsType=rounds



MONTREAL, CANADA

Montreal is known for its unique culture and its ability to leverage R&D spending. The city provides numerous incentives which can be used by startups and highly educated talent due to the presence of world-class universities such as McGill and Université de Montréal. Montreal also placed second globally in the Tier 2 Cities of the Future 2020/2021 global rankings from fDi Magazine (Financial Times).

Capacity for Ecosystem Growth

There are four major universities in Montreal: McGill, Université de Montréal, Concordia University and Université du Québec À Montréal, which represent a combined enrolment second only to Boston in North America.

Montreal also has multiple innovation districts defined as “experimentation areas” where “creative genius, scientific rigor, and entrepreneurial spirit come together.”⁶⁰ The goal is to create conditions where experimentation and collaboration can occur among entrepreneurs, academics and residents. All of the local universities partner in the innovation districts with more than 1,000 researchers, over 300 startups as well as more than 20 incubators and accelerators⁶¹. The Government of Quebec supports the initiative through the Ministry of Economy and Innovation.

Montreal is part of the District 3 network. It works to “nurture and develop multidisciplinary startup teams that harness emerging tech to create businesses with global impact.”⁶² They are focused on innovation, collaboration and entrepreneurship, and offer services such as co-working spaces, lab-to-market programs, programs related to fintech, artificial intelligence and social innovation for entrepreneurs⁶³.

Entrepreneurial Capability and Culture

Montreal’s culture is distinct in North America and is rooted in deeply engaged, local communal networks. This produces a dynamic community whereby social cohesiveness and risk taking is combined⁶⁴.

Montreal also has a young and well-educated population; a population often more accepting of taking risks while possessing a strong local identity, and more favourable to the creation and sustainability of startups.

Creation and Diffusion of Knowledge

A key attraction in the innovation ecosystem has been the availability of low-cost commercial and industrial space in former industrialized port areas near downtown. The diverse, historic character of the neighborhood has been an attraction for startups.

The City of Montreal is playing a role in promoting the innovation ecosystem, through bodies such as Réseau M, Fondation Montreal Inc. and the Centre d’Entrepreneuriat d’Innovation Montréal, a non-profit that coaches companies in information technology, new media, clean technologies and life sciences⁶⁵.

⁶⁰A Tier 2 City defined for the Cities of the Future Ranking by fDi is a non-capital city that attracts no more than 20% of their country’s total FDI projects, and no less than 1%, with a total population of under eight million.
⁶¹Quartier de l’innovation de Montréal. (n.d.). The district. Retrieved from <https://quartierinnovationmontreal.com/>; <https://quartierinnovationmontreal.com/en/about/the-district/>
⁶²Quartier de l’innovation de Montréal. (n.d.). Who we are. Retrieved from <https://quartierinnovationmontreal.com/en/about/who-we-are/>
⁶³District3. (n.d.). District3. Retrieved from <https://district3.co/>; <https://district3.co/>

⁶⁴District3. (n.d.). Explore Entrepreneurship & Innovation. Retrieved from <https://district3.co/>; <https://district3.co/discover-entrepreneurship/>
⁶⁵Witte, P., Slack, B., Keesman, M., Jugie, J.-H., & Wiegman, B. (2017). Facilitating start-ups in port-city innovation ecosystems: A case study of. *Journal of Transport Geography*. Hereinafter referred to as Witte, P., Slack, B., Keesman, M., Jugie, J.-H., & Wiegman, B. (2017).
⁶⁶Witte, P., Slack, B., Keesman, M., Jugie, J.-H., & Wiegman, B. (2017).

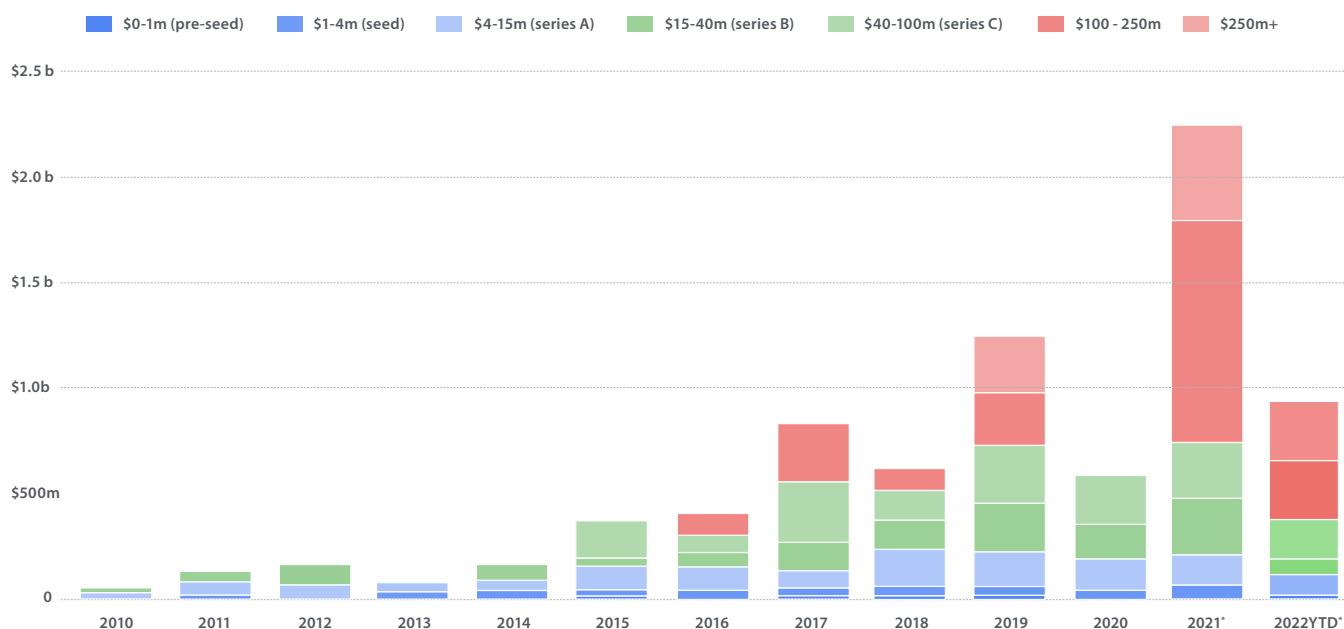


Access to Finance

Venture capitalists from Silicon Valley such as Cycle Capital and Funders Institute have established startup networks in Montreal to identify promising startup candidates for investment and, potentially, major capital injection.

There are tax concessions and subsidies including tax credits, direct tax discounts and rental subsidies that make Montreal an attractive place to start a company.

Montreal has also been able to break the cycle of Canadian firms not being able to access funding to scale up. Firms in Montreal have consistently been able to access Series C funding rounds, as well as capital beyond Series C (Figure 8)⁶⁶.



Note: due to reporting lag, the last 12 months are systematically under reporting on rounds especially small rounds. Contact us for corrected estimates.

Figure 9. Funding rounds by year in Montreal, Canada⁶⁷

⁶⁶https://app.dealroom.co/transactions/rounds/figrowth_stages/not_mature/rounds/not_GRANT_SPAC%20PRIVATE%20PLACEMENT/slug_locations/anyof_montreal/tags/not_outside%20tech/showStats=YEAR&statsType=rounds
⁶⁷https://app.dealroom.co/transactions/rounds/figrowth_stages/not_mature/rounds/not_GRANT_SPAC%20PRIVATE%20PLACEMENT/slug_locations/anyof_montreal/tags/not_outside%20tech/showStats=YEAR&statsType=rounds



KEY INSIGHTS

From the review of the five global innovation ecosystems, seven insights were identified:

1. It typically takes decades for investments into respective innovation ecosystems to reach the tipping point where critical mass was achieved. Investment into innovation ecosystems is a long game.
2. Most leading jurisdictions can identify a key homegrown success story that catalyzed the innovation ecosystem to get to where it is today. The companies have shown high continued engagement in giving back into the innovation ecosystem. Even without a homegrown corporate success story, the role corporations play is critical. The leading jurisdictions know their key assets and leverage their visionary influencers.
3. Leading jurisdictions have focused on key sectors of strength and competitiveness by starting with built-in capacity from post-secondary institutions. The PSIs understand the need for linkages to the real world and industry.
4. Proximity of assets, such as the creation of Innovation Districts, has been key in the development of top innovation ecosystems.
5. Incubators and accelerators are key assets to the innovation ecosystem. They can effectively assess the ideas that will be unsuccessful prior to additional resource expenditures in the innovation ecosystem.
6. Government can play a key role beyond just setting public policy by fostering connections to better drive and sustain the ecosystem.
7. Key innovation assets can be used to stimulate entrepreneurial culture and provide support for equity-deserving groups. For example, Israel's recognition of the value of skilled immigrants.





CONCLUSION

Development of strong, established innovation ecosystems is well underway in jurisdictions around the world. As Calgary continues to build and nurture its innovation ecosystem, it is critical to understand what has worked elsewhere and why.

We know building an innovation ecosystem requires the support and collaboration of many key players. Local success stories such as BlackBerry in Toronto-Waterloo, Dell in Austin, or Nokia in Helsinki and support from large corporations helped catapult the five highlighted jurisdictions. There is a need to nurture corporate, post-secondary and governmental partnerships to match research and commercialization with real world problems. Innovation districts provide space for new ideas and actualization to reach their potential, while offering access to visionary influencers, creating an entrepreneurial culture.

Understanding the factors that contribute to leading innovation ecosystems is paramount as Calgary continues its journey. We are on our way with a 30 per cent increase in the number of technology companies and a half dozen “unicorns” in recent years.

Calgary has long been known as a global centre in energy but we are increasingly seen as a much more diverse economy. With leading corporations and startups in numerous industries – from cleantech, agribusiness, fintech and logistics to life sciences and the creative industries. We are building a diverse and dynamic hub, which nurtures creativity across all sectors and facets of life – priorities in our economic strategy, [*Calgary in the New Economy*](#).



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