



Fostering a Technology and Innovation Ecosystem: Insights for the Edmonton Metropolitan Region

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About Edmonton Global: The purpose of Edmonton Global is to radically transform and grow the economy of the Edmonton metropolitan region. We are a not-for-profit corporation representing 14 municipalities that make up the Edmonton metropolitan region. Our focus is attracting foreign investment, helping regional businesses export with the world, enhancing our region's global competitiveness, and bringing our region together with a unified voice to attract the attention and interest of investors the world over.

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Executive Summary

Edmonton Global is an economic development company in the Edmonton Metropolitan Region (EMR), serving 14 municipalities. Edmonton Global partners and collaborates with all levels of government and other organizations to grow and transform the region's economy, including supporting the growth of its technology and innovation ecosystem. Edmonton Global does this by attracting foreign direct investment, encouraging global and foreign firms to set up shop in the region, and by assisting local firms to create an international presence.

Edmonton Global engaged RSM Canada Consulting LP to provide research on the current state of the EMR's technology and innovation ecosystem and study leading comparable jurisdictions to provide recommendations to support Edmonton Global in its mandate to attract new investment.

Through a review of the current state of the EMR's ecosystem, it was found that:

- The EMR is consistently seen as having an educated population with a high quality of life and a low cost of living. This has contributed to the significant increase in the number of technology jobs seen in the region (increase of 26% over the last five years).
- The EMR has seen an immense growth in ecosystem finance over the last decade with the number of startup funding rounds increasing from under five in 2011 to nearly 30 in 2020. Large dollar funding rounds have also increased in the last several years (i.e.: over \$10 million).
- Recently, there has been an introduction of global leading accelerator programs to the EMR, which suggests top organizations in the world are recognizing the emerging opportunity of the EMR's ecosystem.
- For any ecosystem to grow and thrive, it is important to recognize diversity, inclusion, and equity of all aspects of society. Women's Initiative Edmonton indicates that in Edmonton, 85% of women have a high school diploma, 51% of Indigenous women have postsecondary qualifications, and 30% of visible minority women have a degree.¹
- Among emerging sectors, the EMR has been increasingly known for its advancement of artificial intelligence/machine learning (AI/ML). Starting with a checkers game program that was developed at the University of Alberta in 1994, the EMR has been associated with the development of this emerging sector for over 25 years. Over an 18-year period (1998–2019), the University of Alberta has ranked second in the world for AI/ML research output² and built up a roster of firms and startups in the AI/ML space. In addition, large companies such as Google, Huawei, Royal Bank of Canada, Amazon, and IBM Research have moved into the EMR because of the AI/ML capabilities.

¹ City of Edmonton & Women's Initiative Edmonton, "Edmonton Women's Quality of Life Scorecard," 2021, https://www.edmonton.ca/sites/default/files/public-files/documents/PDF/COE-WAVE_GenderIndicators_ONLINE_2018.pdf.

² *Edmonton.AI*, 2021, <https://edmonton.ai/>.

Although there is no ideal playbook for developing and growing an ecosystem further, it is advantageous to look at globally leading, yet comparable ecosystems in the world for insights as to how the EMR can further advance its ecosystem. This study explores the following ecosystems that are considered more advanced than that of the EMR's:

Helsinki, Finland	<ul style="list-style-type: none">• Similar to Edmonton in terms of being a northern city as well as having the responsibility of being a capital city.
Toronto-Waterloo, Canada	<ul style="list-style-type: none">• Chosen as a domestic comparator (i.e.: similar federal laws, corporate culture, etc.).
Austin (TX), United States	<ul style="list-style-type: none">• Chosen due to it being initially known as a "government town" and having ties to the oil and gas industry at first, then successfully pivoting towards a focus on technological sectors.

Recommendations

The following recommendations reflect the findings of the current state and jurisdictional reviews.

Recommendation #1 – Promote home-grown success stories

Each jurisdiction reviewed had a home-grown success story that became a global success – Dell in Austin, Blackberry in the Toronto-Waterloo region, and Nokia in Helsinki. Each of these organizations were well-known in their respective ecosystem in terms of driving a culture of innovation, attracting talent, and giving back to the ecosystem and local community.

Although the EMR currently does not have a home-grown global success on the same level as Dell, Nokia, or Blackberry, one of the main contributions that these companies have had on their respective ecosystem was to drive an innovation and entrepreneurial mindset. The most successful ecosystems in the world encourage and stimulate their talent pools with the idea that entrepreneurship in technology and innovation is a viable option as a career path. Just recently, companies in the EMR such as Jobber and Showbie have scaled and grown quickly – these are success stories that can drive and further stimulate the ecosystem and increase awareness for those in the region who may not know of the EMR as an emerging ecosystem.

Recommendation #2 – Host a regionally or internationally recognized event in technology and innovation

The jurisdictions reviewed have well-known events which showcase the region's ecosystem and present a platform for the local firms and stakeholders to collaborate with those from abroad, including potential investors. In Austin, an example is South by Southwest (SXSW), and in Helsinki, Slush attracts investors from all over the continent. Such events become a crucial

networking and collaborating tool in the ecosystem and increase awareness of the region's ecosystem within the region and beyond.

Such events showcase the city to visitors, stimulate interest in the ecosystem locally, and promote collaborations and partnerships among local and global technology and innovation players. With the EMR as an emerging leader in AI/ML, organizing regional events in this space can be a way to attract talent and investors, as well as generate buzz that the EMR is the place to be for technology and innovation. The EMR currently has an annual AI Week presented by Amii; there may be further opportunity to build this event and increase the number of attendees from outside of the region.

Recommendation #3 – Continue building upon the Edmonton Research Park

Technology and innovation hubs and districts are a great way to boost innovation within an ecosystem or a jurisdiction. They provide opportunities for collision between stakeholders in an innovation ecosystem and can effectively promote innovation development, increased employment opportunities, and higher business activity.³ These opportunities can be fostered through increased proximity between key innovation assets.

Research suggests that startup density is integral to building an effective startup ecosystem.⁴ Working in close proximity to each other enables founders and other players in the ecosystem to rapidly share information and build highly effective networks. Innovation hubs and districts are an effective means to create pockets of this density. The Toronto-Waterloo region has one such hub known as the MaRS Discovery District (MaRS), which has been identified as North America's largest innovation hub.⁵ Founded in 2000 by leaders from business and the public sector, MaRS started as an ecosystem connector, bridging the gap between startups, industry, and government.

Currently, the EMR has the Edmonton Research Park, which houses 55 companies and over 1,500 members and is dedicated to fostering research-based growth stage companies within the region. At one point, the Research Park had a "flagship" company (Cold-FX), which generated an increased interest in the Research Park. Since then, the Research Park has expanded the type of companies that occupy the Research Park beyond that of research-based growth stage companies. In addition, there was a plan to establish another innovation hub in Edmonton⁶ and one between Edmonton and Calgary (Alberta Innovation Corridor),⁷ but these have not yet come to fruition.

There is potential to increase the scope of the Edmonton Research Park to become a vibrant hub for technology and innovation or to explore the development of an innovation hub elsewhere, such as downtown Edmonton. The creation of an innovation hub or district should not be done in a vacuum. First, the needs of entrepreneurs, startups, and established companies

³ Marija Marovic, "Innovation Districts: A Space to Innovate," Skipsolabs, <https://www.skipsolabs.com/en/custom/news/view/231>.

⁴ Allison Bramwell, Nicola Hepburn, & David A. Wolfe, "Growing Innovation Ecosystems: University-Industry Knowledge Transfer and Regional Economic Development in Canada," Toronto: University of Toronto, 2012, https://tspace.library.utoronto.ca/bitstream/1807/80099/2/Bramwell%20et%20al_2012_Growing%20Innovation%20Ecosystems.pdf.

⁵ MaRS, "About MaRS," 2021, <https://www.marsdd.com/about/>.

⁶ Scott Johnston, "Edmonton City Council puts downtown innovation hub plan on hold," Global News, 2018, <https://globalnews.ca/news/4588722/edmonton-city-council-eedc-innovation-hub-hamilton/>.

⁷ AB Corridor, 2021, <https://abcorridor.com/>.

in technology and innovation should be considered. Based on these needs, a working group that includes stakeholders such as governments, academia, economic development organizations, large industries, and other key players in the EMR's ecosystem may be formed to address the needs, potential location, and structure of the innovation hub or district. A key to any successful innovation hub or district is the ability to bridge the gap between academia and large industry.

Recommendation #4 – Review gaps in the technology & innovation ecosystem for under-represented groups

Leading ecosystems in the world recognize the importance of the diverse ideas that under-represented groups bring (i.e.: women, Indigenous peoples, minorities, immigrants, youth, LGBTQ2+ individuals). Each of these under-represented groups experience unique challenges that need to be considered to have the ecosystem be equitable and accessible for all.

The EMR already has a solid foundation of diversity, equity, and inclusion of under-represented groups, exemplified by the high participation rates of women in the workforce as well as a relatively high proportion of minorities and Indigenous women with postsecondary qualifications. Further enhancing participation rates and advancement of under-represented groups within the ecosystem is a key to unlocking innovation.

The EMR should map out an inventory of current state supports and services specifically targeting each of these under-represented groups, both to market globally to attract talent, as well as to understand if there are any gaps or opportunities. Additional insights can be obtained through one-on-one workshops or focus groups with a subset of these groups to understand their key challenges and needs, which may be different from the rest of the population.

Recommendation #5 – Promote a global mindset

Until recently, “unicorns” were considered a rarity in the Canadian ecosystem.⁸ A unicorn is a privately-held startup company with a value of over \$1 billion.⁹ Generally, Canadian firms and entrepreneurs may not think of going global from day one. This is where jurisdictions such as Helsinki have succeeded in overcoming the weakness of small domestic markets. Organizations in the EMR involved in economic development and foreign investment attraction can look at institutions such as Business Finland,¹⁰ which encourages local firms to go global as one of their core mandates.

⁸ Isabelle Kirkwood, “As 2021 breaks records, can the Canadian tech sector sustain its growth in 2022?” 2021, <https://betakit.com/as-2021-breaks-records-can-the-canadian-tech-sector-sustain-its-growth-in-2022/>.

⁹ Investopedia, “Alternative Investments,” 2022, <https://www.investopedia.com/terms/u/unicorn.asp#>.

¹⁰ Business Finland, “International Growth,” 2021, <https://www.businessfinland.fi/en/for-finnish-customers/services/international-growth>.

Introduction

In 2017, municipalities in the Edmonton Metropolitan Region (EMR) decided to create Edmonton Global.¹¹ Edmonton Global is an economic development company serving 14 municipalities. It partners and collaborates with all levels of government and other organizations to grow and transform the region's economy, including supporting the growth of its technology and innovation ecosystem. This includes attracting foreign direct investment, encouraging global and foreign firms to set up shop in the region, and assisting local firms to create an international presence.

Edmonton Global engaged RSM Canada Consulting LP to provide research on the current state of the EMR's technology and innovation ecosystem and study leading, comparable jurisdictions to provide recommendations to support Edmonton Global in its mandate.

The study involved:

- High-level review and identification of the current state of the EMR's technology and innovation ecosystem (e.g.: key players, assets, outcomes) and how it has developed over the past years.
- Jurisdictional review of three leading ecosystems comparable to that of the EMR. The information gathered from these jurisdictions was then compared with the current state of the EMR to develop an opportunities analysis. The three jurisdictions selected were more advanced than that of the EMR to provide insights for the EMR to advance its ecosystem.
- Information was synthesized into recommendations for the EMR to support further economic development of the region.

More information on the scope and approach and the data and limitations for this project are found in the appendix.

Terminology

Below we define the words 'Innovation', 'Technology Innovation', and 'Technology and Innovation Ecosystem' in the context of this study.

- "Innovation" and "Technology Innovation" will be referred to interchangeably in the report and will be defined as "new or significantly modified technology products or processes where technological novelty emerges."¹²
- "Technology and Innovation Ecosystem" ("ecosystem") will be defined as the "complex dynamic system within which innovators operate – systems characterized by an array of interacting actors, resources, relationships, and conditions that work together to either enable or impede innovation."¹³

¹¹ Natasha Riebe, "Mayor touts Edmonton Global as highlight of 2017," CBC News, 2017,

<https://www.cbc.ca/news/canada/edmonton/edmonton-mayor-don-iveson-edmonton-global-1.4463441>.

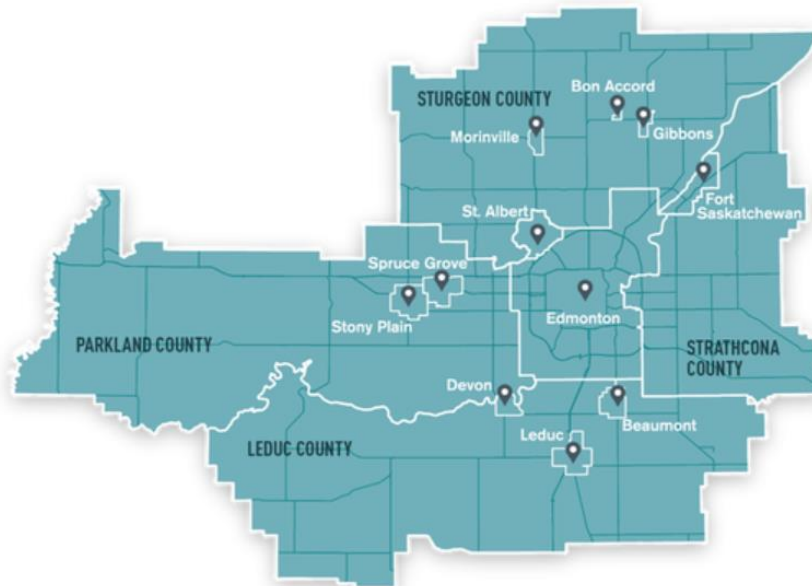
¹² Mihaela Diaconu, "Technological Innovation: Concept, Process, Typology and Implications in the Economy," *Theoretical and Applied Economics*, XVIII (2011): 127-144, <http://www.store.ectap.ro/articole/655.pdf>.

¹³ MIT D-Lab, "Understanding Innovation Ecosystems: A Framework for Joint Analysis and Action," 2019, <https://d-lab.mit.edu/sites/default/files/inline-files/PIA-2019-Ecosystems-V12c-190624-screen-pages.pdf>.

Current State Review

The EMR is made up of 14 municipalities and stands out as one of the youngest and fastest growing metropolitan regions in Canada.¹⁴ It covers an area of nearly 9,500 km² and represents a third of the population of Alberta and its economic activity.¹⁵

Figure 1: Map of EMR¹⁶



The EMR is referred to as having an “educated population, high quality of life, and a low cost of living.”¹⁷ Furthermore, the EMR is recognized as a growing leader in the sectors of artificial intelligence (AI), big data, analytics, and the life sciences. Startup Genome reported that the EMR’s ecosystem value (which is a cumulative estimate of the value of the start-ups in the region)¹⁸ is \$435 million, which has increased more than five times from \$77 million in 2018.¹⁹ Startup Genome is an innovation policy and research firm²⁰ and has recognized Edmonton as an emerging ecosystem to consider. Startup Genome publishes the Global Startup Ecosystem Report each year, which delineates jurisdictions based on their phase of Startup Ecosystem development through four main phases – *Activation*, *Globalization*, *Attraction*, and *Integration* – based on a set of characteristics, challenges, and objectives.²¹ The EMR currently features in the first phase, *Activation*; as part of our jurisdictional review, we will examine leading jurisdictions in phases ahead of the *Activation* phase to discover ways that these jurisdictions have advanced their ecosystem that may also help propel the EMR’s ecosystem development forward.

¹⁴ Edmonton Global, “Emergence of a Great Region,” accessed 2021, <https://edmontonglobal.ca/metro-region/>.

¹⁵ Edmonton Metropolitan Region Board, “Our Future will be made in the Region,” accessed 2021, <https://www.emrb.ca/ourregion>.

¹⁶ European-Canadian Centre for Innovation and Research, “Investing in the Edmonton Metropolitan Region,” accessed 2021, <https://eccir.ca/2021/02/19/investing-in-the-edmonton-metropolitan-region/>.

¹⁷ Startup Genome, “The Global Startup Ecosystem Report 2021,” accessed 2021, <https://startupgenome.com/reports/gser2021>.

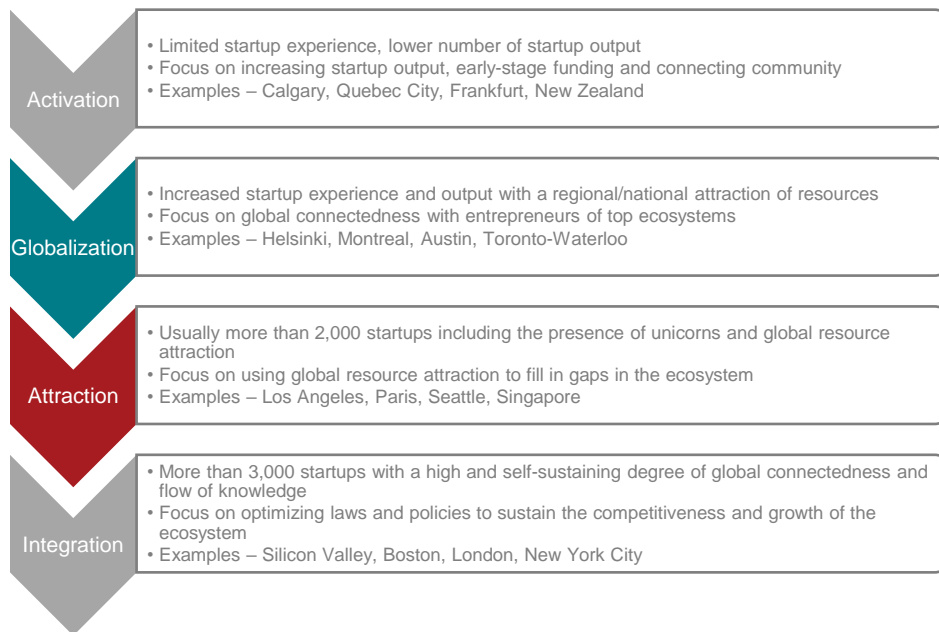
¹⁸ Ibid.

¹⁹ Startup Genome, “The Global Startup Ecosystem Report 2018,” accessed 2021, <https://startupgenome.com/reports/global-startup-ecosystem-report-gser-2018>.

²⁰ Startup Genome, <https://startupgenome.com/>.

²¹ Startup Genome, “The Global Startup Ecosystem Report 2020,” accessed 2021, <https://startupgenome.com/reports/gser2020>.

Figure 2: Startup Ecosystem Lifecycle Phases²²



The number of technology jobs in the EMR has seen an increase of approximately 26% over the last five years and there is also an increasing number of graduates from technology programs.²³ In comparison to other major cities in Canada, the EMR has consistently provided a lower cost of living, and this is one of the big factors that attracts firms to the area.²⁴ These factors have played an important role in the development of the ecosystem in the EMR.

Approach

To review the current state of the EMR, we separated the review into four key areas that are important to consider and integral in any ecosystem: Ecosystem Players, Ecosystem Finance, Ecosystem Culture, and Ecosystem Focus Areas. A summary of each of the key areas are as follows:

²² Ibid.

²³ Cheryl Watson, "Why Edmonton is Surging in Global Tech Rankings. Innovating Canada," Innovating Canada, accessed 2021, <https://www.innovatingcanada.ca/business-and-economy/why-edmonton-is-surgin-in-global-tech-rankings/#>.

²⁴ Ibid.

Table 1: Categorization of Key Areas Essential to Technology and Innovation Ecosystems

Key Area	Ecosystem Players	Ecosystem Finance	Ecosystem Culture	Ecosystem Focus Areas
Description	Includes review of the major players (academia, incubators, accelerators, government, media, start-ups, industry, etc.) of the ecosystem, interconnectedness, and collaboration between players.	Includes review of access to funding and the sources of funding in the ecosystem.	Includes the review of social and cultural aspects of the ecosystem. This includes diversity, inclusion, accessibility, and equity within the ecosystem.	Includes the review of key focus areas of the ecosystem that are ecosystem differentiators.

Ecosystem Players

Key ecosystem players are needed in any well-functioning ecosystem – these are investors, governments, incubators/accelerators, academia, industry/corporations, local media, and technology and innovation startups/companies. The following table includes a review of the presence of key players in the EMR in each of these categories.

Table 2: Ecosystem Players in EMR

Ecosystem Players	Presence in EMR
Investors	The EMR has multiple organizations that provide investments to startups and companies such as micro venture capital, angel investors, and venture capitalists. Some of the notable names include Valar Ventures and Rhino Ventures.
Government	<p>The region is the provincial capital of Alberta and has the presence of provincial and municipal governments. There are multiple Government of Alberta programs for research and innovation, as well as provincial funding of institutions such as Alberta Innovates and Invest Alberta.</p> <p>Through funding support from Alberta Innovates, the Edmonton Regional Innovation Network (ERIN) is a coalition of organizations in the Edmonton region that supports innovation and knowledge-based startups and companies. The collective goal of the ERIN is to build a collaborative, cohesive innovation ecosystem that connects entrepreneurs to resources, capital,</p>

	<p>customers, and the community through alignment of service providers.</p> <p>The City of Edmonton also funds initiatives such as Innovate Edmonton which helps support and attract technology accelerators to the city.²⁵</p>
Incubators/Accelerators	<p>The region has local incubators and accelerators through organizations such as Startup Edmonton and the University of Alberta (U of A). Recently, three new Edmonton-based global accelerators were announced through the Government of Alberta, Alberta Innovates, Prairies Economic Development Canada, and Innovate Edmonton:</p> <ul style="list-style-type: none"> • Alberta Accelerator by 500 – One of the world’s most active venture capital firms, 500 Global, will launch a one-of-a-kind accelerator to nurture seed-stage technology companies in Alberta. The Accelerator will alternate operations between Calgary and Edmonton. • Plug and Play Alberta – Plug and Play connects startups with international corporations to bring technology to market faster. They will offer sector agnostic and sector-based accelerator programs in digital health and sustainable clean resources, with a satellite office in Edmonton. • Community Safety and Wellness powered by Alchemist – based in Edmonton, this is a public/private consortium that has partnered with Alchemist Accelerator to provide services to ventures using AI in the social sector.²⁶
Academia	<p>The region has a network of academic institutions such as the U of A, Concordia University, Northern Alberta Institute of Technology (NAIT), and MacEwan University.</p> <p>The U of A is ranked as one of the world’s top 100 universities and has earned an international reputation for research excellence. The U of A has many programs to support innovation, technology and knowledge transfer, and entrepreneurship, such as a technology transfer office, a student innovation centre, and mentoring programs for entrepreneurs.²⁷ NAIT is the largest</p>

²⁵ Meagan Simpson, “Innovate Edmonton Receives \$5 Million From City To Support Accelerators,” Betakit, 2021, <https://betakit.com/innovate-edmonton-receives-5-million-from-city-to-support-accelerators/>.

²⁶ Alberta Innovates, “Global Business Accelerators to Power Growth, Opportunities in Alberta Tech Startup Sector,” September 23, 2021, <https://albertainnovates.ca/impact/newsroom/global-business-accelerators-to-power-growth-opportunities-in-alberta-tech-startup-sector/>.

²⁷ University of Alberta, “Innovation + Entrepreneurship @Ualberta,” accessed 2021, <https://www.ualberta.ca/research/innovation/at-ualberta.html>.

	apprenticeship trainer in Canada with the capacity to train approximately 15,000 apprentices in 33 trades. ²⁸
Industry/Corporations	The EMR provides a mix of established industries which include oil, gas, and mining; real estate, business and commercial services; ²⁹ engineering, construction, and manufacturing; and emerging industries such as AI/ML, advanced manufacturing, and the life sciences.
Local Media	The EMR has local media that covers the region and the ecosystem through platforms such as Taproot Edmonton. Organizations such as Edmonton Global and Innovate Edmonton also publish stories on their platforms about the ecosystem.
Technology and Innovation Companies & Startups	The EMR has seen an increase in startup activity over recent years. There are approximately 160 active startups ³⁰ in the EMR as of 2020; some of the most recognizable names include Jobber and Dealcloser.

The EMR has been said to be one of the most dynamic start-up ecosystems in western Canada.³¹ Postsecondary institutions such as the University of Alberta (U of A), Northern Alberta Institute of Technology (NAIT), MacEwan University, and Concordia University are important players in the ecosystem, generating vital research with the goal to one day be commercialized. The U of A is a critical player in the ecosystem and is consistently recognized among worldwide rankings for universities in the artificial intelligence/machine learning (AI/ML) space.³² One of the significant achievements for the U of A and the region has been the attraction of Google’s AI research division, DeepMind. DeepMind, which is a London-based division, chose Edmonton as its first international destination to set up shop.³³ Academia is an integral part of any ecosystem, and these institutions produce a high number of technology graduates. Further, institutions such as Innovate Edmonton have provided an effective support system for emerging technology startups, which require a different type of assistance as compared to traditional businesses.³⁴

The region has seen an increase in incubators and accelerators in the last couple of years. Research suggests that startup density is integral to building an effective startup ecosystem. This density is achieved when startup founders and other participants in the ecosystem work in

²⁸ City of Edmonton, “Supporting Industrial Innovation,” accessed 2021, <https://www.edmontonindustrial.ca/why-edmonton/research-and-innovation>.

²⁹ Terry Paranych, “Edmonton Economy: Top Industries, Biggest Employers, & Business Opportunities,” Edmonton Real Estate, January 8, 2021, <https://www.edmontonrealestate.ca/blog/edmonton-economy.html>.

³⁰ StartupBlink, “Edmonton, Canada Startup Ecosystem,” 2021, <https://www.startupblink.com/blog/edmonton-canada-startup-ecosystem/>.

³¹ Ibid.

³² Ibid.

³³ Paula Simons, “Global head-snap: Google’s DeepMind sets up shop in Edmonton,” Edmonton Journal, 2017, <https://edmontonjournal.com/business/local-business/paula-simons-global-head-snap-googles-deepmind-sets-up-shop-in-edmonton>

³⁴ Watson, “Why Edmonton is Surging in Global Tech Rankings.”

close proximity to each other to rapidly share information and build highly effective networks. Startup incubators, pre-accelerators, and accelerators are an effective means to artificially create pockets of this density, while acting as gatekeepers to identify ideas that have the highest potential to gain market traction.

Recently, Alberta Innovates – through its Scaleup and Growth Accelerator Program – approved global accelerators based in the EMR with collaboration from all three levels of government.³⁵ The governments announced funding to support three global accelerators: Alberta Accelerator by 500, Plug and Play Alberta, and Community Safety & Wellness Accelerator powered by Alchemist. The advantage of having these leading accelerators in a region is a hyper stimulation of the current state entrepreneurial mindset using best-in-class methodologies. These accelerators will join the current inventory of accelerators and more than 20 institutions that offer incubation programs and related services in the EMR.³⁶ Alberta Accelerator by 500 will help grow the seed stage technology companies in Alberta; Plug and Play Alberta will assist in forming connections between startups and international firms to bring technology to market faster; and Community Safety and Wellness will provide AI services to ventures in the social sector.³⁷

The introduction of these global leading accelerators suggests that organizations outside of the EMR and Alberta see the emerging opportunity of the region’s ecosystem. This move should further enable EMR’s projections of creating approximately 270 new technology firms, 6,000 new jobs and \$1.5 billion in technology revenue by 2030.³⁸ Apart from the incoming accelerators, the EMR already has accelerator programs such as ‘Propel’ (Startup Edmonton) which helps nurture the “early stage, scalable digital technology startups.”³⁹ Such institutions and programs are very helpful as they are the building blocks to support the commercialization of early-stage ideas.

Governments also play an important role in a jurisdiction and the City of Edmonton is trying to accelerate innovation through the creation of innovation projects such as the Health City Initiative, Open Data Portal, Business Technology Strategy, and CITYLab.⁴⁰

³⁵ Alberta Innovates, “Global Business Accelerators to Power Growth.”

³⁶ Startup Blink, “Edmonton’s Startup Ecosystem,” 2019, <https://www.startupblink.com/blog/edmontons-startup-ecosystem/>.

³⁷ Alberta Innovates, “Global Business Accelerators to Power Growth.”

³⁸ GlobeNewswire, “Innovate Edmonton Funds, Launches and Lands Accelerators, Benefiting Edmonton Tech Companies,” 2021, <https://www.globenewswire.com/en/news-release/2021/09/23/2302514/0/en/Innovate-Edmonton-Funds-Launches-and-Lands-Accelerators-Benefiting-Edmonton-Tech-Companies.html>.

³⁹ Startup Edmonton, “Propel,” 2021, <https://www.startupedmonton.com/propel>.

⁴⁰ Startup Blink, “Edmonton, Canada Startup Ecosystem.”

Ecosystem Finance

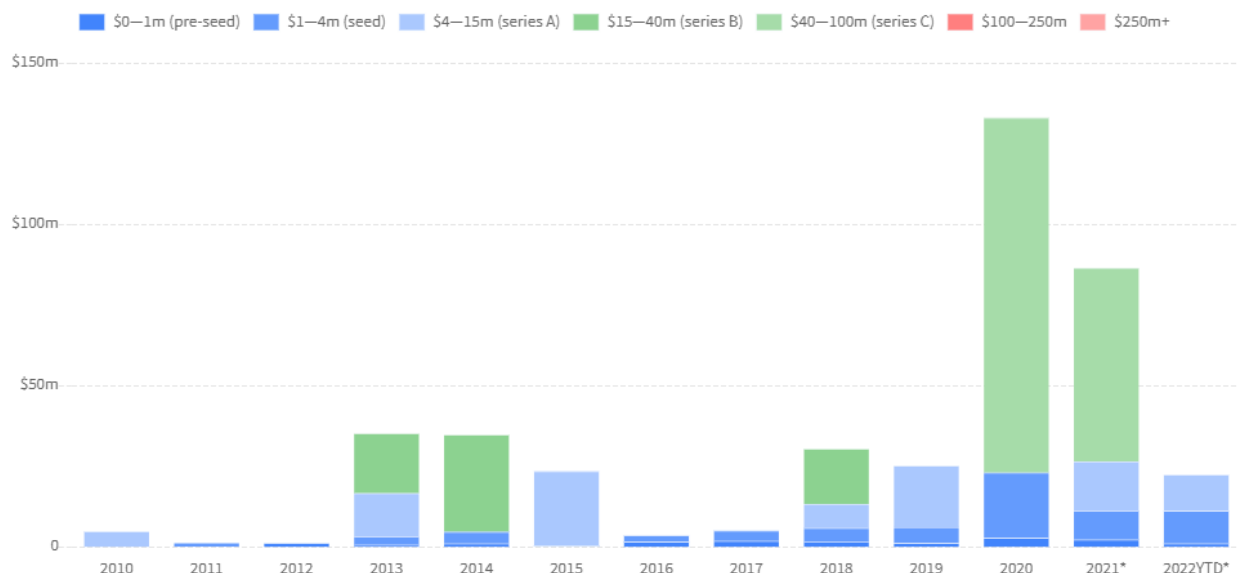
Having sufficient funding available and accessible to startups in any ecosystem is extremely important. Funding rounds are typically a function of a company's size and stage of development:

- **Pre-Seed** – This series of funding typically occurs when the founders are starting the company and pre-seed funding is used for initial startup costs. Typically, pre-seed rounds come from friends and family.
- **Seed or Angel** – This is typically one of the first rounds of funding that a company receives (unless there was a pre-seed funding round), usually occurring when there is a prototype and some indication of market demand.
- **Series A** – Seen as a critical stage of funding for a company, typically one of the first rounds of funding from private equity investors or venture capitalists. Investment is higher than that of the Seed or Angel Stage, though the risk that the investor takes on at this stage is also higher as the company is typically still in the startup or product development stage.
- **Series B** – Typically the second round of financing from private equity investors or venture capitalists, the company is expected to have a higher valuation to accompany the higher investment required. This is aligned with the stage of development of the company whereby growth is now one of the key focus areas.
- **Series C and beyond** – Once the company has proven to have gained market share and scaled up growth, the company may be ready for Series C, which is often significantly higher than that of the previous funding series, or an Initial Public Offering, which is when the company sells stock to the public for the first time.

The EMR has seen immense growth in ecosystem finance over the last decade with the number of funding rounds increasing from under five in 2011 to nearly 30 in 2020.⁴¹ Even though there has been an overall increase, the funding rounds have not been consistent. As can be seen in the following figure, funding beyond Series A has only occurred in 2013, 2014, 2018, 2020, and 2021. As such, it appears as though companies may struggle to obtain funding beyond Series A.

⁴¹ Dealroom, accessed 2022, https://app.dealroom.co/transactions.rounds/f/growth_stages/not_mature/is_verified/anyof_yes/rounds/not_GRANT_SPAC%20PRIVATE%20PLACEMENT/slug_locations/anyof_edmonton/tags/not_outside%20tech?showStats=YEAR.

Figure 3: Number of funding rounds in EMR⁴²



The pandemic has impacted and disrupted ecosystems around the world, but the EMR saw a minimum of 39 deals across 35 technology companies, which raised more than \$168 million in capital in 2020.⁴³ Some of the firms that raised over \$1 million are G2V, Quote2Me, Absolute Combustion, Direct C, and OncoQuest. The year 2021 saw a significant increase of successful funding rounds, with two companies – Jobber and Dealcloser – raising \$78 million in January alone.⁴⁴

Ecosystem Culture

Edmonton consistently ranks among the top cities in the world to live in.⁴⁵ As per the latest ranking of the best cities in the world by Resonance, which uses parameters such as place, product, programming, people, prosperity, and promotion, Edmonton is ranked 86th.⁴⁶ The U of A, downtown revival, healthy immigration, and Edmonton’s festivals moved the city up into the top 100.

Part of an ecosystem’s culture includes equity, diversity, and inclusion of under-represented groups, which include women, Indigenous Peoples, minorities, immigrants, youth, and LGBTQ2+ individuals. The City of Edmonton and the Women’s Initiative Edmonton group developed the Edmonton Women’s Quality of Life Scorecard to benchmark the lives of Edmonton women against men in Edmonton and Canadian female counterparts across five main areas:⁴⁷

⁴² Ibid.

⁴³ Jeff Bell, “Edmonton Region tech companies raise more than \$246 million since January 2020,” Edmonton Global, 2021, <https://edmontonglobal.ca/edmonton-region-tech-companies-raise-more-than-246-million-since-january-2020/>.

⁴⁴ Ibid.

⁴⁵ Andrea Dion, “Edmonton makes world’s 100 best cities to live in,” CTV News, 2021, <https://edmonton.ctvnews.ca/edmonton-makes-world-s-100-best-cities-to-live-in-1.5620482>.

⁴⁶ Laine Mitchell, “Edmonton has been named one of the Best Cities in the World,” Daily Hive, 2021, <https://dailyhive.com/edmonton/edmonton-best-cities-in-the-world>.

⁴⁷ City of Edmonton & Women’s Initiative Edmonton, “Edmonton Women’s Quality of Life Scorecard,” 2018, https://www.edmonton.ca/sites/default/files/public-files/documents/PDF/COE-WAVE_GenderIndicators_ONLINE_2018.pdf.

- **Finance and Economy** – considers whether women have the opportunity to be active members of the workforce in employment of their choice.
- **Leadership, Political Empowerment and Participation** – considers whether women are equitably represented in all levels of government and in key decision-making roles.
- **Education** – considers whether women have access to education in order to achieve qualifications needed to ensure increased opportunities.
- **Health and Wellness** – considers whether women have high levels of physical and mental health, happiness and wellness.
- **Safety** – considers whether women feel and experience safe environments.

The report finds that women in the EMR are either on par or above that of other women in Canada in the areas of Finance & Economy, Education, and Health & Wellness. However, the Scorecard indicates that there is still room for improvement for women in the EMR in Safety and in Leadership, Political Empowerment and Participation.⁴⁸ It further states that the EMR has a labour force participation rate of 67% for women and a labour force participation rate of 49% for women living with disabilities. This is higher than the benchmark results in the scorecard, which is an indication that generally, in the EMR, there is a higher level of engagement of women in the labour force. Edmonton also has 85% of women with a high school diploma, 51% of Indigenous women with postsecondary qualifications, and 30% of visible minorities with a degree.⁴⁹ Non-profit organizations such as Alberta Women Entrepreneurs, and other institutions such as The Institute for the Advancement of Aboriginal Women, Equal Voice, and Alberta Works,⁵⁰ further enhance participation rates of under-represented groups in the EMR's ecosystem. This participation and advancement of all aspects of society is needed for the unlocking of innovation.⁵¹

Collaboration between ecosystem players is a key element to drive culture within an ecosystem. To foster collaboration, the EMR hosts multiple co-working spaces for startups to work alongside like-minded people in an environment that offers the required infrastructure (such as Roundhouse, Work Nicer, and URBN Coworking⁵²). Along with this, entrepreneurial spirit is also encouraged through the visibility of large global companies such as Google entering the EMR ecosystem, and local companies such as Jobber and Showbie scaling, adding jobs, and contributing to the EMR's Gross Domestic Product (GDP).⁵³

The U of A and the City of Edmonton have been in a partnership for 15 years specific to the technology innovation space and now have moved into social and cultural innovation, while continuing to evolve the regional ecosystem.⁵⁴ On the commercialization front, in order to accelerate the volume and quality of commercial ventures from the university to the federal

⁴⁸ Ibid.

⁴⁹ Ibid.

⁵⁰ Women's Initiative Edmonton, "Resources," accessed 2021, <https://womensinitiativeedmonton.ca/resources/>.

⁵¹ Sylvia Ann Hewlett, Melinda Marshall, and Laura Sherbin, "How Diversity can Drive Innovation," Harvard Business Review, 2013, <https://hbr.org/2013/12/how-diversity-can-drive-innovation>.

⁵² University of Alberta, "Spinoff Toolkit: External Resources," accessed 2021, <https://www.ualberta.ca/research/innovation/tech-transfer/spinoff-toolkit/external-resources.html>.

⁵³ Terry Rock, and Cheryl Watson, "Opinion: Alberta's own Silicon Valley will double down on Innovation," Edmonton Journal, 2019, <https://edmontonjournal.com/opinion/columnists/opinion-albertas-own-silicon-valley-will-double-down-on-innovation>.

⁵⁴ Michael Brown, "U of A, City of Edmonton expanding innovation partnership," University of Alberta, 2021, <https://www.ualberta.ca/the-quad/2021/04/university-city-expanding-innovation-partnership.html>.

government, the U of A and Brass Dome Ventures Ltd. have started a program called the Innovation Masterminds of Edmonton (imYEG).⁵⁵

Ecosystem Focus Areas

Edmonton Global has several industry focus areas for the EMR, such as manufacturing, food & agriculture, life sciences, and energy.⁵⁶ The EMR has been increasingly known for its advancement of AI/ML and has been developing this industry for over 25 years. In 1994, the Chinook program was developed by Dr. Jonathan Schaeffer (U of A), for which a checkers program was developed which challenged the checkers world champion. In 1997, Dr. Murray Campbell (U of A alumnus), part of the Deep Blue team, developed IBM's Deep Blue Computer which defeated the then chess world champion. The EMR has since leveraged these early innovation initiatives and continued to build upon them – and a significant part of this is the work and presence of the U of A. Over an 18-year period, the U of A has ranked second in the world for AI/ML research output.⁵⁷

Today, the EMR has built up a roster of firms and startups in the AI/ML space. In addition, large companies such as Google, Huawei, Royal Bank of Canada, Amazon, IBM Research, and Borealis AI have moved into the EMR, and startups such as AltaML, Zept, SAM, and Medo.ai have made a name for themselves locally and beyond.⁵⁸

⁵⁵ Ibid.

⁵⁶ Edmonton Global, "Key Sectors," accessed 2021, <https://edmontonglobal.ca/key-sectors/>.

⁵⁷ Edmonton.AI.

⁵⁸ Ibid.

Jurisdictional Review

Approach

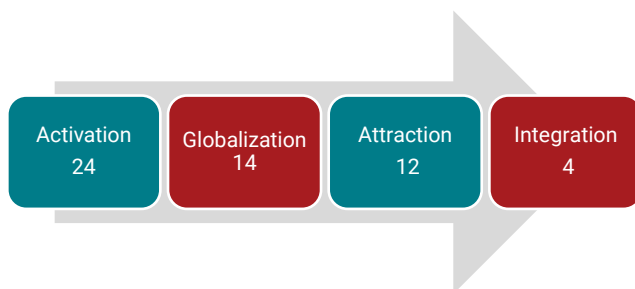
The EMR is currently in the *Activation* phase which means that it is on a trajectory to become a more advanced technology and innovation ecosystem. Even though there is no ideal playbook to develop an ecosystem, the EMR can learn from the jurisdictions in more advanced phases of development.

Startup Genome was used to identify comparable jurisdictions that are considered more advanced than that of the EMR. Startup Genome was used for the following reasons:

- Startup Genome is data-driven and collects both primary and secondary data on technology and innovation ecosystems for their report on ecosystem activation phases. Global ecosystems are placed according to an activation phase based on this data.
- There are a variety of sources that Startup Genome considers, and their study and data collection include multiple sources such as Crunchbase, Pitchbook, Dealroom, Ord Intelligence, as well as industry partners, and more than 100 primary interviews.
- The criteria or parameters (performance, funding, market reach, etc.) that Startup Genome uses in its reports to categorize data and assess an ecosystem are suitable and relevant to this study to gauge where the EMR is currently and to review comparator technology and innovation ecosystems that are further along than the EMR.

Each of the jurisdictions that have been selected for review are at a more advanced stage than that of the EMR. As per the Global Startup Ecosystem Report for 2020, Figure 2 in the previous section provides a glimpse of what each phase constitutes.

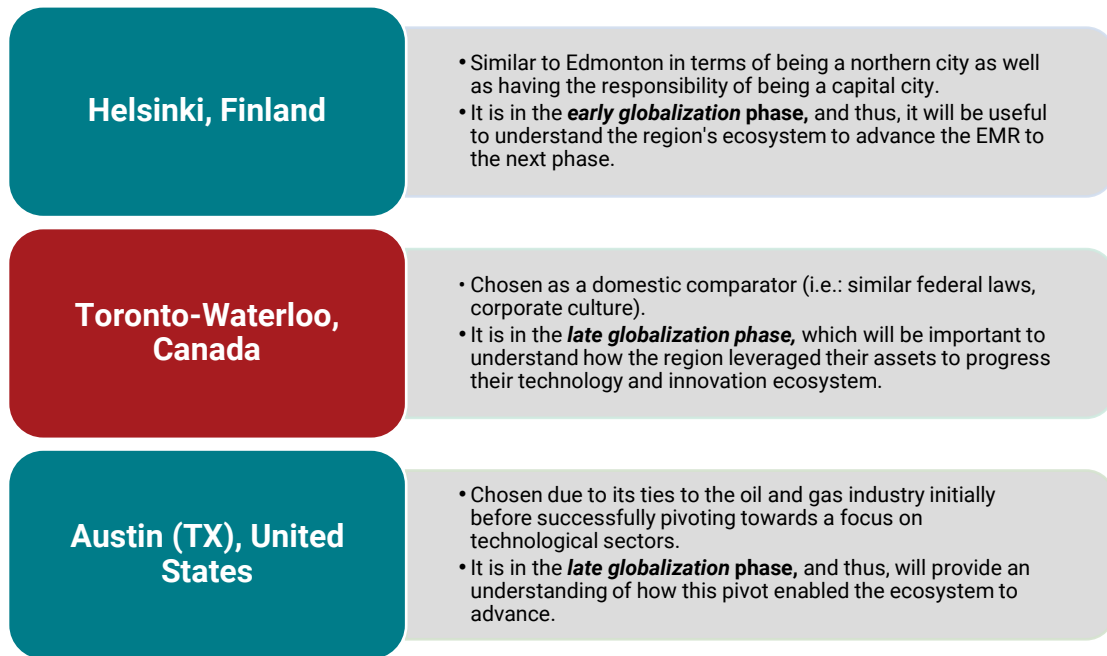
Figure 4: Number of jurisdictions in each phase⁵⁹



Given that the EMR is currently in the *Activation* phase, we selected three jurisdictions to review that are in the *Globalization* phase. Figure 5 summarizes each of the three jurisdictions.

⁵⁹ Startup Genome, "Startup Ecosystem Report 2020."

Figure 5: Jurisdictions selected



Helsinki

Helsinki contains multiple startup success stories such as Nokia, Rovio, and Wolt. It is in the *Early-Globalization* phase of the Global Startup Ecosystem Report of Startup Genome and has been selected as a jurisdiction for this review due to its northern presence (i.e.: the latitudes of EMR and Helsinki are within a seven-degree range) and location outside of North America (i.e.: international comparator). The similar latitude enables comparisons to parallel problems in terms of climate and geography. The figure below gives an overview of the Helsinki Startup Ecosystem, highlighting educational institutions, funding sources, events, and corporations.

AI, big data and analytics, gaming, and digital health are sectors for which Helsinki is known as an emerging leader. Like the EMR, Helsinki offers a low cost of living for a 'Scandinavian lifestyle' relative to other major cities. The ecosystem value of Helsinki measured \$6.6 billion in 2021 and has nearly doubled over the last two years (\$3.4 billion in 2019);⁶⁰ the startup ecosystem has tripled in size since 2015.⁶¹

Helsinki's population is 1,316,757,⁶² slightly smaller than that of the EMR's at 1,491,076.⁶³ Even though the population may be smaller, Helsinki has an ecosystem value much greater than that of the EMR. Furthermore, Helsinki continues to establish approximately 36,000 jobs per year through startups, which continue to attract funding in order to scale.⁶⁴

⁶⁰ Startup Genome, "Startup Ecosystem Report 2021."

⁶¹ Dealroom & NewCo Helsinki, "Helsinki Startup Ecosystem Report 2021," 2021, <https://newcohelsinki.fi/wp-content/uploads/Helsinki-Startup-Ecosystem-Report-2021.pdf>

⁶² World Population Review, "Helsinki Population," Accessed 2021, <https://worldpopulationreview.com/world-cities/helsinki-population>.

⁶³ World Population Review, "Edmonton Population," Accessed 2021, <https://worldpopulationreview.com/world-cities/edmonton-population>.

⁶⁴ Dealroom & NewCo Helsinki, "Helsinki Startup Ecosystem Report 2021."

Ecosystem Players

Helsinki has local universities that saturate the surrounding economy with highly trained talent, specifically in science and engineering, which bolsters Finland's strong innovation capacity in information and communications technology (ICT). In 2010, the Helsinki School of Economics, Helsinki University of Technology and the University of Art and Design Helsinki merged to establish an "Innovation University" – Aalto University. The aim of this initiative was to establish and promote collaboration between industry in sectors with a strategic advantage, which would ultimately have economic and spillover effects.⁶⁵

Another important facilitator in Helsinki's ecosystem is Health Capital Helsinki. This is a platform to nurture and attract investment from global entities. It also encourages collaboration within the ecosystem through events and consultancy, and it assists in navigating the ecosystem for firms wanting to enter the life sciences and health technology environment.⁶⁶

The City of Helsinki has also been playing a key role in the ecosystem by providing the following services:

- **NewCo Helsinki** – offers business consultancy and support to startups as well as international businesses looking to enter Helsinki without a charge.⁶⁷
- **Testbed Helsinki** – a platform set up by the city to assist firms who need to test their product or service.⁶⁸
- **Helsinki Partners** – a city marketing, investment, and talent attraction company providing services for local and international companies.⁶⁹

The inter-connectedness of the ecosystem is supported by a high sense of trust among innovation ecosystem partners and in public administration in Finland.⁷⁰ Openness in the Finnish innovation system naturally fosters networks to find suitable partners and clients. In addition, due to their relatively small population, there is an innate sense of needing to succeed internationally, which manifests not only in companies but also in academia.

Ecosystem Finance

Helsinki has become the fourth fastest-growing technology and innovation ecosystem in Europe for venture capital investment.⁷¹ It is home to one of the largest and most active business angel networks in the world; the Finnish Business Angel Network has 650 approved investor members that are actively seeking new growth companies.⁷²

As shown in the following figures, the number of funding rounds has increased since 2010, although funding rounds have decreased in the last four years. However, the Helsinki

⁶⁵ Bramwell, Hepburn, and Wolfe, "Growing Innovation Ecosystems."

⁶⁶ Health Capital Helsinki, accessed 2022, <https://healthcapitalhelsinki.fi/>.

⁶⁷ NewCo Helsinki, accessed 2022, <https://newcohelsinki.fi/en/>.

⁶⁸ Testbed Helsinki, accessed 2022, <https://testbed.helsinki.fi/>.

⁶⁹ Helsinki Partners, accessed 2022, <https://www.helsinkipartners.com/>.

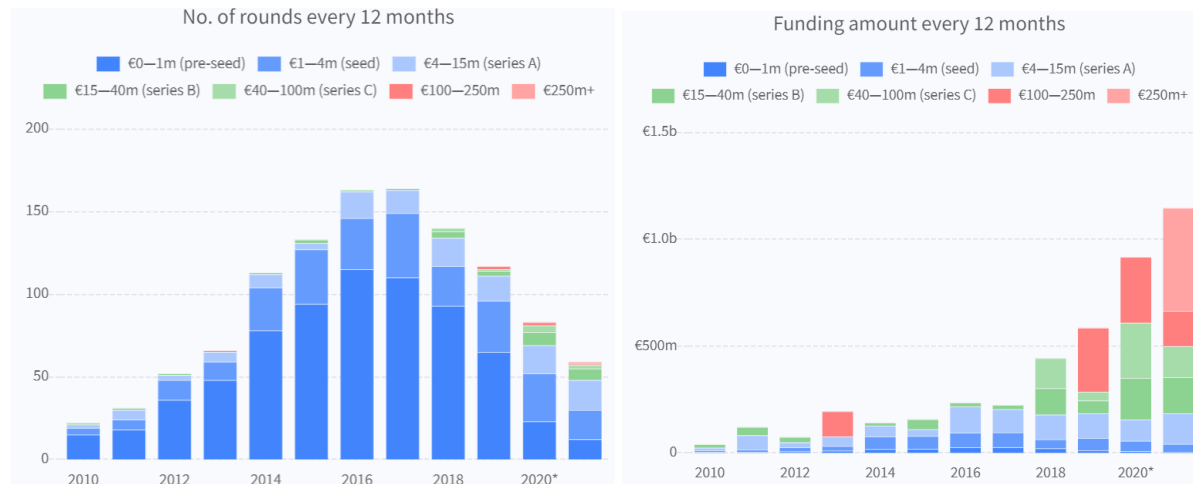
⁷⁰ UNICO. AI, "Finnish Innovation Ecosystem: Trust, Openness and NOKIA," accessed 2021, <https://unico.ai/blog/16/?language=en>.

⁷¹ Dealroom & NewCo Helsinki, "Helsinki Startup Ecosystem Report 2021."

⁷² Finnish Business Angels Network, About FiBAN, accessed 2022, <https://fiban.org/about/>.

ecosystem has seen funding rounds greater than €100 million starting in 2019, which more than covers the decrease in number of funding rounds. The amount of funding has significantly increased year over year, crossing the €1.0 billion mark in 2021.

Figures 6 & 7:⁷³ Number of funding rounds and the funding amount in Helsinki



The Government of Finland also assists startups in their early phases of growth. The government has provided programs such as the Finnish Startup Grant, which is quite different than the grants that other governments typically offer as it provides an entrepreneur with a secure income during the time it would normally take to get a business up and running (up to 12 months).⁷⁴ This grant is meant to encourage potential entrepreneurs by decreasing the risk of not having stable employment – one of the eligibility requirements is to be a full-time entrepreneur.

Another government institution, Business Finland, was created in 2018 to bring Finland’s innovation funding together into one place. Although Business Finland offers funding for research, product development, and various kinds of business development needs similar to those seen in Alberta, there is a specific focus on international growth.⁷⁵

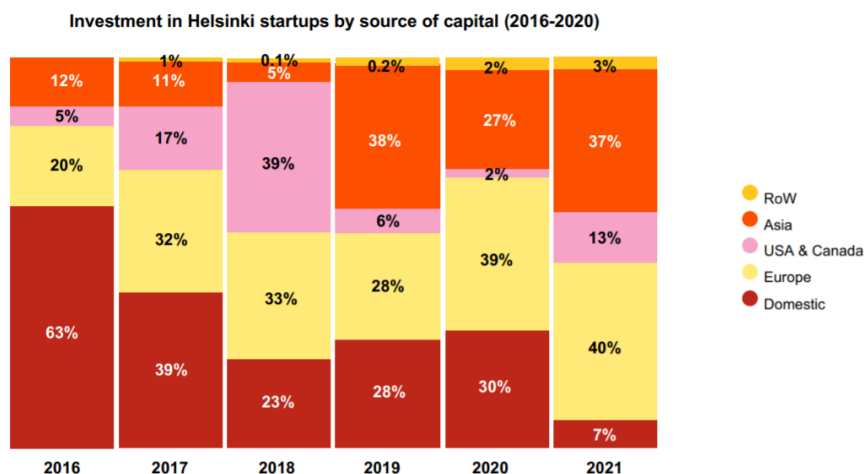
Recent trends have shown a significant increase in foreign capital investments compared to local capital. Of the total amount of funding to Helsinki startups, 63% came from local sources in 2016. In 2021, this reduced to 7%, with the majority of the funding to the startups now coming from international sources. This can also be seen in Figure 8.

⁷³ Dealroom, 2021, https://helsinki.dealroom.co/transactions.rounds/f/growth_stages/not_mature/regions/all_of_Greater%20Helsinki%20Area/rounds/not_GRANT_SPAC%20PRIVATE%20PLACEMENT/tags/not_outside%20tech?showStats=YEAR&statsType=rounds.

⁷⁴ Suomi.fi, “The start-up grant – support for a new entrepreneur,” accessed 2022, <https://www.suomi.fi/services/the-start-up-grant-support-for-a-new-entrepreneur-te-office/af2667af-e1b5-43dd-9b46-5e49ad1b1c9c>.

⁷⁵ Business Finland, accessed 2022, <https://www.businessfinland.fi/en>.

Figure 8: Investment in Helsinki startups by source of capital⁷⁶



Ecosystem Culture

Nokia Corporation has been a major influencer in the ecosystem and culture of Helsinki. Although Nokia is no longer growing at the pace it once was, it continues to have strong links to the Helsinki ecosystem. Through Nokia’s Bridge program, which offered training and financial assistance to people and helped employees initiate their own ventures, more than 500 entrepreneurs and 400 companies have been created.⁷⁷ Collaboration still exists among the former workers. In addition to this, multiple firms have attempted to replicate the open innovation concept that Nokia introduced, through sharing of knowledge and information about problems and being open to solutions provided by people outside the organization.⁷⁸ Many organizations have tried to instill a similar corporate culture to that of Nokia, which focuses on innovation. Open innovation has led to an extremely collaborative culture in the Finnish ecosystem, which is built on ideas and technologies being openly shared – from universities to startups and corporations.

Another highlight of the Helsinki technology culture is Slush,⁷⁹ an event known to be the largest gathering of venture capitalist investors in Europe. This showcases the ecosystem and its startups to investors from all over the continent. Helsinki has also created hubs like ‘Maria 01 Campus’ which is becoming one of the biggest startup campuses in Europe. Such hubs are important as they provide an environment to collaborate and enable entrepreneurial culture through networks, tools, working spaces, and knowledge for firms to grow and accelerate. They also help bridge gaps in the ecosystem and assist to make global connections and collaborations.⁸⁰

⁷⁶ Dealroom & NewCo Helsinki, “Helsinki Startup Ecosystem Report 2021.”

⁷⁷ Mark Bosworth, “The Upside to being let go by Nokia,” BBC News, 2014, <https://www.bbc.com/news/magazine-25965140>.

⁷⁸ Jonathan Livescault, “What exactly is open innovation?” Braineet, 2021, <https://www.braineet.com/blog/open-innovation>.

⁷⁹ Slush, accessed 2022, <https://www.slush.org/events/helsinki/>.

⁸⁰ Maria.01, “A Startup Ecosystem under one roof,” 2021, <https://maria.io/about/>.

Ecosystem Focus Areas

Like the EMR, Helsinki has been a leader in AI, which has been in development in Finland since the 1960s. The key technology and innovation players, including research institutions, universities, companies, and entrepreneurs, closely collaborate with each other on research in the AI space. A dedicated organization known as the Finnish Center for AI has also been established to provide a platform to encourage collaboration and research in the AI industry.⁸¹

Finland consistently ranks high in AI and has been ranked 5th globally by Oxford on the Government AI Readiness Index, as well as placed in the top quartile for AI readiness by McKinsey.⁸² Finland has over 400 AI startups, with about 50 new startups established every year. As part of its National Strategy for AI, the government provided a €160 million investment package for the overall development of AI in Finland in 2018. In 2020, this amount increased to €215 million, which is very significant given the size of the Finnish economy.⁸³

Toronto-Waterloo

The Toronto-Waterloo region is in the *Late-Globalization* phase according to Startup Genome and is an emerging leader in life sciences and AI, big data, and analytics. It is one of the fastest growing and densest innovation clusters in the world.⁸⁴ Toronto and Waterloo are two of the most concentrated technology workforces in North America.⁸⁵ This ecosystem has leading postsecondary institutions, talent, funding, innovation districts, and infrastructure. The impact of this region can be measured from the fact that it constitutes 17% of Canada's GDP.⁸⁶

Ecosystem Players

Academia is one of the most important players in this region. The Waterloo region alone hosts three renowned postsecondary institutions – University of Waterloo, Wilfrid Laurier University, and Conestoga College. With an average of 15 patents granted per 10,000 people,⁸⁷ this region is one of the most innovative in the country, and its postsecondary institutions produce world-class software engineers.⁸⁸ The co-op program at the University of Waterloo focuses on providing students with real-world experience along with providing the relevant technical expertise needed. Another factor which accelerates commercialization of ideas in the region is the intellectual property (IP) policy at the University of Waterloo, which permits the creator to keep the IP through a “creator-owned” model. The university is a critical catalyst in the region and has led to the creation of multiple startups and spin-offs.⁸⁹

⁸¹ Business Finland, “Artificial Intelligence for a better world,” accessed 2021, <https://www.businessfinland.fi/en/do-business-with-finland/explore-key-industries/ict-digitalization/ai>.

⁸² Faia, “Market Research,” accessed 2021, <https://faia.fi/market-research/>.

⁸³ Faia, “Market Research.”

⁸⁴ Startup Genome, “Startup Ecosystem Report 2021.”

⁸⁵ WaterlooEDC, “5 charts that prove the Toronto-Waterloo Corridor is a top tech hub,” February 17, 2022, <https://blog.waterloeedc.ca/five-charts-toronto-waterloo-tech-hub>.

⁸⁶ Connect the Corridor, “Who We Are,” accessed 2021, <http://connectthecorridor.ca/>.

⁸⁷ Waterloo EDC, “Waterloo: Your Optimal Business Partner,” 2022, <https://www.waterloeedc.ca/en/market-data/resources/waterloo-edc-demographics-and-statistics-snapshot.pdf>.

⁸⁸ Steven Denney, Travis Southin, and David A. Wolfe, “Entrepreneurs and the Evolution of Toronto's ICT Cluster: Insights and Lessons Learned,” University of Toronto, 2021, https://munkschool.utoronto.ca/ipf/files/2019/04/Denney-Southin-Wolfe_CDO-research-summary_final.pdf.

⁸⁹ Bramwell, Hepburn, and Wolfe, “Growing Innovation Ecosystems.”

The region is home to more than 150 leading research centres that range from quantum computing and advanced cryptography to autonomous vehicles and advanced manufacturing. These centres are known for their world-class expertise and state-of-the-art facilities for research and development.

One of the biggest local players in the Toronto-Waterloo region has been the company Blackberry, which continues to encourage innovation through multiple collaborations with other firms and universities. For example, the Joint Innovation Program has been established through a partnership between the University of Waterloo and Blackberry. This program will encourage research-powered innovation in the country.⁹⁰ Blackberry continues to nurture talent through various programs such as the annual \$10,000 Blackberry Cybersecurity and Privacy Excellence Scholarship with the University of Waterloo's Cybersecurity and Privacy Institute. Other examples of collaboration include involvement with the Conrad School of Entrepreneurship and Business, and the Stratford School of Interaction Design and Business.⁹¹

Another key player in the region's ecosystem is the not-for-profit organization MaRS Discovery District, which has developed into one of North America's largest urban innovation hubs.⁹² MaRS was initially established as a platform to help understand the needs of startups and explore how government can help bridge gaps to support their needs. Over the years, MaRS has grown to offer services to startups such as access to talent, access to funding, business advice and mentorship, and entrepreneurial education. It also assists early-stage companies with funding through its Catalyst Fund. Information technology, social innovation, life sciences, and clean technology are just some of the focus areas for MaRS.

The Government of Ontario has long been assisting the advancement of the region's ecosystem. It supported the creation of the Communitech Hub: Digital Media and Mobile Accelerator in 2010. This is a physical space aimed at attracting and increasing collaboration between academic institutions, firms, and entrepreneurs.⁹³ It has housing facilities for students attending the University of Waterloo VeloCity program and participating in its entrepreneurial residence program.⁹⁴

Ecosystem Finance

The Toronto-Waterloo region has seen a massive increase in the number of funding rounds, as can be seen in the following figure.

⁹⁰ "BlackBerry and the University of Waterloo Expand Partnership to Create First Ever Joint Innovation Program," *University of Waterloo*, accessed 2021, <https://uwaterloo.ca/news/media/blackberry-and-university-waterloo-expand-partnership-create>.

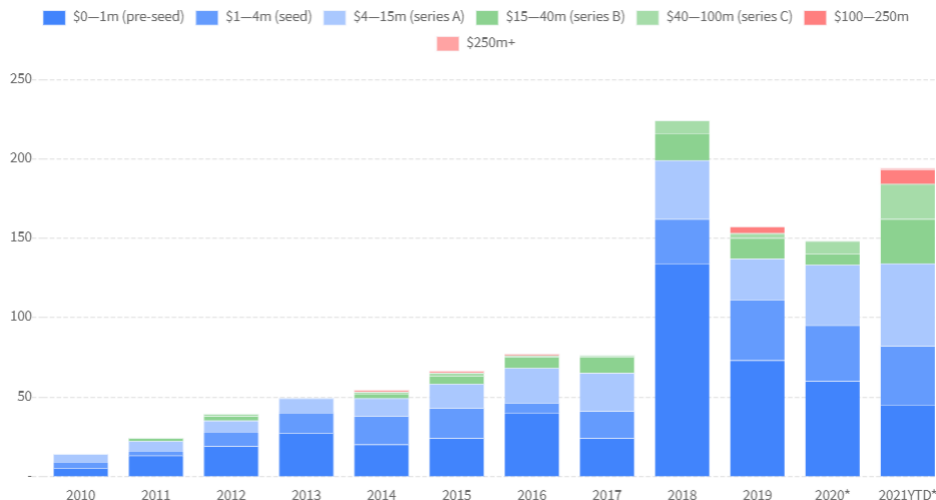
⁹¹ Ibid.

⁹² MaRS, "We help innovators change the world," accessed 2021, <https://www.marsdd.com/>.

⁹³ David Crow, "The Communitech Hub," *Startup North*, 2009, <https://www.startupnorth.ca/2009/11/06/the-communitech-hub/>.

⁹⁴ Bramwell, Hepburn, and Wolfe, "Growing Innovation Ecosystems."

Figure 9: Number of Funding Rounds in the Toronto-Waterloo region⁹⁵



In 2017, Canada accounted for USD \$2.7 billion in venture capital funding and the Toronto region was responsible for 29% of the total, also accounting for the highest number of deals in the country.⁹⁶

In addition to other services provided, MaRS has made an impact on the region through the provision of funding. In 2018, MaRS itself had \$112.4 million in funding under its management and its affiliates were able to raise \$931 million in follow-on funding. Between 2008 and 2017, MaRS-supported ventures were able to raise a total of \$4.8 billion.⁹⁷

The Government of Ontario has also provided funding in specific emergent areas. For instance, in partnership with the Ontario Centre of Excellence, it created the Autonomous Vehicle Innovation Network and pledged \$80 million for the province’s investment in self-driving cars.⁹⁸

Ecosystem Culture

Several important factors that occurred simultaneously led to the catalyzation of the Toronto-Waterloo ecosystem over the past ten years. Mobile platforms and cloud computing led to the rise of affordable growth in software-driven products and services.⁹⁹ Reduced costs in this area sped up the formation of startups. At the same time, startup formation was also encouraged by the rise of incubators and interest shown by venture capital firms in the United States around the same time. This, coupled with the talent coming out of the universities in the area, created a culture of collaboration and ideation that ultimately led to a significant increase in innovation and technological advances in the region. This culture was further enabled through Meetup groups such as TechToronto and Barcamp.

⁹⁵ Dealroom, accessed 2021,

https://app.dealroom.co/transactions.rounds/f/growth_stages/not_mature/is_verified/anyof_yes/rounds/not_GRANT_SPAC%20PRIVATE%20PLACEMENT/slug_locations/anyof_~toronto_5~/tags/not_outside%20tech?chartDataKey=count&showStats=YEAR.

⁹⁶ Toronto Global, “Toronto Region – A Magnet for Canadian and Foreign Tech Companies,” accessed 2021,

<https://torontoglobal.ca/TG-Blog/October-2018/Toronto-Region-A-Magnet-for-Canadian-and-Foreign>.

⁹⁷ MaRS, “Impact Report,” 2018, https://www.marsdd.com/wp-content/uploads/2018/09/MaRS_Impact_Report_2018.pdf

⁹⁸ Toronto Global, “A Magnet for Canadian and Foreign Tech Companies.”

⁹⁹ Denney, Southin and Wolfe, “Entrepreneurs and the Evolution of Toronto’s ICT Cluster.”

Ecosystem Leading Area

The Toronto-Waterloo region is one of the leading ecosystems in AI, evidenced by having the highest concentration of AI startups in the world. The region has multiple support systems to assist startups focused in AI such as the MaRS Discovery District, ventureLAB, and Durham College AI/HUB.¹⁰⁰ These institutions help firms grow in the AI space through various programs like supply chain AI,¹⁰¹ and by offering mentoring services or access to funding.¹⁰² There are multiple reasons for the attraction of AI firms to the region, such as the availability and access of capital in the region for AI startups, the favorable environment for innovation, a burgeoning local talent pool, and proximity to other leading cities in the United States for AI such as New York, Boston, and Chicago.¹⁰³

During the last several years, multiple large global firms have invested in the region's AI space. Uber has plans to invest approximately \$200 million over five years through an engineering office while also opening a new research hub for AI in driverless cars in Toronto. Nvidia Corporation also has plans to open an AI research facility in Toronto, and Samsung opened a new research and development office in 2018 to collaborate on research with top AI scholars.¹⁰⁴

Austin

Austin has been a leading technology and innovation ecosystem for many years and is classified as being in the *Late-Globalization* phase in Startup Genome's Global Startup Ecosystem Report. Austin is known for its "growth market" (i.e.: its offerings of market opportunities and access to capital). It has been among the top-ranked cities in the United States in terms of population growth and attraction, density of high-growth firms, and job creation. The city hosts not only multiple Information Technology (IT) firms, incubators, and corporations but also large-scale technology and innovation events such as South by Southwest (SXSW), which facilitates collaboration between technology, film, music, education, and culture through a platform of conferences and festivals.¹⁰⁵

¹⁰⁰ Toronto Global, "AI in the Toronto Region," accessed 2021, <https://torontoglobal.ca/ai>.

¹⁰¹ MaRS, "MaRS announces Supply Chain AI program in partnership with Scale AI," 2020, <https://marsdd.com/media-centre/mars-announces-supply-chain-ai-program-in-partnership-with-scale-ai/>.

¹⁰² MaRS, "We help high-impact Canadian tech ventures grow and succeed," accessed 2021, <https://marsdd.com/startup-services/>.

¹⁰³ Sweha Hazari, "Why Toronto is home to the highest number of AI startups in the world," Toronto School of Management, 2021, <https://www.torontosom.ca/blog/why-toronto-is-home-to-the-highest-number-of-ai-startups-in-the-world>.

¹⁰⁴ Toronto Global, "AI in the Toronto Region."

¹⁰⁵ SXSW, "About SXSW," accessed 2021, <https://www.sxsw.com/about/>.

Figure 10: Austin Startup Ecosystem¹⁰⁶



Ecosystem Players

Austin has been able to transform from a university town to a fast-growing, globally competitive hotspot for technology and innovation. Visionary influencers have played a major role in this transformation through bold decisions, connections, and leveraging otherwise unconnected and, at times, competing sectors. This has brought the innovation community together to drive large-scale projects, generate a creative environment for partnerships that are productive, and ensure synergies that lead to institutional and organizational change.¹⁰⁷

The University of Texas at Austin (UTA) is often touted as a key contributor to the growth and sustainability of the Austin ecosystem for the following reasons: it has increased endowed research chairs through UTA's matching program with private donations, increased research and development expenditures funded by the federal government, and enhanced technology and spinoff activity through UTA's Technology Incubator.¹⁰⁸

The regulatory environment has kept taxes low with no personal income tax and a generally pro-business environment, which has been a key to Texas' economic development. Austin is one of the fastest growing metropolitan areas in the country, attracting nearly 65,000 people annually.¹⁰⁹ This contrasts with the city's earlier reputation of being a "sleepy government and university town."¹¹⁰ Due to the success of the company Dell, top talent from leading business schools and ecosystems such as Silicon Valley are drawn to the city and settle there.

¹⁰⁶ Joshua Baer, "Our Message to President Obama," Capital Factory, 2013, <https://www.capitalfactory.com/2013/05/12/our-message-to-president-obama/>.

¹⁰⁷ David V. Gibson, "Sustaining the Technopolis: The Case of Austin Texas," World Technopolis Review 74, 2013, https://www.researchgate.net/publication/259673263_Sustaining_the_Technopolis_The_Case_of_Austin_Texas.

¹⁰⁸ Ibid.

¹⁰⁹ S.C Gwynne & Texas Monthly, "Dell's Great Success Story," Texas Monthly, 2013, <https://www.texasmonthly.com/the-culture/dells-great-success-story/>.

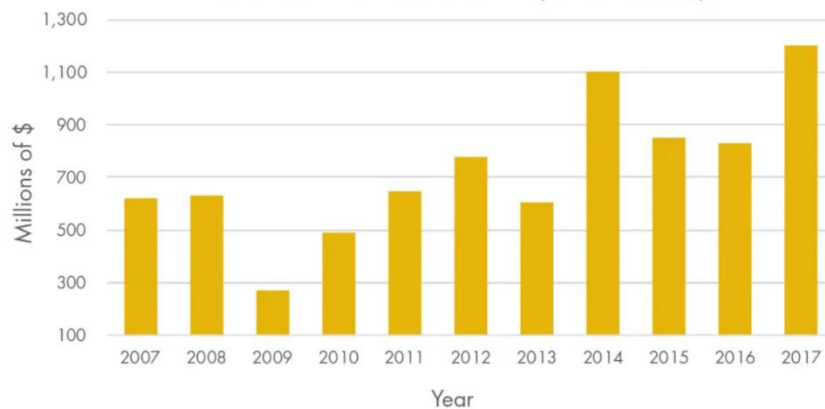
¹¹⁰ Ibid.

Ecosystem Finance

A key to Austin’s growth as an ecosystem has been specific state-sponsored economic development initiatives early on, such as the Texas Enterprise Fund created in 2003, which helped attract industry to Texas and create jobs. Further, the Emerging Technology Fund (ETF) was created in 2005 to provide funding for the research, development, and commercialization of emerging technologies, enabling companies to take ideas from concept to market. By 2012, the ETF had invested over \$192 million in 133 companies which made it the largest seed investor in the state of Texas.¹¹¹

Between 2007 and 2017, venture capital funding in Austin nearly doubled. Although Austin is smaller than both Houston and Dallas in terms of population, its share in Texas’ total venture funding is 61%. The year 2017 was a benchmark year for Austin wherein it managed to raise approximately \$1.2 billion.¹¹²

Figure 11: Venture Capital funding in Austin¹¹³



Ecosystem Culture

Austin has grown to become a worldwide cultural hub in the technology and innovation space. It holds multiple events that bring together people from various sectors in one place. One of the biggest global events in technology is SXSW; this event started in 1986 and drives technology innovation in the ecosystem of Austin and beyond through collaboration between technology, film, music, education, and culture.¹¹⁴ Not only does the event benefit entrepreneurs, but it also indirectly boosts the local economy, drawing visitors from around the world. For example, in 2016, it brought in 230,000 people to the city including the President and First Lady, resulting in the city earning \$325.3 million in just ten days of the month of March.¹¹⁵

¹¹¹ Gibson, “Sustaining the Technopolis.”

¹¹² Jackson Sowell, “3 Reasons Austin, TX is one of the most Innovative cities in the U.S., 2Q 2018 Eagle’s Nest,” Aquila, accessed 2021, <https://aquilacommercial.com/learning-center/reasons-austin-tx-one-most-innovative-cities-us/>.

¹¹³ Ibid.

¹¹⁴ SXSW, “About SXSW.”

¹¹⁵ Alissa Walker, “How South by Southwest Transformed Austin,” Curbed, 2016, <https://archive.curbed.com/2016/12/7/13854510/austin-sxsw-festival-history>.

The innovation culture has also attracted the United States Army to choose Austin as their new centre for its four-star command centre.¹¹⁶ The United States Army had initially indicated 150 cities as potential sites for its new headquarters, ultimately recognizing and acknowledging Austin for its proximity to science, technology, engineering, and mathematics (STEM) workers and industries, private sector innovation, academia, and research and development investment.¹¹⁷

¹¹⁶Jen Judson, "Why the Army picked Austin for Futures Command," Defence News, 2018, <https://www.defensenews.com/land/2018/07/13/why-the-army-picked-austin-for-futures-command/>.

¹¹⁷ Sowell, "3 Reasons Austin, TX is one of the most Innovative cities in the U.S."

Recommendations

Recommendation #1 – Promote home-grown success stories

Each jurisdiction reviewed had a home-grown success story that became a global success — Dell in Austin, Blackberry in the Toronto-Waterloo region, and Nokia in Helsinki. Each of these organizations were well-known in their respective ecosystem in terms of driving a culture of innovation, attracting talent, and giving back to the ecosystem and local community.

Although the EMR currently does not have a home-grown global success on the same level as Dell, Nokia, or Blackberry, one of the main contributions that these companies have had on their respective ecosystem was to drive an innovation and entrepreneurial mindset. The most successful ecosystems in the world encourage and stimulate their talent pools with the idea that entrepreneurship in technology and innovation is a viable option as a career path. Just recently, companies in the EMR such as Jobber and Showbie have scaled and grown quickly — these are success stories that can drive and further stimulate the ecosystem and increase awareness for those in the region who may not know of the EMR as an emerging ecosystem.

Recommendation #2 – Host a regionally or internationally recognized event in technology and innovation

The jurisdictions reviewed have well-known events which showcase the region’s ecosystem and present a platform for the local firms and stakeholders to collaborate with those from abroad, including potential investors. In Austin, an example is South by Southwest (SXSW), and in Helsinki, Slush attracts investors from all over the continent. Such events become a crucial networking and collaborating tool in the ecosystem and increase awareness of the region’s ecosystem within the region and beyond.

Such events showcase the city to visitors, stimulate interest in the ecosystem locally, and promote collaborations and partnerships among local and global technology and innovation players. With the EMR as an emerging leader in AI/ML, organizing regional events in this space can be a way to attract talent and investors, as well as generate buzz that the EMR is the place to be for technology and innovation. The EMR currently has an annual AI week presented by Amii — there may be further opportunity to build this event and increase the number of attendees from outside of the region.

Recommendation #3 – Continue building upon the Edmonton Research Park

Technology and innovation hubs and districts are a great way to boost innovation within an ecosystem or a jurisdiction. They provide opportunities for collision between stakeholders in an innovation ecosystem and can effectively promote innovation development, increased employment opportunities, and higher business activity.¹¹⁸ These opportunities can be fostered through increased proximity between key innovation assets.

¹¹⁸ Marija Marovic, “Innovation Districts: A Space to Innovate,” Skipsolabs, <https://www.skipsolabs.com/en/custom/news/view/231>.

Research suggests that startup density is integral to building an effective startup ecosystem.¹¹⁹ Working in close proximity to each other enables founders and other players in the ecosystem to rapidly share information and build highly effective networks. Innovation hubs and districts are an effective means to create pockets of this density. The Toronto-Waterloo region has one such hub known as the MaRS Discovery District (MaRS), which has been identified as North America's largest innovation hub.¹²⁰ Founded in 2000 by leaders from business and the public sector, MaRS started as an ecosystem connector, bridging the gap between startups, industry, and government.

Currently, the EMR has the Edmonton Research Park, which houses 55 companies and over 1,500 members and is dedicated to fostering research-based growth stage companies within the region. At one point, the Research Park had a "flagship" company (Cold-FX), which generated an increased interest in the Research Park. Since then, the Research Park has expanded the type of companies that occupy the Research Park beyond that of research-based growth stage companies. In addition, there was a plan to establish another innovation hub in Edmonton¹²¹ and one between Edmonton and Calgary (Alberta Innovation Corridor),¹²² but these have not yet come to fruition.

There is potential to increase the scope of the Edmonton Research Park to become a vibrant hub for technology and innovation, or to explore the development of an innovation hub elsewhere, such as downtown Edmonton. The creation of an innovation hub or district should not be done in a vacuum. First, the needs of entrepreneurs, startups, and established companies in technology and innovation should be considered. Based on these needs, a working group that includes stakeholders such as governments, academia, economic development organizations, large industries, and other key players in the EMR's ecosystem may be formed to address the needs, potential location, and structure of the innovation hub or district. A key to any successful innovation hub or district is the ability to bridge the gap between academia and large industry.

Recommendation #4 – Review Gaps in the technology & innovation ecosystem for under-represented groups

Leading ecosystems in the world recognize the importance of the diverse ideas that under-represented groups bring (i.e.: women, Indigenous peoples, minorities, immigrants, youth, LGBTQ2+ individuals). Each of these under-represented groups experience unique challenges that need to be considered to have the ecosystem be equitable and accessible for all.

The EMR already has a solid foundation of diversity, equity, and inclusion of under-represented groups, exemplified by the high participation rates of women in the workforce as well as a relatively high proportion of minorities and Indigenous women with postsecondary qualifications. Further enhancing participation rates and advancement of under-represented groups within the ecosystem is a key to unlocking innovation.

¹¹⁹ Allison Bramwell, Nicola Hepburn, & David A. Wolfe, "Growing Innovation Ecosystems: University-Industry Knowledge Transfer and Regional Economic Development in Canada," Toronto: University of Toronto, 2012, https://tspace.library.utoronto.ca/bitstream/1807/80099/2/Bramwell%20et%20al_2012_Growing%20Innovation%20Ecosystems.pdf.

¹²⁰ MaRS, "About MaRS," 2021, <https://www.marsdd.com/about/>.

¹²¹ Scott Johnston, "Edmonton City Council puts downtown innovation hub plan on hold," Global News, 2018, <https://globalnews.ca/news/4588722/edmonton-city-council-eedc-innovation-hub-hamilton/>.

¹²² AB Corridor, 2021, <https://abcorridor.com/>.

The EMR should map out an inventory of current state supports and services specifically targeting each of these under-represented groups, both to market globally to attract talent, as well as to understand if there are any gaps or opportunities. Additional insights can be obtained through one-on-one workshops or focus groups with a subset of these groups to understand their key challenges and needs, which may be different from the rest of the population.

Recommendation #5 – Promote a global mindset

Until recently, “unicorns” were considered a rarity in the Canadian ecosystem.¹²³ A unicorn is a privately-held startup company with a value of over \$1 billion.¹²⁴ Generally, Canadian firms and entrepreneurs may not think global from day one. This is where jurisdictions such as Helsinki have succeeded in overcoming the weakness of small domestic markets. Organizations in the EMR involved in economic development and foreign investment attraction can look at institutions such as Business Finland,¹²⁵ which encourages local firms to go global as one of their core mandates.

¹²³ Isabelle Kirkwood, “As 2021 breaks records, can the Canadian tech sector sustain its growth in 2022?” 2021, <https://betakit.com/as-2021-breaks-records-can-the-canadian-tech-sector-sustain-its-growth-in-2022/>.

¹²⁴ Investopedia, “Alternative Investments,” 2022, <https://www.investopedia.com/terms/u/unicorn.asp#>.

¹²⁵ Business Finland, “International Growth,” 2021, <https://www.businessfinland.fi/en/for-finnish-customers/services/international-growth>.

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Appendix 1

Methodology and Limitations

Scope & Approach

The project was conducted in four phases. The figure below provides an overview of the scope of activities employed in each phase of the project:

Phase 1: Kick Off & Scope Definition	Phase 2: Current State Review	Phase 3: Jurisdictional Review	Phase 4: Recommendations & Report
<ul style="list-style-type: none"> • Kickoff project with client leadership and key stakeholders • Development of draft reporting framework for final report • Review of past relevant studies 	<ul style="list-style-type: none"> • Assess Edmonton Region’s innovation ecosystem based on labour statistics • High level identification of the Edmonton Region’s innovation ecosystem (e.g., key players and assets) 	<ul style="list-style-type: none"> • Select three other jurisdictions for comparison (based on some of RSM’s past work/research) • Identify gaps and opportunities • Assess government strategic plans to develop innovation ecosystem for each jurisdiction 	<ul style="list-style-type: none"> • Development of recommendations for the Edmonton Region to consider to support development of innovation ecosystem based on our research and analysis • Development of report

The review consisted of the following sources of information:

- Internal documentation provided by the Edmonton Global team; and
- Research through multiple online sources to gain additional understanding of the EMR’s ecosystem as well as knowledge of the three jurisdictions selected for review.

Data & Limitation

RSM relied upon the completeness, accuracy, and fair presentation of all the information, data, and representations obtained from various sources, which were not audited or otherwise verified by RSM. These sources include:

- Data and information provided by Edmonton Global; and
- Relevant literature as referenced throughout the report.

This report has been prepared by RSM based on data and information provided by Edmonton Global and from other sources as referenced throughout. The assessment is based on RSM's professional interpretation of the information obtained. In preparing this report, we have strived to be as transparent as possible in terms of the methodology employed and subsequent results, data sources used, and any assumptions made to ensure users of the report can properly critique and assess this report's conclusions.

RSM reserves the right at its discretion to withdraw or revise this report should we be made aware of facts existing at the date of the report that were not known to us when we prepared this report. The findings are as of the date hereof and RSM is under no obligation to advise any person of any change or matter brought to its attention after such date which would affect the findings.

This information has been prepared solely for the use and benefit of, and pursuant to a buyer relationship exclusively with, Edmonton Global. RSM disclaims any contractual or other responsibility to others based on its use. Any use that a third party makes of this report or reliance thereon, or any decision made based on it, is the responsibility of such third party.

Appendix 2

About the Consultants

Dorothy Chan

Dorothy Chan advises both the private and public sector on how to initiate, plan, and execute their projects and strategies. With over fifteen years of experience as a project manager and team leader, Dorothy has experience advising and working in a wide array of organizations – from government and not-for-profit, to large publicly listed companies – across a wide range of industries in a variety of jurisdictions in Canada, Europe, and Australia. Dorothy has performed various program, project, and operational evaluations and assessments for governments, not-for-profit, and for-profit organizations.

Dorothy specializes in understanding, evaluating, and measuring the performance of research and innovation ecosystems – from academia to commercialization. Dorothy has worked in and with government agencies and other players in innovation to assess the current state of an innovation ecosystem, provide recommendations to progress the innovation ecosystem to a more advanced stage, and develop frameworks on how to effectively measure the progress at the ecosystem level.

Saurabh Kumar

Saurabh has significant experience working in innovation ecosystems and prioritizes bringing socially responsible elements to businesses, while providing a global perspective. Saurabh has his Master of Business Administration (MBA) in Business Administration and Management from the Haskayne School of Business.

Prior to joining RSM, Saurabh worked as a Graduate Research Assistant for the University of Calgary and was an intern with Innovate Calgary. Since joining RSM, Saurabh has worked on projects in the research and innovation space, with a focus on the Alberta tech and innovation ecosystem.

