Primer on technology superclusters and a fact base on Canada's Toronto-Waterloo Innovation Corridor

THE TORONTO-WATERLOO INNOVATION CORRIDOR

Canada’s nascent technology supercluster in the Toronto-Waterloo region has the potential to become one of the world’s top innovation ecosystems. This report prepared by McKinsey & Company examines how this can be achieved and what could move Toronto-Waterloo to global technology supercluster status.

December 14, 2016

The Toronto-Waterloo Innovation Corridor today:

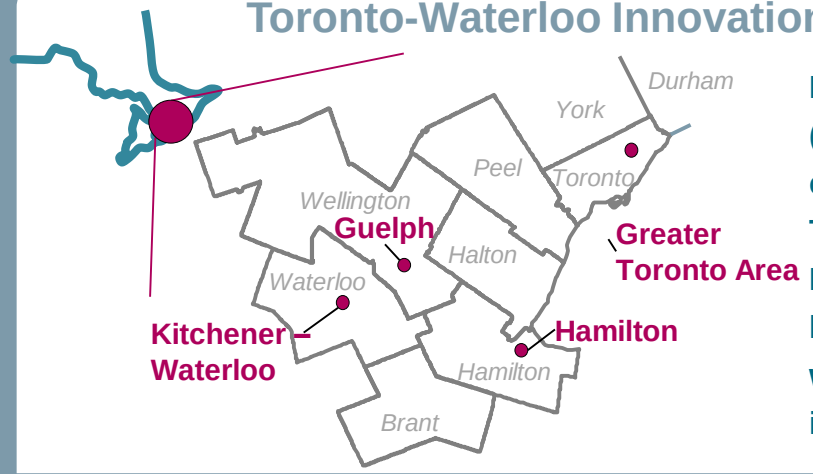
4 Urban centres

15,000+ High-tech companies

205,000+ Tech workers

17%+ Contribution to Canadian GDP

Toronto-Waterloo Innovation Corridor



Bound by vibrant cities (including the fourth-largest city in North America), the Toronto-Waterloo Innovation Corridor is a highly connected economy with more than $360 billion in annual GDP

INTRODUCTION

This report was inspired by an informal group of technology entrepreneurs, thought leaders, and academics in the Toronto-Waterloo Innovation Corridor who feel that the corridor is Canada's best chance to build a top tier innovation ecosystem. They sought external analysis and expert views to understand how to create a better foundation for a top tier innovation ecosystem that could catalyze growth in the region and across Canada.

Transforming the Toronto-Waterloo Innovation Corridor into a world-class technology supercluster is a unique opportunity to drive productivity and build a brighter Canada. Technology superclusters are forming across the world, drawing talent, capital, and innovative ideas, and Canada lacks one.

Today, the corridor represents over 17% of national GDP. It is also home to the largest number of tech companies and one of the world's most sophisticated financial sectors.

Despite its strong positioning, the equity value of the corridor's tech companies lags far behind those of peer cities like Chicago, Boston, Berlin, and Singapore. Catching up, if not surpassing them, might require bold ideas, a concerted effort, and leadership across public and private sectors alike. The measure of success is equity value creation – how much value is created by technology entrepreneurs and companies.

This report provides an overview of McKinsey & Company's analysis of technology superclusters, their impact, and the factors that drive their creation and acceleration.

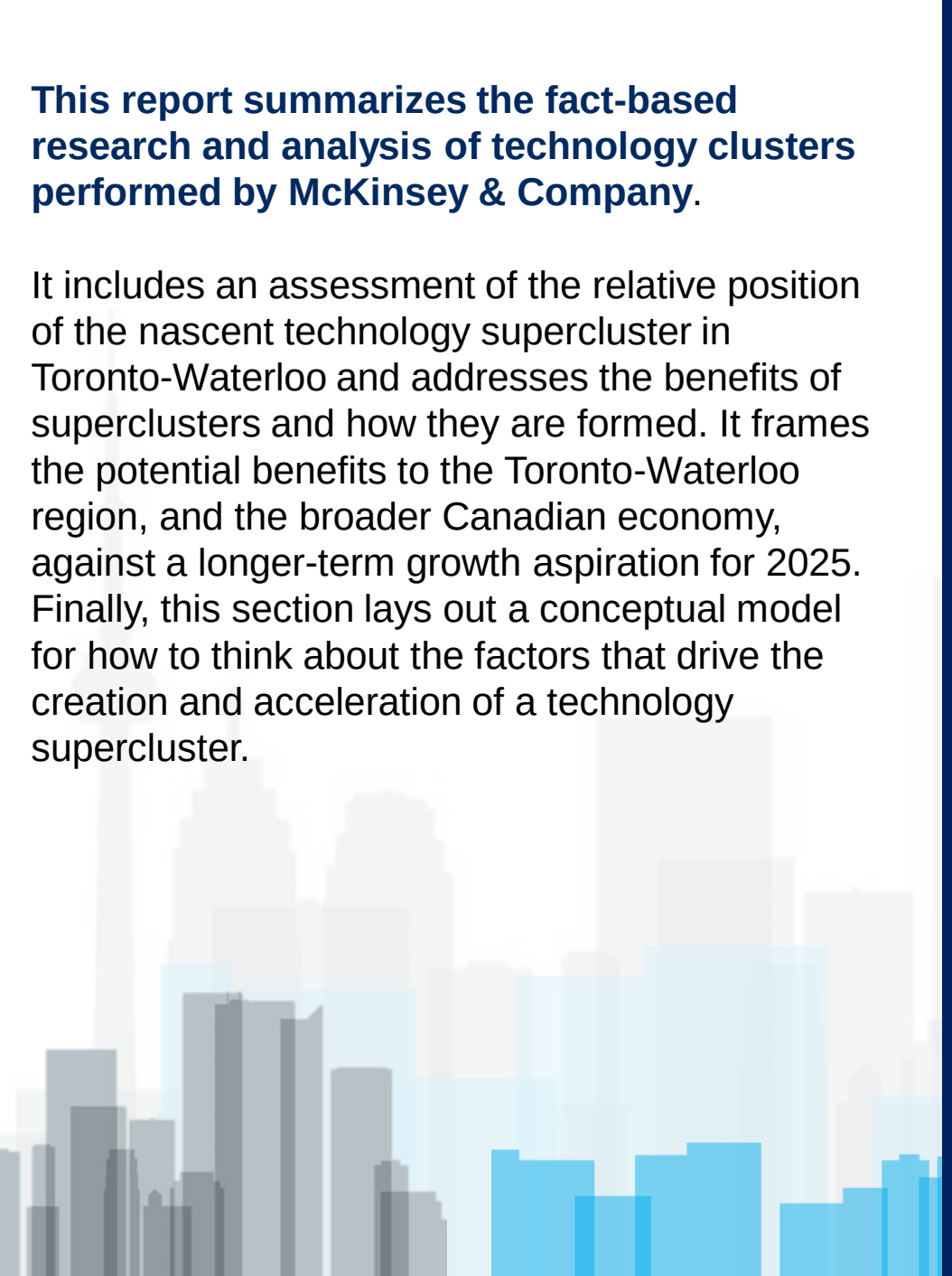
Important notes

- Although this document focuses on the Toronto-Waterloo Innovation Corridor, the success of this cluster **does not preclude that of similar efforts in other regions.** Instead, we hope it serves as a catalyst for the development of tech clusters across Canada – winning begets winning.
- The ideas presented in this paper are **not intended to be exhaustive.** They are intended to serve as inspiration for organizations across the region and to augment the many opportunities that are in various stages of development.

Source: Invest Toronto

This report summarizes the fact-based research and analysis of technology clusters performed by McKinsey & Company.

It includes an assessment of the relative position of the nascent technology supercluster in Toronto-Waterloo and addresses the benefits of superclusters and how they are formed. It frames the potential benefits to the Toronto-Waterloo region, and the broader Canadian economy, against a longer-term growth aspiration for 2025. Finally, this section lays out a conceptual model for how to think about the factors that drive the creation and acceleration of a technology supercluster.



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Executive Summary

Canada faces the possibility of an uncertain economic future, with productivity consistently lagging that of its peers in the developed world. The forces that once buoyed the economy – rising commodity prices and a growing workforce – cannot be relied on in the future.

In the meantime, technology superclusters around the world are attracting talent and capital to fuel growth and productivity. Clusters like Silicon Valley, London-Cambridge, and Tel Aviv-Haifa are able to achieve non-linear gains in both job creation and economic value accumulation. These clusters spark innovation and turbocharge economic growth.

A Canadian supercluster could be a significant first step to helping jump-start economic growth. The Toronto-Waterloo Innovation Corridor, which also includes several surrounding municipalities, such as Guelph, Hamilton, Kitchener, and Mississauga, has the potential to develop into a world-class technology supercluster. However, this may require a concerted effort to address persistent structural gaps in talent and capital, together with initiatives that promote connectivity and scale.

The Ontario government is actively shaping education priorities for the knowledge economy, which will support the talent imperative in driving the corridor and through which there is much scope for industry partnerships to grow a uniquely skilled workforce.

There is a critical mass of universities and incubators to supply the needs of a growing cluster.[1] The universities include: University of Toronto, McMaster University, University of Waterloo, Wilfrid Laurier University, York University, Ryerson University, Conestoga College, and University of Guelph. Startup incubators include: Communitech, MaRS, Velocity at University of Waterloo, DMZ at Ryerson, NEXT Canada, and Creative Destruction Lab at Rotman School of Management, along with several other University of Toronto entrepreneur centres.

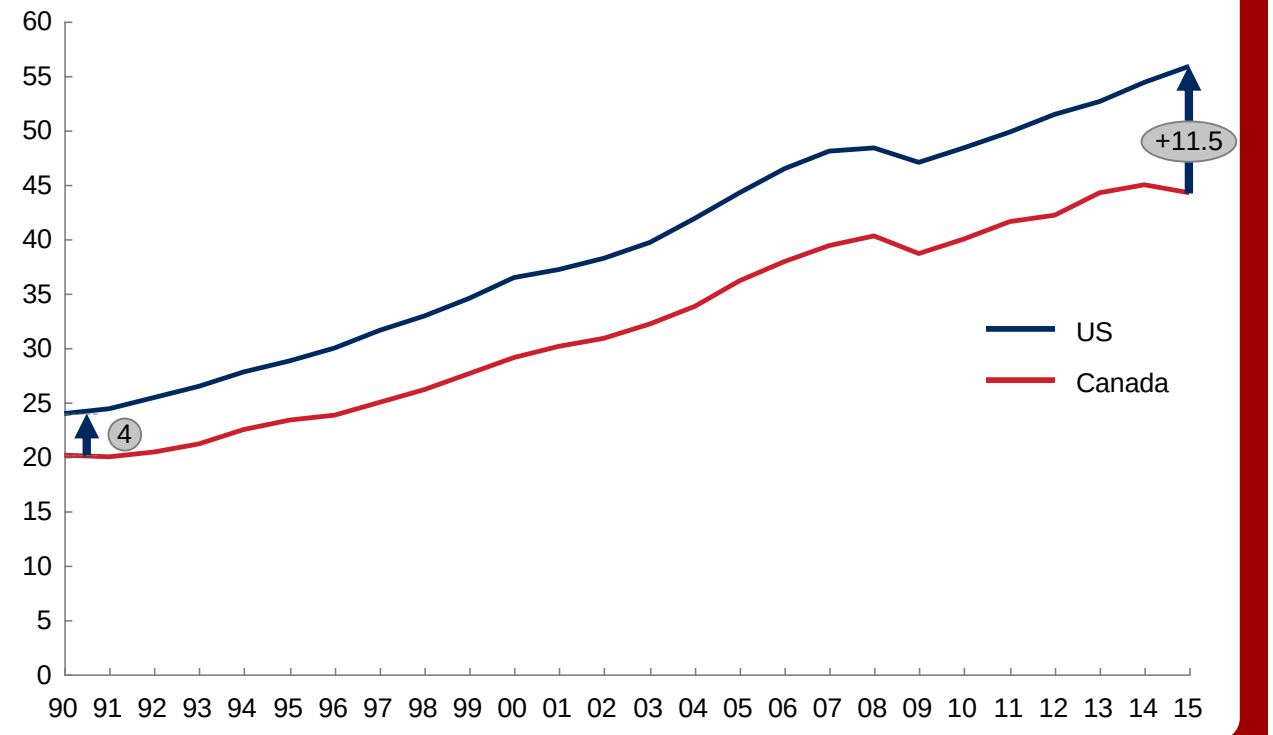
Turning the Toronto-Waterloo Innovation Corridor into a global innovation hub has the potential to deliver a $50 billion increase in direct equity value, $17.5 billion in direct annual GDP, and more than 170,000 high-quality jobs by 2025.

The opportunity is there, but the window could be closing quickly. Observers predict that approximately 80% of cluster gains will accrue to 5 global superclusters in the medium to long term. Participating in these gains will require policy changes, new approaches, and significant near-term investments, but the upside potential is enormous.

1 List not exhaustive

The PPP-adjusted GDP per capita gap between the United States and Canada has grown from $4,000 in 1990 to over $11,500 in 2015

PPP adjusted GDP per capita[1]
US $ Thousands



WHERE A TECHNOLOGY SUPERCLUSTER IN CANADA COULD MAKE A DIFFERENCE

Canada's human capital ranks with the best in the world. Despite this advantage, **Canadian incomes lag those of its OECD peers,** especially its biggest trading partner, the United States.

Data show that Canada's "prosperity gap" might be driven by decreasing productivity:

- From 1995 to 2012, Canada's average annual productivity growth rate ranked 26th of 35 OECD countries
- The gap between Canadian and US business-sector productivity growth doubled from an average of 0.8 (1985-2000) to 1.6% (2001-2011)
- Business productivity levels in Canada are 70% those of the United States, negatively impacting Canadian competitiveness and standards of living.

The recent downturn in energy prices may not be temporary and major demographic changes over the next decade point to declining growth in labour force participation. Even if the status quo persists, Canada's prosperity relative to the United States could drop by 30%.

GDP per capita is approximately $11,000 lower in Canada than in the United States. Despite an increase in hours worked, Canada has not been able to close a persistent productivity gap.

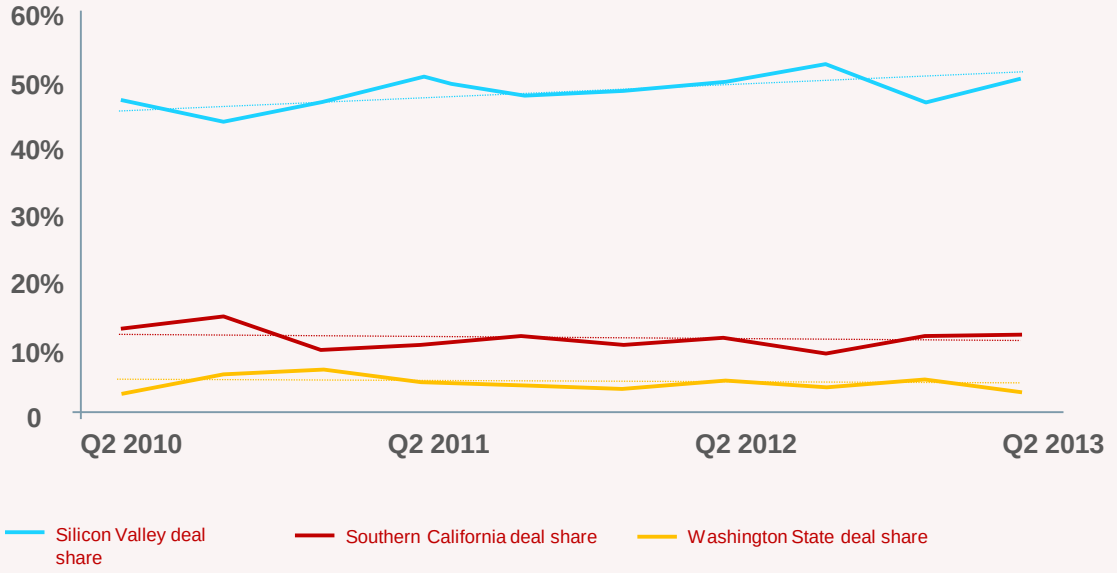
A step-change in productivity is required to maintain current standards of living and drive economic growth. A technology supercluster would drive innovation, productivity, and growth at the national scale.

1 2015 US $, http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD

Source: UN Development Indicators; The World Bank; US Energy Information Administration; IMF; OECD; Government of Ontario; Statistics Canada; Business proprietary data

Silicon Valley – the world's preeminent technology supercluster – is a major economic growth engine. It attracts a huge proportion of growth capital, and its employees contribute approximately 30% more economic value than the average American employee

Share of VC Deals
Q2 2010-Q2 2013



THE BENEFITS OF A TECHNOLOGY SUPERCLUSTER

Technology superclusters typically help nurture and grow companies, generate new successes, and help close countries' prosperity gaps.

Clusters energize economies by creating large, accessible talent markets, facilitating knowledge spillover, driving business specialization, and cultivating global anchor companies. These champions drive productivity, growth, and density for long-term cluster success.

Winning tech companies are the champions of successful clusters. While scaling and growing into large companies, they create and further strengthen new tech champions, resulting in superclusters. Examples of this virtuous cycle are seen around the world in high-performing, geographically concentrated clusters like Silicon Valley, New York City, Tel Aviv, and Berlin.

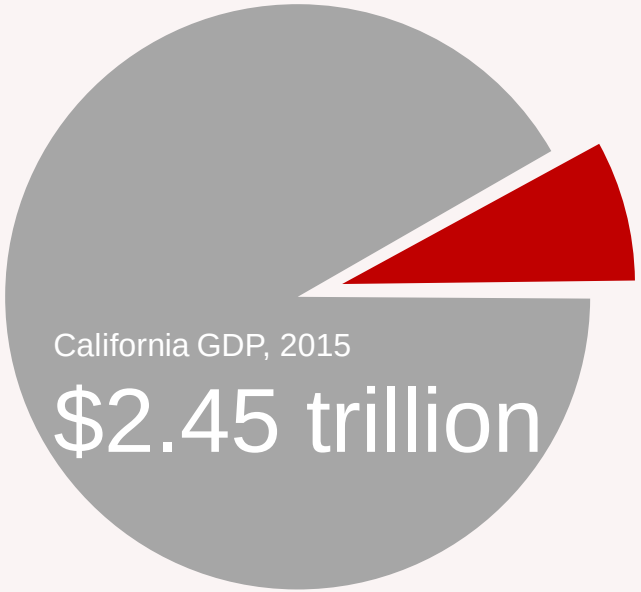
The fundamental case for cultivating strong, dense clusters is premised on the non-linear gains that clusters make possible. As of 2015, 50% of all VC investment in the United States went to Silicon Valley.

Non-linear gains can also have a national economic impact, especially as strong clusters are the breeding ground for technology champions and disruptive innovations. Large technology companies tend to create platforms that smaller firms can grow on. In the process, they accelerate high-value job creation and spur innovation, entrepreneurship, and economic growth.

Source: *Harvard Business Review;* Moody's Economy; Silicon Valley Institute for Regional Studies; US Bureau of Labour Statistics; Dow Jones VentureSource

Silicon Valley was catalyzed by companies like Apple, Google, Salesforce, Facebook, and Intel

Companies in Silicon Valley contributed $235 billion to California's GDP in 2015 or +1% of the total US GDP



$235 billion

GDP contribution from Silicon Valley

Source: Silicon Valley indicators; Silicon Valley Institute for Regional Studies, 2015

THE BENEFITS OF A TECHNOLOGY SUPERCLUSTER

Empowered and supported by superclusters, technology champions create economic wealth and high-paying jobs.

Tech salaries in high-performing clusters are 35 to 38% higher than average salaries and outgrow other industries. Each job created in the high tech sector generates up to five new indirect jobs. The resulting economic impact is substantial.

Young firms create a disproportionate number of new jobs when scaling up:

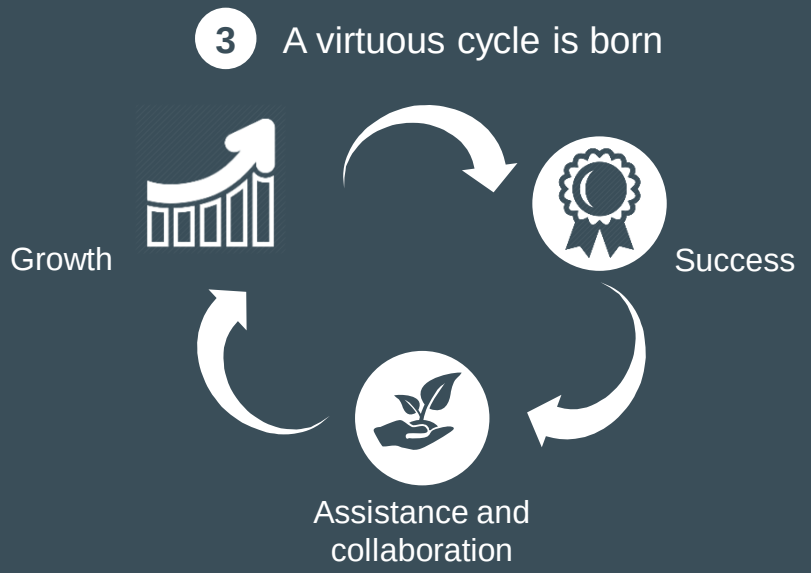
- Those that survive more than 5 years tend to exhibit higher rates of job creation than mature firms.
- Larger firms invest more and create more wealth, which enriches the greater population through increased spending and tax revenues.

Large tech companies can also play a direct role in alleviating productivity gaps. The Canadian tech sector was the largest spender on business enterprise R&D (BERD) in Canada in 2015, accounting for more than 50% of national BERD spending. Evidence also suggests that the larger the tech company, the more productive it is likely to be.

The creation of a technology supercluster could, therefore, help bridge Canada's prosperity gap. The technology champions created in that supercluster will help nurture it, accelerate productivity growth, and create growth, wealth, jobs, and expertise from which the entire country could benefit.

Source: Kauffman Foundation; The World Bank; Enrico Moretti; Mercer; Robert Half Technology; Statistics Canada; NYU Stern; Bay Area Council; McKinsey Global Institute

Foster winning companies and nurture the nascent stages to form a strong supercluster



HOW ARE SUPERCLUSTERS FORMED?

CLUSTERS: ***Harvard Business School professor Michael E. Porter coined the term "cluster" to describe geographic concentrations of interconnected companies, suppliers, service providers, and associated institutions.***

1 Capital and resources organically concentrate in a geographic region.

When a group of companies that shares an industry and a geography forms, resources, capital, and talent begin to concentrate. Once this group reaches a critical mass of companies, a cluster is born. Such a tech cluster has formed in the Toronto-Waterloo Innovation Corridor.

2 Agglomeration amplifies winning companies.

Once there is a nascent supercluster, the success of winning companies needs to be amplified. The key is not to pick winners but to turbocharge technologies and firms that are leaders in applying these technologies to disrupt traditional market and sectoral models. Winning tech companies in the Toronto-Waterloo Innovation Corridor include established players like Google Canada and Medtronics Canada and newcomers like Financeit, Thalmic Labs, Revlo, and Kira Talent, and they are accelerating the growth of this cluster.

3 Success begets success and nurtures a virtuous cycle.

A virtuous cycle for growing and strengthening the nascent supercluster can be enabled by being laser-focused on ensuring winning companies and adequate infrastructure are in place. **The Toronto-Waterloo Innovation Corridor has the potential to become a supercluster. Building a productive collaboration between businesses, government, policy-makers, investors, and academia will support its development.**

The Toronto-Waterloo Innovation Corridor is Canada's largest cluster measured by the equity value of tech companies

$411B Silicon Valley

Source: Compass, 2015

CAN THE TORONTO-WATERLOO INNOVATION CORRIDOR BECOME A SUPERCLUSTER?

The Toronto-Waterloo Innovation Corridor is Canada's top technology cluster, with both Toronto and Waterloo in the top 25 globally. Thinking and acting as a "connected corridor" with the supporting infrastructure would make the whole greater than the sum of its parts.

The development of winning clusters is grounded in factors that are common across all ecosystems, even those as diverse as Berlin and Bangalore:

- The presence of world-class academic and research centres
- A large, high-quality talent pool
- Access to capital
- Connective infrastructure and community
- High standards of living
- Access to early adopters or receptive markets.

The Toronto-Waterloo Innovation Corridor has the ingredients to reach top tier scale among Canadian technology clusters. It is home to some of the world's leading research universities and a large pool of capital.

Major universities within the corridor are noted for their academic excellence and serve 20% of the country's university students.

- The University of Toronto (ranked in the top 25 universities globally and the top 50 most innovative universities in the world) and its partner hospitals raised the most research funding of any university in Canada, totalling $1.1 billion in 2016.
- Hamilton's McMaster University (ranked in the top 100 universities globally) has the country's leading industry-sponsored research programs.
- The University of Waterloo has the world's largest co-op education program. Waterloo is also the #1 Canadian university for venture-capital-backed student businesses.
- The University of Guelph is a leader in ag-biotech and global agricultural research.

Source: Compass, 2015; interviews with representatives from University of Toronto, University of Waterloo, and McMaster University

Features of the Toronto-Waterloo Innovation Corridor that could appeal to technology enterprises

The Toronto-Waterloo Innovation Corridor employs **205,000+** tech workers, second only to Silicon Valley in North America

Toronto is ranked the **4th** most liveable city in the world

Canada will have tariff-free access to **60%+** of global GDP if ongoing free trade agreement negotiations are successful

Canada is ranked the **2nd** most cost-competitive country in the world

The corridor has a concentrated **financial** services sector that welcomes innovation

Source: Invest Toronto

THE TORONTO-WATERLOO INNOVATION CORRIDOR

The corridor's cities are home to a vibrant and growing technology ecosystem.

Toronto-Waterloo is also home to Canada's largest group of tech employees working for 15,000 high-tech companies. Toronto, Canada's financial capital, has the second-highest concentration of large bank headquarters in the world and accounts for more than $1.5 trillion in institutional investor capital. The corridor's largest urban centre, Toronto, has been consistently ranked one of the world's most liveable cities. Nearby Waterloo has the second-highest density of startups in the world.

The Government of Ontario is a willing partner and is actively planning to reshape education to serve the needs of tomorrow. The release of the report "Building the Workforce of Tomorrow" shows strong commitment and highlights the opportunity for the technology industry to actively support education priorities.

There is a critical mass of universities and incubators to supply the needs of a growing cluster.[1] The universities include: University of Toronto, McMaster University, University of Waterloo, Wilfrid Laurier University, York University, Ryerson University, Conestoga College, and University of Guelph. The startup incubators include: Communitech, Velocity at University of Waterloo, DMZ at Ryerson, NEXT Canada, and Creative Destruction Lab at Rotman School of Management, along with several other University of Toronto entrepreneur centres.

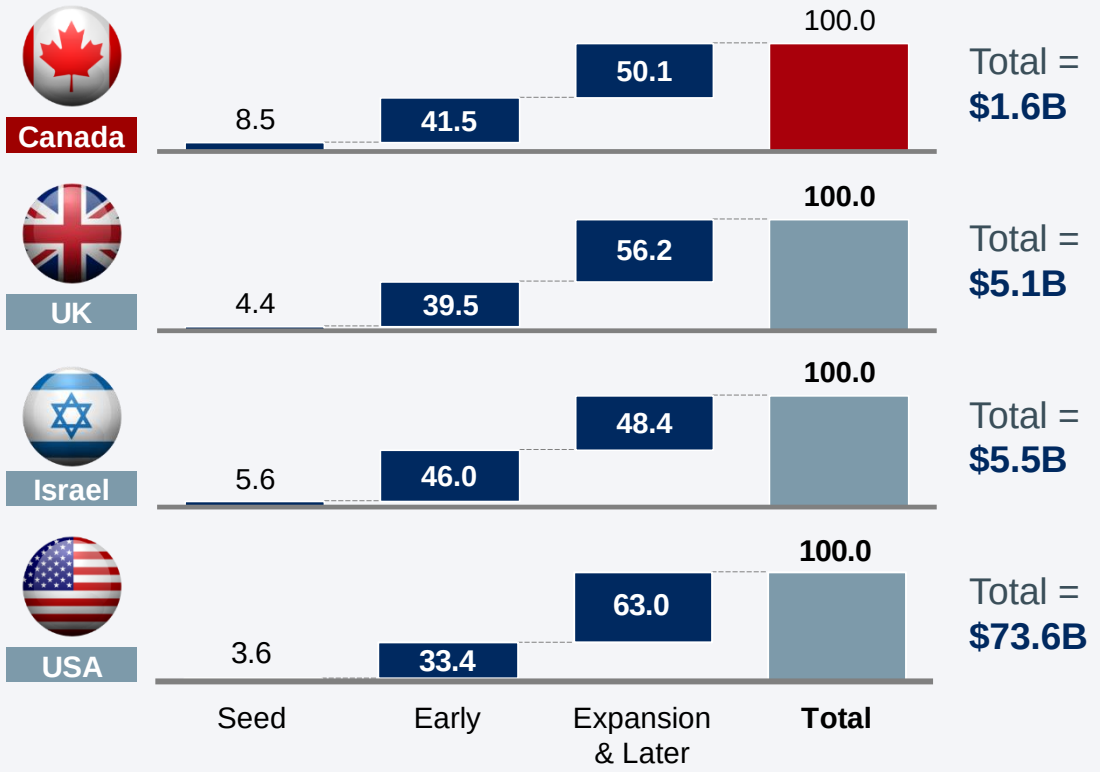
These factors could uniquely position the Toronto-Waterloo Innovation Corridor in Canada to become a technology supercluster. Its geography and infrastructure density make it an extremely cohesive cluster – its major urban centres are all less than a 2-hour drive from one another. Toronto offers world-class arts and culture and easy access to Canada's largest airport, Pearson International, which provides global connectivity.

1 List not exhaustive

Source: Economist Intelligence Unit; Invest Toronto

Canada is lagging peer countries in attracting the level of growth capital required to drive scale

Breakdown of total VC funds invested by stage
In percent, 2015



Source: Pitchbook 2016

TIMING COULD AFFECT POTENTIAL SUCCESS

Global dynamics are changing and competition is intensifying.

Density is key for winning clusters: they require the geographic concentration of economic value and large or growing firms.

Larger, faster-growing clusters tend to have higher "equity density" (i.e., cluster equity value per capita). To successfully compete, Canada should focus on increasing density where it already exists – in its growing clusters.

Technology clusters across the world are vying for the same global pool of talent and capital. Denser clusters, like Boston, Berlin, and Los Angeles, are attracting three to five times as much VC investment as Toronto-Waterloo. The competition for capital parallels an equally difficult challenge: attracting and retaining top talent. Talent could fuel growth, bring new entrepreneurs, and build a community to sustain the corridor's success.

To attain these benefits, Canada must consider focusing its efforts on building density and enabling companies to scale for global success.

Source: Compass; Government websites; Universities Canada; University of Toronto; University of Waterloo; McMaster University; Pitchbook

Supercluster growth and diffusion could create a hub-and-spoke effect, breeding and strengthening clusters across the country, based on the success of the Toronto-Waterloo Innovation Corridor

THE TORONTO-WATERLOO INNOVATION CORRIDOR AS A SPRINGBOARD

Establishing one technology supercluster could lead to other global-scale technology clusters across Canada.

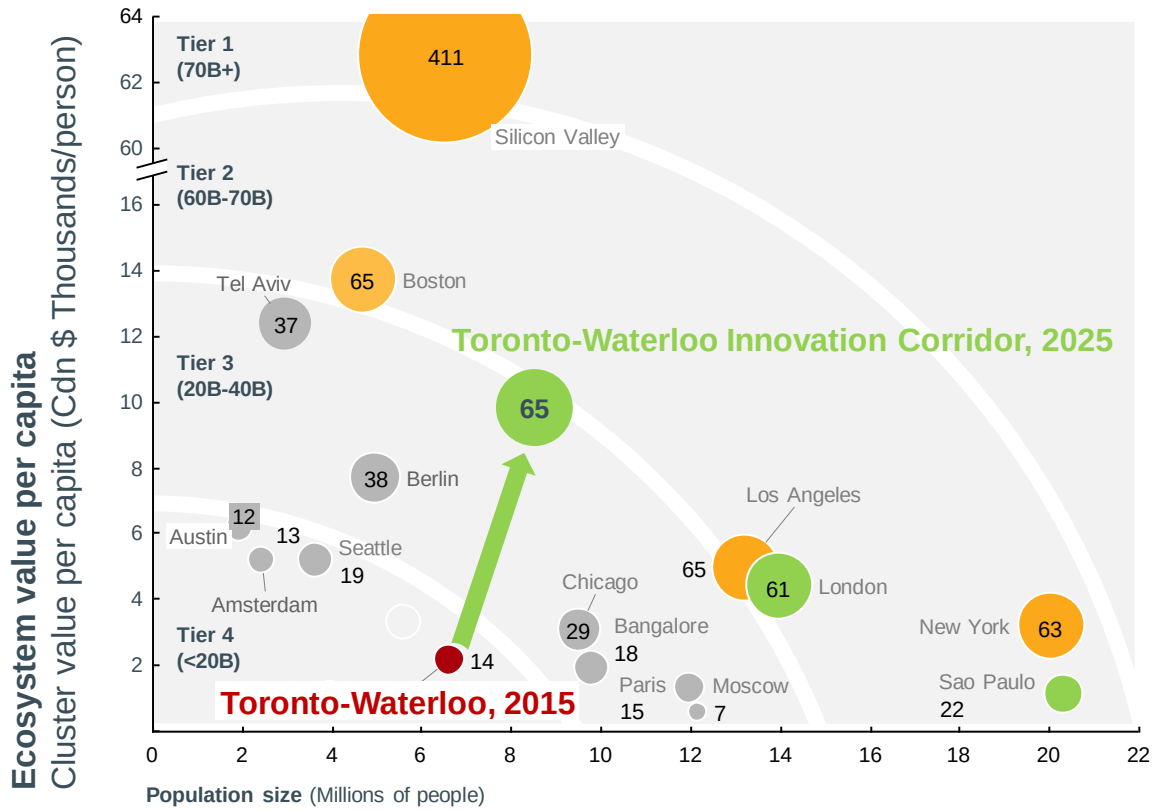
In fact, if successful, a Toronto-Waterloo supercluster could serve as a platform and model for other top tier clusters across the country – much as Silicon Valley spurred the development of US clusters like New York, Boston, and Austin.

Canada has emerging clusters in Calgary, Halifax, Montreal, Ottawa, and Vancouver and strong connectivity to a Toronto-Waterloo supercluster would be positive for all, building the Canada technology and innovation brand.

+$50 billion in direct equity value

+$17 billion in direct GDP

+170,000 new jobs



(#) **Size of circle** = Total cluster value (Cdn $ Billions)

Fast growth | Medium growth | Slow growth

Source: Compass, 2015

THE AMBITION: THE TORONTO-WATERLOO INNOVATION CORRIDOR IN 2025

The success of this corridor could lead to a more innovative and productive economy, the emergence of global technology champions, and more high-value jobs.

A top tier technology ecosystem could bridge Canada's prosperity gap by unleashing the economic potential of our technology companies. The wealth and expertise they generate could create a spillover effect and build economic momentum for the region and country. Addressing structural gaps within the corridor and creating conditions that enable growth could form the foundation for achieving the goals of this initiative.

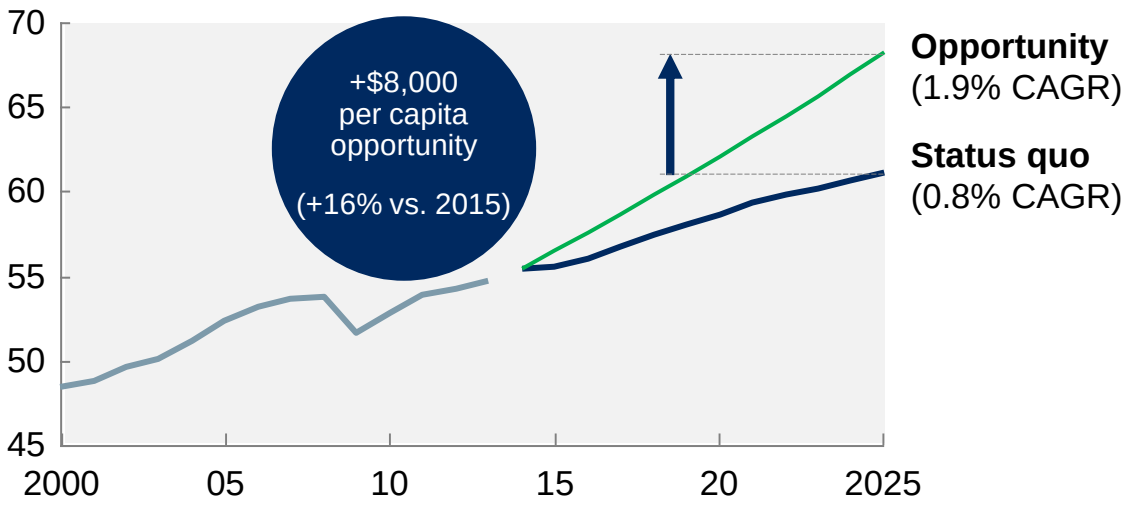
The payoff by 2025 could include:

1. **Raising the direct equity value of tech companies in the Toronto-Waterloo Innovation Corridor by up to $50 billion within 10 years** by creating new companies or scaling up existing companies
2. **Contributing up to $17 billion[1] in direct gains to the GDP**
3. **Creating up to 170,000 new jobs[2]**, including indirect jobs, as a result of the expansion of the corridor
4. **Advancing Canadian leadership in key disruptive technologies** – in particular, artificial intelligence and quantum computing
5. **Tripling VC investments** in sectors of strategic interest – in particular, HealthTech and FinTech
6. **Making the Toronto-Waterloo Innovation Corridor brand a recognized top tier global ecosystem.**

1 Assumes an equity-to-sales ratio 3-5
2 Assumes two direct jobs in the tech sector are created per $1M in sales, and each new tech sector job generates four indirect jobs
Source: MGI Global Economics; Statistics Canada; NYU Stern; Bay Area Council Tech Report; Compass Global Startup Ecosystem Ranking, 2015; government websites

The initiative's initial focus is to help bridge Canada's prosperity gap with the United States

Real GDP per capita, 2015 $



Assumptions

Status quo: **0.8% p.a.,** based on historical productivity growth (1.1%) and forecast employment growth (-0.3%)

Target growth: **1.9% p.a.,** based on historical productivity and employment growth (1.1 and 0.8%)

Source: Statistics Canada; Business proprietary data

THE BENEFITS: THE TORONTO-WATERLOO INNOVATION CORRIDOR IN 2025

Globally competitive tech companies are crucial to uplifting the entire economy. They also deliver spillover gains in productivity, capital, and talent that could unleash an unprecedented economic transformation.

Creating a technology supercluster would have real impact for Canadians. If successful, the Toronto-Waterloo Innovation Corridor could directly contribute up to $2,100 GDP per capita in the region[2]. Other regions could replicate this success to generate value across the country, resulting in exponential gains for decades to come.

Talented young graduates, straight out of university, could have access to up to 170,000 new jobs[2].

What are the challenges and where are the gaps to making this 2025 vision a reality?

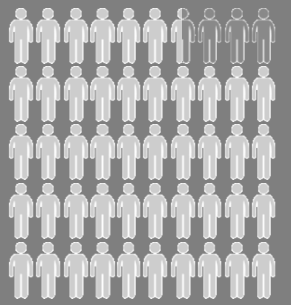
+$2,100
per capita in the Corridor

For the average household in the Corridor

$570	Increase in housing and household budget
$310	Increase in transportation budget
$210	Increase in food budget

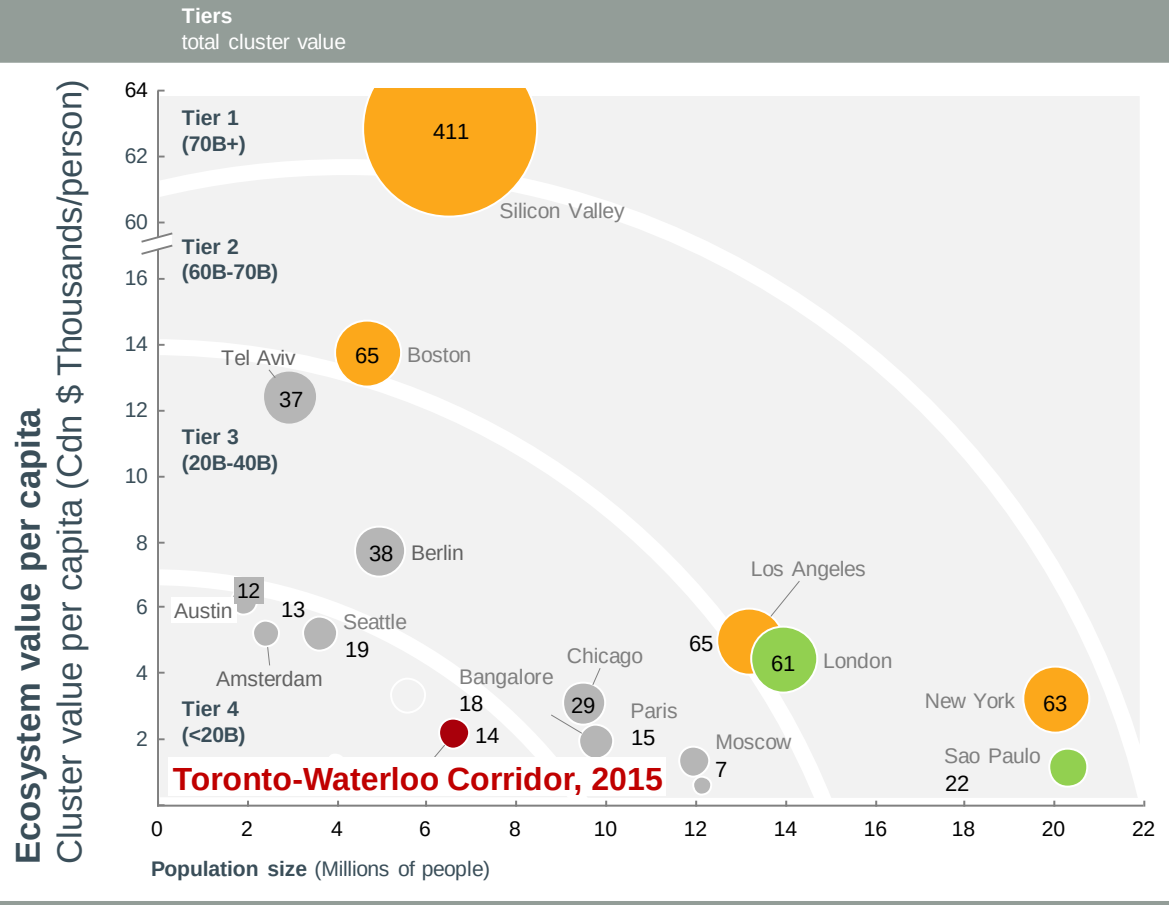
+170,000
jobs[2] created

Over 94% employment rate



1 Assumes $17B of direct GDP will be created, and the 2025 population of the Toronto-Waterloo region to be 8M
2 Includes new tech sector jobs and indirect jobs

The Toronto-Waterloo Innovation Corridor currently ranks with slower- growth Tier 4 clusters, lagging peer regions globally



Source: Compass, 2015

WHERE ARE THE GAPS?

The Toronto-Waterloo Innovation Corridor is currently a slow-growth Tier 4 cluster. The corridor's largest city, Toronto, fell in the global ecosystem rankings from #8 to #17 between 2012 and 2015, driven by gaps in commercial activity and talent, capital deficits, lack of connective infrastructure, and limited access to early adopters. All these factors were underpinned by the marked absence of globally competitive tech companies.

To turn the corridor into a technology supercluster, **seven main challenges should be addressed:**

1. The Toronto-Waterloo Innovation Corridor hosts some of the world's best academic and research centres, but it lags in commercialization activity.

Canadian universities account for approximately 40% of total Canadian R&D. Despite having some of the world's leading research universities, Canada consistently lags its peers in converting research strength into commercial success. The missed opportunities are most acute in Toronto-Waterloo, which is home to some of the country's largest and most research-intensive universities.

Part of the commercialization lag is due to IP ownership and management rules, as well as revenue-sharing requirements in Canadian universities. Most universities retain IP ownership, control the transfer of technology, and keep a share of future revenue from research done on campus – this limits incentives to pursue commercialization.

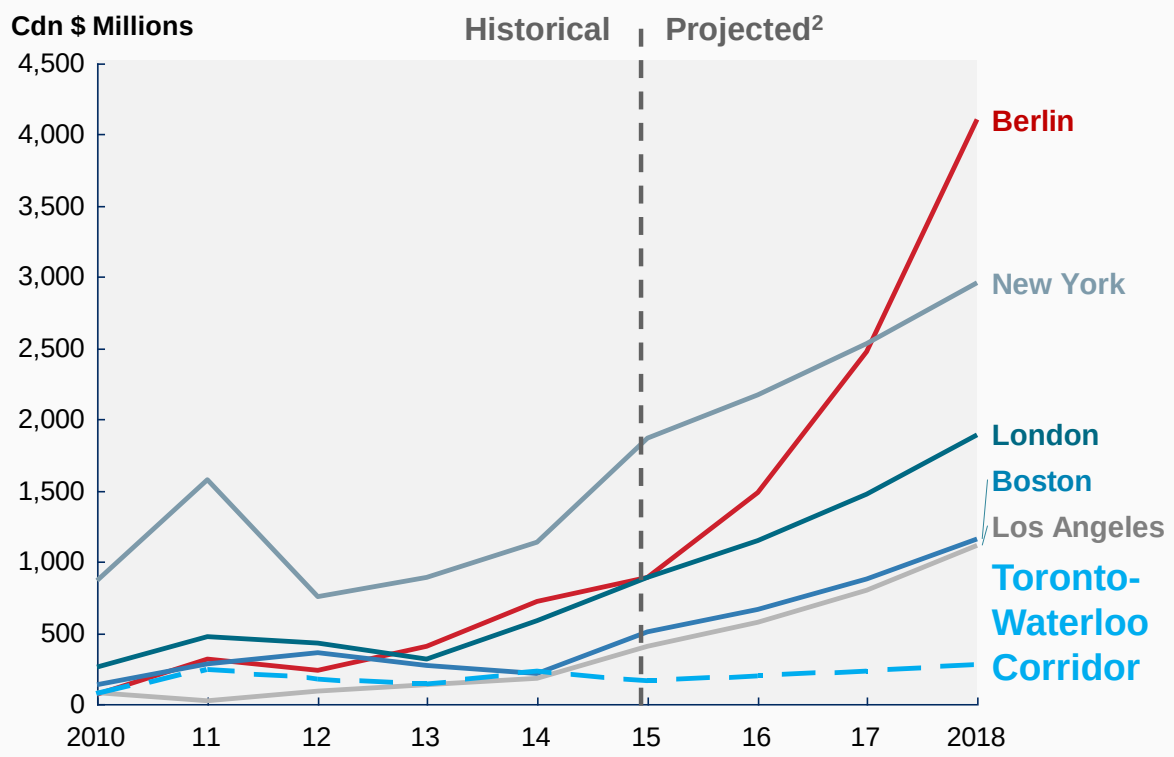
Moreover, many universities do not offer flexibility and support for faculty engaging in entrepreneurship, such as offering a leave of absence to pursue business development or providing access to business mentors with the expertise needed to commercialize their inventions.

To translate its research advantage into commercial success, Canada could provide stronger incentives and business support to researchers to help accelerate commercialization efforts.

Source: Business proprietary data; Statistics Canada; NYU Stern; Bay Area Council Tech Report; government websites

Clusters like Boston and Los Angeles attracted almost three times as much VC investment as the Toronto-Waterloo Innovation Corridor in 2015

Capital IQ Company Screening Report



1 Silicon Valley has been excluded to improve the readability and comparability of graph. Tech sector total VC investment in Silicon Valley is $7,462M in 2015 and growth multiple from 2010 to 2015 is 2.5X
2 Values projected using historical CAGR for the past 5 years
3 Largest technology firms by 2016 market capitalization

WHERE ARE THE GAPS?

2. Canada is losing the global competition to attract capital.

Global capital is critical to the success of a startup and of a cluster. 72% of the top 100 technology companies (90% of the top 10) have leveraged VC investments at some point to grow and scale globally. The vast majority of these VCs are based in Silicon Valley.

In 2015, Canada attracted just 1% of global VC investments and approximately 2% of the capital invested in Europe and the United States, well below its relative GDP. Even as the average transaction size across most top technology clusters grew, the corridor witnessed negative growth of -19%.

To successfully scale Canadian companies, global capital sources should be attracted and incentivized to invest locally.

3. Canada has a deficit of "scale up" technical and business talent.

Although Canada produces some of the best technical talent in the world, it has too few employees with hands-on experience scaling companies, a shortfall that is slowing growth. This reality is echoed in a recent survey conducted by the Lazaridis Institute that found 53% of industry stakeholders citing insufficient executive and managerial talent as the primary impediment to scaling tech companies in Canada.

To create the broad and deep talent pool needed to sustain a technology supercluster, bold reforms that will equip existing talent with the right skills and lead to a better access to global talent could be pursued.

Source: Lazaridis Institute; Compass; Capital IQ Company Screening Report

Canada's scale-up talent deficiency is exacerbated by siloed urban centres lacking sufficient infrastructure connectivity to facilitate expertise spillovers and active mentorship networks

The primary impediments to scaling up as cited by to executives and stakeholders[1]

Insufficient executive and managerial talent	**53%**
Insufficient access to capital	16%
Complex ecosystem dynamics (founder ambition, risk tolerance, business culture)	20%

The **most prevalent business challenges** include[2]
- Optimizing operations (#1)
- Marketing and sales (#3)
- Strategy setting (#4)

1 Lazaridis report, 2016

Source: BDC competitiveness survey, 2014

WHERE ARE THE GAPS?

4. The corridor lacks the connective infrastructure required to facilitate density and community.

The infrastructure connecting the urban centres in the corridor, mainly via traditional commuter rail and highways, has long been cited as insufficient for facilitating access between residents of the different cities. This limits spillover between the pockets of expertise forming in each city. The Toronto-Waterloo Innovation Corridor also lacks any formal coordinating body to build strategy and cohesiveness within the corridor, exacerbating the lack of connectivity.

To build a strong community of entrepreneurs, investors, and industry sponsors within the corridor, connectivity between the corridor's urban centres could be strengthened.

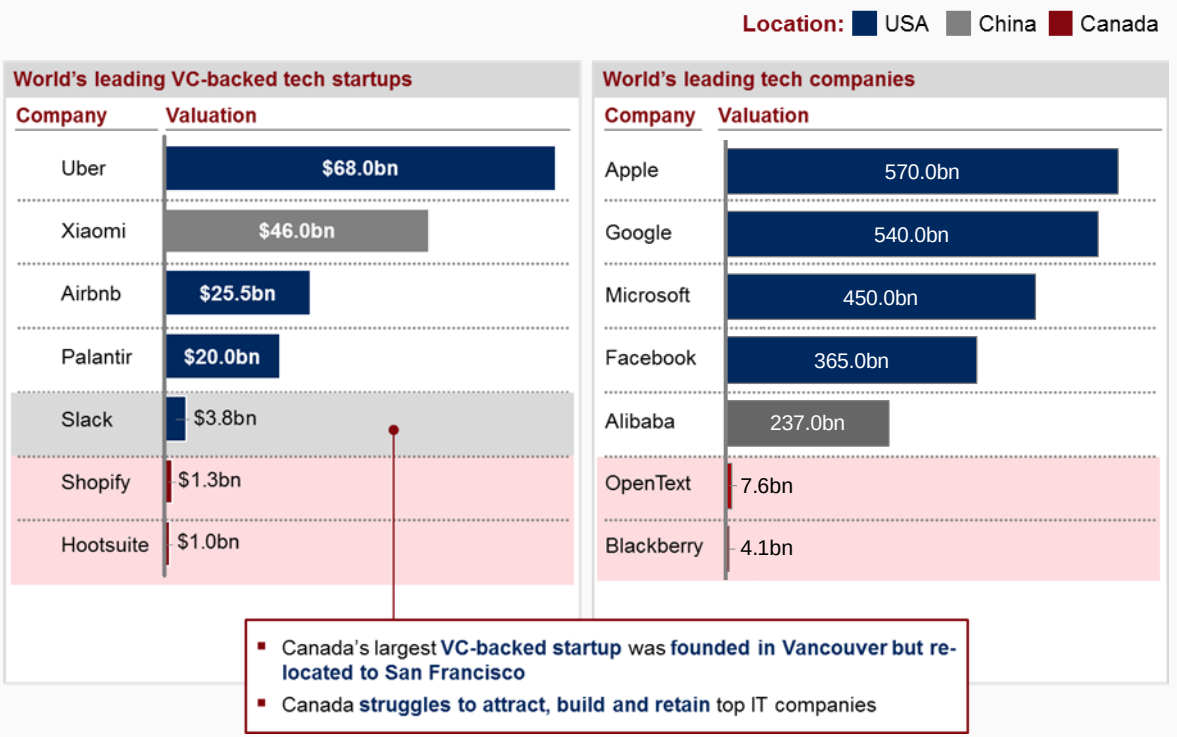
5. Companies in the Toronto-Waterloo Innovation Corridor need better access to early adopters and customers.

Canada is home to several concentrated industries, including financial services, healthcare, and telecommunications. These technologically advanced industries, combined with a sophisticated public sector, create a significant population of ready customers for corridor companies' products. Entrepreneurs, however, consistently cite difficulties navigating the complex processes to access these customers, including very risk-averse procurement systems, as serious impediments to conducting business.

For Canada to become home to global technology champions, early-stage firms need to gain access to large corporate and government customers, and these organization should view procurement as a potential source of innovation and competitive advantage.

Source: Lazaridis Institute; Compass

Except for Nortel and RIM, Canada has produced no global brand multi-billion-dollar technology companies in recent memory



Source: PitchBook M&A; Private Equity & Venture Capital Database

WHERE ARE THE GAPS?

6. Canada lacks global champions that can promote cluster density and strength.

Canadian tech companies are disproportionately composed of small firms. Firm size is highly correlated with productivity in the tech sector, and the preponderance of small firms in our technology clusters has hindered our ability to achieve density and the expertise and wealth spillovers that large tech companies usually create.

Creating large global technology firms based in Canada is vital to building Canada's tech ecosystem.

7. The Canadian tech cluster needs strong brands.

A strong brand is central to the success of any company. The power of a strong brand is doubly important when creating a supercluster, as strong brand presence attracts national and international attention and capital. Innovative and well-established brands also attract top talent. Silicon Valley's deeply rooted brands, such as Google and Apple, are magnets for much sought-after talent that values the opportunity to work for innovative and successful companies.

Building a globally competitive supercluster in the Toronto-Waterloo Innovation Corridor would be facilitated by the emergence of large tech companies with strong brand presence.

Source: Pitchbook

Conclusion

- **Despite its world-class human capital and infrastructure**, **Canada lags its OECD peers** in productivity levels and growth.
- **Technology superclusters help countries prosper** and drive productivity and innovation in economies.
- **Superclusters form when a group of companies that share an industry concentrate in a geographical region**, allowing resources, capital, and talent to concentrate – the Toronto Waterloo Corridor is an example of such a cluster.
- **Once there is a nascent supercluster, the success of winning companies and technologies needs to be amplified** to gain the necessary density to attract the talent and capital that generates further growth:
  - **Global technology clusters** (i.e., Boston, New York, Berlin, Los Angeles) **are vying for the same global pool** of **talent and capital.**
- **Canada lags its global peers** – Toronto-Waterloo is classified as a **slow-growth Tier 4 cluster and fell to #17 from #8 in global ecosystem rankings** between 2012 and 2015.
- **The payoff by 2025 is substantial: $17 billion of direct GDP, 170,000 new jobs, and $50 billion of direct equity value** for tech companies:
- To catalyze growth, Canada must focus on the following activities to close gaps:
  - **Accelerate commercialization** efforts and liberalize IP ownership
  - **Incentivize and attract global capital** to invest locally
  - **Better equip local talent** with the necessary skills and open up to global talent
  - **Build a stronger community** of entrepreneurs, investors, and industry sponsors and strengthen connectivity between the corridor's centres
  - **Encourage large corporate and government entities to procure from firms within the corridor** and view it as a source of competitive advantage.

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