
Local Factors Driving the Global Competitiveness of Toronto's ICT Sector

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Cluster Definitions

- Defined as:
 - “Clusters are a geographically proximate group of interconnected companies and associated institutions in a particular field linked by commonalities and complementarities. Clusters encompass an array of linked industries and other entities important to competition. . . . Including governmental and other institutions – such as universities, standard setting agencies, think tanks, vocational training providers and trade associations.” (Porter)

Past Drivers of Toronto's ICT Sector

- GTA – 11,500 firms in the ICT sector in Toronto (2011)
- 605 manufacturing firms & 10,900 service firms
- More than 161,000 employees in Toronto ICT sector
 - Cluster is geographically dispersed from Markham to Oakville – Multiple, competing industry associations representing different segments and interests
- Key firms include headquarters of most major MNCs – foreign & Canadian
 - Autodesk, Celestica, CISCO, Constellation, IBM, HP, Microsoft, Xerox, Bell, Rogers, Telus, Microsoft, 500 firms are active R&D performers – 6,600 researchers
 - IBM Software Solutions Lab – 2500 employees
 - Xerox Research Centre in Sheridan Park-100 scientists
- But really multiple realities across these different industry segments

Puzzle: Transformation of the ICT Cluster

Toronto ICT 1990's-2000's	Toronto ICT Today
<p>-MNC headquarters and sales offices and few domestic large firms (Britton 2003; Creutzberg 2005)</p>	<p>-Dominated by startups, service firms -Vast majority of firms in this sector have fewer than 50 employees (City of Toronto 2011)</p>
<p>-Hardware and Telecoms</p>	<p>-Software (Saas)</p>
<p>-Minimal R&D, mostly sales offices</p>	<p>-MNCs coming to access startup innovation</p>

TechToronto Report (2016)

TechToronto, Munk School Innovation Policy Lab, & PWC

Toronto's Tech Sector (2015)

72k

Non-tech jobs
in tech companies

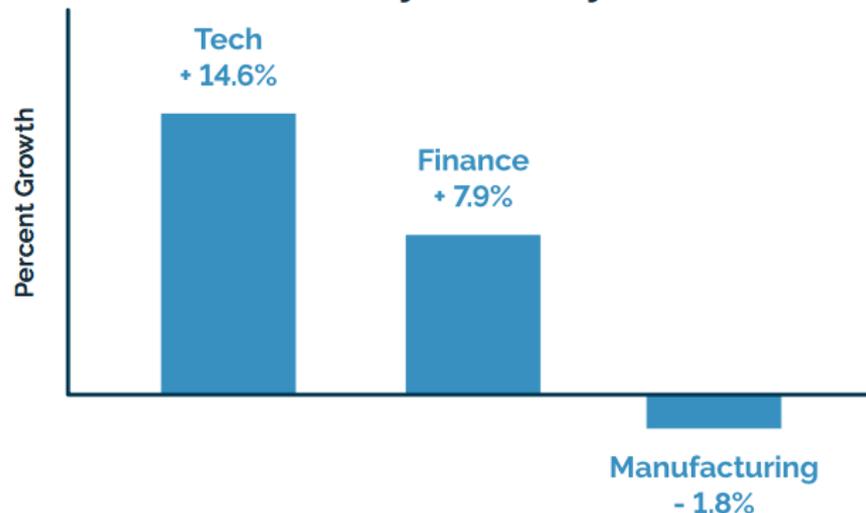
98k

Tech jobs
in tech companies

231k

Tech jobs
in non-tech companies

Job Growth By Industry (2010-2015)



Ecosystem Demographics

Ecosystem Performance

Funding

Metropolitan GDP
\$323 bn
Global Avg: \$267 bn

Metropolitan Population
6.1 m

Ecosystem Value
\$7.2 bn
Global Median: \$4.1 bn

Startup Output
2.1 - 2.7 k
Global Avg: 1,762

Growth Index
4.7

Early-stage Funding per Startup
\$443 k
Global Avg: \$252 k

Early-stage Funding Growth Index **4.5**
Global Avg: 5

Experienced VC Firm Index **8.1**
Global Avg: 7

Market Reach

Foreign Customers



Global Connections
10
Global Avg: 6.1

Talent

Experienced Software Engineers



Software Engineer Salary
\$56 k
Global Avg: 49 k

Experienced Growth Employees



Visa Success Rate



Global Avg: 5

Startup Experience Index **4.9**

Founders Demographics

Women Founders



Immigrant Founders



Resource Attraction

Entrepreneurs **350**
Global Avg: 300

Startups **17**
Global Avg: 83

Source: Startup Genome 2017

	Ranking		Performance	Funding	Market Reach	Talent	Startup Experience	Growth Index
Silicon Valley	1	0	1	1	1	2	1	4.2
New York City	2	0	3	2	3	7	4	4.5
London	3	▲ 3	4	4	2	10	5	4.8
Beijing	4	NEW	2	5	19	8	2	4.4
Boston	5	▼ -1	6	6	12	4	3	4.0
Tel Aviv	6	▼ -1	9	8	4	11	7	4.5
Berlin	7	▲ 2	7	9	6	5	10	4.6
Shanghai	8	NEW	8	3	10	9	13	5.5
Los Angeles	9	▼ -6	5	7	15	14	11	4.2
Seattle	10	▼ -2	12	13	14	3	6	4.5
Paris	11	0	14	14	9	16	8	4.2
Singapore	12	▼ -2	16	16	11	1	20	4.6
Austin	13	0	15	11	18	6	9	4.3
Stockholm	14	NEW	17	20	8	18	12	5.3
Vancouver	15	▲ 3	19	19	7	15	15	4.3
Toronto	16	▲ 1	18	12	5	20	18	4.7
Sydney	17	▼ -1	20	10	13	12	17	6.3
Chicago	18	▼ -11	13	15	20	13	14	3.9
Amsterdam	19	0	10	17	17	19	16	4.8
Bangalore	20	▼ -5	11	18	16	17	19	4.7

Source: Startup Genome 2017

Core Research Question

- What are the key factors driving the post-2008 transformation of Toronto's ICT cluster from consisting mostly of MNC flagships into a dynamic ecosystem for domestic startups?

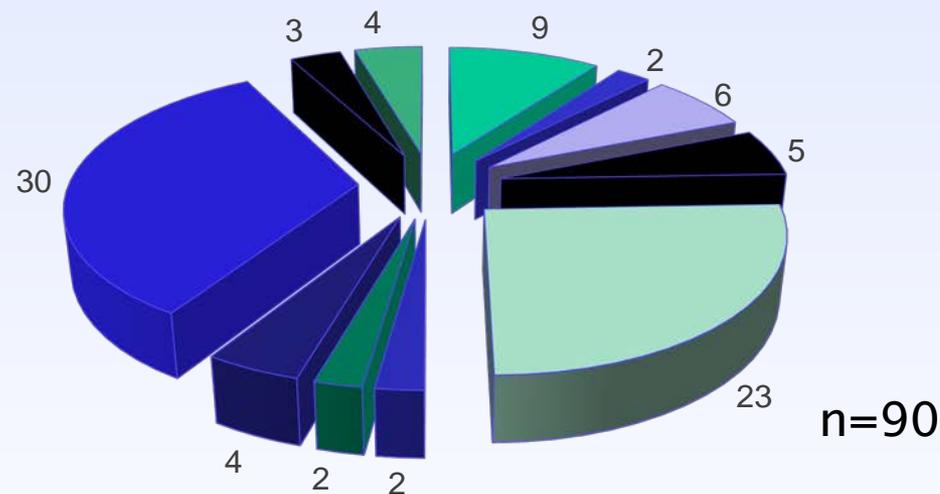
What factors triggered the transformation?

- Literature suggests 6 types triggers:
 - Talent base
 - Anchor firms
 - Research infrastructure
 - Incubators
 - Outburst of entrepreneurial activity
 - Civic capital

Methodology: Interviews

(Summer 2015 through January 2017)

ICT Organization Type & Frequency



- Banks (9)
- Professional Services (6)
- Fintech (23)
- Incubators (2)
- Software Development & Services (4)
- Venture Capital (4)
- Insurance (2)
- Industry Associations (5)
- Government (2)
- Consulting (4)
- IT Manufacturing & Services (3)

Talent base

- Existence of specialized skills and talent are seen as necessary condition of cluster development (Porter 1998).
- This sustains and/or attracts established tech. firms to city-regions and spurs startups. (Nelles, Bramwell and Wolfe 2005)

Findings: Talent base

- Strong technical talent base, but highly competitive to hire specialists
- Lack of Experienced managers hurts the cluster's global talent ranking
- *“the combination of early-stage startups reporting a low level of access to experienced technical and growth talent with a low level of international talent attraction and scaling experience pushed the Corridor to the 20th rank on Talent” – Start-up Genome 2017 Global*

Rankings

INNOVATION POLICY LAB

at the MUNK SCHOOL OF GLOBAL AFFAIRS

NOC	The Most Common Jobs In The Tech Ecosystem	Employed in Industry Group 2015	Median Hourly Earnings
2171	Information Systems Analysts & Consultants	26,980	\$34.99
2174	Computer Programmers & Interactive Media Developers	22,146	\$38.77
2173	Software Engineers & Designer	8,510	\$47.00
0213	Computer & Information Systems Managers	6,423	\$47.97
2281	Computer Network Technicians	4,408	\$30.88
2175	Web Designers & Developers	4,181	\$38.21
2147	Computer Engineers (except software engineers & designers)	2,986	\$16.01
9523	Electronics Assemblers, Fabricators, Inspectors & Testers	2,881	\$32.52
2172	Database Analysts & Data Administrators	2,982	\$28.12
2242	Electronic Service Technicians (household and business equipment)	1,980	\$26.49

Source: TechToronto, 2016

Anchor firms

- Clusters tend to develop out of the formation of one or two critical firms that feed the growth of numerous smaller ones (Porter 1998).
- The emergence of a major anchor firm in the cluster acts as a magnet for the local cluster, attracting both allies and rivals to locate in the region to monitor the activities of the dominant firm.

Findings: Anchor firms

- Few interviews reflected the literature's focus on the legacy influence of one or two major anchor firms
- Some reported ongoing benefit of proximity to suppliers of platforms like IBM

Research Infrastructure

- Universities and corporate research laboratories have been shown to provide the intellectual space for the growth of the ICT cluster (Nelles, Bramwell and Wolfe 2005).
- Research infrastructure serves the regional economy in two important ways:
 - by providing a pool of local talent
 - by transferring cutting-edge knowledge, either in the form of entrepreneurial spin-off companies or through patenting, licensing, consulting or joint research projects

Findings: Research Infrastructure

- Limited engagement reported with research partnerships (tech transfer, spin-offs)
 - Many tried unsuccessfully, citing different timelines for academia and business, IP ownership concerns, and frustrating interactions with tech transfer offices
 - Many of the companies in campus-linked accelerators are not even spin-offs of university research
- Main reported benefit of proximity to universities is access to talent

Incubators & Accelerators

- Incubators and accelerators are vital intermediary organizations for startups (in particular).
 - Provide crucial early advice, from established industry actors, and services.
 - Also provide infrastructure support, physical and digital. (Stagars 2014)

Findings: Incubators & Accelerators

- Explosion of incubators, mixed reviews by interviewees
- Private:
 - OneEleven, MaRS, IBM I3 initiative, Highline, Incubes, Brightspark
- Toronto's university/college-affiliated incubators and accelerators:
 - **Ryerson University:** Digital Media Zone, the Fashion Zone, Innovation Centre for Urban Energy
 - **University of Toronto:** Department of Computer Science Innovation Lab, Impact Centre, Creative Destruction Lab, the Entrepreneurship Hatchery, the Hub Ideation and Experimental Learning Centre, among others
 - **York University:** LaunchYU, York Entrepreneurship Development Institute Accelerator
 - **Centennial College:** Centre for Entrepreneurship, Student Business Incubator, Wireless Acceleration
 - program in partnership with Wavefront
 - **George Brown College:** Digital Media and Gaming Incubator, EmpoweredYouth Startup Hub, Prototyping Lab
 - **Humber College:** Humber Launch
 - **Seneca College:** The Health Entrepreneurship and Lifestyle Exchange (HELIX) incubator

Outburst of entrepreneurial activity

- Trippi et. al (2015) argue that cluster studies need to take into account the “free” or “purposive” action taken by individuals or groups within the cluster space (ex: Israel VCs)
- Feldman and Zoller find presence of “dealmaking” entrepreneurs as sufficient condition of cluster development (more important than the other cluster factors).
 - Dealmakers are “individuals with valuable social capital, who have deep fiduciary ties within regional economies and act in the role of mediating relationships, making connections and facilitating new firm formation” (Feldman & Zoller 2012)

Findings: Outburst of entrepreneurial activity

- Active cohort of dealmakers, many of whom are serial entrepreneurs from 1990s-2000s successes
 - Actively reinvesting their money, knowledge, and facilitating networks
 - Serial entrepreneurs emerged from earlier successful startups –
 - Delrina, Workbrain, Rypple, Grocery Gateway

Spotlight on Software Start-ups

- Serial entrepreneur
 - Came from enterprise workforce management software company (whose former employees have produced about 16 other companies)
 - Started a company, sold to major U.S. software company and joined that company as VP for three years
- Cohort of experienced serial entrepreneurs growing, and collaborating
 - “Not the Valley yet, but still a lot more people than there were 10 years ago, who have done that before, sort of seen that, done it”
 - Biggest obstacle: Best talent leaves due to lack of firm density compared to Silicon valley
 - Catch 22: we are not plugged into US networks (buyers, investors, talent), you have to live there
- Founding partner of Rotman’s Creative Destruction Lab

Civic capital

- ‘Economic community’ – strong, responsive relationships between the economy and community that afford both companies and the community a sustained advantage.
- Relationships mediated by key people and organizations that bring the economic, social, and civic interests in the community together to collaborate (Henton, Melville, and Walesh 1997).
- Henton argues that social – or civic -- capital is a critical ingredient in the success of the most dynamic clusters and regional economies (Henton et al. 1997; Wolfe and Nelles 2009)

Findings: Civic capital

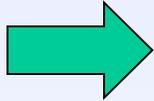
- The main benefit of proximity to other firms reported to be in benefiting from personal networks
- Serial entrepreneurs are:
 - Recycling capital and advice to seed and support next generation of startups,
 - Founding networking/advocacy organizations (ex: TechToronto)

Spotlight on TechToronto Meet-ups

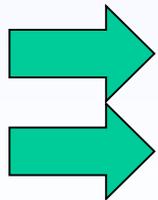
- Runs monthly meetups of 500+
 - Networking where attendees wear nametags indicating they are looking to hire, looking for work, or looking for funding
 - Presentations by founders who share best practices
 - Includes firms in the digital space, ICT, hardware, software, and wearable technologies
- Founded in 2014 by entrepreneurs, TechTO has achieved buy in from local policymakers (Mayor Tory) and large corporate sponsors (RBC host, PWC)
- Founder Alex Norman instrumental in achieving OSC and CSA approval for Angel List Syndicates to Canada

Summary of Findings

- What factors featured most prominently in the interviews?



- Talent base
- Anchor firms
- Research infrastructure
- Incubators



- Outburst of entrepreneurial activity
- Civic capital