

Entrepreneurs and the Evolution of Toronto's ICT Cluster: Insights and Lessons Learned

Steven Denney, Travis Southin, and David A. Wolfe

Innovation Policy Lab, Munk School of Global Affairs and Public Policy, University of Toronto

This document summarizes the findings and ongoing progress of two related research projects on the evolution of Toronto's Information Communications Technology (ICT) cluster. The first project focuses on investigating the bottom-up processes and factors fueling the rise of a domestic startup scene. This research draws from 116+ interviews with local ICT start-ups and scale-ups and is informing a forthcoming paper analyzing the drivers fueling Toronto's emergence as a startup hotbed.

1. What was your key research question and what is your major finding from the research?

ICT cluster transformation

While the extensive cluster literature has contributed much to our knowledge of the conditions under which clusters emerge, less is known about how clusters change and evolve over time. This study makes an empirical contribution to the literature on cluster evolution by undertaking an examination of the radical transformation of Toronto's ICT cluster over the past decade. Specifically, this study explores the key factors that have driven the post-2008 transformation of Toronto's ICT cluster from one consisting primarily of MNC flagship firms into a more dynamic ecosystem for domestic startups and emerging scale-ups.

The critical questions addressed in the article are twofold: Primarily, what are the factors driving the transformation of Toronto's ICT cluster from consisting mostly of MNE flagships into an increasingly dynamic ecosystem for local startups? Secondly, are startups successfully scaling?

The local-level variables this study examines align with the three stages of evolutionary cluster change identified by geographers, policy analysts, and political scientists: (1) the restructuring of skilled labor and research infrastructure, supported by technological shifts and disruptions which generates new entrepreneurial opportunities; (2) civic-capital and networking building by entrepreneurs; (3) and establishment of a functioning entrepreneurial environment. Findings suggest that a strong talent base was the dominant contributing condition, mobilized by a technological triggering event in the rise of cloud computing and mobile platforms. The second phase of cluster development -- the emergence of strong civic capital following the buildup of antecedent conditions and a triggering event -- also find evidentiary support. The research suggests that a strong sense of civic capital is being fostered by entrepreneur-led organizations. Our findings also support the third phase of cluster development -- the emergence of a dynamic and supportive start-up ecosystem. A growing cohort of serial entrepreneurs in Toronto have

contributed to the emergence of a supportive ecosystem within Toronto's ICT cluster by re-deploying financial and knowledge-based capital through their network to seed the next generation of startups.

2. What do your research findings mean for our understanding of Canada's digital opportunity?

The case study of the transformation of Toronto's ICT cluster illustrates the local drivers of digitally-enabled growth. Specifically, the case's theoretical contribution highlights the explanatory value of combining actor-driven cluster development models with the literature's more recent emphasis on entrepreneurial agency. The marriage of these conceptual models yields a more nuanced picture of entrepreneurial agency in driving cluster transformation. The transformation of Toronto's ICT cluster is driven by actors who capitalizing on antecedent conditions and trigger events, "civic capital building entrepreneurs" self-organized into communities, who then acted purposefully to extend these networks into the policy realm in order to enhance the cluster's institutional supports. Finally, this paper points to opportunities for further research into the combined effects of the civic capital generated within the tech sector by civic capital-building entrepreneurs and the institutional engagement by serial-entrepreneurs which may function to provide the hitherto missing ingredients to the development of broader civic capital and governance in the region.

Our research strongly suggests that the growth of the Toronto startup ecosystem in last 5-7 years has been fueled by the emergence of affordable scalability of software derived products and services (at the early stages of firm development) via cloud computing and mobile platforms, a recent phenomenon. Cloud computing is a technological shift that has transformed access to computing power from characterized by in-house servers (scarcity) to highly scalable and inexpensive pay-per-use access (abundance). Cloud computing is cited as lowering the cost of entry and enabling more startup formation. It is difficult say that this is *the* definitive trigger event, of course, but the spread of cloud computing technology in the last 5 years is identified as an exogenous trigger catalyzing the growth -- and perhaps the transformation -- of the ICT sector over the same period, especially for software companies, but also for hardware companies, too, given that virtually all hardware devices also contain software (e.g., smart phones). Many of the firms our interviewees run or work for have worked with global cloud services providers. These partners are cited as enabling their startup or startups across the city-region to develop unique offerings while harnessing capabilities offered through cloud platforms. Interviewees noted that this trigger occurred around the same time as other meaningful developments which lowered the cost and other barriers to entry. These include the emergence of incubators further facilitating the ease of startup creation as well as increased interest of U.S. VCs and accelerators such as 500 Startups and Techstars. Overall, the factors identified here combine to create a "virtuous circle" of ever-accelerating technology advances and innovations at still-affordable cost.

3. What are the key policy implications that flow from your findings

a) The role of talent

Talent was the most common asset cited, with interviewees stressing the world class quality of software engineers graduating from local post-secondary institutions at highly competitive salaries compared to those required to obtain talent in the major U.S. tech areas such as Silicon Valley. However, interviewees often noted the intense competition for this talent, from both local and multinational firms. Some firms cited the inability of local scaling firms to compete for talent as an opportunity for additional policy support, an issue confounded by brain drain (usually ICT university graduates accepting higher paying jobs in the United States). Another key institutional advantage was the role of civic capital-building organizations that were instrumental in building strong networks within the ecosystem. Meetups such as TechToronto and Barcamp were cited as useful resources for connecting to talent, capital, and knowledge. These entrepreneur-led grassroots organizations have grown and have garnered support from other local institutions such as the City of Toronto and corporate sponsors. These civic capital-building organizations and the networks they foster have connected a growing cohort of serial entrepreneurs who have established a supportive ecosystem within Toronto's ICT cluster by re-deploying financial and knowledge-based capital through their network to seed the next generation of startups. This mentoring aspect was identified as partially filling the knowledge gap left by the dearth of management talent with experience scaling firms. One policy recommendation was for governments to support the organizers of grassroots networking organizations with funding and organizational support.

Access to senior talent

The scarcity of senior-level engineering and management talent was regularly mentioned and sometimes lamented. Some interviewees attributed the dearth of senior-level talent to the tech ecosystems lack of development, especially the lack of experienced scaling talent; in other words, Canada doesn't support scale-ups which, in turn, results in a lack of scaled up talent. The Global Skills Strategy program was described as a positive step in attracting this talent. However, many firms have not used it yet. Those that have reported largely positive results.

In this context, scale-ups report having to compete for limited international talent and can't offer competitive wages (esp. when compared to the U.S.). Interviewees are divided on whether the presence of foreign subsidiaries matters. A few interviewees argue that the presence of subsidiaries can increase the ecosystem's reputation and ease recruitment, while others argue it only drives up wages and "sucks up talent." Notably, interviewees are somewhat divided on the idea of a brain drain: it is either understood as stunting business growth, or it is viewed positively – spending time in Silicon Valley is seen as, in this case, as crucial to business success (C100 mentioned).

In light of these limitations, some interviewees report their firms invest in employee training and workforce development in the region (e.g. boot camps), but others see it mostly as the responsibility of the publicly funded higher education sector or government.

b) The importance of customers and markets

Firms interviewed primarily specialized in software/service offerings, selling primarily to customers in North America. This software orientation also was cited as a competitive strength due to the ability to rapidly enter global markets earlier than hardware firms. Regarding connections to global production networks, many interviewees did not reflect a high degree of inputs being sourced from abroad. While some development was offshored, most reported that the majority of the inputs going into their products were local software developers, reflecting the fact that many of the firms interviewed were software/service-based offerings. Customer needs were the most frequently-cited source for new product innovation. Policy supports for entering new markets such as the Trade Commissioners Service and export financing from Export Development Canada were positively discussed. However, some interviewees cited the need to streamline the approval process and better tailor requirements to the unique nature of software/service business models.

Procurement

Few interviewees spoke favourably about government procurement at the provincial or federal levels. Negative sentiment was strong. It was surprising how much they valued government as a customer, rather than as a source of funding through innovation programs. Interviewee noted that government as a reference customer would help them attract financing and increase exports. A frequent experience was selling to foreign governments long before domestic ones. Some expressed frustration at a lack of strategic vision in procurement policy leading to missed opportunities to establish a Canadian protocol/platform that could be used as a reference customer to validate products which could be exported. Instead, interviewee said procurement favoured foreign multinationals, an opinion back by available data.

One interviewee, in particular, lamented the missed opportunity of using smart cities to showcase and develop a platform built by consortium of Canadian companies. Instead, Waterfront Toronto was accused of favouring Sidewalk Labs, forcing Canadian firms to “play on top of their platform” rather than defining a Canadian one that can then be exported around the world. The favouring by provincial (Ontario, Québec) and federal governments of the ENCQOR group (Evolution of Networked Services through a Corridor in Québec and Ontario for Research and Innovation), which consists of mainly foreign-based firms funded for the development of a 5G “test corridor” is another example.

c) **The availability of capital**

Although most interviewees spoke of an increase in availability of capital at the start-up phase, a common view was that access to capital becomes a major barrier to growth as the firm scales. Many interviewees point to the post-2008 infusion of start-up capital and increasing interest by U.S. VCs. Several interviews noted that venture capital investment in Canadian start-ups grew in the post-2008 period, noting low interest rates between 2009 and 2015 pushed investors away from traditional investment and toward riskier projects (private equity, VC). This was a response driven by the federal VCAP (Venture Capital Action Plan) funding (announced January 2013), which provided ~\$400M VC funding conditional on the private sector's ability to match this funding at a ratio of 1:4. This funding was followed by another \$400M, part of the new government's Venture Capital Catalyst Initiative (VCCI). Follow on VC rounds for seed or early stage investment are noted as less frequent. The seed funding model -- whereby VCs invest seed funds in many start-ups, but only follow up with a select few -- is noted as on the rise. Investors can exit at any stage through secondary markets for selling shares, and don't have to wait for an IPO, M&As or a sale to a private equity firm to get a return. This is identified as contributing to early exits for many firms, even those with more than 10M in revenue. Finally, debt financing was commonly described as difficult to access, with banks (including BDC) demanding strict revenue and asset requirements. Interviewees noted banks and BDC do not understand how to value the asset-light model of SaaS, and monthly recurring revenues.

Type of capital & control

Several of the scaleups interviewed are self-funded or bootstrapped by reinvesting revenues back into the firm. The link between type of capital structure and the requisite control needed to scale long-term was commonly emphasized. Interviewed CEOs noted the importance of having investors who were patient and willing to grow the company over the long-term. Many of these investors were described as high-net-worth individuals with experience scaling Canadian tech companies. Those who take VC capital (usually "impatient" and dilutes founders' equity and control) are understood as doing so because they don't have better alternatives, but private equity is seen as different, more "patient capital."

Policy support

Government sources of capital such as SR&ED tax credits and IRAP were generally spoken of positively. However, interviewees often emphasized the need to streamline the approval process and better tailor requirements to the unique nature of software/service business models. Some firms cited the need to augment indirect tax credit supports with more direct innovation policy instruments (such as grants). Canada continues to have one of the highest proportion of indirect to direct R&D funding/support in the OECD, despite recent cuts to SR&ED. Another area for improvement cited was to increase revenue qualification thresholds in order to address a perceived funding gap for firms who grow past the startup stage.

d) Access to knowledge (in terms of research, data sources and intellectual property)

Most firms don't have an IP strategy, except security and data firms and some advanced manufacturers (e.g., solar). Several interviewees complained that they don't have the time and money to secure patents and particularly to defend them against trolls. Some also expressed desire to develop IP strategy while others were unsure of its relevance, especially if the product relied more on 'trade secrets' to avoid divulging the way their product worked (especially noted by software firms).

4. Policy Implications and Recommendations

Much of the research summarized here focused on the transformation of Toronto's ICT ecosystem and as such explored the most relevant variables identified in the literature; namely, trigger events, inputs (e.g., labor, capital), and networks (i.e., connections between firms and/or individuals). That said, we can reasonably infer from our interviews where there are either social or market failures and what policy changes or adjustments might address them.

- **NETWORKS:** Personal networks and grassroots-organized communities/meetups have been instrumental in circulating resources and advice, particularly from serial entrepreneurs to newer founders. Some interviewees who have organized these events have expressed a desire for more government support for sustaining and growing these grassroots communities. Incubators are looked upon as providing ambiguous value. Impact on firm performance is considered negligible.
- **CAPITAL:** Access to investment has improved since 2008. However, gaps persist beyond the start-up/SME level. Government initiatives to increase investment should be targeted to bridge this gap, especially at the level of series-C and above. VC funding is at best inadequate and at worst damaging (because it dilutes owners' equity) to the ecosystem.
- **TALENT:** Talent is the #1 local asset. Government should continue to invest in university STEM programs to feed the talent pipeline. Talent is plentiful and regularly identified as the ecosystem's greatest strength, especially software developers. However, not all talent is equal. Specifically, there is a lack of senior-level sales/marketing and management talent. This is regularly cited shortcoming. Governments should explore policy mechanisms to increase the talent pipeline for experienced managers, senior level sales and marketing. For example, expanding fast-track quotas at the provincial-level and otherwise limiting immigration restrictions should be further explored, as well as various incentive options for hiring (and hiring back Canadians abroad).