

Employment, Innovation and Growth

Analyzing the Health of Canada's Economic Ecosystem

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Where does economic and employment growth in a modern economy come from? How do firm size, age and industry influence overall economic performance? And how does Canada fare on measures of international competitiveness? In tackling these questions, this DEEP Centre report on Canadian competitiveness provides stakeholders with a nuanced understanding of the key drivers of economic growth and innovation as Canada's economy is reshaped by complex patterns of technological, demographic and economic change. The report calls for the enactment of better-targeted policies to support enterprise growth and provides a unique and ultimately more accurate lever for policy makers seeking to stimulate the next generation of jobs and growth.

The Canadian growth and innovation challenge

The confluence of increasing global competition for economic growth and the continued economic stagnation present across mature economies is catalyzing governments at every level and jurisdiction to seek innovative means of facilitating increased economic performance. Be it at the national, regional or municipal level, policy makers across the West are looking beyond orthodox strategies related to research and development to capture the potential economic dividends that accompany high-growth firms. These strategies range from the development of accelerator centres and business incubators, the increased provision of grants and subsidies to high-tech industries, and the wholesale reform of tax and patent policies geared towards start-ups and small and medium sized businesses.

Each of these levers aims to help attract “innovation economy jobs” to specific jurisdictions. The attractiveness of such jobs is evident. Ever since Robert Solow found that 85% of economic growth originates in new product and process innovation, governments have aggressively sought to foster innovation for the broad economic benefits such forward progress brings to an economy. New research by Enrico Moretti, the author of the *New Geography of Jobs* and professor at the University of California, finds that “*each innovation economy job supports up to five jobs elsewhere – in other professional sectors and in the service sector. These halo effects are large because sectors like the digital economy are labour-intensive, well-paid, and tend to cluster – amplifying the benefits for those cities with clusters of innovation job.*”

This amplification effect related to knowledge-intensive, high-tech jobs has catalyzed a race amongst jurisdictions to promote, facilitate and incubate start-up companies that may provide a boost to stagnant employment numbers in most Western jurisdictions. Yet as policy makers seek to outdo each other in this battle to help facilitate the development of the next Google, RIM or Lenovo, analyzing which strategies are ultimately

successful and efficient is necessary to ensure government policies and the taxpayer dollars they allocate contribute to meeting these goals.

For Canada to succeed in an increasingly competitive global economy, policymakers must grapple with a series of interrelated challenges:

- 1 Policymakers must obtain a more nuanced understanding of where jobs actually come from in today's economy. While policymakers lavish attention on start-ups, the data reveals that the most significant job creators are established companies who mature into high-growth firms. To maximize the effectiveness of our economic development efforts, we must do a better job targeting firms with the greatest growth potential, and whose export and research-orientation capture the best growth prospects.
- 2 Promoting broad-based innovation across sectors should be at the heart of economic development. While one can be forgiven for thinking that Canada' future economic growth is dependent on either natural resources or start-up technology companies, the truth is that a large share of high-impact employment creators come from traditional, “boring” manufacturing and services sectors. Policy makers must focus on enabling innovation and creative destruction across all sectors of the economy, not just those that capture the public, and the media's, attention.
- 3 Determining the extent to which public policy should promote geographical specialization and the clustering of industrial activity. While there are undeniable efficiencies from location-based specialization, there are also distinct limits to their applicability given the broad expanse of rural and tier-2 cities that comprise most jurisdictions. Promoting broadly-based economic development thus requires an ability to create employment and growth beyond the gravitational nodes of Alpha cities.

This report grapples with each of these three issues in turn: fine-tuning our understanding of the key sources of growth in Canada, the need to enable innovation across a diversity of sectors, and the rightful balance between promoting economic clustering and pursuing growth strategies that address the needs of smaller cities and rural areas. In so doing, it offers insights and research findings that challenge the ultimate effectiveness of policies currently enacted at various levels of governance. In particular, it aims to add to, and influence, the debate about how contemporary economies grow, and how best to enable this growth given the confluence of technological, economic and demographic issues Canada faces. Ultimately, we hope this report--and the series of reports that will follow--helps facilitate a more informed policy discussion about the levers used to facilitate economic growth, especially those measures targeted at the high-growth, export and research-oriented firms that comprise the majority of job growth in mature economies.

“In the past you had to be large to gain global reach; today, this is no longer the case.”

The tension and contrasts that this report seeks to highlight, and the dialogue and discussion that we hope results, are a significant element towards the shared goal of improving Canada's competitiveness, and ensuring that current and future generations of Canadians are able to obtain fulfilling employment that provides the basis for the standards of living and quality of life that we have long assumed guaranteed.

This report focuses on Canada, and the increasingly significant challenges the country faces related to job creation and economic growth. The lessons herein, however, are applicable far and wide, and certainly not limited to this one jurisdiction. Rather, Canada's relatively rapid job recovery, its overall economic stability and its relative economic diversity provide an appropriate

test case to analyze long-term rather than short-term policy choices. The lessons herein are thus applicable to other states, especially those who have built policy choices on similar assumptions and economic research.

Analyzing the health of Canada's economic ecosystem

Canada may have recovered well from the global economic crisis, but its vaunted post-crisis trajectory cannot hide a series of underlying structural challenges. As noted by University of Ottawa economist Miles Corak, “Compared to Greece, Spain, and the United States, the (Canadian employment) story is a story of robust growth. But Canadians live in Canada, and the working age population has been steadily increasing. This has left the fraction of the population without a job still below its pre-recession high, and virtually unchanged since 2009” (Corak 2013). Moreover, while the 2012 job market included a jump in permanent employment, this simply makes up for several years wherein job growth was primarily temporary in nature. The picture is worse for 15-24 year olds for whom virtually all jobs created have been temporary jobs. This speaks to broader findings related to underemployment in the Canadian economy whereby 24.6% of youth with a university degree are considered “underemployed” (CGA 2012). This figure declines to 19% for core working age Canadians (25 to 44 year olds).

A hyper-competitive global marketplace for innovation only exacerbates these domestic challenges. As Herman (2012) notes, mature industrial economies no longer monopolize the ability to capture high-value innovation rents or the potential for employment and consumption power that accompany them. Whether measured through shares of global R&D spend, shares of peer-reviewed journal publications, or shares of high-value patent applications, the building blocks of innovation are increasingly dispersed across both developed and developing economies. And while policy makers had long assumed that mature industries

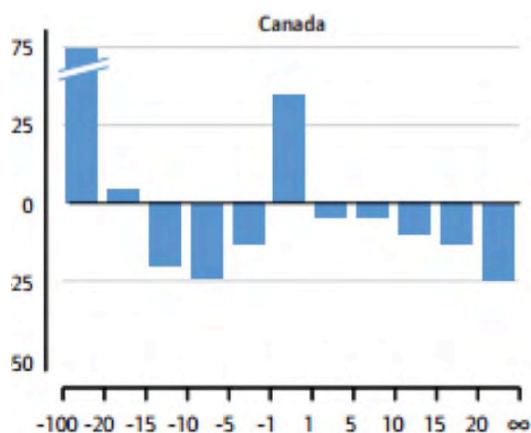


Figure 1
Canadian firm performance vis-a-vis US firms
based on average annual growth rate
NESTA 2010

economies possess material advantages in the transition towards new, high-value sectors, services and processes, it now seems that this democratization of innovation potential through science and technology has rendered these supposed advantages less relevant than ever before.

In fact, the intensity of the global competition for business attraction, retention and development suggests, if anything, that Canada faces this competition with significant structural challenges weighing against it. The “Jenkins Report” on Canadian innovation argues that Canada’s underachievement on high-value job is the product of continued under-investment in new technologies, a lack of competition in important sectors of the economy, and a dearth of early-stage capital for entrepreneurs—all of which contribute to comparatively low productivity gains (Industry Canada 2011). This report argues that the roots of Canadian underachievement on employment and the deterioration of Canada’s competitive stature run deeper than our anemic investments in technology and a lack of capital. Our economic performance is also a reflection of the failure of policymakers to properly understand

the levers of growth and how best to utilize them. This report sets out to shed light on these levers and, in so doing, aims to help policymakers address a significant set of challenges that are undermining the competitiveness of the Canadian economy.

Such challenges and long-term economic risks are not just potentialities. For example, while on a net basis new Canadian firm creation has outweighed firm exits, in 2008 (the last year on record), there were 30,000 more exits than entries (Industry Canada 2012). Amongst surviving firms, and compared to its OECD peers, Canada has the highest share of firms that experienced reductions of more than 20% per year in employment (followed by Spain and US). And, as per Bravo Biosca (2010), Canadian firms underachieve on growth metrics significantly compared to their American counterparts at every firm size, and possess a far greater proportion of firms with dismal growth records (defined as negative 20-100% growth, see Figure 1). Given similarities in Canadian-US business cycles, this signals a significant problem in Canadian firm dynamics. Finally, even amongst successful high-growth firms, Canadian ones are not as potent at creating jobs as in other OECD countries, producing less than 50 jobs per high-growth firm compared to Italy (70), Netherlands (60), Spain (70), and US (80).

Determining the causes of this weak performance is complex. Using the UNIDO Competitive Industrial Performance (CIP) Index, Canada ranks **dead last in growth** amongst the top 60 global industrial economies having seen a 11% decline in its CIP score over the 2005-2009 period. UNIDO’s Competitive Industrial Performance (CIP) index is calculated on the basis of the following components: industrial capacity, manufactured export capacity, impact on world manufacturing value add, impact on world manufactures trade, industrialization intensity, and export quality (high-tech intensity). To be fair, other advanced industrial economies haven’t fared well either. The UK dropped nearly 7%, New Zealand -6%, Japan and the United States -4%. And while one might equate the

drop to the growing share of resources in the Canadian economy, the relative comparison between Canada and the US – both of whom have enjoyed the benefits of increasing resource dividends (shale gas in the US/oil sands in Canada) – leads one to once again see a significant issue related to firm and market dynamics in Canada.

The 2012 Global Innovation Index adds some data regarding those deeper issues. This recently published report (co-authored by INSEAD and WIPO) sees Canada drop out of the top 10, falling to 12th from 8th the previous year. The GII aggregates 84 different measures related to innovation – including education, research funding, infrastructure, capital and credit access – to come up with its rankings. Canada is still ranked far ahead of high-performing industrial economies such as Germany (15th), providing evidence that we are doing some things right. Yet, one might question where the sources of competitiveness and future growth will come from given Canada's 25th place ranking in human capital and research. In particular, our

may partially be explained by its significantly higher score on ICT infrastructure (7th to Canada's 20th place) and slightly higher per capita funding of education (38th to Canada's 49th). The result is a much more significant role of knowledge-based output in the economy (11th to Canada's 38th).

Policy makers will need to acquire a deeper and more accurate understanding of the drivers of contemporary growth in order to address these structural challenges and facilitate the private sector employment growth required to ensure a prosperous future. This means setting aside orthodox beliefs both about the sources of economic growth and the policies that are most effective in promoting this growth. The next section addresses four such beliefs by contrasting them with empirical realities. The result is a more nuanced and complex understanding of the sources of growth and the policies required to ignite them.

1. Job creation – myth and reality

While significant public (and political) attention is placed on the contributions of small business to employment growth, the reality is far more complex. In fact, Birch and Medoff (1994) found that as little as 4% of firms create over 70% of all new jobs in the United States. These so-called “Gazelles” represent a small share of total small businesses but create an overwhelming share of ongoing employment. The initial work of Birch and Medoff was later confirmed by Henrekson, whose 1998 meta-study showed that the vast majority of net employment growth was generated by a few rapidly growing firms.

In work commissioned by the US Small Business Administration, Acs et al. (2008) add to this research by differentiating between firms with high revenue growth and those with high employment growth. Since employment rather than revenue is a more valuable target for public policy, they define the latter as high impact firms. According to Acs, a “nontrivial” number of traditional gazelles, as defined by Birch and Medoff, experience dramatic revenue growth without contributing to significant employment

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49th place ranking in per capita spending on education, 46th place in the percentage of science and engineering students, and 20th place in access to ICTs are glaring weaknesses for an economy like Canada's and help to explain the country's growing challenges.

Moreover, while Canada dropped 4 spots (and the US dropped 3), the similarly-endowed UK moved up 5 spots. It's evident that policy plays a role here. The UK's advantage in the ranking

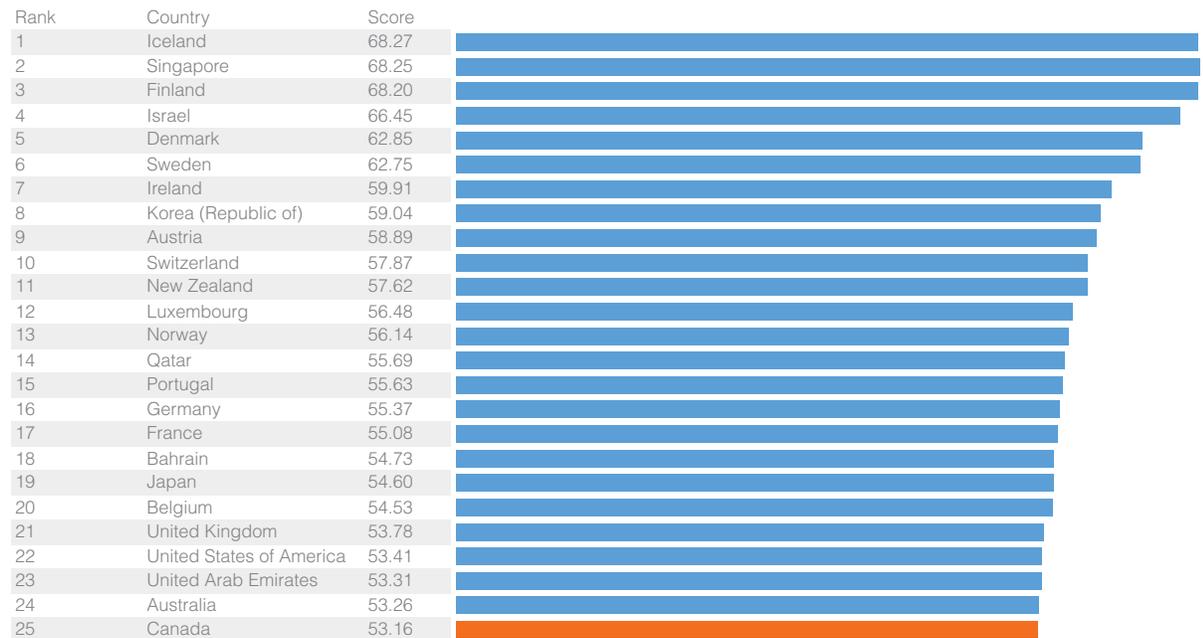


Figure 2
Global Innovation Index 2012
Human Capital and Research Rankings, by Country

growth. Given contemporary public policy prioritization on job creation, their definition of “high impact” firms provides a better guide to policy makers seeking to identify nascent enterprises that may follow similar growth paths.

The findings of Acs et al's research includes the following key points:

- High-impact firms represent between 2 and 3% of all firms.
- High-impact firms are responsible for nearly all employment and revenue growth in the economy.
- Large low-impact firms (+500 employees) are largely responsible for all job loss in the economy.
- High-impact firms exist in all industries, they are not limited to high-tech industry.
- 95% of high-impact firms are over 5 years of age, with the average age of small firms

(5-100) in this sub-group at 17 years, and 25 years for the average age of medium (100-499).

- Only 3% of high-impact firms die in the following 4 year period their ascension to high-growth.

This research confirms the findings of Henrekson (2008) who also finds that high-growth firms are not necessarily young firms, nor small firms. Instead these findings highlight the diverse nature of high-impact firms. The prioritization of startups and entrepreneurship by policy-makers, while laudable, must subsequently be understood as necessarily limited in its ability to catalyze large-scale employment gains.

Across other similar jurisdictions, notably Canada and the European Union, the results of similarly designed research yields a similar set of conclusions. NESTA's 2009 study of employment creation across the EU finds that high-growth firms account for between 35 and 50% of all jobs created despite comprising

only 3-6% of total firms. They find that the average high-growth firm in Europe multiplied its employment by more than 2.5 times over the three-year period measured.

Available Canadian statistics highlight a broadly similar picture. In line with Acs et al's differentiation of gazelles and high-impact firms, Industry Canada (2012) finds that while 12% of Canadian firms grew by over 20% per year in terms of revenue growth, only 4.7% of firms saw similar growth in employment (over the 2003-2006 period). Over a more extended period of analysis, 1993-2003, they find that these 13,000 hyper-growth firms are responsible for 45% of net job creation in the country, this out of a total pool of over 1.2 million Canadian firms.

Moreover, they conclude that high-growth firms are not concentrated in high-tech or knowledge-based sectors of the economy. Rather, they find pockets of high-growth activity spread across the economy, with the highest concentrations in professional, scientific and technical services, construction, waste management and remediation, natural resource and utilities

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management, and general management and administration firms. More recent data does highlight some interesting, and non-conforming trends. Notably, year-over-year 2011, large businesses (defined as over 500 employees) contributed to most of Canada's job gains with a 49% contribution. In contrast, small business created only 14.5% of Canadian jobs during this most recent period. Evidently this does not negate the broader finding that small business

is responsible for 45% of job creation over the 2001-2011 period, however it does magnify the need to think broadly about where job creation comes from.

Notwithstanding the broad consensus across these jurisdictionally-specific findings, an important question regarding the a priori identification of high-impact firms remains. How can policy makers identify who will and who will not grow? Acs et al attempt to answer this by examining the four-year period that predates the dramatic growth stage of high-impact firms. They find that only 3% of high-impact firms were established in the prior 4 year period; that 52% exhibited no change in employment or revenue; and that 31% were mixed decliners in either revenue or growth. In short, high-impact firms showed no signal or, at best, mixed signals as to their subsequent potential. Identification thus remains the key to unlocking effective and targeted policy. Research by Industry Canada (2012) highlights a series of common threads across Canadian hyper-growth firms: the majority are innovative, research intensive and export-oriented.¹ One particular finding stands out: high growth firms are more likely to be R&D intensive (defined as spending 20% or more of their investment budget on research), a ratio that is approximately double the rate of R&D intensity in traditional firms. Yet given such factors exist in non-performing firms, deeper analysis is necessary to enable a priori identification.

Given this substantial gap in our knowledge about what drives firm growth, it appears unwise for the contemporary prioritization of entrepreneurship and startup growth to continue blindly. As Acs et al conclude, “the data suggest that local economic development officials would benefit from recognizing the value of cultivating high-growth firms versus trying to increase entrepreneurship overall or trying to attract relocating companies when utilizing their resources.” In particular, policy efforts should be designed to build existing firm capacity and the expansion and retention of firms as a complement to startup and entrepreneurial program. Economic gardening is as important, if not more important, than planting! The importance of such retention-oriented policy is quite evident given that, in Canada, just 50% of firms survive

for 5 years (Industry Canada 2012), with the comparative statistic for young startups even more dreadful with a survival rate of just 20% beyond the five year mark.²

2. The limitations of startup growth

Given the aforementioned role of such a small number of high-impact or hyper-growth firms on the creation of employment in advanced economies, and the low survival rates that plague the majority of new firms, the broad policy focus on startups in general is surprising. Certainly, part of this focus stems from a general romanticization of small business and, more specifically, of the rags to riches stories of innovative firms such as Research in Motion, Google and Apple.

However, a more tangible driver for this focus is in the significant contribution startup firms make to ongoing employment creation. The Kauffman Foundation in its 2010 report *The Importance of Startups in Job Creation and Job Destruction* notes that US startups are responsible for the creation of an annual average of 3 million new jobs. In contrast, existing firms are “net job destroyers,” losing 1 million jobs per year. The simplistic definition of job creation therein, however, belies the facts about start-ups and the aforementioned death rates that accompany them. Research by Haltiwanger, Jarmin and Miranda (2010) finds that 40% of startup jobs are lost within ten years of firm establishment. Similar research by the Toronto-based Institute for Competitiveness & Prosperity (2011) finds that 78 out of every 100 Canadian startup jobs are lost as firms fail in the early stages of growth. The figure decreases slightly to 66 job losses for American startups. In both cases, however, the impact of high-impact/hyper-growth firms, outweighs those losses leaving net effects of 94 and 74 jobs respectively.

A secondary driver for the attention on startups is found in the choices made by labour market participants. A recent report written by the CIBC highlights the impact of economic and technological change on employment:

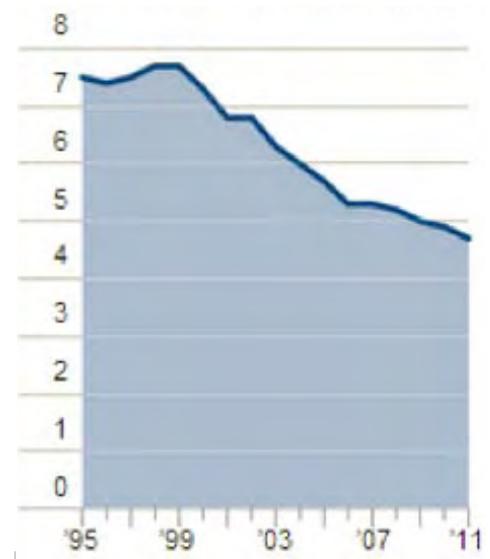


Figure 3

Average number of employees per new business
New York Times, Oct. 5, 2012

“Irreversible structural forces suggest that the next decade might see the strongest start-up activity in the Canadian economy on record. The gradual shift to a strong culture of individualism and self-betterment, the role of technology in driving the transition from boardrooms to basements, the more global and interconnected markets that require greater specialization, flexibility and speed, as well as small business friendly demographic trends are among those forces that are likely to support a net creation of 150,000 new businesses in Canada in the coming ten years.”

This research notes that only a small share of these new entrepreneurs are “forced” into entrepreneurship as a result of layoff or job loss, and rather choose to go-it-alone as a strategized career path. Further research by Industry Canada highlights that the number of Canadian entrepreneurs has grown by 57% between 1987 and 2011, far more than the 38% in the total number of Canadian employees.

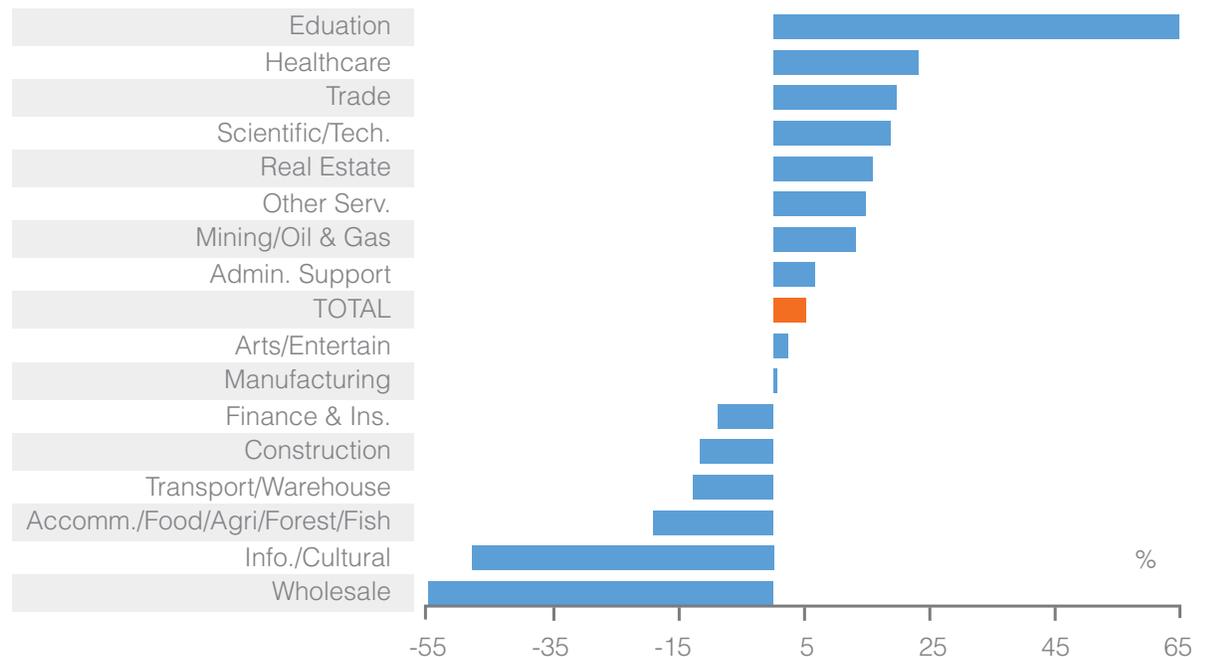


Figure 4
Growth in Start-ups by Industry, 2007 - 2012
Statistics Canada, CIBC

Yet while this swing towards entrepreneurialism is celebrated in certain circles, the impact on job creation is far less significant than many assume. While the sluggish economy and its high unemployment rates may have pressed more individuals into business ownership than at any previous point in history, most of them are going it alone, rather than starting companies that employ others. In fact, the number of new firms with employees has been dropping steadily since the late 1990s. Of course, Europe and North America's growing population of freelancers does represent a potentially significant pool of latent job creators, assuming they could be activated if equipped with the training, mentorship, resources and incentives they need to grow their businesses. But unfortunately, firms that support only the self-employed owner typically do not scale to generate the new jobs needed to support overall job creation and economic growth.³

The increase in so-called "jobless entrepreneurship" is only one troubling aspect uncovered in recent employment and business

dynamic statistics. Just as worrying is the fact that start-ups appear to be hiring fewer people than in the recent past. At the peak of job creation in the US between 1997 and 2000, start-ups were generating 4.65 million jobs annually, but recent cohorts have performed much worse, creating only 2.5 million jobs in 2010.⁴ In the 1990s, for example, a typical new enterprise opened its doors with about 7.5 employees on average. Today, new enterprises are forming with only 4.9 employees. The global economic implosion may partially account for the tendency for small firms to stay lean, but research suggests that these trends predate the recession. In other words, new firms have tended to hire fewer workers, even when economic times are good.

This is not to denigrate the value of startups and entrepreneurial activity, for those that survive and mature into hyper-growth and high-impact firms are what drive advanced economy job creation. However, the near-singular focus on young firms leaves more mature firms with better

growth prospects largely without concrete policy interventions aimed at helping facilitate their success.

All together these data point to a need to revisit how we, in Canada and across developed economies, attempt to facilitate economic growth and job creation. For while the sponsorship of startups and entrepreneurialism is important, it is insufficient to ensure the forward progress of the real job creators in our economies.

3. The sectoral composition of Canadian growth

While contemporary policies in advanced economies are largely designed to nurture firms in high-tech, knowledge-based industry, available research points to the value of diversity and the presence of high-growth firms across all sectors of the economy. In particular, as it relates to growth, we need to separate innovation, driven as it may be by new technologies, from the companies who exploit it.

“In the 1990s, a typical new enterprise opened its doors with 7.5 employees on average. Today, new enterprises are forming with only 4.9 employees.”

To be sure, companies like Research in Motion and OpenText are important flagbearers for our innovative capacity but tech companies alone won't drive an entire economy.

Innovation writ large, however, will. Long ago economist Robert Solow found that new breakthroughs in production accounted for 85% of economic growth, with inputs accounting for the other 15%. So when politicians state that “It will be innovation that propels Canada's future high-growth firms” we should all say

“no kidding.” The question isn't whether innovation will drive growth, but rather who those high-growth firms are and how to expand their numbers and success. And there, our increasingly narrow focus on tech companies risks obscuring the fact that traditional, unsexy industries in Canada still have a significant role to play in the growth that will shape our future.

Twenty-five percent of Canada's fastest growing companies, for example, are defined as either IT or software development focused. And the innovations and technologies created therein create significant capabilities for firms in others sectors to improve their operations and drive efficiencies through traditional processes. Limiting our lens to these tech-focused organizations, however, risks missing a significant source of economic growth, notably the other 75% of Canada's fastest growing companies. Moreover, while much of the startup attention is geared towards young firms in the information technology sector, the reality is that entrepreneurialism and growth are present across nearly every sector of the economy. Research by the Canadian Imperial Bank of Commerce highlights that start-ups have been most active in the education, healthcare and skilled trades, with scientific and technological start-ups, whom garner most of the attention, in fourth. And while innovative clusters such as Waterloo, Silicon Valley and Tel Aviv paint an image of youthful creativity, the highest rate of startup growth in Canada is now occurring in the 50 and over age group. According to Statistics Canada, this group now accounts for close to 30% of the total start-ups, more than double the rate seen in the 1990s.

Thus continually seeking to foster the next “one” misses the fact that some of Canada's fastest growing companies are far less exciting and far less orthodox. In terms of sector, Canada's fastest growth companies are present in various traditional fields. They make clothes, jewelry, and store fixtures (didn't we all assume that we had shipped those functions away to China?). They represent the other 75% of fast growing Canadian companies. They aren't software or application designers and largely fall beyond the

reach of popular tech incubators and accelerator centres. Learning how to best support these ventures will be key to promoting growth across the Canadian economy. And since the vast majority of these firms gain a large share of their revenue from exporting, policymakers should redouble their free trade efforts to ensure that they not only have easy access to markets (especially emerging ones), but also to cost-effective imported components.

Another priority should be to expand the number and diversity of environments that are available to facilitate learning, innovation and experimentation in traditional sectors. The vast majority of incubators and accelerator centres today support technology-based business. Meanwhile other fields that could equally benefit from the mentorship and collaborative ideation that such centres provide have heretofore been

“75% of fastest growing Canadian companies aren’t software or application designers and largely fall beyond the reach of popular tech incubators and accelerator centres.”

neglected. For example, while Toronto is home to a fashion incubator, there are no materials/packaging incubators to collaborate with the Ontario’s growing agri-food and food processing industry. And if 3D printing is indeed going to revolutionize manufacturing around the world, why not prioritize the development of shared spaces to help entrepreneurs design and develop products that take advantage of new manufacturing techniques?

In short, while sectors such as IT and the life sciences capture the lion’s share of public attention and public investment, it’s imperative that policy makers not be myopic about where

growth comes from. IT is indeed a driving force in innovation, but often it’s a conduit to progress in other fields. Whether growth is enabled in agriculture or retail is secondary to the creation of high-value jobs, no matter the sector. And enabling those goals means policy makers need to think broadly about the economy and where value really comes from.

4. Beyond clustering and culture

If sectoral diversity is key to economic growth in Canada, so too is regional and geographic diversity. And yet, there is a tendency in policy circles to assume that economic clusters in major urban centres will be the primary instruments of growth, which of course overlooks the fact that a non-trivial share of Canada’s population and economic capacity lies outside of our major cities. Moreover, new research suggests that the economic benefits of clusters are overstated.

Popularized by the work of Michael Porter in the 1990s, clusters have long been viewed as a driving force of regional economic competitiveness and comparative advantage. Porter’s work, built in large part on the analysis of industry dynamics in Silicon Valley, is now orthodox in economic development circles, and posits that by clustering like-industry companies together in a geographic area, firms will create iterative cycles of supply, demand, competition and collaboration (Padmore & Gibson 1998), spurring overall cluster growth and employment creation. For example, in a 2011 analysis of US clustering data, Porter and his colleagues find significant evidence for cluster driven synergy. Notably, the authors highlight that “industries participating in a strong cluster register higher employment growth as well as higher growth of wages, number of establishments, and patenting.” Such findings are found repeatedly across jurisdictions and industries. Be it footwear clusters in Northern Italy, software clusters in Austria or motorcycles in China, the relation between like-corporate density and growth is repeatedly found to be positive.

	Company	5-Year Growth	Sector	2011 Revenue	Export Share of Revenue	Number of Employees
1.	NexJ Systems Inc.	15,025	Private cloud software for customer relationship management	30,249,000	85%	327
2.	Mood Media Corp.	14,215	In-store background music, messaging and signage	330,460,000	95%	1,800
3.	Dallata Consulting Group Ltd.	10,031	Business consultancy and food-products trading house	87,826,373	95%	23
4.	Redwood Global Inc.	7,329	IT staffing agency	22,760,305	0%	26
5.	JewelPop Inc.	7,156	Manufactures jewelry with interchangeable pieces	14,511,308	96%	27
6.	Clevest Solutions Inc.	6,001	Mobile-workforce management software for utilities	12,202,825	90%	91
7.	InterAtlas Chemical Inc.	5,679	Chemical distributor	11,558,239	95%	7
8.	Wi-LAN Inc.	5,616	Intellectual-property licensing	105,809,000	95%	59
9.	Terrapro Inc.	5,417	Rents heavy-duty mats to support industrial equipment on-site	11,033,899	0%	14
10.	Life Science Nutritionals Inc.	4,519	Manufactures nutritional and dietary supplements	11,208,768	30%	40

Figure 5
Canada's 10 Fastest Growing Companies
Profit Magazine, 2012

While quickly adopted across most jurisdictions, the rise of cluster theory has not been without its critics. Martin and Sunley (2003) note that the adoption of cluster theory by policy makers has advanced with little strong empirical basis, warning that “the cluster concept should carry a public policy health warning.” Their critique is largely methodological, highlighting the too-general definition of clustering, a large series of assumptions that underlie these definitions, and a selective use of positive findings to further the clustering case. Their review of several studies highlights that, “far from being the general rule and the key missing link in local competitive advantage, the benefits realised from geographical clustering appear to

specific to certain industries at certain stages of development in certain places, and are only realised under particular conditions”.

New empirical research further contests their effectiveness. In 2011 researchers at the Centre for Economic Policy Research (CEPR) released a study aptly entitled “When local innovation does not suffice.” The report analyses 1,604 firms with more than 10 employees, across the five largest Norwegian clusters, and finds that within-region interaction held negligible effects on innovation, and were largely irrelevant to firm growth and success. In fact, the study found that companies defined as regionally or cluster-focused, rather than internationally focused, were four times less

likely to innovate. The authors of the study note that “the roots of greater innovative capacity lie in a combination of firm – size of firms, share of foreign ownership, and sector – and cultural – the level of open-mindedness of managers – characteristics.” These findings add credence to earlier work by Trippi et al. (2009: 458) who found that in the case of the Vienna software cluster, “the more radical the innovation, the larger the variety of sources of knowledge and the stronger the diversity of mechanisms for transferring knowledge”. These authors conclude that while local interaction may trigger more incremental innovation, radical transformational innovation is more likely to come from dispersed pipelines of knowledge and skills.

However it's not just a discerning look at the available research that forces a rethink of the use of clustering as a general rule of economic development. Rather, while the concept provides for potential gains in areas well served by the presence of strong human resources and industrial capacities, it is of limited prescriptive value to geographies that fall beyond the scope of dense, urban or semi-urban locales. Here, the decline of manufacturing employment across North America has been replaced by little, leaving a significant employment gap. The fallacy of composition is thus ever-present as industrial clusters will undoubtedly not flourish everywhere. While many jurisdictions will attempt to facilitate clustering, many will fail and many of the cities at their core will be unable to define themselves as gravitational nodes for growth and entrepreneurialism. Finding the right mix of competitive, cultural and organizational inputs is dependent on opaque, geographically-dependent chemistry.

Modern computing technologies, however, allow this dependence to be broken. The primacy of geography that is central to cluster theory is in fact reversed in a technological age that provides, for certain sectors, a divorce of place from production or service provision. Dispersed expertise is thus growth-enabled, allowing for a redirection of rural or semi-rural capacity towards non-local activity. For example, local accountants and designers recently laid off from agricultural

processing plants in South West Ontario might find new roles as contract expertise for emerging agricultural processors in Brazil and Asia. The question for policy makers is thus how to best facilitate this new class of international worker, and at the same time, how to deal with the competition for local employment that will come from similar workers from abroad.

As DEEP Co-founder Anthony Williams writes in an accompanying DEEP publication,

“At the forefront of this seismic shift in the way jobs are created and economic value added is a new type of company, the micro-multinational. Traditionally, these small, self-starting, service-driven companies would have been described as small- and medium sized enterprises, or SMEs, but thanks to the Internet, the emergence of new business platforms and the increased openness of the global economy, these companies can enter markets with a minimum of bureaucracy and overhead. Micro-multinationals pose a formidable intellectual and policy challenge for domestic innovation systems. Not only do they undermine the validity of domestic showcase innovation initiatives, such as clusters, but they also hold the potential to be politically sensitive. Micromultinationals, by definition, don't know national boundaries.”

Yet insofar as these firm types may disrupt orthodox thinking about innovation, they offer intriguing potential as to the reinvention of both urban and non-urban workforces, no matter the local industrial environment. Doing so, however, will require a prioritization of computing and educational infrastructure, metrics by which Canada currently falls short. As noted earlier, the 2012 Global Innovation Index saw Canada fall further behind in several rankings, notably a 49th place ranking in per capita spending on education, 46th place in the percentage of science and engineering students, and 20th place in access to ICTs. Facilitating the ongoing development of a broadly-based, knowledge economy, one that locates itself beyond dense clusters of urban and semi-urban activity, will require a significant investment by policy makers on all levels.

Conclusion

For Canada to succeed in an increasingly competitive global economy, policymakers must grapple with a series of interrelated challenges:

1. Obtaining a more nuanced understanding of where jobs actually come from in today's economy.

While policymakers lavish attention on start-ups, the data reveals that the most significant job creators are established companies who mature into high-growth firms. To maximize the effectiveness of our economic development efforts, we must do a better job targeting firms with the greatest growth potential, and whose export and research-orientation capture the best growth prospects. Moreover, while identifying firms with growth potential is a necessary start, it must be accompanied by a deeper understanding of the policy levers that are most likely to help catalyze that potential growth.

2. Promoting broad-based innovation across sectors should be at the heart of economic development.

Innovation is not limited to information technology or life sciences firms. A survey of Canadian growth highlights that a large share of high-impact employment creators come from traditional, "boring" manufacturing and services sectors. Policy makers must focus on enabling innovation and creative destruction across all sectors of the economy, in large part by facilitating the adoption of new technologies and processes in these sectors.

3. Determining the extent to which public policy should promote geographical specialization and the clustering of industrial activity.

While there are undeniable efficiencies from location-based specialization, there are also distinct limits to their applicability given the broad expanse of rural and tier-2 cities that comprise most jurisdictions. Promoting broadly-based economic development thus requires an ability to create employment and growth beyond the gravitational nodes of Alpha cities. Advances in computing technologies offer a new type of firm, the micromultinational, that portends employment divorced from place. Exploiting this potential growth sector, however, requires a sustained investment in ICT infrastructure and a commitment to building Canada's innovation capacity through both human and physical resource growth.

Endnotes

- 1 According to Statistics Canada/CIBC research, no less than half the revenues derived from businesses aged 2-5 years are coming from outside Canada.
- 2 To be sure, such churn isn't necessarily negative. As NESTA notes, a high rate of entries and exits in the enterprise environment highlights a form of economic dynamism that should reflect a transfer of resources from low- to high-productivity firms. In fact, Nesta concludes that the EU's low rate of churn, in both expansionary and contractionary terms, is part and parcel of the region's innovation and job creation challenge.
- 3 Of the more than 32 million self-employed people in Europe, for example, some 23 million were freelancers. Eurostat, Self-Employment by Sex, Age Groups and Highest Level of Education Attained (Luxembourg: Eurostat, 2011).
- 4 These exceptional hiring statistics may be partially inflated by the technology bubble in the United States – a period during which an enormous amount of investment capital poured into start-ups that were ultimately unsustainable. Historically, new firms in the United States have generated about 3 million new jobs every year on average. E.J. Reedy and Robert Litan, "Starting Smaller; Staying Smaller: America's Slow Leak in Job Creation." Kauffman Foundation, July 2011.

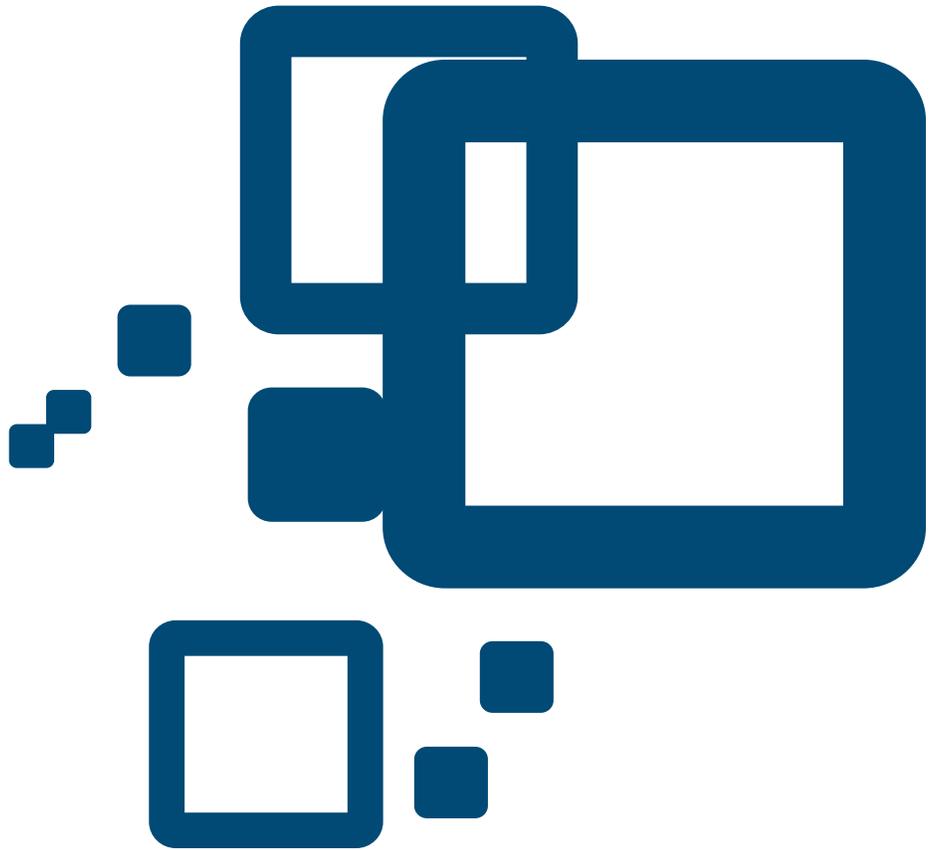
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The Centre for Digital Entrepreneurship and Economic Performance (DEEP Centre) is a Canadian economic policy think-tank based in Toronto and Waterloo, Ontario. Founded in 2012 as a non-profit and non-partisan research institute, the DEEP Centre's work shapes how jurisdictions build fertile environments for launching, nurturing and scaling companies that will thrive in an increasingly connected world. We understand the changing drivers of success in the global economy and the critical interconnections between technology, entrepreneurship and long-run economic performance. Our goal is to help policymakers identify and implement powerful new policy levers to foster innovation, growth and employment in their jurisdictions.

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