



Atlantic Canadian Startup Community

2017

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EXECUTIVE SUMMARY

Has there ever been an Atlantic Canadian economic program more successful than the startup movement?

It's a serious question. If we look back over the history of economic development programs – involving offshore petroleum, Muskrat Falls, business attraction, shipbuilding, coal in Cape Breton, and sundry megaprojects that ended up as miniprojects – has anything been more successful than building the startup ecosystem. Offshore petroleum has delivered economic gains, but the industry is subject to fluctuations in oil prices and we're obviously in the sunset of the hydrocarbon era. I'd say that the startup experiment that came together slowly this decade is the most successful program (more accurately, an amalgam of programs) that Atlantic Canada has ever seen.

The data we've collected in this report shows the economic power of nurturing companies that are commercializing innovation for international markets. Their performance last year, we'd argue, justifies the investment that has gone into developing the ecosystem for startups in the past decade.

The four main metrics – company formation, employment, financing and revenue – all had banner years in 2017.

Company Formation – We found that 114 companies launched in 2017, the highest number in the five years we've been collecting this data. It pushed the number of startups and high-growth companies we're covering to 486, again the largest group of companies we've seen yet. The ecosystem is now developed to the point where it can generate and sustain new companies, thanks to strong programming at University of New Brunswick, Dalhousie University and Memorial University, Venn Innovation and Momentum Cape Breton, to name just a few.

Employment – We estimate there are now 6,400 Atlantic Canadians working for the region's startups and high-growth companies (including companies that have exited.) We believe the overall number is rising at about 7 percent annually. We will always have startups that fail, stagnate or move away, but the companies that endure here grew their workforces by 26 percent last year. Anecdotal evidence suggests startups are extremely effective at retaining young people and attracting immigrants to the region.

Financing – By our count, East Coast startups raised \$116.1 million in 2017, and we believe there were a few deals that weren't reported to us. It was the most equity investment in one year that we've seen yet. The financing was dominated by institutions outside the region, which are backing elite companies. Our report includes an in-depth examination of eight regional funding bodies, and highlights the strong performance by Killick Capital, Innovacorp, Build Ventures and Pelorus Venture Capital.

Revenue – We received detailed revenue data from 124 companies, and together their sales increased by 73 percent. There are two reasons for the strong increase: about 17 percent of the companies reported revenue for the first time; and one-fifth of respondents reported 100 percent revenue growth or better. But, although more companies are bringing in more money than two years ago, the proportion of revenues from export markets has dwindled.

After examining these metrics we've highlighted three groups of companies in the community. First, we selected 35 “elite” companies, which have made significant achievements in creating employment, raising money, and/or generating sales. We have named 51 “scaling” companies, which comprise an echelon just below the elites. These companies are growing and attracting attention and capital and many could be considered “elite” within a few years. These 86 companies really make up the core of the community. Finally, we've looked at 24 companies that launched in 2016 or 2017 – these are the ones that represent the hopes for a new generation of high-growth companies.

This report highlights the particular high points and low points of the Atlantic Canadian startup community. It shows that Halifax is now the cornerstone of the community, accounting for 36 percent of the companies and 63 percent of the capital raised. The jurisdiction that is improving most quickly is St. John's, where companies reported 33 percent

growth in employment and a 178 percent increase in revenues. Other highlights: The number of startups headed by women has tripled in three years, and more companies in Sydney are reporting revenues, which rose 70 percent from 2016. For the first time, there are enough OceanTech companies (35) to report on them as a sector in their own right. Areas of concern include the apparent underperformance of Saint John, and the shortage of tech talent in several communities.

We believe this report demonstrates how the startup community is maturing. “Startup” is, and always has been, a flawed description of the companies covered by this report. They are locally owned, high-growth innovation companies, which is quite a mouthful. Whatever we call them, this report shows that a broad range of them are growing strongly.

ABOUT



ENTREVESTOR

Entrevestor was founded in 2011 by writers Peter and Carol Moreira as a portal to unite and inform the startup community in Atlantic Canada. It posts daily news on Atlantic Canadian startups on its website, www.entrevestor.com, and its articles appear thrice weekly in the *Chronicle-Herald*.

SECTION 1 - OVERVIEW

1.1 Macro-Economic Background

There are a few glimmers of hope in the Atlantic Canadian economic situation, though the four eastern provinces are still growing more slowly than the country overall. The region is moving forward with large projects in ocean technology and smart grids and is beginning to attract more immigrants. But most of the region remains stuck in the slow growth that has plagued it for decades.

Canada's GDP grew 3.2 percent in 2017, according to Statistics Canada. Canada's economic outlook was buoyed by several positive factors, such as continuing low inflation and interest rates, recovering oil prices and an historic low in unemployment. Canada's unemployment rate in December was 5.7 percent – a level rarely seen since the early 1970s. Of course, unemployment on the East Coast is higher than other parts of Canada – it was 14.4 percent in Newfoundland and Labrador in December and ranged between 7.8 and 8.1 percent in the Maritimes. The only Atlantic Province to come near the national growth rate was Prince Edward Island, which had the strongest growth in the region for the second year in a row.

The aspect of economic development that has been most successful over the past couple of years is the region's ability to attract immigrants. This policy has had patchy success for several decades and is finally gaining traction. Chart 1.2 shows the progress made in less than 10 years:

Chart 1.1

GDP Growth		
Jurisdiction	2016	2017
Canada	3.3%	1.4%
Prince Edward Island	3.2%	2.2%
Newfoundland and Labrador	2.1%	1.7%
New Brunswick	1.9%	1.2%
Nova Scotia	1.2%	1.0%

Source: Statistics Canada, found at <http://www.statcan.gc.ca/daily-quotidien/180502/t001a-eng.htm>

Chart 1.2

Permanent Residents Admitted			
Province	2007	2016	%
Newfoundland and Labrador	511	1118	119%
Prince Edward Island	565	2313	309%
Nova Scotia	2585	5483	112%
New Brunswick	1646	4675	184%

Source: Citizenship and Immigration Canada, reports to Parliament, 2007 and 2016.

Every Atlantic Canadian province more than doubled immigration over nine years, and P.E.I. quadrupled its total.

One feature of the Canadian economic story since the election of the Trudeau government is the emphasis it places on innovation and new industries. The government came to power hoping to accelerate the country's conversion to new forms of energy. That goes hand-in-hand with finding new industries to drive the Canadian economy, rather than relying so strongly on oil and gas.

Atlantic Canada has done well in the innovation bonanza, as this report will show. In 2017, the big announcement was that Atlantic Canada's Ocean Supercluster proposal was one of five regional proposals accepted into the federal government's Supercluster program. That means it will claim a share of \$950 million in federal funding over the next five years, supplemented by other funding from the private sector and academia. The other East Coast applicant in the program was the Smart Grid proposal centered in New Brunswick. This initiative is proceeding, with its proponents seeking other sources of funding than the Supercluster program.

1.2 2016 Recap

We researched our 2016 report in collaboration with the Atlantic Canadian team going through the MIT Regional Entrepreneurship Acceleration Program or REAP program. Together, we surveyed community members, bringing in 190 responses. This survey did not produce detailed job and revenue data, though it did produce qualitative data on assessments of the ecosystem. Overall, community

members showed little worry over the ecosystem, though some voiced concerns about access to capital and physical space. One important development we noticed in 2016 was a greater internationalization of the community. Our startups began to participate more frequently in national and international events, often winning or placing. Several have established foreign offices.

As in previous years, we witnessed a story of growth in 2016. We tracked 414 companies – up 58 percent over three years. Company formation remained strong, especially in Fredericton and Moncton. Meanwhile, there were fewer failures in 2016 than the year before.

We found that 2016 was an excellent year for funding, with \$71.8 million being invested in East Coast startups. The year was marked by funding rounds of more than \$8 million each by Resson, Kinduct and TruLeaf. These multi-million-dollar deals were notable because they were led by investors outside the region. Atlantic Canada has become a hotbed of pre-seed funding, accounting for 11 percent of the VC deals in Canada in 2016 even though it has about 6 percent of the country's population.

The Reap survey suggested 46 percent of the startups in the region had revenues of more than \$100,000. That's meaningful data because it means about 190 companies were drawing in significant sales. That will help them find funding and finance sales teams which can help increase their sales.

One feature of our 2016 report was a special section called The Exit Economy. We tracked 27 innovation-based companies that were sold since 2011. What we found was that these sales raised a total capital of \$1.8 billion, much of which remained in Atlantic Canada. Most of these operations continued to grow after the sale, and we estimate there are now 2,200 Atlantic Canadians working for companies that bought regional startups. These deals have helped to shape economic development, improved mentorship and philanthropy, and developed serial entrepreneurs.

In the 2016 report, we revised upward our previous estimate on the number of jobs created by the startup movement. In 2015, we estimated there were about 4,000 Atlantic Canadians working for startups (including exited companies). However, our examination of exited companies showed that we grossly underestimated the number of people working in such operations. We now believe that as of year-end 2016, more than 5,000 people

worked for startups and exited companies in the region.

The ecosystem continued to add accelerators and incubators, with more expected to open in the next year or two. In Halifax, the largest startup base in Atlantic Canada, the ecosystem is evolving with the formation of an Innovation Zone. The University of New Brunswick has become the dominant force in developing new startups in Fredericton. It now oversees the city's newest accelerator, Energia, and its alumni dominated the 2016-17 Breakthru competition.

No part of the ecosystem has evolved more in the past two years than Charlottetown. It has always shown strength in life sciences and it continues to gain critical mass in that sector. But it has also diversified with the opening of the Startup Zone and many of its IT startups are competing and succeeding on a national level.

SECTION 2 - THE ATLANTIC CANADIAN STARTUP COMMUNITY

2.1 Introduction

The Atlantic Canadian community continues to evolve, comprising 486 companies at year-end 2017. The most important feature of the community is that the leading companies are accelerating growth, hiring more people and logging increasing revenues. In the middle tiers, some companies are positioning themselves to join the elite companies and are increasing sales. Other companies, as would be expected in the startup world, are struggling. We counted more new companies and failures than ever before in 2017, suggesting there is a healthy life cycle in the community. New entrepreneurs are finding more and more support for their first attempts at entrepreneurship. And founders who have been clinging to struggling ventures are now letting go.

The 486 companies in the Entrevestor Databank include innovative companies that have existed for years, new IT companies that have found a market, experimental ventures from university entrepreneurship courses and problematic young companies that are clinging to life. The nature of the startup world dictates that the community will always contain dozens of experiments that may or may not become companies. Many will fall by the wayside and they

Chart 2.1



Source: Entrevestor Databank 2013-2017

will be instantly replaced by new experiments.

With a universe of 486 companies, the Atlantic Canadian startup community has grown by 85 percent (in number of companies) since we first published our startup data analysis four years ago. The quality of the companies has improved at all levels – at the top, the best companies are selling more and growing faster; at the bottom, there are more young startups that have better prospects.

The size of the databank grew by 17 percent during 2017, one of the stronger years we've seen. In each year that we've been producing this report, the growth in the databank has ranged between 11 and 26 percent – strong and steady growth that is on pace to double the number of companies every five years or so.

For the first time this year, we have divided the databank into five categories: Elite, Scaling, Established, Rookies, Zombies and Other. By breaking the community down into these sub-groups, it's possible to see how the companies have evolved in the past few years.

Placing companies in these categories requires some subjective judgments, and we readily admit that this is not an ironclad assessment of our community. But it does help us to understand how the startup group has taken shape in the past few years and where we are now. There is some overlap in these categories – for example, some “rookie” companies are gaining customers with alacrity and are also in the “scaling” group.

In the following pages, we will look at most of these groups in detail, omitting established companies and those in the “Other” category. The established companies are for the most part in good shape and grow steadily year-in,

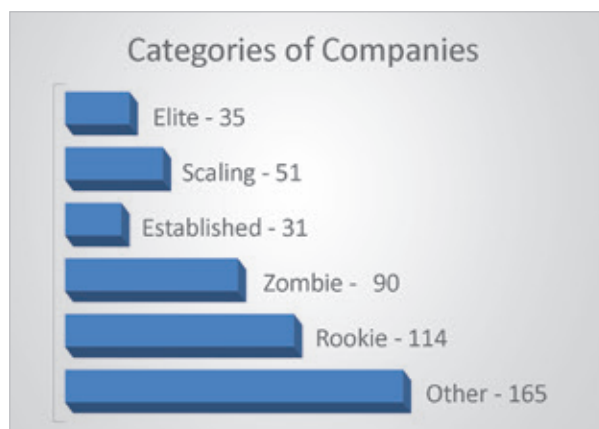
year-out. The other companies are mostly companies still working at finding their product-market fit.

2.2 Elite Companies

There is not yet an Atlantic Canadian narwhal – a clever name for a Canadian unicorn, or high-growth company with a valuation of more than \$1 billion. We're still waiting for an Atlantic Canadian tech company to hit a billion-dollar valuation. (Media company DHX Media had a \$1 billion-plus market capitalization for a while, but we could debate whether it's an innovation company.) Yet there has been one Halifax company named to the 2018 Narwhal List, which is assembled by the University of Toronto's Impact Centre. Rather than list companies valued at \$1 billion or more, this Narwhal List assesses what it calls the “financial velocity” of high-growth companies. It divides the amount a company has raised by the number of years it has been in existence, indicating the firm's momentum in building up its capital structure.

Halifax-based Manifold, a two-year-old company that helps software developers access services, placed No. 28 on the list of 49 companies. It makes the list because of its US\$15 million (C\$18.5 million) funding round led by OMERS Ventures last September. Founded in 2016, Manifold is one of the youngest companies on the list – a group more notable for the speed with which they've raised money than the amounts raised. The Halifax company joins five others on the list that were founded in 2016 or later. Of that group, only one has raised more money than Manifold – Toronto-based Platterz, which was founded in 2016 and has raised US\$20 million.

Chart 2.2



Dataset: 486 companies in the Entrevestor Databank

Chart 2.3

The Elite Companies		
ABK Biomedical	HeyOrca!	ScreenScape Networks
Affinio	Introhive	Sequence Bioinformatics
Appili Therapeutics	Kinduct	SimplyCast
Avalon Holographics	LifeRaft	Skyhawks Telematics
B4Checkin	Manifold	Solace Power
BlueLight Analytics	Masitek Instruments	Spring Loaded Technology
CarbonCure	Metamaterials	Swept
Celtx	Proposify	TruLeaf
Dash Hudson	QRA Corp.	Ubique Networks
Eigen Innovations	Radiant360	Vidcruiter
Halifax Biomedical	Resson	Vineview
Health Outcomes Worldwide	RtTech	

Dataset: Selected from 486 companies in the Entrevestor Databank

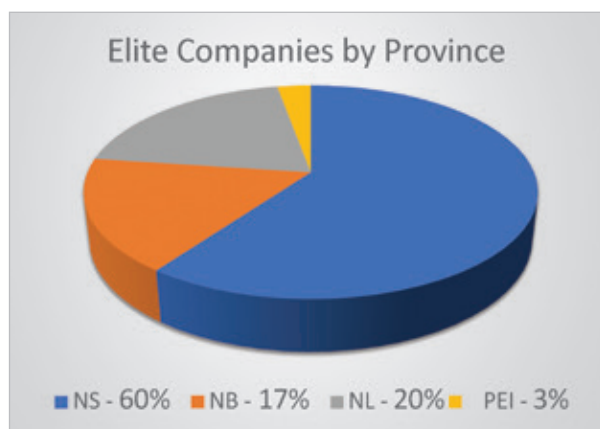
Manifold is just one of 35 companies we assessed as being elite at the end of 2017. We determined which companies could be called “elite” by assessing size and growth of both staff and revenues, and how much capital the companies have raised in their history. We also gave each company a score for its overall reputation, which helped some of the pre-revenue life sciences companies take their rightful place among the elite.

We have strong data on these companies with 25 completing our survey, and 13 providing full revenue data. But we did make suppositions on a few companies and showed some leeway with younger companies. Collectively, they employ more than 1,000 people and their staffing increased 53 percent over 2017.

Our knowledge of their revenues is incomplete, but at least 16 of them have at least doubled revenue in the last year or reported revenue for the first time. There are a few whose revenue story is known publicly: Resson’s 2017 revenue rose 21 percent to \$1.7 million. Proposify’s annual recurring revenue rose 121 percent in 2017 to \$3.9 million. Public pitches by Swept and Affinio at accelerators in the U.S. in recent years have indicated their revenues are doubling or more each year.

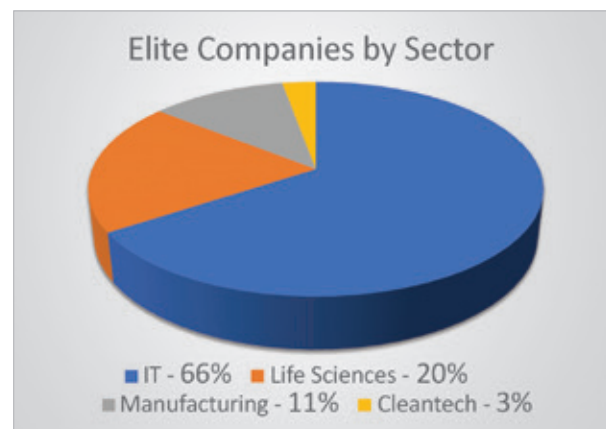
It’s easier to track fundraising than revenue, and these companies’ investment rounds show their burgeoning economic clout. We estimate that as of May 2018, these 35 companies have raised \$240 million in equity capital since they were founded. The clear majority of this money

Chart 2.4



Source: 35 Elite companies in the Entrevestor Databank

Chart 2.5

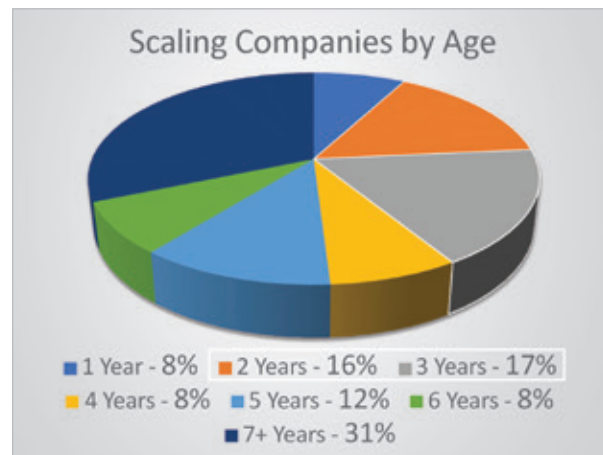


Dataset: 35 Elite companies in the Entrevestor Databank

is from private sources outside Atlantic Canada. The sources are placing money into Atlantic Canadian-owned companies that tend to double sales every year or two. The investment levels, especially from outside sources, are accelerating. The elite companies raised more than C\$80 million in 2017, and in the first four months of 2018 we estimated they raised about \$50 million.

There are three elite companies that are two years old, and

Chart 2.6



Dataset: 51 scaling companies in the Entrevestor Databank.

Chart 2.7

The Scaling Companies		
3d Bolus	Eosense	Orenda Software Solutions
4Deep Inwater	Eyesover	Peer Ledger
AirVM	Fiddlehead Technology	Porpoise
Alentic Microscience	Finleaf Technologies	Red Meat Games
Alongside	Forestry.io	ReviQ
Athletigen Health Solutions	Gemba Software Solutions	Securicy Data Solutions
Beauceron Security	GoBumpFree	Simptek
Brave New World	Guild Solutions	Smart Skin Technologies
Clockwork Fox Studios	Harbr	Solid State Pharma
Dadavan	Inversa Systems	SomaDetect
Densitas	Island Water Technologies	Somru Bioscience
DGI Clinical	Jaza Energy	Soricimed Biopharma
Discovery Garden	Kognitiv Spark	Squiggle Park
Dockside Pet Treats	Leadsift	Stepscan
Elandas	Marcato Digital	The Rounds
Empowered Homes	MoneyFinder	WellTrack
Envenio	Nocland Solutions	Whitecap Scientific

Dataset: Selected from 486 companies in the Entrevestor Databank

then the ages are spread evenly among three to seven years. There is geographic and sectoral concentration with most being in Nova Scotia and the IT sector.

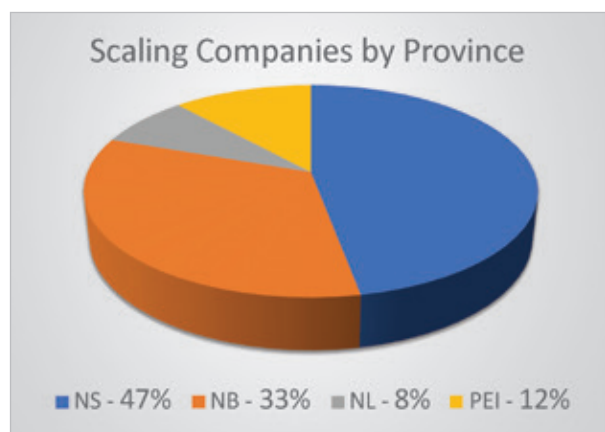
One final note about these companies is that half of them would have been considered “scaling” rather than “elite” companies had we conducted the same exercise a year earlier. These companies have made such strides in one year that the ranks of elite companies have ballooned. However, high-revenue companies made up a smaller proportion of the overall databank in 2017 than in 2016, because of the proliferation of pre-revenue companies launched in 2017. In 2017, companies with revenues of \$1 million or more comprised about 13 percent of the total community. In 2016, the figure was 16 percent.

2.3 Scaling Companies

Several of the “scaling” companies were close to being in the elite category, and likely will be there in a year or two. We’ve calculated there are 51 scaling companies in the region, again based on employment, revenue and funding.

The scaling companies – half of which provided revenue data for us – are increasing their revenue collectively at a rate of 70 percent a year. (That number rises to 89

Chart 2.8



Dataset: 51 scaling companies in the Entrevestor Databank.

percent if we delete one company, whose substantial revenue declined slightly last year as it repositioned its business.) The 25 companies that provided revenue data collectively booked \$14 million in revenue last year.

The 51 companies in this category had a total staff of 628.5 FTE (up 54 percent year-on-year). They have raised a total of at least \$59.3 million in their lifetimes, of which \$31 million was raised last year. Eighteen of these companies told us they are now working on raising a total of \$30 million. These companies are not quite in the “elite” bracket but they are an economic force and headed in the right direction.

As might be expected, the vast majority of these companies are in the IT sector – 71 percent in total. Beyond this, there are two things to consider about this group. First, about one-third of them were founded in 2015 and 2016. What this means is that we have a bulge coming through the eco-system of two- to three-year-old companies that have found a market, are attacking it and growing aggressively. About half of these seventeen companies provided us with revenue, and as a group they quadrupled their revenue year-on-year, with five of them reporting revenues for the first time.

The other thing to consider about the group is the strong representation from New Brunswick. As we will see in Section 5.2, 2017 was a quiet year in New Brunswick. But the province is well represented among the young, scaling companies in the region. Companies like Pfera, SomaDetect, EyesOver and Kognitive Spark (all of which have launched in the last two years) are gaining clients and admirers west and south of Atlantic Canada and appear poised to move into the elite category.

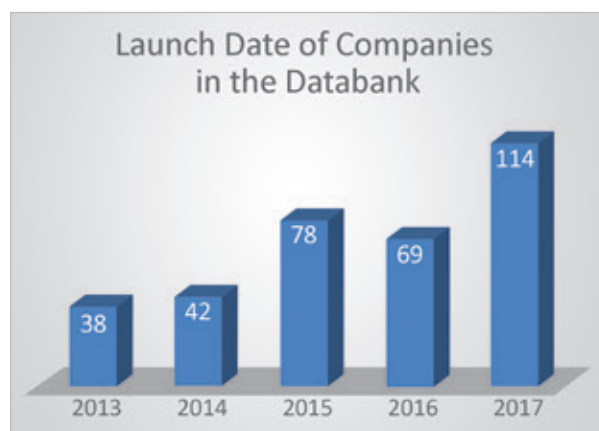
2.4 Rookies and Sophomores

By our count, 114 companies launched in 2017, meaning that almost one-quarter of the companies in the databank are rookies. It was the strongest year we have seen yet for company formation, outpacing 2015 when there were 104 new companies. What the strong company formation in 2015 and 2017 means is that more than half of the companies in the Entrevestor Databank are less than three years old.

There are various forces driving the increase in new companies. The most important is the cultural shift to a more entrepreneurial society, a trend that is sweeping every part of the world. As part of this trend, universities are ramping up their entrepreneurship programs. At least one-quarter of the new companies in 2017 were started in universities. As we’ll see in Section 6.1, the largest institutions in each province all have champions of entrepreneurship, and the result is the generation of more companies.

There are several programs throughout the region outside of universities that take new entrepreneurs through the early stages of launching a business. The largest is Innovacorp’s Spark competition, which awarded \$800,000 to 18 companies in 2017. (The impact of this sort of program will be magnified in 2018 as Nova Scotia will hold its province-wide Spark competition at the same time that the New Brunswick Innovation Foundation holds its Breakthru competition. It will be the first time the two province-wide competitions have been held in the same year.)

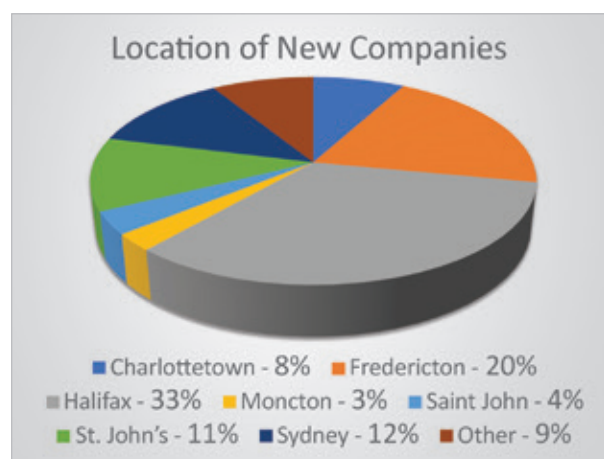
Chart 2.9



Dataset: 486 companies in the Entrevestor Databank. (Note: This chart does not show the number of companies launched each year, but the number of companies from each year that are still in the databank. It omits the 145 companies launched before 2013.)



Chart 2.10



Hand in hand with these provincial events, there are more local organizations and initiatives that work to uncover and encourage new companies. For the past two years, there have been startup houses in seven different cities, all of them working with local founders to spin out new enterprises. (See Section 6.3.)

Some of these new companies are showing surprisingly strong metrics. We estimate they have created a total of 113 jobs on an FTE basis. Some 42 companies founded in 2017 (one-third of the total) completed the survey, and these companies reported a combined payroll of \$1.2 million. The respondents intend to hire 155 new employees this year. The 33 companies that reported revenue reported that they booked sales of \$1.1 million, with about half of it coming from one company. Two-thirds of these companies were pre-revenue.

Some of these companies are able to access external funding, though many of the founders are risking their own capital in these ventures. Some 24 founders of new companies said they invested their own money in their companies. Most were nominal amounts of \$10,000 to \$20,000, though one founder reported the team invested \$250,000. The total investment by founders was \$1.2 million. Tapping other sources of funding, the companies launched in 2017 raised a total of \$1.7 million in equity funding, including \$690,000 in venture capital.

Most of the new companies in the Databank are located in Halifax and Fredericton, while Sydney and St. John's are both demonstrating a zeal for creating new businesses. We've found only three new companies in Moncton and four in Saint John. In Moncton's case, it's likely we missed some, or there are rookie companies still flying under the

radar. In the case of Saint John, the city has been the quietest location for new startups in the past few years, and four is actually an improvement on its recent performance.

The Rookie All-Stars

It can be trendy in startup circles to complain that the quality of new startups is somewhat lacking. We have quantity not quality, goes the common refrain. It stands to reason that if Atlantic Canada launched 184 companies in 2016 and 2017, it's going to be hard to find strong companies. Actually, it's not hard at all. We set out to find 10 exemplars founded in the past two years – figuring that it may be too hard to find good ones in just one year. It turns out we found 10 Rookie All-Stars – all companies founded in 2017. We also came up with 14 Sophomore Sensations – those founded in 2016. This report is focusing largely on the older, scaling companies so it will be beneficial to look at some of the promising young companies. Some completed our survey and others didn't. All have been covered in *Entrevestor* already but seeing them together is a healthy reminder that there's a new generation of great companies coming along.

There are three facts about these companies that are worth noting: First, one-third of them are based in New Brunswick. Last year was a quiet year for startups in New Brunswick but there is a crop of exciting companies that are rapidly entering their growth phase. Second, six of the companies, or one-quarter of the total, have female CEOs (and a seventh has a policy guaranteeing half its employees are women.) And third, four of the 10 companies founded in 2017 booked revenues of \$200,000 or more in their first year.



AVSS

Rothesay, NB

Josh Ogden and Josh Boudreau

AVSS is developing hardware and software to improve the safety of autonomous aircraft, or drones. The company's main product so far is the Connected Recovery System, which is like a black box for drones connected to a parachute, which can deploy if the system senses trouble. AVSS is already working with a major Canadian drone operator, which has a fleet of several hundred drones across the country.

Beauceron Security
Fredericton
David Shipley, Benjamin Steeves and
Sean McDougall

Beauceron helps organizations protect themselves against cyberattacks. It's an online product that helps organizations assess whether they have the right systems and culture to protect themselves. Leading New Brunswick tech companies such as Mariner and Bulletproof Solutions have become resellers of its product. It also raised \$500,000 in equity investment in June, 2017.

CoLab Software
St. John's
Jeremy Andrews and Adam Keating

CoLab is developing collaboration software for people working with 3D designs. Its product Gradient allows mechanical engineers, interior designers or others to work in different cities on 3D designs in real-time, rather than sending one another PDFs of two-dimensional images. As of November, it had lined up \$250,000 in non-dilutive financing and was raising \$125,000 in investment.

Easy Golf Tour
Sydney
Todd Chant

Sydney-based Easy Golf Tour has developed software that helps golf courses administer the tournaments they hold several times each season. The strength of the sales strategy is its partnership with the National Golf Course Owners Association of Canada, which has 1,300 members across the country. In May 2018, Chant said he expected to enroll 40 to 60 clubs in the coming few months.

Guild Solutions
Bedford
Colin Gourlay

Guild has developed administrative software for the association management industry and has already found clients in the space. In fact, it booked \$500,000 of revenue in Year 1. Specifically, it targets professional colleges, which are the organizations that oversee the credentials and membership of licensed professions, such as the College of Physicians and Surgeons of Nova Scotia.

Bereda Training
Halifax
Dennis Cottreau and Blake Pucsek

Bereda Training has developed an online training platform that automates the training plans that coaches prepare for endurance athletes (runners, cyclists, triathletes, etc.). What Bereda does is greatly reduce the time it takes for coaches or self-coached athletes to customize training schedules over the course of a year. After building their initial product, they marketed it through Facebook ads and instantly got traction. The company raised \$250,000 in early 2018.

Enkidu
New Brunswick and Toronto
Mike White

The company has developed a Software-as-a-Service platform that helps organizations and their staff or members develop an inclusive culture. That can mean changing personal behaviour to ensure all team members feel comfortable and poised to succeed. It can also mean adjusting a company's hiring process to welcome people who will work well with a diverse workforce and show the flexibility needed to change culture. Enkidu landed 12 enterprise clients in the first year after its launch.

Graphite Innovation and Technologies
Halifax
Mo Algermozi and Marciel Gaier

The Halifax company known as GIT has developed a marine coating out of graphene, a carbon-based material that is 200 times stronger than steel and efficiently conducts heat and electricity. The team had been planning to use the coating on the hulls of boats and ships but realized it could have other applications. They have won numerous awards and generated early revenue by producing and selling graphene.

Brave New World
Halifax
Mike Rizkalla

Brave New World, a web development company, added a robotics division to its business and is developing a mixed-technology game called Chancellor of the Universe. It features a robot (called the Chancellor) that uses machine learning to understand the people playing the game. Players can not only interact directly with the Chancellor but can use an augmented reality feature on their phones to enhance the experience. The Chancellor was featured on the Discovery Channel's Daily Planet segment.

Finleaf Technologies
Liverpool, NS
Mryna Gillis

Finleaf Technologies is finding solutions to problems common to aquaponic cultivation, a method in aquaculture that harnesses the symbiotic relationship between fish and hydroponically grown plants.

Cultivating cannabis using aquaponics can be tricky since plants that flower or produce fruit need higher amounts of potassium or phosphorus. Finleaf is developing proprietary nutrient recipes that will give plants the right amount of extra nutrients, without harming the fish. Finleaf is a subsidiary of Aqualitas, a cannabis production company that closed a round of funding totaling \$8.8 million.

The Sophomore Sensations

Founded in 2016, the companies are already making great strides, gaining clients, winning awards, and/or attracting investments:



Adaptiiv, Halifax – Adaptiiv (formerly 3DBolus) has developed software that works with 3D printers to produce a personalized bolus — a plastic fitting used in radiation therapy.

BlockCrushr Labs, Halifax – This Techstars company produces various projects based on blockchain and is gaining traction with TokenClub, a subscription service for initial coin offerings, or ICOs.

Chinova Bioworks, Fredericton – A participant in four accelerators in three countries, Chinova is developing natural food preservatives using chitosan.

Forestry.io, Charlottetown – Forestry.io, which was the first Canadian company to raise capital through an AngelList syndicate, has developed a platform for posting content on static websites.

Harbr, Halifax – Harbr is developing mobile technology that uses artificial intelligence to help construction companies perfect such tasks as scheduling.

Island Aquatech, Charlottetown – The company, founded by three engineering students from UPEI, invented a cage flipper for the oyster farming industry.

Kognitiv Spark, Fredericton – Kognitiv Spark, which booked \$1 million in sales in its first year, offers an augmented reality solution to help train or instruct remote workers using complex equipment.

Pfera, Fredericton – The winner of the 2017 Breakthru competition helps horse owners determine when a pregnant mare will give birth.

Peer Ledger, Halifax – Peer Ledger creates blockchain applications that improve the human condition in such industries as pharmaceuticals and precious metals.

Quber, Moncton – The company, which attended the FinLab Accelerator in Singapore, has developed an app that helps people visualize the money they're saving.

SayleGroup, Halifax – Founded by brothers Bryan and Stephen Sayle, the company offers several products that work together to digitize and improve workplace safety.

Securicy Data Solutions, Sydney – Led by serial entrepreneur Darren Gallop, Securicy helps enterprises make sure they are compliant with their clients' and partners' cybersecurity standards.

SomaDetect, Fredericton – SomaDetect, which won US\$1 million at 43North in Buffalo, sells software and hardware that analyze cow's milk to monitor health and increase milk quality.

WEnTech, Fredericton – WEnTech has developed a Software-as-a-Service solution that helps consulting engineers assess the needs of a waste-to-energy project and pick the right system.

Many – if not most – of these companies are reaching the angle of their hockeystick and will be scaling soon. As exciting as that is, it highlights one of the talent shortfalls in the region – the dearth of seasoned management experience in fast-growing companies. By our count, 14 of these 24 companies are headed by people a couple of years out of university and/or first-time entrepreneurs. Launching and scaling companies require different skillsets and it's likely some of these companies will be held back by the inexperience of senior management. It highlights a new message in mentorship that we're beginning to hear more in Atlantic Canada: founders need to surrender some equity and bring in senior managers. Some companies have done this already: Sona Nanotech of Halifax did so, and as of writing this report it is on the cusp of a stock market listing. More noticeably, the Co-

Founders of Fredericton-based Resson allowed investor Jeff Grammer to take on the company's top leadership role as Executive Chairman. As a result, the company has raised more than \$30 million in equity investment – the most by any Atlantic Canadian company other than those that have done private equity deals.

2.5 Failures and Zombies

One of the mystifying aspects of the Atlantic Canadian startup community over the past four years has been the low number of failures. The region is known for its ample supply of non-dilutive capital. Such funding sometimes allows founders to retain a day job and work on their startups part-time. If the startup runs into problems, founders can shelve it for a while and bank the money while pondering their next moves. Startups in Atlantic Canada tend not to die. They languish on ice.

That's changing. For the first time, we're reporting a dramatic increase in the number of failures. Failures are hard to track. There are rarely announcements of failed companies. The signs are more subtle – founders report on LinkedIn that they have new jobs; websites are shut down; you hear about the failure from scuttlebutt in the community.

In 2017, we learned of 66 companies that are no longer a going concern or became lifestyle businesses – that is, they're nice businesses for the founder(s) but not on a strong growth trajectory. That's roughly double the 32 failures in 2016 and 36 in 2015.

On top of that, nine companies left the region. (Though we spoke to one founder lately who left the region for Vancouver, misses the East Coast community and is considering a return.) All this means we removed 75 companies from the 2016 Entrevestor Databank, or about 18 percent.

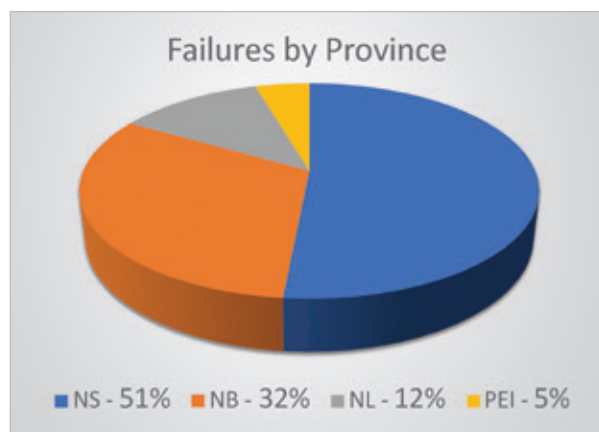
That is great news.

Over the years, a common refrain we've heard from founders and service providers concerns the number of "zombie companies" – the companies that aren't quite alive but aren't quite dead. These can include companies that have evolved into lifestyle businesses even though they've received investment as high-growth companies. The problem with zombie companies is they tie up resources. They tie up investors' capital and can draw

on the limited pool of non-dilutive funding. One funder recently told us of his disdain for "GRANTpreneurs", or founders who grow their businesses just through government largesse. Worse, these companies tie up human resources, which are in sharp demand in some disciplines. One founder told us that if a tech company fails in Halifax, its developers don't have to wait weeks, days or even hours to hear from potential employers; they get calls within fifteen minutes of the news hitting the streets. A rise in failures frees up people so they can join more dynamic companies and help them accelerate their growth.

There were not really any high-profile closures in 2017, nothing like the 2016 closing of Unique Solutions of Dartmouth or the 2015 failure of Techlink Entertainment in Sydney. The highest-profile closures were Halifax companies Cellufuel and Vendeve, as well as the St. John's ventures Agile Sensor Technologies and Sentinel Alert. The talent of several of these companies has been distributed to several other companies. Sentinel CEO Sarah Murphy has joined Halifax construction technology company Harbr as Vice-President of Business Development. The staff of Agile Sensor reportedly found jobs with other startups in St. John's. Some founders of failed companies come back to start new companies, like Techlink President John Xidos, who has now launched Sydney startup Woopla Gaming. And some companies rise from the dead. A couple of years ago, we labeled Moncton biotech company Picomole among the failures. But it has returned with new owners, who have raised money to move the project forward.

Chart 2.11



Dataset: Companies from the Entrevestor Bank 2016 that failed.



Of these 66 companies, 31 were less than two years old, and 53 were IT companies. That suggests that a large proportion of the companies were experiments and likely didn't have employees who lost their jobs. Yet, 16 of the companies had raised capital. Some 24 of the failed companies were in Halifax, with eight each in Moncton, Fredericton and St. John's

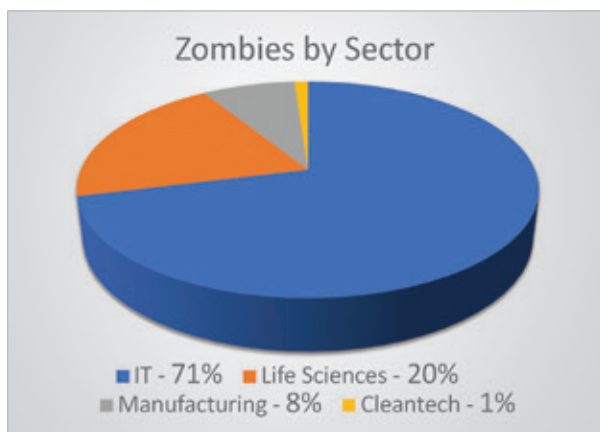
Meanwhile, the region is replete with zombie companies that, true to their name, just won't die. We found 90 companies we believe fit the description. The databank has plenty of companies that we have been tracking for a few years but have not seen them scaling – at least not so much that anyone would notice. Again, it's difficult to track zombie companies, as it's conceivable these companies' execs are keeping their heads down and working on their products. And yet there are companies throughout the region that seem to be lingering more

than lunging – they won an award or went through an accelerator a few years ago, and now they appear to be in suspended animation. We tried to quantify this, but several of these companies didn't respond to emails. We have not included companies founded in 2016 or 2017 in our list, as it would be unfair to label a two-year-old company a zombie.

What we found is that 37 of the companies, or 41 percent, were founded in 2015, and then the numbers drop dramatically as the companies get older. It suggests that there will always be a group of companies that spend two to three years experimenting, pivoting, and eventually dropping off. It also means that in the 2016 databank, there were 66 companies that would fail in a year, and 90 companies considered zombies. That's more than one-third of the Databank as of year-end 2016.

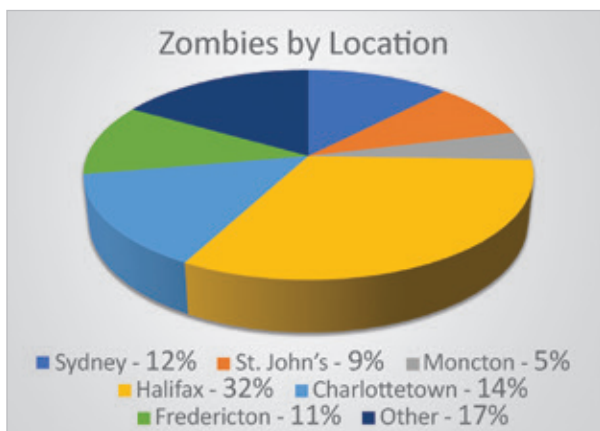
Almost three-quarters of the zombies are IT companies, which makes sense. These companies require minimal investment. The founders can just hold on to the digital assets with no expenditure while they work another job and figure out what to do with their companies. There are several life sciences companies that exist but it's difficult to assess how much progress they're making. Many of the founders have academic and/or medical positions, which seem to be their priorities.

Chart 2.12



Dataset: 90 companies in the Databank we identified as zombies.

Chart 2.13



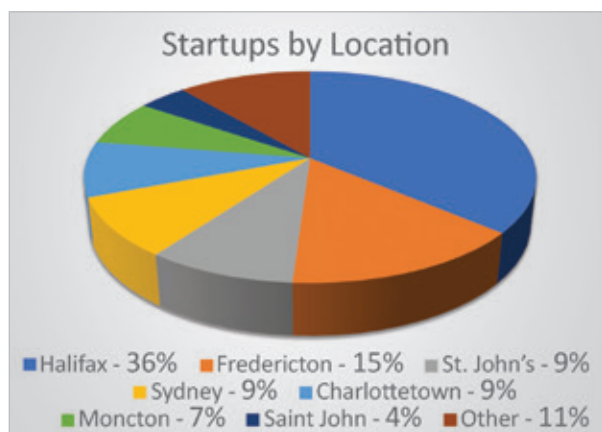
Dataset: 90 companies in the Databank we identified as zombies.

2.6 Location

Halifax is becoming more dominant in the East Coast startup group. Entrevestor is committed to a startup community spanning all four Atlantic Provinces, and works to highlight startup success across the region. But the data we've uncovered speaks for itself. In this section and others in this report, it's evident that the gap between Halifax and other parts of the region is widening. In Section 5.1, we'll discuss the benefits and dangers of Halifax earning such pre-eminence.

Halifax now accounts for 176 startups in the region – about 36 percent of the total. The number of startups in the city rose 20 percent over the previous year. Halifax was not the fastest-growing centre for startups in the region last year. That honour belonged to Fredericton, which increased its number of startups by 29 percent largely because of the work carried out by the University of New Brunswick's Technology, Management & Entrepreneurship program. Even St. John's, Sydney and various rural areas had

Chart 2.14



Dataset: 486 companies in the Entrevestor Databank.

Chart 2.15



Dataset: Most of the 486 companies in the Entrevestor Databank. We omitted Moncton, which showed a 15 percent YOY decline in the number of startups.

Chart 2.16

Startup Density – Startups per thousand people			
City	Startups	Population	Density
Halifax	176	317,000	0.6
Fredericton	72	106,000	0.7
St. John's	44	206,000	0.2
Sydney	44	94,000	0.5
Charlottetown	41	36,000	1.1
Moncton	34	145,000	0.2
Saint John	20	127,000	0.2

Dataset: all Atlantic Canadian startups

faster growing startup communities than Halifax. But in absolute numbers, Halifax added more startups – a net 29 – than any other city in the region, so its share of the regional startup community rose to 36 percent from 35 percent a year earlier.

One interesting aspect of our examination of location is that a few startup communities seem to be reaching an optimum size compared with their underlying population. We say “seem” to be at the right size because our study is too small to draw definitive conclusions. We did a quick study in “startup density” – comparing the number of startups in each city with the underlying population. (For population numbers, we used the population of metropolitan areas found on Wikipedia.) Here’s what we in terms of startup density, calculated as number of startups per thousand people.

There are three cities that have a startup density of about 0.5 to 0.7 – Halifax, Fredericton and Sydney. One city is above this level – Charlottetown, with a density of 1.1. (We’ll delve into what this means for the ability of startups to find talent in Section 5.) Meanwhile, Moncton, St. John’s and Saint John all fall short of this level, suggesting they could grow their startup base without jeopardizing their founders’ ability to find talent.

Rural Startups

The most difficult assessment in this report is that of rural startups. We decided to look at rural startups because it seemed that they underperform the overall region. In April 2018, Entrevestor published an article saying so, which drew criticism from several people. So for this report, we have studied the performance of startups based outside the seven principal cities in the region (The four capitals, Saint John, Moncton and Sydney).

One reason this is a difficult assessment is we’re not convinced that all rural companies are purely rural. Particularly in Nova Scotia, there are entrepreneurs who know the odds of attracting non-dilutive funding increase if they’re in rural locations. So they find a way to place their headquarters in an outlying area, even though everyone knows they themselves are based in Halifax. Second, rural companies have an especially hard time finding staff, especially technical staff. Therefore, they are more likely to outsource work or hire remote employees. That means the employment figures may be distorted as hiring is actually happening in larger centres. Yet, there



are companies like Mabou-based Halifax Biomedical and Great Village-based Ocean Sonics that have built up staff in their rural communities.

The metrics we have gathered on rural startups do not paint a picture of calamitous failure. They employed 258.5 people, up 27 percent from the previous year. We received revenue data from eight companies, and only one had revenue of more than \$10,000. (Obviously, there are successful rural startups that declined to share data with us.) In terms of funding, rural companies raised \$15 million in equity funding in 2017, with about \$9 million being reported by Aqualitis. Rural startups accounted for 17 percent of zombies on our list, a larger proportion than the 11 percent of all startups based in rural areas. We named one rural startup to the “elite” list and another to “scaling”.

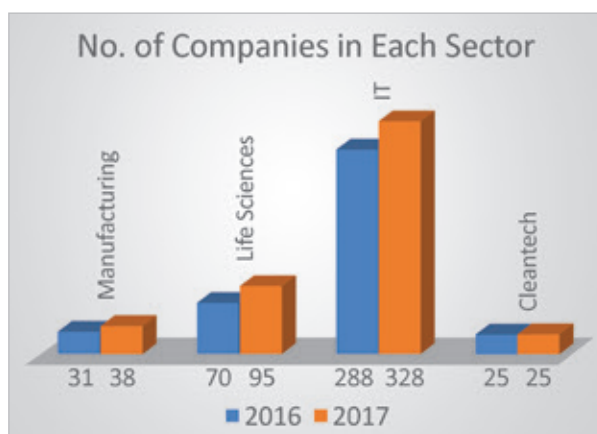
This data gives a fuzzy picture on rural-based startups, as there are jobs generated and attraction of financing (much of it project financing, rather than funding of innovation). But when we compare the rural data to that of the region’s cities, we see a stark contrast, with a higher percentage of companies growing more quickly in areas with high population bases. We stress that we are not arguing against rural entrepreneurship, which is an effective tool for economic development. These observations pertain specifically to companies that commercialize innovation, which benefits from having a lot of people nearby to draw on a range or technical abilities.

2.7 Sectors

For the past five years, we have separated the startups we cover into four sectors – IT, Life Sciences, CleanTech and Advanced Manufacturing. The borders between these sectors are often blurred and many startups fit into more than one category. Halifax-based 4Deep Inwater Imaging, which makes 4D microscopes that can be used in water, could fit into any of these categories, even CleanTech.

This year, we’ve added a fifth category – OceanTech. For the first time, we have identified a sufficient number of ocean-related companies that they can be considered a “sector”. However, all the companies in the oceans sector can also be assigned to another category, so all companies were assigned to one of the four original categories first. And 35 of them also feature in the Oceans section. 4Deep, for example, is first place in the Manufacturing section, but also appears in Oceans.

Chart 2.17



Dataset: 486 companies in the 2017 Databank; 414 companies in the 2016 Databank

Information Technology

Like most startup communities, the Atlantic Canadian group is dominated by IT. Digital technologies lend themselves well to the Atlantic Canadian economy because they require less capital than other enterprises, and generally get to market more quickly. Two-thirds of the high-growth companies in the region are IT enterprises and the sector accounts for 66 percent of the companies we label elite. (See Section 2.2.)

More than 80 companies in this sector provided us with revenue data, and this information demonstrated that sales were growing strongly. Some major companies’ sales are known publicly. Halifax’s Proposify told Entrevestor in an interview that its annual recurring revenue increased 121 percent to \$3.9 million in 2017. Regulatory documents showed Fredericton-based Resson’s revenue rose 21 percent to \$1.7 million, and HeyOrca of St. John’s said in October that its ARR had hit US\$1 million and its monthly recurring revenue had risen 170 percent in the first 10 months of 2017.

Chart 2.18

IT Fact Box	
Number of Companies	328
Funds Raised in 2017	\$66.1M
No. of Jobs	2,478.5
Job growth	29%
Revenue Growth in 2017	81%

This sector appears to be firing on all cylinders, but there are two reasons for concern. The first is size. While Atlantic Canadian companies are growing rapidly, larger companies in larger centres are growing just as fast or faster. When Branham released its list of the top 250 IT companies in Canada last June, there were no Atlantic companies in the top 100. The highest ranking was Mariner of Saint John at 128, up from 131 a year earlier. What's more, there were no Atlantic Canadian companies on the Deloitte Fast 50 in 2017 or 2016. This is a problem because more VC funding in Canada is going to larger companies, and the region will have to produce big players to capture the attention of investors.

The second problem in technology is talent – especially in coding talent in highly technical fields like artificial intelligence, internet of things and blockchain. One P.E.I. entrepreneur recently told Entrevestor that there is a “crisis” in coding talent in the region. Others say the market is tight, but no worse than other markets. Yet, as technological solutions rely more and more on special algorithms and AI, the region will feel more pressure to develop or attract more technical talent.

Life Sciences

There's more excitement in the life sciences space in Atlantic Canada than at any time in the past. For the first time, biotech companies are making strides in every province, whereas it used to just be a sector with hubs in Halifax and Charlottetown. Consider the news on just a few of the companies:

Chinova Bioworks has attended four accelerators in three countries and is working with industry partners.

Truleaf Sustainable Agriculture will open its new farm in Guelph, Ont., in the autumn.

Chart 2.19

Life Sciences Fact Box	
Number of Companies	95
Funds Raised in 2017	\$26M
No. of Jobs	937.5
Job growth	24%
Revenue Growth in 2017	84%

ABK Biomedical raised more than \$9 million last August and hopes to receive regulatory clearance for its product soon.

Somru Biosciences recently moved into a 20,000-square-foot facility in Charlottetown and signed a partnership in Bangladesh that it hopes will provide sales of \$50 million over five years.

SomaDetect won US\$1 million in a pitching competition in Buffalo, NY.

In Newfoundland and Labrador, there is a lot of buzz about Sequence Bio and its outlook for this year.

What's most striking in this sector is that revenues are ramping up. Companies like Adaptiv and TruLeaf are making sales to customers. This sector is known for its long regulatory processes, but companies are now making money from bona fide customers. Overall, the companies that shared revenue data with us almost doubled their sales, and six of them had sales of more than \$100,000.

CleanTech

There is one big story in CleanTech in Atlantic Canada, and it's a doozy. CarbonCure Technologies is a finalist for the NRG COSIA Carbon XPRIZE Challenge and has a one-in-five shot at winning a total of US\$8 million in the next two years. What's interesting about CarbonCure's entry is that the company is now in operation in more than 100 plants across North America. Many of its competitors in their pitches are discussing what they hope to do with their technology. Just making the finals is a huge step because it pits this Atlantic Canadian technology against leaders from across the world to determine who's the best at producing products from carbon.

Chart 2.20

CleanTech Fact Box	
Number of Companies	25
Funds Raised in 2017	\$1.9M
No. of Jobs	148
Job growth	32%
Revenue Growth in 2017	10%

CleanTech is not undergoing the ferocious growth of some other sectors, but there are advances being made on several fronts. Companies like Eosense, Green Power Labs and Island Water Technology have products in the market and are scaling. Others, like Stash Energy and Neothermal are preparing for their launches. Two companies Jaza Energy and Mbissa Energy are even doing projects in Africa.

Manufacturing

Once again, the headline numbers conceal an active sector. Solace Power of Newfoundland and Labrador has brought on a new CEO and is gaining traction, and Metamaterial Technologies Inc. has raised money and been working on new verticals. To an extent, manufacturing is a subset of IT as most of the advanced manufacturing companies have significant digital components in their businesses.

Oceans

Before this year, there was little indication that the efforts around marine technology would result in a flood of startups. There had been a few companies like Virtual Marine Technology and Acadian Seaplants that fit the bill. But many of the ocean companies were service companies, or divisions of overseas multinationals.

That changed in 2017.

The ecosystem is now producing more companies, and the outlook is bright for the sector. The big news, of course, is that the Atlantic Canadian proposal for an Oceans Supercluster was one of five proposals from across the country to win a share of \$950 million in the federal Supercluster program. This funding, to be distributed over the next five years, will be matched by private-sector money. This program should aid startups as it will involve large companies and organizations seeking solutions to their problems in a structured environment. What's more, there will likely be greater collaboration between the provinces so resources in one will be more available to companies in another.

Meanwhile, the resources within the ecosystem are increasing. Dartmouth's COVE facility – a specialized industrial park for maritime industries, is opening this year and it will include a Startup Yard for young companies. Dalhousie's Ocean Research Institute received \$220

Chart 2.21

Manufacturing Fact Box	
Number of Companies	38
Funds Raised in 2017	\$20.7M
No. of Jobs	208
Job growth	37%
Revenue Growth in 2017	17%

million in funding in 2016, and the CDL-Atlantic promises to offer specialization in OceanTech as well as other disciplines. Innovacorp has also been seeding the sector with its Blue Solutions competition, which offered funding to local and international oceans companies.

We can now count 35 OceanTech companies in our Databank, which means it's a larger segment than CleanTech, and it is growing rapidly. Sixteen of these companies, almost half the total, were founded in the last two years, and in 2018 we've learned of new companies to add to the databank. When Innovacorp announced its Blue Solutions competition, some 47 companies applied, including foreign companies from as far away as California. Six companies will be residents at the Startup Yard at COVE in Dartmouth, and four others will do some work in the new facility. Outside Nova Scotia, new companies like Island Aquatech in P.E.I. and Woolastoq Marine at the JEDI accelerator in Fredericton are joining the OceanTech parade.

The whole OceanTech project is fascinating because it is largely a government-led initiative, especially in Nova Scotia. The startup movement in Atlantic Canada was led by the private sector (first in New Brunswick, then across the region). Various governments then crafted programs to suit the needs of the private sector growth. When the ocean program gained momentum in the middle of this decade, government, academic institutions and large industry were on board. But the startup culture had yet to buy in. The challenge going forward will be for startups in this segment to prove they can build revenue streams and attract investors.

We found 11 OceanTech companies that completed our survey – a small sample size but almost one-third of the OceanTech community. These companies told us they now employ 68 people, up 74 percent from the previous year. They reported revenue of \$1.3 million. They have

raised \$4.7 million in equity funding and tell us they're collectively raising \$3.8 million now. More than half of the sector work with universities in research or by using the institutions' facilities – a higher proportion than the overall startup community.

These are modest beginnings, but they're something to build on. And we now have a baseline number.

2.8 Women and Immigrant Founders

Female Leaders

In our latest survey, we asked respondents to identify whether their founders include CEOs and/or founders who are female or immigrants. One or two respondents asked us why this matters. It matters because the region and community are trying to attract more immigrants overall, and more women to entrepreneurship. By quantifying the numbers, it's possible to assess our success. There has been a concerted effort to increase the number of women starting businesses across Atlantic Canada and beyond. It appears to be paying dividends.

We identified 99 companies with female CEOs or founders, more than one-fifth of the total.

In 2014, we counted the number of female CEOs in the Atlantic Canadian startup community. Our lone criterion was that these women had to be the “faces” of their organizations. We counted 23 female CEOs, or 8 percent of the total databank. This year, we broadened the criteria somewhat, asking for CEOs or founders. (Maybe we should have asked for senior leadership roles, as some of the leading companies have female members on the executive teams, though they're not necessarily founders – such as Spring Loaded Technology COO Dawn Umlah, Dash Hudson COO Charlotte Murray-Rydlund, Proposify Head of Sales Lisa Jackson, and Harbr Head of Business Development Sarah Murphy.) If we consider just female CEOs, we find that 68 startups are now headed by women, or 14 percent of the total. That means the number of female CEOs has almost tripled in three years. This happened even though the companies of such high-profile CEOs as Tanya Shaw, Gillian McCrae, Sarah Murphy and Katelyn Bourgoin closed.

When we look at the broader group that comprises female CEOs and founders (and all the ensuing

analysis will refer to the 99 companies with female founders or CEOs), we see they include some of the leading companies in the region. Squiggle Park of Halifax, WellTrack and Green Imaging Solutions of Fredericton, and Gemba Software Solutions of Saint John are all celebrated companies with years of revenue growth already. But the female-led startup movement is notable mainly for its recent growth. Twenty-six of the companies were launched in 2017 and a further 20 started in 2016, meaning that almost half the female-led companies are less than two years old. As previously noted, several of these companies, like Pfera, SomaDetect and Chinova Bioworks, are making great strides early in their development. When we selected the top 24 startups launched in the last two years, we found that one-quarter of them were headed by female CEOs.

These companies are showing exceptional metrics – outpacing the broader community in all categories. The companies with senior women executives employed 478 people at the end of 2017, a rise of 54 percent from the previous year. Fifty-three of these companies responded to our survey, and the total revenue for those sharing such information was \$7.5 million, up 92 percent from 2016. The 99 companies raised a total of \$39.8 million. That's about 35 percent of the total for the community, a huge outperformance for 20 percent of the total companies.

That number seemed high, so we ran the numbers for just the companies with female CEOs. We found that the 68 companies with female CEOs (14 percent of the total community) raised a total of \$15.1 million (13 percent of the total funding from last year). That statistic is flattered somewhat as about \$9 million of the funding was raised by cannabis-producer Aqualitis and its R&D subsidiary Finleaf Technology. The funding round is undeniably impressive, but it falls into a grey area between project financing for a cannabis facility and funding for the innovation unit. We believe that number should be included, largely because of CEO Myrna Gillis' use of innovation in aquaponics to help secure funding for her cannabis business. If the Aqualitis funding is included, female-led companies accounted for 13 percent of the total funding, exceeding the 7 or 8 percent that is common in the startup world. Without Aqualitis, the proportion falls to about 5.3 percent.

One final note about companies with female leadership – their presence is being felt more and more in the

community. More than one-quarter of them collaborate with post-secondary institutions. The Genesis Centre in St. John's in 2018 launched its Women in Tech peer group to help support female entrepreneurs and tech specialists. It's headed by Dyanna McCarthy, who worked for four-and-a-half years with the Newfoundland and Labrador Association of Technology Industries. Halifax-based Harbr has instituted a gender equality program in its staffing.

One place where the impact of Atlantic Canadian female founders is really felt is in Kitchener, Ont. For the last five years, Communitech has offered its Fierce Founders program, which is open to female founders from across Canada. East Coast women have excelled in this program. Ten Atlantic Canadian companies have participated – including five in 2018. Sarah Murphy of Sentinel Alert and Bethany Deshpande were both winners of the pitching competition. Halifax's Aurea and Squiggle Park both graduated from the bootcamp into the more prestigious Fierce Founders Accelerator.

Immigrant Leaders

We attempted to assess the number of immigrant CEOs and founders for the first time in this report. It turns out there were even more companies with immigrants in senior positions than with senior women – 104 companies in total. Again, there were some high-flyers, like Fredericton-based Resson, Dartmouth-based SimplyCast and HeyOrca of St. John's. Once more, we asked for CEOs and founders rather than just CEOs, and we found that 104 companies had newcomers in leadership positions.

There is a concerted effort to encourage immigrants to establish companies here. It's difficult. The success relies first on Immigration, Refugees and Citizenship Canada allowing them to enter the country. Provincial agencies have been using the federal government's Startup Visa program to attract founders from other parts of the world. They are also opening up competitions to encourage more inward migration among entrepreneurs. The New Brunswick Innovation Foundation in 2016 added a category to its Breakthru competition for founders from across Canada, and Innovacorp opened its Blue Solutions competition to startups from anywhere in the world.

The second problem is keeping them here. Several

entrepreneurs that entered the region with Startup Visas decamped, taking their companies with them. MouseStats, which moved to Halifax from Iran, and Tunedly, a Franco-German company that settled in Charlottetown, have both left the region. Fredericton-based Sentrant Solutions, which had two co-founders receive startup visas was purchased by Nielsen Holdings in an acqui-hire deal, and it's understood Nielsen transferred them to the Toronto area. There are Startup Visa successes like the Chinese company Skyline, which set up shop in Halifax. But the program involves the risk that companies will move on.

2.9 Exits and Corporate Transactions

In our 2016 report, we analyzed exits by Atlantic Canadian startups, concluding they benefitted the regional economy. We calculated that the sale of Atlantic Canadian startups to multi-nationals had brought \$1.8 billion into the economy since 2011, and that 2,200 Atlantic Canadians now work for these enterprises. We also noted that there had not been large deals since John Risley sold Ocean Nutrition Canada for \$540 million in May 2012.

We began 2017 with the announcement that STI Technologies had been bought by QuintilesIMS, reportedly for \$200 million. It was auspicious news that suggested there might be a rebound in the exit totals. Sadly, the STI deal was the only major deal last year. There were, however, several sales and corporate transactions that we should highlight.

Exits

STI Technologies, Halifax

American multinational QuintilesIMS, the world's largest provider of biopharmaceutical development and commercial outsourcing services, said in February 2017 it had bought STI. The U.S. company declined to reveal the details of the transaction, though Allnovascotia.com reported the price was about \$200 million. Rather than shipping out small samples to doctors and have them hand them out to patients, the STI platform allows drug companies to send physicians smart cards they can hand out to patients, who take them to a pharmacy along with a prescription to receive the drug.

Ooka Island, Charlottetown

The EdTech company said in April that it was being purchased by the multinational textbook publisher Scholastic, though it provided no details. The P.E.I. startup had online learning content that helped children to learn to read. Betakit, which broke the story, said Ooka Island at the time had 95 books, and over 80 hours of personalized learning available on iOS and Android devices.

iWave Information Systems, Charlottetown

iWave, which helps not-for-profit organizations understand their donors and customers, sold out in June to San Francisco private equity company Sverica Capital Management LLC of San Francisco for an undisclosed sum. The new owner retained CEO Gerry Lawless and appointed Ross Beattie as Executive Director and Vice Chairman to strengthen the management team. Founded in 1991, iWave provides data and proprietary analytics to help organizations understand who to ask for money and how and when to do so.

Sentrant Solutions, Fredericton

The cybersecurity company that combats fraudulent online advertising quietly sold key assets and personnel to the media-rating giant Nielsen Holdings. Sentrant started in 2014 as a cybersecurity company that developed from work carried out at University of New Brunswick. It evolved into a specialist in detecting and fighting fraudulent online advertising schemes that use sophisticated botnets.

Shift Energy, Saint John

Shift Energy had been a portfolio company of Mariner's investment arm, East Valley Ventures. The mother company invested so much in Shift, which uses Internet of Things solutions to optimize heating and energy consumption in large complexes, that it chose to buy the company outright. Mariner did not reveal the price tag.

ADM Systems Engineering, Saint John

The electronics engineering company was purchased in August for an undisclosed price by French industrial giant Vinci Energies. ADM began in 2002 and grew into an operation with 40 people. Vinci said that last year the Moncton company reported revenue of about \$6 million. ADM has strengths in automation, data management, mechanical design and industrial energy management.

Corporate Transactions

Dockside Investco-Nature's Way Canada

Mississauga, Ont.-based Dane Creek Capital Corp. continued to buy up companies to develop Dockside Investco, a Nova Scotia-based company that owns sustainable pet food operations. In August, the company bought pet-related assets of Dartmouth-based Nature's Way Canada. The parties did not disclose the terms of the deal, under which Dane Creek acquired all current and future brand formulations. In 2016, Dane Creek paid an undisclosed sum for a 48-per-cent stake in Midgard Insect Farm Inc. of Windsor.

RtTech Software's Sale of its Cipher Unit

RtTech of Moncton sold a key product in December to Bedford, Mass.-based Aspen Technology, providing a capital injection for the company. It meant two operations – Cipher and RtTech would grow in the Moncton area.

Aspen purchased RtTech's Cipher Industrial Internet of Things software and associated assets for an undisclosed price. The buyer brought on board RtTech CEO Keith Flynn and seven other Moncton-based employees to continue with this business. Meanwhile, RtTech continued to build its business with the products it had been selling since the beginnings of the company six years earlier.

SimpTek Technologies-PowerWhys

In 2017, Fredericton-based SimpTek began the process of buying Halifax's PowerWhys, which meant it brought on veteran CleanTech entrepreneur Megan McCarthy. Together these entrepreneurs pivoted the business so it helps electricity purchasers measure their consumption, analyze how it might be reduced and help them to make the changes that reduce consumption.

SECTION 3 - COMPANY METRICS

There are three main categories of company metrics that we study – employment, funding and revenue – and they are inter-related. Companies need strong revenue to attract investors. The companies with the most investment tend to hire the most people. And the companies with large staffs often sell the most, and/or adapt their products most skillfully to meet market needs.

Is one metric more important than the others? If so, it would probably be revenues. It's the hardest data to secure, and the best proof that a company is growing. Funding is the category that generates the most excitement among readers. Our analysis of funding this year meshes with our in-depth examination of eight funding organizations in Atlantic Canada.

3.1 Employment

We estimate that Atlantic Canadian startups directly employed about 4,000 people at the end of 2017. The precise number was 3,972. We arrived at this figure by determining the employment of the 486 companies in the databank – most told us their staffing numbers, and some we had to estimate. Those companies reported total staffing levels at the end of 2016 of 3152.5 suggesting a growth rate of 26 percent.

However, that does not account for the companies

we've removed from the databank – because of exits, failures and moving out of the region. We didn't tabulate employment in our 2016 report, so the most recent figure we have to compare the total number to is 2015, when we stated that the region's startups employed 3,200 people.

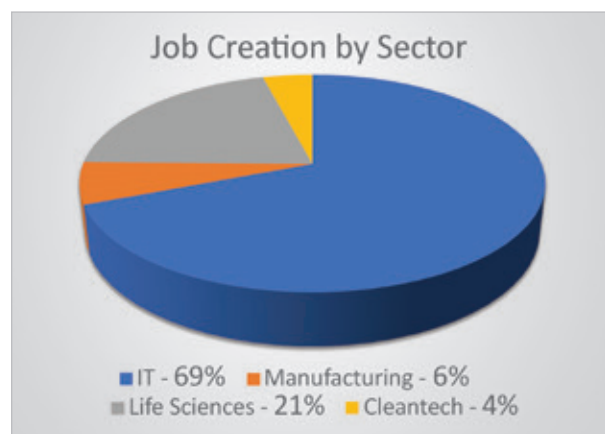
In our 2016 report, we calculated that about 2,200 Atlantic Canadians worked for startups that had exited. The 2016 report conducted a deep analysis into exited companies, and concluded they continue to generate wealth, jobs, exports and research in Atlantic Canada long after they are sold. We believe the exited companies in Atlantic Canada continued to add jobs in 2017. And some companies, such as STI Technologies of Halifax, were purchased in 2017, thereby joining the group of exited companies. Therefore, we estimate there are about 2,400 people working at exited companies. So we see that the startup movement has created about 6,400 direct jobs in the region.

As we highlighted in our report two years ago, research by Enrico Moretti of the University of California at Berkley shows that each high-tech job creates 4.3 indirect jobs due to professional services, taxes and individual spending. If we apply this multiplier to the 6,400 jobs in Atlantic Canada, we find that the Atlantic Canadian startup community is responsible for about 27,520 jobs in the region.

One final note on total job creation in the startup community. Our data accounts for jobs created by companies that existed as of year-end 2017. Each time a company fails or moves outside the region, it's removed from the databank and its employment vanishes. If we factor in this change (which is substantial in a year in which 66 companies closed shop) we calculate employment rose by 7 percent in 2017.

In most years, IT companies have been the true engines for job growth, though this year the companies adding jobs most quickly have been in the advanced manufacturing sector. Manufacturing companies increased employment by a rate of 37 percent, trumping the 31 percent growth recorded by IT companies. (Life sciences followed at 24 percent and CleanTech 11 percent.) Yet in absolute numbers, IT companies added the most jobs at 607.5. In fact, IT companies added twice as many jobs as all the other sectors combined.

Chart 3.1



Dataset: 486 companies in the Entrevestor Data Bank.

3.2 Revenue

As we mentioned previously, revenue data is the hardest information to accumulate. There can be no doubt that revenue growth is strong, but quantifying it is problematic. This year, we gave companies the option of telling us their revenue growth even if they didn't want to reveal sales in dollar terms. We received revenue data of some sort from 145 companies – about 31 percent of the total community. Some 122 of these companies provided full revenues for 2017 and 2016, while the rest simply reported their revenue growth in percentage terms. The companies that provided full sales data produced total revenue in 2017 of \$51.3 million, up 73 percent from their 2016 revenues.

Chart 3.2

No. of Companies in Each Revenue-Growth Bracket	
Pre-Revenue	52
First-Time Revenue	24
Declining Revenue	7
0-99%	33
100-2800%	29
<i>Dataset: 145 companies that provided revenue-growth data in our surveys.</i>	

Consider for a moment how strong that growth is. One criterion of a “gazelle” (the gold standard for a high-growth company) is that it has 20 percent revenue growth three years in a row. If we look at the startups in Atlantic Canada that are booking revenue, we find that 85 percent of them reported revenue growth of more than 20 percent last year or recorded revenue for the first time. Thirty-one percent of the companies with revenue saw their sales at least double last year. Even among the companies that reported revenue for the first time, 11 (or 44 percent) booked sales of \$100,000 or more.

That leads us to the second chart, which shows how big the revenues are at these companies. We estimate (based on the previous chart) that about one-third of the companies in the databank are pre-revenue. If we strip these companies out, we're left with 70 companies that provided detailed information on their revenues. They break down as follows:

Chart 3.3

No. of Companies in Each Revenue Bracket	
\$100-\$99K	22
\$100K-\$499K	21
\$500K-\$999K	11
\$1M-Plus	16
<i>Dataset: 70 companies with revenues that provide sales details.</i>	

There are several ways to read this, but let's focus on the companies that have more than \$1 million in annual sales – a sign of a healthy, growing startup. They now make up 23 percent of the with-profits companies. Even if we add in the pre-revenue companies, the seven-figure-revenue companies comprise 13 percent of the total group. (I think that understates the real situation, as more pre-revenue companies would speak publicly about revenues than companies with paying customers, and stalking competitors.)

Chart 3.4 is our best illustration of how the Atlantic Canadian startup community has changed in the past couple of years. In both 2015 and 2017, about 125 companies shared their revenue data with us, and we totaled their revenues. The big story is that the total revenue in two years has almost doubled – it grew by 96 percent to be exact. Yet there is a sub-plot in the story: the dominance of IT has waned. IT accounted for 96 percent of the revenue in 2015, but in the most recent survey it fell to 84 percent. We're witnessing sales

Chart 3.4

Revenues by Sector in 2015, 2017		
	2015	2017
Cleantech	\$110,000	\$1.8M
IT	\$25.1M	\$43.3M
Life Sciences	\$188,000	\$4.4M
Manufacturing	\$780,000	\$1.8M
Total	\$26.2M	\$51.3M
<i>Dataset: Companies that provided detailed revenue data in 2015 and 2017</i>		

growth in all other sectors, but none stronger than in life sciences. The data in Chart 3.4 shows 22X growth, and I think that the mix of companies reporting each year exaggerates the growth. But having said that, there is fantastic growth in these biotech companies. Two have revenues of more than \$1 million, and there are four companies with six-figure revenues that reported sales for the first time. In the CleanTech category, we similarly saw four companies with strong revenue growth in 2017.

Exporting

Export markets accounted for a smaller proportion of Atlantic Canadian startups' sales in 2017 than they did two years earlier. But it would be a mistake to say that startups are exporting less than in previous years, or that export markets are less important to our innovators. What we're seeing is an evolution of path-to-market strategies, and a more diversified approach to global markets.

Quite clearly, the proportion of revenue coming to Atlantic Canada from outside the country has fallen in two years. That would be a cause for concern, were it not for the rapid growth of the startup sector's sales overall. As we saw in Chart 3.4, sales by startups and Atlantic Canadian companies have almost doubled in two years. Our study suggests that Atlantic Canadian startups are now bringing in about 60 percent more money from export markets in absolute terms than they did two years ago.

There's another factor to consider that is impossible to quantify – the sales strategies of young companies that are finding their markets. Among the revenue-

Chart 3.5

Revenues by Sector in 2015, 2017		
Sources of Revenue	2015	2017
Canada	38%	50.4%
Export Markets	62%	49.6%

Dataset: Survey responses from 127 startups in 2015 and 113 startups in 2017.

Chart 3.6



Dataset: 133 companies that identified their leading export markets.

generating companies that told us exports account for less than half their revenues, there are a lot that we know are planning rapid international expansion. These are companies generating a lot of excitement, and their “low-hanging fruit” is domestic clients. Naturally, they’re going to grab the opportunity to make sales close to home. The federal government’s Build in Canada Innovation Program is increasing the opportunity to make meaningful sales domestically. But a swath of these companies – most of whom we have interviewed – are keen to expand into international markets once they have some steady domestic income streams.

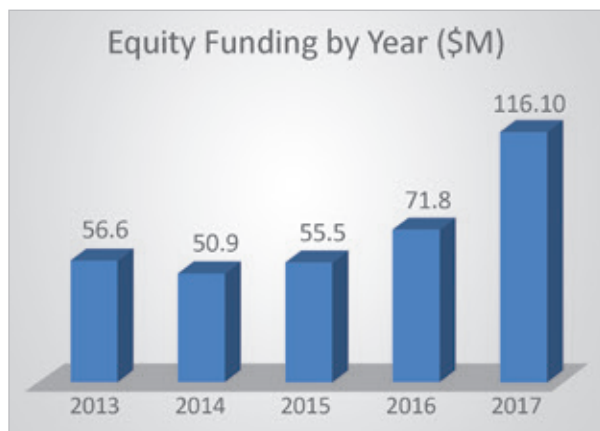
One final aspect of the companies’ export strategy is more companies appear to be looking beyond the U.S. Two years ago, 9 percent of the companies told us their main markets were countries other than Canada or the U.S. Admittedly, we changed the wording of the question for the 2017 report, which is one reason we’re getting a different result. But respondents are mentioning more countries in discussing potential markets than in previous surveys. Countries like Singapore, Norway and Tanzania are appearing in responses for the first time. More than half the companies still name the U.S. as their top export market, but the interest in other countries is growing.

SECTION 4 - FUNDING IN ATLANTIC CANADA

4.1 Introduction – Funding in 2017

Atlantic Canadian startups raised more equity capital in 2017 than in any previous year. We calculate that this group raised \$116.1 million in 2017 – which is more than the totals of 2014 and 2015 combined. We may even be understating the totals. Our totals include funding in five categories – Founders; Friends and Family; Angels; Venture Capital and Strategic. The largest category was VC, which accounted for \$71 million of the total. We compare our totals with the VC data compiled by Canada's Venture Capital and Private Equity Association, or CVCA, which said that Atlantic Canada raised \$99 million in VC funding alone last year. There are two explanations for the discrepancy: we at Entrevestor were not told about some deals; or the CVCA included some other categories of investment (strategic or super angels, for example) as VC. It's probably a combination of the two. (There is one life sciences company that we hear attracted notable funders, but we could not confirm it.) We also believe strongly that there are funding deals in New Brunswick that we are not aware of. The CVCA, for example, recorded \$16 million in funding deals in New Brunswick in 2017, 60 percent more than the \$9.9 million

Chart 4.1



Dataset: Equity funding deals 2013-2017. (We should note that we did not include private equity or stock market listings in these funding totals. Those deals would have inflated the totals for 2014 and 2015.)

Chart 4.2

Funding by Sources	
Founders	\$7.9M
F&F	\$3M
Angels	\$23.5M
VC	\$71M
Strategic	\$10.7M

Dataset: Equity funding deals in 2017.

we recorded. In any case, our data shows 2017 was a record year for equity funding in Atlantic Canada.

The funding burst in 2017 was driven largely by large investment rounds led by institutions outside the region. The breakdown of funding categories is as follows:

Venture capital then accounted for 60 percent of the total equity funding for 2017. VC funding jumped 36 percent from the previous year, which was in itself a strong year for funding. According to the CVCA, Nova Scotia alone was the fourth-largest market in the country for VC investment in 2017 with \$77 million in funding – more than Alberta, Saskatchewan and Manitoba combined.¹ It would not be surprising if the total rose again in 2018 as we estimate there has been \$45 million to \$50 million raised in the first five months of the year. The 171 companies that completed the survey told us they were working on funding deals with total targets of \$134.6 million.

As was the case in 2016 (and will be the case in 2018), the funding in 2017 was dominated by a few deals. We had to omit some of the larger deals from this list as some companies preferred not to have their funding information disclosed.

Whereas IT accounted for 72 percent of the funds raised in 2016, there is a much more even distribution of fundraising in 2017. Companies in the CleanTech sector either didn't need or failed to attract investment, but the other three sectors succeeded in drawing healthy amounts of investment. There was more than \$66 million in IT investment, which most years would be a healthy total for the entire startup community. Yet, IT accounted for about 57 percent of the total, a lower proportion than

¹ See VC & PE Canadian Market Overview. Pg. 7 <https://www.cvca.ca/wp-content/uploads/2018/03/Q4->

Chart 4.3

Top Funding Deals in 2017		
Company	Raised (\$M)	Investors
Manifold	18.5	OMERS Ventures, BoldStart Ventures, Leaders Fund, Version One Ventures, Build Ventures, Amplify Partners, angels
Metamaterials	13.4	Radar Capital, Innovacorp, First Angel Network, angels
Affinio	11.4	Round13 Capital, Whitecap Venture Partners, Build
ABK Biomedical	9.1	Innovacorp, FAN, others
Aqualitas/Finleaf	8.8	Angels
Radiant360	3.3	Build, Killick
Appili Therapeutics	3	Angels, Innovacorp
HeyOrca	2.65	Killick, Pelorus, angels
Swept	2.5	iNovia, Afore Capital
MoneyFinder	1.75	Build, Innovacorp
LifeRaft	1.6	Mike Durland

Chart 4.4

Breakdown of Funding by Sectors			
Sector	No. of Cos.	Dollars Raised (C\$M)	% age of Total Raise
CleanTech	7	\$1.9	2%
IT	83	\$66.1	57%
Life Sciences	19	\$27.4	24%
Manufacturing	10	\$20.7	18%

Dataset: Equity funding deals in 2017.

in previous years. The reason was Life Sciences and Manufacturing both had splendid years.

Some 119 companies raised capital last year, and overall they showed healthier metrics than the broader startup community. Their staffing increased 63 percent to 995 positions, and their collective revenues increased 90 percent.

Finally, there are three things about the funding environment that stand out from the data we collected:

1. External institutions are providing more money than Atlantic Canadian funding bodies.

We estimate about \$59 million of venture capital or strategic funding came from organizations outside the region. That compares with about \$11 million a year from Innovacorp and NSBI, which dominated the funding tables just four years ago. (In the 12 months to March 31, 2017, the nearest indication of their annual investments, Innovacorp invested \$5.6 million and NBIF \$4.6 million.) Pelorus and Killick were active in 2017, but engaged largely in early-stage deals, and Island Capital Partners, which began announcing deals

in 2018, is also early stage. Build has more firepower than the other regional funds, but not enough to lead an eight-figure funding round. This prominence of external institutions, which we first noticed two years ago, is a sign of health in the local ecosystem.

2. Reports of the death of angel investors are greatly exaggerated. You hear it frequently from founders – angels are tapped out. The evidence shows this is completely false. Companies told us that angels accounted for \$23.5 million of funding last year – one-fifth of the total funding. If we add in friends and family (who are essentially angel investors), that number rises to \$26.5 million. That's an impressive number when you consider that there are always angel investments that go unreported. The First Angel Network continues to make its four or five investments a year. At the time of writing this report, East Valley Ventures had 23 Atlantic Canadian companies in its portfolio and seven of the investments were made in 2017 or 2018. Clearwater Fine Foods founder John Risley has become the most prominent super-angel in the region, backing companies like Proposify and Kinduct. And the Creative Destruction Lab Atlantic, is bringing in a new generation of angels, who have already put money into Halifax companies like Bereda Training and Harbr. Meanwhile, Invest Atlantic and Springboard Atlantic launched their Investment Opportunities Program in 2017, which aims to take promising early-stage companies to Toronto to seek investment from angels and other investors.

3. Founders are bringing their own money to companies in greater numbers. Fifty-nine companies reported that their founders made investments in their companies last year, totaling \$7.9 million. Two companies account for more than half of the total funding, but it's the other 57 companies that are interesting. These entrepreneurs are pumping their own money into their companies. Thirty-six of these companies – almost two-thirds of the total – were founded in 2016 or 2017 and their founders are getting them off the ground with their own money. Some are young people right out of college. For example, research scientist Gabrielle Masone noted at the Volta Cohort pitching event in May 2018 that she would invest \$15,000 of her own money in the \$100,000 round she was trying to raise for ColourSmith Labs. They also include seasoned business people who are coming into the startup space for the first time and investing significant amounts to get their tech companies off the ground. In 2015, funding by founders amounted to \$1.7

million, and that number more than quadrupled two years later. Founders are becoming a more noticeable source of capital for launching businesses.

4.2 The Outlook for Funding in 2018

We don't believe the growth in funding in 2017 was a one-off event. Rather, we believe the growth in major deals in the past two years will continue into the near future. There are simply too many good companies growing too strongly and needing too much capital for it to fall back. In the first five months of 2018, we've charted about \$45 million to \$50 million in funding, even though the final months of each year are usually the busiest for closing major funding rounds. These funding rounds include a major investment into Proposify, a \$14 million raise by Resson, a \$4.3 million raise by Appili Therapeutics and a \$1.75 million round by Harbr.

In our survey this year, we asked founders how much money they are now trying to raise. Eighty-three companies told us they are now working on raising \$134.6 million, including four companies each working on a \$10 million round. When you consider that only one-third of the companies in the community complete the survey, it gives some indication of the amount of capital now being targeted by these dynamic entrepreneurs.

4.3 The Atlantic Canadian Funders

One of the strengths of the Atlantic Canadian ecosystem is the stratified funding system shown in Chart 4.2. At every phase of a company's growth, there are opportunities for funding. It's never enough, and founders will complain eternally of the lack of investment. But we've seen that scores of companies are closing funding deals. The key to funding the pre-seed and seed-stage companies is the funding institutions based in the region. With the launch of Island Capital Partners in P.E.I. in 2017, there is now at least one funding body in each province, and several that make investments in multiple provinces. Several groups channel angel investors into funding syndicates, and one organization, Build Ventures, specifically targets scaling companies.

In this year's report, we want to take a deep look at the funding bodies in the region. We do a deep dive into one issue each year – last year it was exits, and this year it's

Chart 4.5

Impact of Funding Organizations								
	Build	EVV	FAN	Innovacorp	ICP	Killick	NBIF	Pelorus
Companies	13	23	17	41	4	8	40	5
Staff	422.5	238.0	205.0	588.0	22.5	183	419.5	96.5
Staff Growth	54%	68%	53%	50%	32%	73%	33%	66%
Rev. Growth		61%		79%		99%	129%	1068%
Rev. Sample		38%		46%		75%	20%	80%
Elite Cos.	7	4	5	12	0	3	3	2
Scaling Cos.	5	10	2	7	2	2	15	1
Zombies	1	2	3	2	0	0	2	0
Exits	0	4	2	2	0	0	2	0
Women Execs	1	3	8	12	1	1	7	0
Immigrants	3	5	5	12	2	2	7	1

the funding organizations in the region. These groups have shrunk in terms of the proportion of the total investment they provide, but not in their importance. The early-stage investments provide a foundation that's necessary for the eventual seven- and eight-figure deals that have become the vogue. As we mentioned in our report last year, Patrick Keefe of Build Ventures said there tends to be a 30 percent attrition rate between rounds of funding. So if 10 companies raise a seed round, only seven will survive to raise an A round. And of those, about five will be able to raise a B round.

With this chart, we have attempted to map the performance of the eight funding organizations in the region, based on investments as of May 2018. (We have not included Technology Venture Corp. of Moncton, as we have too little information on the fund and its portfolio.) We tried to assess follow-on funding but found it impossible to develop meaningful information – for example, Build Ventures participated in Manifold's \$18.5 million A round, which is the biggest VC round ever in the region. But technically it is not "follow-on" funding as it was the company's first round. In the same vein, members of FAN have participated in repeated rounds of some of its better companies, but these don't always get reported. What's more, this chart does not assess how much each fund has invested as several groups don't make this information available. That's unfortunate, as some groups may invest tens of thousands of dollars in a company while other groups invest millions, yet both are given similar weighting when investors are listed in the media.

Therefore, we have omitted follow-on funding, and have attempted to assess impact using other metrics. We've examined the total staff and staff growth in 2017 among the portfolio companies. Wherever possible, we looked at 2017 revenue growth in the portfolio companies, and the sample size used in calculating revenue growth. (For example, we found total revenues of Innovacorp's portfolio companies rose 79 percent in 2017, based on data from 46 percent of its portfolio. We omitted revenue information on Build Ventures and FAN due to insufficient data and Island Capital Partners because it announced its first investments in 2018.) We have also counted the number of elite companies, scaling companies and zombies, as laid out in Section 2, in each portfolio. We've counted the number of bona fide exits (omitting fire sales, acqui-hires and the like) in each fund's history. And finally, we've counted the number of companies led by women and/or immigrants, in terms of founders or CEOs.

One final piece of data we have not tried to come up with is the number of failures in each portfolio. Most funding bodies erase failed companies from their online portfolios, so it's difficult to get an accurate tally of how many failures each fund has endured. It ranges between none for Build Ventures and Island Capital Partners to quite a few for some others.

The economic metric in which these funding organizations have had the most obvious impact is employment (which is also the easiest data to gather). We've examined the performance of 101 Atlantic

Canadian companies backed by eight investment groups based in the region. We found that these companies in total increased their staffing by 43 percent in 2017, employing a total of 1,414 people by the end of the year. The strongest employment growth in percentage terms was St. John's-based Killick Capital, whose companies increased staffing by a total of 73 percent. The largest in absolute terms of number of jobs created was Innovacorp's portfolio, which added 196.5 positions in 2017.

The funding situation continues to evolve in the region. While Newfoundland and Labrador and Prince Edward Island have added funding bodies in recent years, in Pelorus Venture Capital and Island Capital Partners respectively, New Brunswick and Nova Scotia are adding government-backed funding sources. Nova Scotia – which suspended the Nova Scotia Business Inc. venture capital operation in the summer of 2014 – plans to provide \$10 million in funding for a new early stage fund. (The government said four years ago it would invest \$25 million in an early-stage fund. It said in 2017 that \$15 million would go to Build Ventures, and has yet to reveal what will happen to the other \$10 million.) The New Brunswick government, meanwhile, has increased the funding of NBIF, unveiled two sidecar funds that together can invest as much as \$7 million a year. The organization Opportunities New Brunswick oversees the funds – a pre-seed fund that can invest up to \$2 million a year and a seed fund that can invest up to \$5 million. The funds have quietly been making investments, though none has been publicly announced at the time of writing this report.

Chart 4.6



We would like to emphasize that the major development in funding in the past few years has been the growing importance of external funding groups in the region. When Entrevestor began in 2011, support groups frequently complained that follow-on funding for their companies was difficult to find because funders in Toronto and the U.S. wouldn't even consider Atlantic Canadian investments. But the number of external funding bodies with active investments in the region has almost quintupled since then.

Build Ventures

Backed by five governments and private limited partners, Build Ventures holds a unique position in the East Coast funding community. It is the only fund set up to invest tranches of \$1.5 million to \$3 million. That means its \$60-million-plus first fund has participated in such landmark deals in the region as Manifold's \$18.5 million funding round, Affinio's \$9 million round and both of Resson's \$14 million rounds. Build Ventures has also led investment rounds that changed the outlook for such companies as Spring Loaded Technology and Radiant360. In recent years, Build introduced such new companies to its portfolio as the Money Finder and Manifold as it reached its funding limits. It is now raising its second fund with a target of more than \$50 million. The Nova Scotia government committed \$15 million to the new fund and the fund is canvassing other governments and investors. Founders Patrick Keefe and Rob Barbara have recently bolstered their staffing by bringing aboard serial entrepreneur and investor Patrick Hankinson as a team member. We rate 12 of its 13 Atlantic Canadian investments as elite or scaling companies.

Build Ventures has been especially successful in generating employment in the region. It has 13 Atlantic Canadian companies in its portfolio, and at the end of 2017 these companies employed 422.5 people, having increased staffing by 147 positions year-on-year. That's an increase of 54 percent. Though we were unable to publicize revenue growth of the Build portfolio, it's obvious many of its companies are generating sales rapidly. Companies like Manifold, Affinio and Resson would not have been able to attract so much investment without strong revenue stories, and Dash Hudson is known to be growing strongly.



East Valley Ventures

Headed by Gerry Pond, East Valley Ventures is a division of diversified technology company Mariner Partners. It conducts business similar to an angel network, bringing local investors into funding deals, and its members have backed two of the most successful investments in the history of the East Coast startup community – Radian 6 and Q1 Labs. As of May 2018, East Valley's portfolio comprised 25 companies, most based in New Brunswick (four are in Nova Scotia, three in P.E.I. and two outside the region). The group recently removed some of the investments that didn't work out. Though it's unknown how much funding the group raised for its portfolio companies, what's undeniable is its companies are doing well. The data we have – admittedly not as much as we would like – shows that staffing increased 68 percent and revenues 61 percent in 2017. Like NBIF (with whom it frequently co-invests), East Valley Ventures has greater depth in scaling companies than elite companies.

First Angel Network

The oldest investment group in the region continues to invest. In its twelfth year, FAN continued to back four or five companies a year. It has been especially strong in life sciences companies, investing in such high-potential companies as Chinova Bioworks, Covina Biomedical and PhotoDynamic. Largely because of its backing of life sciences companies, FAN has five elite companies in its portfolio – the third most among the eight funding bodies covered here. These include such companies as Metamaterial Technologies and Eigen Innovations. Its highest profile investment was its first, Immunovaccine Technologies, whose share price has risen 88 percent in the last year (as of May 21). However, the FAN portfolio also includes three zombies. Unlike other funding bodies, FAN leaves all its investments on its website, so it's easy to see its failures, such as Unique Solutions and Origin Biomed. Founded by Ross Finlay and Brian Lowe, FAN has also backed eight companies led by women, including Green Imaging Technologies, whose CEO Jill Green now sits on its board. FAN has been in the news lately for legal dealings as much as anything. Fan and some members took the developers of the condo project King's Wharf in Dartmouth to court in 2017. And in 2018, FAN, NBIF and some of their officers were sued by KnowCharge, a Fredericton company they invested in years ago. The suit is seeking \$11 million in damages.

Both FAN and NBIF deny wrong-doing and say they will fight the suit.

Innovacorp

As a venture capital fund, Innovacorp has had a remarkable turnaround from two years ago. In August 2016, the provincial Crown corporation warned that its Nova Scotia First Fund had only \$5.5 million left to invest – about enough for one year. It said it might have to rely on exits for funding in the future, which seemed a long-shot, given that at the time it had never had a meaningful exit. Then the province ponied up \$40 million for the Nova Scotia First Fund -- \$29 million in fresh money and \$11 million from an under-used CleanTech fund. Now Innovacorp has one of the best-performing portfolios in the region.

With investments in 41 companies as of year-end 2017, Innovacorp has 12 elite companies and seven scaling companies in its portfolio. Its companies employ 588 people, more than any other portfolio. The organization has had only two exits (Analyze Re in 2016 and Kivuto, which brought in a 12X return, in 2018). We received revenue data from almost half its companies, and together their sales increased 79 percent in 2017. It has invested in a dozen companies headed by women and a dozen headed by immigrants.

As well as its VC duties, Innovacorp has been conducting regular competitions to distribute small amounts of non-dilutive financing, including its Spark, Blue Solutions and CleanTech contests. It also oversees the Startup Yard at the new COVE facility in Dartmouth.

Island Capital Partners

ICP launched in 2017 with the announcement that it was beginning with \$4 million to invest. What impressed observers was not so much the size of the fund but the mentorship potential it brought to its portfolio companies. The fund is headed by managing investment director Alex MacBeath, a former CEO of Grant Thornton Canada. Its partners include: Ron Keefe, the former CEO of Charlottetown drug manufacturer BioVectra; Steve Nicolle, former CEO of Halifax-based STI Technologies; and Paul Lypaczewski, who has run several IT companies over the past 30 years. The fund began to make investments in late 2017, and as of May

2018 has invested in Forestry.io, Garago, and Island Water Technologies.

Killick Capital

Managing the holdings of the Dobbin family of St. John's, Killick Capital is now rechanneling the proceeds of two exits into an exciting assembly of young companies. The investment company sold part of its Killick Aerospace for about US\$229 million in January 2015, months after it exited its investment in anti-fraud software maker Verafin in a private equity buy-in. Since then, President Mark Dobbin has been methodically investing in a portfolio of younger companies, such as HeyOrca, Sequence Bio and Empowered Homes. The portfolio has focused on Killick's home province of Newfoundland and Labrador, though in 2018 the fund invested in Halifax-based Harbr. And Celtx, which it invested in early in the decade, continues to grow. The result is one of the best performing portfolios in the region: its companies' staffs increased 73 percent to 183 employees, and their revenues almost doubled. What's most impressive is that one of the stars of the portfolio, genomic-based research company Sequence Bio, has yet to hit its full stride with the launch of its study into the province's founder population.

New Brunswick Innovation Foundation

This non-profit company takes on several policy initiatives for the provincial government, such as overseeing its innovation voucher programs. But it is best known for its disciplined venture capital fund, which made a 28X return on its investment in Radian6 seven years ago. NBIF now runs two funds, its Venture Capital Fund and Startup Investment Fund, which have holdings in 40 companies. These include such elite companies as Eigen Innovations and Introhive, but the strength of the NBIF portfolio is found in its mid-section. The fund, which the CVCA named the second-most active "government fund" in Canada last year, has 15 scaling companies, the most in the region. This includes such young luminaries as Pfera, SomaDetect and Kognitiv Spark. Characterized by young, growing companies, the one-fifth of its companies that reported revenue data saw their sales increase by 129 percent. The fund's companies accounted for an estimated 419.5 jobs in 2017, up by one-third from a year earlier. The biggest news in the portfolio last year was that IIoT company RtTech of Moncton sold a portion of

its business to Bedford, Mass.-based Aspen Technology. As mentioned above, portfolio company KnowCharge has launched legal action against NBIF and some of its officers. NBIF has vowed to defend itself, saying it has done nothing wrong.

Pelorus Venture Capital

This offshoot from GrowthWorks Atlantic appears to be in the early stages of building an impressive group of companies. For three years, Pelorus has been working exclusively in Newfoundland and Labrador, where it manages the Venture NL fund, which is backed by the NL government, BDC Capital and several angels. Though one portfolio company Sentinel Alert has closed down, its other investments have been thriving. Pelorus frequently co-invests with Killick Capital. Though its portfolio comprises five companies, it includes such elite ventures as Sequence Bio and HeyOrca. Several Pelorus companies reported revenues for the first time in 2017, which helped drive revenue growth to more than 1,000 percent last year. Its companies' staffing increased by two-thirds in 2017 to almost 100 people.

SECTION 5 – PROVINCIAL BREAKDOWN

5.1 Nova Scotia

The Nova Scotia data is influenced heavily by the metrics in Halifax, described in the subsection below. Halifax dominates the performance of Nova Scotia, but it is not the entire story. Outside of Halifax, the most notable development is the growth of the startup community in the Sydney area. What's especially noteworthy is the growing revenue in Cape Breton startups.

For several years, Innovacorp has seeded Cape Breton startups through its Spark competitions, handing out grants of up to \$50,000 to promising startups, many at the conception stage. The progress was slow, and we noticed that the number of startups in CBRM was growing but too few of them were gaining customers. Until now. Relatively young startups like Securicy (which entered TechStars this year) Orenda Software Solutions,

Chart 5.1

Provincial Data

The following is a summary of the data Entrevestor collected broken down by province.

	NS	NB	NL	PEI	Total
No. of Startups					
IT	164	104	38	22	328
Life Sciences	64	18	2	11	95
Cleantech	14	7	1	3	25
Manufacturing	19	8	5	6	38
Total	261	137	46	42	486
Ocean*	25	3	5	2	35
<i>*All OceanTech companies are also listed in one of the four other categories.</i>					
Failures and Zombies					
Failures	34	21	8	3	66
Zombies	41	17	6	10	74
Women and Immigrants					
Cos. with Female Leaders	51	30	11	7	99
Cos. with Immigrant Leaders	62	25	10	7	104
Employment					
No of Jobs	2,154	959	651	208	3,972
YoY Change	27%	22%	33%	12%	26%
Revenue Growth					
Companies Providing Data	75	28	18	9	
Revenue Growth	80%	56%	178%	17%	
Cos. w/ 1st Sales	13	6	5	1	
Equity Funding (\$,000)					
2017	86,292	9,904	18,390	1,930	116K
2016	41,480	23,075	4,000	3,200	71,755
2015	54,769	15,869	3,779	2,069	76,486
2014	40,395	14,983	63,984	7,327	127K
2013	30,064	17,522	1,526	2,206	51,318
2012	34,324	22,405	723	3,190	60,642
2011	56,415	13,730	1,698	8,921	80,764

and Ubique are gaining customers and plaudits, joining older companies like Marcato Digital, Health Outcomes Worldwide and MediaSpark to form the core of a high-growth business community. Supporting this community is a new institution called the Momentum Initiative, which the federal and provincial governments have funded with almost \$2 million. It is headed by Innovacorp executive Bob Pelley.

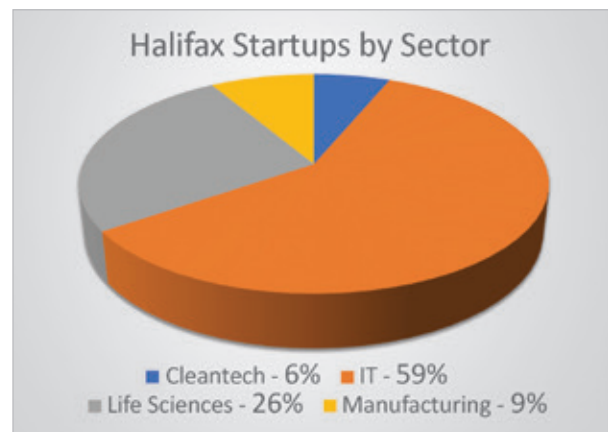
We are now tracking 44 companies in the Sydney area, most of them Spark winners. Our best estimate is that they employed 123.5 people at the end of 2017, up 49 percent from a year earlier. Fifteen of them shared revenue information with us, and their sales rose 70 percent year-on-year to \$3.9 million. It's the first time we've gathered meaningful revenue data for Cape Breton with our surveys. The Sydney startups raised \$2.5 million in equity funding last year, \$759,000 from the founders themselves. They are also gaining more recognition. Securicy entered TechStars this year, while Orenda not only entered Fintech Labs in Boston but was one of six companies chosen to pitch before Wall Street execs and funders in New York City. Talem Health Analytics was one of five companies to win \$25,000 at the Volta Cohort pitching event in May 2018.

Halifax – Its Own Jurisdiction

Metropolitan Halifax has established itself as its own jurisdiction in the Atlantic Canadian startup community. The Nova Scotia capital in 2017 accounted for 176 startups, or 36 percent of the total in the region. Its companies accounted for almost half of the startup jobs. Companies based in Halifax raised \$73.3 million in equity funding – 63 percent of the of the Atlantic Canadian total. Since its inception, Entrevestor has been dedicated to supporting a pan-regional ecosystem, and with clients across the region it is not in our interest to highlight the dominance of Halifax. But the numbers speak for themselves. Halifax enjoys a unique position in the region and its companies and institutions are attracting capital, talent and technology to Atlantic Canada.

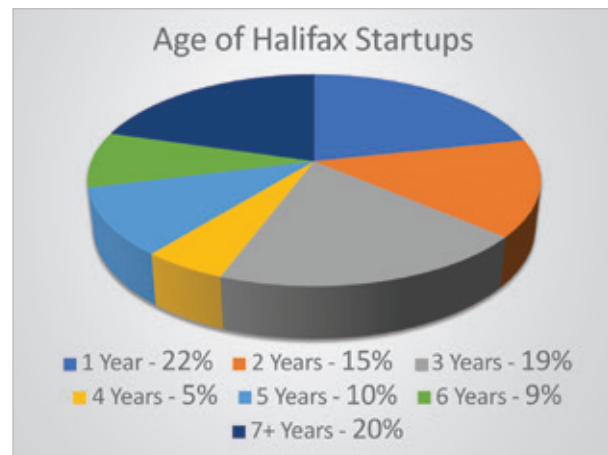
One facet of the Halifax startup community is that it has a balanced grouping among the sectors and phase of company. Almost 60 percent of the startups are in IT, but that's to be expected given the ease of launch and fast growth of IT companies. The fact that more than one-quarter of the companies are in the life sciences space demonstrates the diversity brought by the city's academic

Chart 5.2



Dataset: 176 startups based in Halifax.

Chart 5.3



Dataset: 176 startups in Halifax

(1 Year means founded in 2017, etc.)

institutions. Similarly, the Nova Scotian capital has a nice balance of new companies (38 launched in 2017), growing ventures and older companies. The development of the Ocean Supercluster will likely support the growth of a new sector in the city – OceanTech. Halifax will likely be the centre of the OceanTech community, given that it is home to the COVE development in Dartmouth.

As well as this healthy diversity, Halifax hosts several startups that are growing at a healthy clip. Some 25 companies with profits provided revenue data to Entrevestor, and their combined revenues rose 78.8 percent in 2017. Five of these companies had more than \$1 million in revenue, and a further 13 booked \$100,000 to \$999,999 in sales. We've identified 18 elite and 20 scaling companies based in the Halifax area. Where

Chart 5.4

Job Creation in Halifax, Atlantic Canada		
	Halifax	Atlantic Canada
Jobs 2017	1,818	3,972
Jobs 2016	1,426.5	3,152.5
New jobs	391.5	819.5
Change	27%	26%
2018 Hires*	378	804

Dataset: 486 companies in the Entrevestor Databank.

**Planned hires for 2018. These numbers were drawn from our survey, in which respondents indicated their hiring plans for this year. There were 66 respondents from Halifax and 171 from the region overall. Our research in the past showed that companies rarely hire as many people as they expect, but the forecast is an indication of the optimism in the community.*

The city's startups raised a total of \$73.3 million in equity capital in 2017 – 63 percent of the equity capital raised in Atlantic Canada last year. To put that in perspective, the CVCA says that \$56 million in VC funding was raised in Alberta, Saskatchewan and Manitoba in 2017.

Our examination of startup jobs in the region shows that Halifax's startups are increasing their workforce by more than one-quarter a year. (Given that Halifax is home to many larger startups, some of these jobs are opening up in locations other than Halifax.) Startups in other parts of the region are adding jobs more quickly, but Halifax is dealing with a bigger base. The fact that the city's startups added almost 400 jobs last year is an impressive figure. And, as we mentioned in our 2016 Startup Data Analysis, exited companies continue to add jobs after they have been sold off. Companies like STI Technologies and Ocean Nutrition Canada have continued to add to their staffs since they were sold.

We believe the ecosystem in Halifax is improving and the gap between this city and the rest of the region will likely continue to widen. The combination of physical assets and mentoring bodies are poised to underpin growth in Halifax's startup community. These will be the factors driving the growth in the coming years:

1. The Innovation District – Halifax has declared an innovation district stretching from Dalhousie University

to the new COVE facility in Dartmouth. The importance is not so much that the district exists so much as the institutions within it are growing rapidly. At its heart is Volta Labs, which has just tripled its floor space to 60,000 square feet, including street-level space. Volta will anchor the innovation district. Dalhousie University is opening its new IDEA Building (Innovation and Design in Engineering and Architecture) and St. Mary's University has opened its Student Entrepreneurship Centre on lower George Street. Across the Harbour, COVE and its Startup Yard will be ground zero for the OceanTech community. Members of the life sciences community say there is still a need for more laboratory space, but the infrastructure in Halifax is growing. Hopefully, it will all come together to lend momentum to the entrepreneurial community.

2. Population Base – Halifax more than any other Atlantic Canadian city is close to being large enough to attract the range of specialized talent needed for cutting-edge innovation. The city is undoubtedly too small to do this successfully, but it's closer to the size needed than any other location in the region.

3. Mentoring Bodies – Volta's growth also means it will have more firepower as a mentoring body – more resident companies, more programs, more peer-to-peer learning. And new groups have come to Halifax. CDL-Atlantic has helped mentor leading new companies, and young companies like Bereda Training and Harbr have tapped its fellows for funding. Dalhousie University has various programs through LaunchDal, including the Creator Series, the only program in the region for hardware entrepreneurship. The Centre for Entrepreneurship Education and Development, or CEED, is expanding its programing, and the Spark Sandbox is becoming more active. There is still a movement to bring programing affiliated with iCorps in the U.S. to Halifax.

4. Office Space – Companies like Dash Hudson, Affinio, Kinduct, Manifold and Proposify are adding staff rapidly, and Halifax offers them a growing selection of space to house their operations. Alexandra Baird Allen of the real estate consultancy Turner Drake told the CBC in February that the vacancy rate in the downtown core was then about 17 percent – more than three times the healthy rate of 5 percent. She said it could take 25 years to get back to a balanced market.² The logical conclusion is Halifax is looking at several years of inexpensive Grade B commercial rentals. That's great news for a growing startup community (and arts community as well).

5. Transportation – The Stanfield International Airport offers the most flights to major centres in the region. And travelers from other parts of the region often have to pass through Halifax to get to large cities. Flights from Halifax are expensive compared with other markets. But the ease of travel to and from the city will aid the growth of its scaling companies.

There are benefits and dangers of having such a strong concentration of activity in one city. The entire Atlantic Canadian startup community needs a centre, and everyone will benefit from having a single medium-sized city where there are events and institutions. CDL-Atlantic, for example, is based in Halifax but has already nurtured companies from across the region. The Atlantic Venture Forum is held in Halifax, but links investors with founders from around the region. The more Halifax grows, the better it projects the entire region.

The downside is that Haligonians have a history of condescension toward other parts of Atlantic Canada, to the detriment of the entire region. There's a danger that sporadic successes in Halifax will convince people in the city that they don't need the benefits of sharing resources around the region. It could result in two or more startup communities on the East Coast, each bickering with the other and competing for limited resources. To maximize its potential as a startup centre for all Atlantic Canada, Halifax needs to benefit from pan-regional institutions, like PropelICT, Springboard Atlantic, Emergence and the region's universities.

5.2 New Brunswick

The highlights of 2017 for the startup community in New Brunswick were the development of some impressive companies and the evolution of the startup ecosystem at University of New Brunswick. Having said that, there was not a lot of big news in the province last year. There were few big funding deals, and little news from the high-profile companies the province has been nurturing for the past few years. In our survey this year, we did not get the responses we had hoped for, especially in the Moncton area. Yet, from our interviews and the responses we did get, a picture emerged of below-the-radar progress.

The biggest news was that RtTech Software of Moncton sold its Cipher product to Bedford, Mass.-based Aspen Technology, providing a capital injection for the company and the growth of two operations in the Moncton area. We understand the remaining business is still growing strongly, though the company has declined to grant us an interview. There are other indications of strong growth in the province. IntroHive continues to grow, as data on LinkedIn suggests the company now has about 85 employees. Resson was out of the news last year, but in early 2018 announced a \$14 million funding led by Mahindra & Mahindra of India. ProcedureFlow of Saint John is emerging in early 2018 as a company to watch, reaching the finals of the 2018 Fundica Roadshow and being recognized by the Startup Canada awards.

We believe there was funding in New Brunswick in 2017 that has not been announced and that our funding tallies for the province understate how much was actually raised. For example, we have recorded \$9.9 million in equity funding, while the CVCA has recorded \$16 million. The funding highlight in 2017 was the round by Envenio, reported to be worth \$1.3 million, and the \$1 million that SomaDetect raised by winning a competition in Buffalo. Even by the CVCA measures, it was a weak year in funding for the province, and the recent Resson deal will ensure that funding improves in 2018. Companies (not including Resson) told us they were working on funding rounds worth a total of \$26.9 million, suggesting there will be more funding news in New Brunswick this year.

What has been newsworthy in the past 18 months is the development of young companies. When we assembled our list of Rookie and Sophomore All-Stars in Section 2.2, we found that one-third of these one- and two-year-old companies come from New Brunswick. SomaDetect won the 43North competition in Buffalo. Kognitiv Spark, with sales of more than \$1 million in its first year, is in the Plug and Play accelerator in Silicon Valley. Beauceron Securities was raising capital and gaining clients. Then there are intriguing life sciences in the southeastern portion of the province, like Picomole, Zecken Laboratories and Kasis Environmental. These are ones to watch in ensuing years.

For the most part, New Brunswick's startup community put up metrics that would be admirable in most sectors.

² Corfu, Nina, "Are there too many office buildings in downtown Halifax?", CBC News, Feb. 5, 2018, found at <http://www.cbc.ca/news/canada/nova-scotia/empty-office-buildings-downtown-halifax-vacancy-rates-development-boom-1.4520160>

They just were outperformed by other startup jurisdictions this year. More than 30 new companies were launched in the province, with a concentration in Fredericton. The New Brunswick startups that supplied revenue data reported a 56 percent rise in sales, and overall employment in the New Brunswick startup community increased 22 percent to 959. In the tech community, anecdotal evidence suggests the employment gains may have been strongest in IT companies that exited in the past few years.

The ecosystem continued to improve with Opportunities New Brunswick launching two sidecar funds, which together could pump \$7 million into the sector annually. The Smart Grid Initiative—which aims to build a community of companies and researchers involved in smart grids—failed in its application for Supercluster funding from the federal government. But the initiative is still proceeding with funding from private sector and government sources. The best news in the N.B. ecosystem has been the maturation of the TME program at University of New Brunswick. The program now includes the Energia accelerator, which nurtures companies involved in cleantech, smart energy and cybersecurity. Energia has had one cohort and plans to hold another in the autumn of 2018. As well as mentoring, the accelerator includes a funding component. For five years, TME has also held its Summer Institute, which fosters small businesses with a human element (this year's attendees include a maternity clothing company and a vegan egg substitute business). Two of the three winners of the 2017 Breakthru competition were affiliated with TME.

We believe the startup community in Moncton is stronger than our report indicates. Venn Innovation has done a great job of developing young companies like social venture Porpoise. One area of concern in New Brunswick is Saint John. We are just not hearing about much happening in the Port City. Big companies like Mariner and Innovatia are thriving, and ProcedureFlow has doubled revenues in the 12 months to May 2018. But we are not seeing hot new companies coming down the funnel. In many ways, it should have the strongest ecosystem in the region, given the established IT companies in the city.

5.3 Newfoundland and Labrador

Newfoundlanders have argued for years that the missing element in their ecosystem was funding, and

their startups would take off once that gap was filled. The data from 2017 suggests they were right.

With the Venture NL Fund (managed by Pelorus Venture Capital) and Killick Capital both funding several companies, usually in tandem, the startups and high-growth companies in St. John's are showing strong fundamentals. Of the 46 companies we are tracking in St. John's, only six are zombies and 13 are new companies. The companies increased their staffing by one-third to 651—that means they hired more than 200 people in 2017. We got a fantastic response to our survey in this community, with half the companies completing the survey, and 18 providing revenue data. These respondents' collective revenues increased 178 percent over the previous year, with five reporting sales for the first time. One of the high-flyers HeyOrca announced in October 2017 that its annual recurring revenue had hit US\$1 million, and its growth was continuing. Wireless energy company Solace Power brought in a new CEO and continues to add customers.

The increased funding is due to two factors. The provincial government several years ago teamed up with BDC Capital and local angels to back Venture NL, and brought in experienced fund managers Pelorus Venture Capital to manage the fund. At about the same time, Killick Capital received the proceeds from two exits—from St. John's anti-fraud company Verafin, and from the sale of part of Killick's Texas-based aerospace operations. As a result, Killick and Pelorus have co-invested in several companies, including HeyOrca, Sequence Bio, and Empowered Homes. But that is only part of the funding story. Having invested in St. John's-based film software company Celtx in 2016, Build Ventures of Halifax invested \$3 million in Radian360 in 2017. Sequence Bio also brought in investors from outside the country in 2016 with its US\$3 million round led by Silicon Valley venture capital firm Data Collective. The next phase of the funding story will likely see further external funding in the coming years. Founders in Newfoundland and Labrador have told us that they're eyeing funding rounds worth more than \$30 million, so they expect more growth capital to flow into the St. John's region.

While the funding mechanism has been strengthened, the underlying ecosystem in St. John's has also been enhanced in several ways. There is greater collaboration than before. People in the community say there are now people in key positions, such as Michelle Simms,

CEO of the Genesis Centre, and Florian Villaumé, the Director of the Memorial Centre for Entrepreneurship, who are more interested in improving the ecosystem than claiming credit. The result is a more collaborative spirit in the city. The Genesis Centre's mandate changed a few years ago and it is now more of a community startup hub than an incubator for commercializing research from MUN. It now lists 22 companies in its portfolio and is still working on its move from the MUN campus to the Battery complex near Signal Hill. Under Simms' guidance, Genesis is also showing leadership in diversity in the region. The group has initiated a Women in Entrepreneurship program with the goal of removing impediments to female entrepreneurship across the region. The Memorial Centre for Entrepreneurship, meanwhile, is filling a role similar to TME in Fredericton – as a mechanism for helping students take their first steps from idea to startup. The MCE's Woodward Cup is key to providing seed funding to such promising newcomers as SucSeed and CoLab.

5.4 Prince Edward Island

In last year's report, we noted that the P.E.I. ecosystem had evolved more than that of any other province in the region in 2016. That evolution continued in 2017 so the Island now offers a many-layered, multi-sector ecosystem that can nurture a range of companies. The main problem facing the Charlottetown startup community now is talent, especially the difficulty in finding skilled developers.

When we began Entrevestor in 2011, we came to view Charlottetown as a city with an advanced life sciences community, represented by the PEI BioAlliance, and a smattering of great IT companies, like Screenscape and DiscoveryGarden. But it needed a multifaceted startup incubation facility and there was no provincial funding agency.

The incubation problem was solved in the summer of 2016 when the Startup Zone opened on the corner of Water and Queen Streets in Charlottetown. As well as providing office space for half-a-dozen companies at a time, it was a central meeting space for local events and the PropellCT cohort. Innovation PEI added to the infrastructure in 2017 when it opened LaunchPad, which comprises offices for some of the next generation of Charlottetown startups, like RevIQ, Forestry.io, Onset Communication and Space O.

The life sciences side of the startup community has continued to develop, with significant upgrades at the BioCommons and a new fermentation and downstream processing equipment suite at the BioFoodTech facilities. The BioAlliance continues to grow as the umbrella group for biotech companies. Its offshoot, the Emergence biotech accelerator, is growing its presence, not just in Atlantic Canada but beyond. And Natural Product Canada, launched in 2016, gained momentum in 2017.

Last year, the funding side was improved. With the launch of Island Capital Partners in 2017, each of the Atlantic Provinces has at least one funding body for startups. (See Section 4.3.) The result is a small jurisdiction with companies growing rapidly at several stages and in several sectors. IT company Forestry.io was the first Canadian company to use an AngelList syndicate to secure funding, and it continues to grow. Somru BioScience last year signed a deal with Radiant Pharmaceuticals that the parties say could produce \$50 million in revenues over five years. RevIQ has been quiet about its ambitions, but the company has been staffing up and developing new products.

We believe the metrics for the P.E.I. startup community will improve in the coming years, though the impact of the upgraded infrastructure and ecosystem hasn't really shown up in the 2017 data. The employment at the 42 innovation companies we track rose 12 percent to 208 full-time positions. Nine companies provided revenue data and their total sales rose 17 percent, as a couple of established companies had stable revenue. P.E.I. companies raised \$1.9 million last year, a figure that will increase in 2018 as Island Capital Partners becomes more active.

The main problem the community faces is finding talent needed by scaling companies. One solution is immigration, and founders say the province has helped them in attracting skilled immigrants. As we mentioned in Section 1.1, immigration into P.E.I. has quadrupled in a decade, so the Island now attracts almost as many immigrants as Nova Scotia did a decade ago. Though Charlottetown has a population of just 36,000 people, the P.E.I. government can – and does – use the provincial nominee program to attract skilled immigrants to help staff its growing startups.



SECTION 6 - THE ATLANTIC CANADIAN ECOSYSTEM

The ecosystem evolves slowly, so from one year to the next there are only incremental changes. In this section, we will highlight the enhancements and changes within the ecosystem. The big changes are that CDL-Atlantic has launched, and PropellCT is getting a reboot under the leadership of new CEO Barry Bisson. UNB TME, Genesis Centre and Emergence are all ramping up. If programs have continued to do what they did before, we have not changed our description.

Atlantic Canada Opportunities Agency

There are not a lot of programs directly offered by ACOA. There are two that come up in conversation regularly – the Business Development Program, which provides loans of up to \$500,000 to startups that have raised equity capital; and the Atlantic Innovation Fund, which extends loans of up to \$3 million for R&D. But it's difficult to overstate the importance of ACOA's role in most components of the Atlantic Canadian startup ecosystem. The Atlantic Canadian community has a reputation across the country for its non-dilutive financing, which is seen as an advantage (it helps companies grow) and a detriment (it becomes a crutch). But it's not hyperbole to say the startup community would not exist in its current form without ACOA's support. It underpins many of the programs and organizations described in this section.

6.1 Educational Institutions

When Steve Blank visited Halifax in 2017, one message he kept repeating was that he was amazed by the science he witnessed in Atlantic Canada. "I've been a little bit blown away by how much good science there is here," said Blank, the father of the lean canvass and lean methodology, in an interview with *Entrevestor* after he received an honorary degree at Dalhousie University. Blank's message was that the research being conducted at the region's universities is superb and needs to be the foundation for more high-growth companies.

Blank is a charming man, and we probed on whether he praised the science of every region he visited, but he insisted he was genuinely impressed with the research

in Atlantic Canada. It was a reminder of how important the region's post-secondary institutions are to its startup movement. Many of the best companies are based on technology developed at universities. Several of these schools have entrepreneurship programs. Universities offer lab and incubator facilities. In a world screaming for computer developers, universities continue to produce a fresh crop of computer science graduates each year. Through programs like Natural Sciences and Engineering Research Council and the NBIF's Innovation Vouchers, startups and other companies are incentivized to work with researchers to produce better products. And above all, universities attract and educate young people who staff the startups.

However, quantifying how much the universities help startups is tricky. Many of the 114 startups launched in 2017 came out of university programs, but it's hard to tell at such an embryonic stage which of these are genuine companies and which are school projects. It's astonishing how many startup founders are reluctant to acknowledge the support they received from their university. Even faculty members who continue to work at an institution as their company develops often refuse to admit their employer has helped their company.

In our survey this year, we asked respondents whether they had a relationship with or used the facilities of a post-secondary institution in the region. Of the 171 people who responded, about 88 or 52 percent said their company

Chart 6.1

Post-Secondary Institutions Working with Startups			
School	No. of Startups	School	No. of Startups
Acadia	3	NSCC	1
CBU	3	StFX	3
Dal	52	SMU	11
MtA	2	UdeM	1
MUN	25	UNB	34
NBCC	5	UPEI	9

Dataset: 134 startups identified as working with post-secondary institutions. (Some startups say they are working with more than one school.)

Chart 6.2

Performance of Startups Affiliated with Post-Secondary Institutions		
	Broader Startup Community	Startups with Post-Secondary Relationships
Number of Companies	486	134
Percentage of Community	100%	28%
Rookie Companies	114	32
Total jobs	3,972	951
Percentage of Total Jobs	100%	24%
YoY Job Growth	26%	53%
YOY Revenue Growth	74%	100%
Capital Raised in 2017	\$116.1M	\$51.7M
Percentage of Capital Raised	100%	45%
Currently raising	\$134.6M	\$86.6M

Dataset: 134 startups identified as working with post-secondary institutions.

had some association with a university or college. We've added some companies we know have relationships with universities, based on our interviews or checking lists of companies that worked with universities in research. With this, we identified 134 companies (28 percent of the total) that have some relationship with at least one institution. Here is the breakdown of the institutions that are working with or have worked with startups:

In previous years, we assessed the performance of startups that work with universities and found that it far exceeded the startup community overall. That is the case once again this year.

It's easy to see that university-related startups outperformed the overall community in almost every category. The lone exception is total employment – the startups that work with post-secondary institutions account for 28 percent of the overall community, but only 24 percent of the jobs. We thought it might be because of a high proportion of companies in university accelerators, but proportionally there are no more first-year companies in the university group than in the broader community. We think the more likely reason is that job creation in the broader community has been dominated by IT companies led by mature or serial entrepreneurs who often feel they don't need to work with universities.

We should note that 32 companies launched in 2017 are working with or out of post-secondary institutions,

and they represent 28 percent of the startups launched last year. It shows that university entrepreneurship programs are effective in producing the next generation of startups. Some of the most exciting new companies in the region, such as Pfera (UNB), CoLab Software (MUN) and Graphite Innovation (Dal), have come up through university programs. These programs, as shown below, are growing and gaining more importance. The UNB Technology, Management and Entrepreneurship program, in particular, has become a force in the community with its Energia accelerator and its funding ability. The Fredericton university does especially well considering that it accounts for only 12 percent of the research funding in the region.

Here is a glance at the entrepreneurship programs operated at universities in the region:

Acadia University

Acadia Entrepreneurship Centre
www.acadiaentrepreneurshipcentre.com
 Findlay MacRae

The AEC predates the startup boom. The centre's tagline is "Supporting the Rural Economy," which gives an indication of its specialty. Within the startup efforts in the region it takes a unique focus, striving to apply cutting edge technology to agricultural and rural initiatives. It works closely with the Acadia Institute for Big Data, which has launched several projects involving

the wine and agricultural industries. The Centre has bases in Wolfville and Bridgewater.

Memorial University of Newfoundland

Memorial Centre for Entrepreneurship

mce.mun.ca/

Florian Villaumé

The MCE is dedicated to helping MUN students and faculty members to learn about entrepreneurship and get their businesses off the ground. The group has become more visible in the past few years, as students and recent grads have launched high-profile startups. Project SucSeed and CoLab Software are two companies that have won the MCE's Woodward Cup, which provides seed funding for young companies.

Genesis Centre

(See description in Section 6.3 and additional information in Section 5.3)

St. Mary's University

Masters of Technology, Entrepreneurship
and Innovation

www.smu.ca/academic/sobey/mtei

Ellen Farrell

Launched in 2013, the program is an accelerated graduate program aimed specifically at people who want to develop their own company or lead innovative divisions of existing corporations. The MTEI takes only 16 months to complete and focuses on lean methodology. In the spring of 2018, the program changed the way it funds startups, moving from a pitching competition to a VC-based model, in which funding relies on students reaching milestones. Reaching the first milestone can produce funding of up to \$25,000. SMU is also home to the David Sobey Centre for Innovation in Retail and Services and has opened the SMU Entrepreneurship Centre in downtown Halifax.

Dalhousie University

LaunchDal

www.launchdal.ca

The Idea Project

www.Dal.ca

Mary Kilfoil and Jeff Larsen

Dalhousie University holds a special position in this group because it accounts for 43 percent of the

research spending by Atlantic Canadian universities. That amounted to \$136 million in 2017, according to Canada's Top 50 Research Universities.³ As the region's dominant research university, its R&D has produced several scaling and elite companies, especially in the life sciences sector. It has a range of entrepreneurship programs that are nurturing companies, some of them having nothing to do with academic research.

Until recently, the focus for innovation has been the LaunchDal program, a pioneering project launched in 2012 by professors Mary Kilfoil and Ed Leach. The university did not renew Leach's contract in 2017, yet LaunchDal and its associated programs like Starting Lean and its summer accelerator are due to continue. This group also oversees the Creator Series, which is an accelerator for hardware companies (most of the participants in winter 2018 were women), and LaunchPad, a summer program that awards \$100,000 to 10 startups.

Dalhousie is one of the main backers of the Creative Destruction Lab-Atlantic, which has been the leading mentorship organization in the region in the first half of 2018. In early June, the 12 graduates of the first cohort attended the CDL Super Session in Toronto, and at least two of the attendees, Harbr and Bereda Training, closed funding rounds with investment from CDL fellows.

Dal is also home to other innovation-related projects, including the oversight committee for the Oceans Supercluster. It is home to the Ocean Frontier Institute, which received \$220 million in funding in 2016. There has been some effort to begin a mentorship group for research-based innovation, aligned with the I-Corps movement in the U.S. "It's almost a criminal waste that there isn't already an I-Corps here in Canada," said Blank during his visit to Halifax.

University of New Brunswick

Technology, Management and Entrepreneurship

www.unb.ca/fredericton/engineering/tme

Dhirendra Shukla

Housed within the Faculty of Engineering, the Dr. J. Herbert Smith Centre for Technology, Management and Entrepreneurship emphasizes the role of engineering and design in the development of a product. The

³ <https://www.researchinfosource.com/pdf/CIL2017-Top%2050%20Universities%20List.pdf>

university's research has been vital to many of the leading companies in the Fredericton area, which is one of the hubs of entrepreneurship in the region. The program now includes a Masters of Technology, Management and Entrepreneurship. As we described in Section 5.2, UNB can be linked to much of the startup activity in the Fredericton area and has aided such promising companies as Pfera, WEnTech, and Stash Energy. The TME program now operates two accelerator programs: Energia, which offers programing for energy, CleanTech and cybersecurity companies, and the Summer Institute, which teaches the human elements of entrepreneurship.

TME Director Dharendra Shukla said in an interview that his team is reviewing the next phase of growth for the program. The options include a PhD program in entrepreneurship, a ramping up of its Energia accelerator, a program to help mature companies grow, or all of the above. "We are thinking about what's next for us," said Shukla. "Some are calling it TME Next. Some are calling it TME 5.0."

UNB is the home of the Canadian Institute for Cybersecurity, which provides research into one of the pillars of Fredericton's IT community. The university is also a founding member of the Smart Grid Initiative, which is a partnership between government, private industry and academia to improve the storage and transmission of electricity.

Cape Breton University

UIT Program

Sadly, the UIT Program at CBU closed down in 2017. The tech and entrepreneurship initiative was launched by serial entrepreneur Gavin Uhma, and strove to have gender balance in its enrollment.

The Nova Scotia Sandboxes

Nova Scotia also has a "sandbox" program, which is a series of groups within universities that encourage entrepreneurship. The sandboxes have often been effective in sparking interest in entrepreneurship. These programs are starting to come into their own and can point to several companies growing under their stewardship.

The Island Sandbox

islandsandbox.ca

Cape Breton University, NSCC
D. Darren MacDonald, Manager

The Island Sandbox is a collaboration between Cape Breton University and the Nova Scotia Community College. Its primary focus is on helping students launch businesses in three key areas – CleanTech, social entrepreneurship and entrepreneurship for new Canadians.

Shiftkey Labs

shiftkeylabs.ca

Dalhousie, NSCAD, SMU, Volta, NSCC
Grant Wells, Manager

Shiftkey's specialty is software-based innovations. The organizers believe it can be challenging to navigate the wealth of resources and supports available to bring your ideas to fruition. ShiftKey Labs aims to lead the entrepreneur through the development process. It lets entrepreneurs work out of free collaboration space where they can meet with current students, post-secondary alumni, mentors, and industry partners.

Cultiv8

www.dal.ca/faculty/agriculture/cultiv8

Dalhousie's Agricultural School, Acadia
Jolene MacEachern, Coordinator

Located in the campus of the former Agricultural College, Cultiv8 aims to bring about innovation in agriculture. The services range from testing ideas to teaching business principles, and the group hosts a range of events.

The Spark Zone

thesparkzone.ca

SMU, NSCC, NSCAD, MSVU, Atlantic School
of Theology
Jason Turner, Manager

The Spark Zone brings together students and community members to create, develop and ultimately launch business ideas and social innovations. The Spark Zone provides students with access to a variety of services and supports at each partner institution, striving to provide opportunities for both students and community members interested in developing an entrepreneurial mindset. The group has been working with the David Sobey Centre for Innovation in Retail and Services to generate retail-related startups.

Launchbox

aec-wordpress.colibri-software.com/launchbox/about-launchbox
Acadia University



Launchbox is the centre for student entrepreneurs, located on the fourth floor of Patterson Hall at Acadia University. It supports students in their entrepreneurial pursuits by providing free programming, networking, access to mentors, and other entrepreneurs, working space and competitions.

IDEA

www.ideaproductdesign.org

Dalhousie, NSCAD

Clifton Johnston, Associate Professor

IDEA is a multidisciplinary collaborative initiative that integrates NSCAD Design with Dalhousie's Faculty of Engineering and the Rowe School of Management. The IDEA Sandbox is built around new product development. Currently located in the Waterfront Design Studio, IDEA provides professional mentoring, seminars, programming and space for students, faculty and businesses in support of product development.

Innovation and Enterprise Centre

www.innovatenortheast.ca

St. Francis Xavier University

The StFX Extension Innovation and Enterprise Centre believes that rural communities have the assets and strengths to face current economic, environmental, social, and cultural challenges. Programs and services available at the centre focus on actively tapping into existing assets in order to develop new enterprise opportunities.

6.2 Mentoring Groups

There's a fine line between the startup houses and the mentoring groups, as many organizations offer both work space and programming. The groups in this section are primarily mentoring bodies, while those in Section 6.3 feature well known startup hubs.

PropelICT

Pan-regional

Propelict.com

Barry Bisson

The regional IT accelerator is undertaking its third major revamp. It initiated Launch36 in 2011, then the pan-regional PropelICT accelerator in 2014. Last year, the Propel board hired a new CEO, Barry Bisson, the former head of UNB TME and Shad, a national program for gifted high school students.

Over the last few years, Propel had been operating cohorts across the region. It staged a Build cohort for growth-stage companies in Moncton and Launch cohorts for seed-stage companies in Fredericton, Halifax, Charlottetown, Sydney and St. John's. After the last cohort ended in January 2018, Bisson said the group would take time to review its mission and methods.

Bisson and Entrepreneur-in-Residence Trevor MacAusland consulted with more than 100 stakeholders across the region in determining what direction the organization should take. "We must learn to work with our broad geography and dispersed population, and find new ways to support talent development," said Bisson in the statement. He suggested the organization will find ways to mentor founders across the broad population, and to aid companies for a longer term than a 12-week accelerator.

Propel is expected to unveil its new program by the autumn.

The Aboriginal Business Accelerator

(Affiliated with The Joint Economic Development Initiative, or JEDI)

Fredericton

www.jedinb.ca

The country's first tech accelerator for Aboriginal entrepreneurs was launched in New Brunswick in 2016, and it immediately witnessed great progress from the five teams enrolled. The inaugural Aboriginal Business Accelerator is operated by the Joint Economic Development Initiative, or JEDI, a not-for-profit that supports Aboriginal participation in the New Brunswick economy. It works closely with the federal and New Brunswick governments. The four tribal councils of New Brunswick and the New Brunswick Business Council govern JEDI. JEDI started its 10-week accelerator in 2016 to get more Aboriginal entrepreneurs into major industry supply chains and help them with fundraising for their businesses. With JEDI's vast network in New Brunswick, it can connect Aboriginal entrepreneurs with angel investors and venture capitalists.

Spark and Ignite

(Affiliated with Mashup Lab)

Rural Nova Scotia

www.mashuplab.ca

Andrew Button

Following the successful launch of his virtual Spark accelerator for fledgling rural entrepreneurs, Andrew Button, CEO and Founder of Mashup Lab, announced in Spring 2016 he would launch Ignite, a virtual program for more advanced rural startups. Button, who is based in Wileville on Nova Scotia's South Shore, began Spark in September 2015 to assist entrepreneurs who don't have easy physical access to programs and mentors. Ignite is for people who have validated their ideas and are in the early stages of launching and looking for their first clients. Both programs feature two three-hour online seminars per week for six weeks.

B4 Change

www.ponddeshpande.ca/social-enterprise-accelerator
The Pond Deshpande Centre
Fredericton
Karina LeBlanc

The accelerator at UNB's Pond-Deshpande Centre focuses on social entrepreneurship, or companies with a social mission. The accelerator is now three years old with dozens of graduates to date.

Innovacorp's Programs

Innovacorp.ca
Nova Scotia

The innovation agency launched programs for startups in general and specific sectors in 2016 and enhanced them in 2017. All these programs, which it offers in partnership with the Atlantic Canada Opportunities Agency, involve some mentorship. Innovacorp previously operated its I-3 Technology Startup Competition every second year, but has opted instead to expand its Spark competition, which last year divided \$800,000 in non-dilutive funding between 18 companies. Innovacorp oversees two other sector-specific competitions, the CleanTech Accelerate Program for green companies, and the Blue Solutions Startup Challenge, which together granted \$920,000 to 27 companies. Innovacorp also operates the Startup Yard in the new COVE facility for OceanTech companies in Dartmouth, which welcomes its first six companies in the spring of 2018. Its facilities also include innovation centres in Dartmouth and Halifax, which provide badly needed labs for life sciences companies.

The NextPhase

Pan-Regional
thenextphase.ca
Toon Nagtegaal

The NextPhase is a four-day workshop that uses proprietary software to force entrepreneurs to assess their clients' pain and plot how to make money by solving it. The workshops have been held for several years and are now led by Toon Nagtegaal, a former VC executive from the Netherlands, and David Crow, former Evangelist-in-Residence at OMERS Ventures. The sessions are known for their blunt assessment of the candidates' business prospects and for providing a roadmap for each company to reach the market. This is the only program that accommodates companies in all sectors and all four provinces. The program has graduated more than 200 companies, including Entrevestor.

6.3 Local Incubators or Co-Working Spaces

Genesis Centre

www.genesis.mun.ca/GenesisCentre
Michelle Simms

What started off as the commercialization centre of Memorial University has now become a hub of entrepreneurship in the city. Under the leadership of CEO Michelle Simms, the centre is nurturing companies from inside and outside the university. As of June 2018, there were 11 resident companies. The centre's programs include the Evolution program for new companies, the Enterprise program for scaling companies, and MOTR, offered in collaboration with the MaRS Innovation District in Toronto. It also hired Dyanna McCarthy in 2018 to head its Women in Entrepreneurship program. Genesis Centre will move to new headquarters on the edge of Signal Hill in 2018.

Planet Hatch

Fredericton
Planethatch.com
Adam Peabody

Planet Hatch is a co-working space in Fredericton's Knowledge Park and has established itself as the hub of startups in the New Brunswick capital. It is the base for PropelICT sessions in the city and also features a range of services and events. The organization changed direction in 2015 and decided to focus less on tech startups and more on a broad-based support model for all kinds of entrepreneurship. It hosts a range of programs to help entrepreneurs "from idea to profit".

Venn Innovation

Moncton
Venncentre.ca
Doug Robertson

Formerly Tech SouthEast, Venn has established its Main Street office as the hub for innovation in the greater Moncton area. Its Vennture Garage has begun to turn out some interesting companies, such as Porpoise, which made it into the Propel Build program in the summer of 2015. In the past year or so, Venn has been expanding to be more than a Moncton-focused organization to offer support for companies across New Brunswick and the region. It partnered with ACOA in 2017 to offer a pan-regional program in competitive intelligence, hosted by University of Ottawa professor Jonathan Calof.

Volta Labs

Halifax
www.voltaeffect.com
Jesse Rodgers

Volta is tripling its size and broadening its scope in 2018, so it will occupy a unique position in the Atlantic Canadian community. Its physical space will comprise several floors at the Maritime Centre in downtown Halifax, including ground floor retail space. It will serve as the anchor for Halifax's innovation district. That means Volta will not only house startups but provide a place where the general public can come to understand what the movement is all about. Volta has also hired experienced marketing exec Chris Crowell as the Vice-President of Corporate Innovation to encourage established companies to set out innovation outposts in the facility.

Under the leadership of CEO Jesse Rodgers, who joined in 2016, Volta has initiated a range of programs to support startups. The Startup Bureau is a little-known offering for resident companies in which they meet with a group of mentors who help guide their businesses. In 2017, Volta launched the Volta Cohort, a pre-seed funding program that, as of May 2018, had provided \$250,000 to 10 companies. As of May 2018, Volta listed 14 resident companies on its website.

Navigate Startup House

Sydney
navigatestartup.com
Ardelle Reynolds

Tech enthusiasts Ardelle Reynolds and co-founder Lindsay Uhma set up Navigate in late 2015 as a base

for the growing tech community in the second-largest metro area in Nova Scotia. It offers co-working space, subsidized offices for as many as four startups and a range of mentoring sessions. The organization has tapped Arkansas mentor Jeff Amerine to provide mentorship for the next year. It hosted its first Propel Launch cohort in 2017.

Startup Zone

Charlottetown
www.startupzone.ca
Shannon Pratt (*Filling in for CEO Christina MacLeod, who is on maternity leave*)

Supported by Innovation PEI and various community groups, the Startup Zone is a 3,600-square-foot facility at Water and Queen streets that opened in July 2016. It has enough space for about 16 companies and will be a work zone for tech and innovation startups as well as other entrepreneurial pursuits. It is the P.E.I. base for PropellCT, the regional tech accelerator. The organization in the spring of 2017 named serial entrepreneur Colin Deacon as its Entrepreneur-in-Residence.

Common Ground

St. John's
workatcommonground.com
Peter Gifford

Common Ground, the 4,000-square-foot co-working space in St. John's, is now three years old, which makes it one of the oldest community incubators in the region. The facility is the Newfoundland and Labrador base of Propel and the accelerator's Entrepreneur-in-Residence is Peter Gifford.

Connexion Works

Saint John
connexionworks.ca

The co-working space on Germain Street opened in 2014. It offers space for small companies and hosts regular events. The organization behind it works closely with Enterprise Saint John and other community groups.

6.4 Life Sciences Organizations

EmerGence

Charlottetown
emergencebioincubator.com
Martin Yuill

Launched in late 2014, EmerGence is a virtual business incubator focused on life sciences businesses in the food, nutraceutical and pharma segments. Companies receive comprehensive support customized to their needs and benefit from experienced mentorship, specialist services and established networks. EmerGence is affiliated with the PEI BioAlliance, which coordinates programing for life sciences companies on the Island.

Executive Director Martin Yuill, who has held business development posts across Canada and in South Africa, has built up a group of companies in Atlantic Canada and in other parts of Canada and other countries. Emergence works with its group of mentors to identify the areas in which each company needs mentorship and find a leading expert in the field to help the company. The incubator also offers Specialist Services Projects, in which it will fund as much as 65 per cent of the cost of bringing in specialists to help a company with a specific project.

Natural Products Canada

Charlottetown

www.nce-rce.gc.ca/NetworksCentres-CentresReseaux/CECR-CECR/NPC-PNC_eng.asp

Shelley R. King

Headquartered in Charlottetown, the NPC helps companies across Canada that are developing products from natural materials. The partnership includes AgWest Bio in Saskatchewan, the Ontario Bioscience Innovation Organization and the Institute for Nutrition and Functional Foods in Quebec. The federal contribution will be matched by over \$10 million from industry and other sources, for total funding of more than \$24 million over the next five years.

BioNova

Halifax

www.bionova.ca

Scott Moffitt

BioNova is a not-for-profit that represents life sciences companies in Nova Scotia. It has about 65 members, many of which are life sciences startups in the province. The organization's big event each year is BioPort Atlantic, an annual conference held each autumn. And the highlight of BioPort is the BioInnovation Challenge, a pitching event for life sciences companies in the three Maritime provinces. By entering BIC, novice companies receive a range of mentoring sessions that culminate with the pitch at the competition. Its role and membership has expanded in recent years as the life sciences base in Nova Scotia has evolved.

BioNB

Fredericton

Bionb.org

Meaghan Seagrave

BioNB is the bioscience authority in New Brunswick for government, industry, and media, translating and communicating the business opportunities behind the science in a highly technical sector. BioNB builds and enhances new and existing businesses, supports technology transfer from public institutions and the private sector, and works to build a community and enhance collaboration among sector stakeholders. Like BioNova in Nova Scotia, the organization has progressed as the life sciences community in the province has grown. BioNB said in its (first ever) annual report for 2017 that the organization now works with 40 startups.

SECTION 7

THE ENTREVESTOR DATABANK

Company	City	Company	City
NOVA SCOTIA			
3d Bolus	Halifax	Acadian Seaplants	Dartmouth
4Deep Inwater	Halifax	AddText.me	Dartmouth
ABK Biomedical	Halifax	Advanced Glazing	Sydney



Company	City	Company	City
Advocate Cognitive Technologies	Sydney	BuyMyLemonade	Halifax
Affinio	Halifax	CarbonCure	Halifax
Agada	Halifax	Ceesix Health	Halifax
AgSeed Technologies	Bible Hill	Charged Engineering	Halifax
aioTV	Halifax	Checkin	Halifax
Alentic Microscience	Halifax	Chelation Partners	Halifax
Alias Earth	Morden	Clever Fruit Juice	Antigonish
Alpha Dog Games	Bedford	Click2Order	Sydney
Annapolis Orchards	Lawrencetown	Clinical Logistics	Dartmouth
Appili Therapeutics	Halifax	Clockk	Halifax
Aramax IP Services	Sydney	Code + Mortar	Halifax
Art Trust	Halifax	Code the Solution	Sydney
Artisync Technologies	Sydney	CogPro	Halifax
Ashored	Halifax	Colibri	Wolfville
Athletigen Health Solutions	Halifax	Collegio	Sydney
Audioptics	Halifax	Comlett Technologies	Sydney
Aurea	Halifax	Conceptualiz	Halifax
Avive Naturals	Halifax	Construction AI	Mosquodoboit Harbour
Axem	Halifax	Copsys Industries	Halifax
Azorus	Halifax	Covina BioMedical	Halifax
B4Checkin	Halifax	Crate	Halifax
Bean Counter Technologies	Halifax	Creative Variant	Sydney
Bend Beauty	Dartmouth	Cribcut	Halifax
Bereda Training	Halifax	Curbza	Dartmouth
Bid Tasker Mobile Applications	Sydney	Current Studios	Dartmouth
BidSquid	Pictou	Dadavan	Waverly
BioMedica Diagnostics	Windsor	Dash Hudson	Halifax
BioPolyOil	Bible Hill	Daxonics Ultrasound Inc	Halifax
B-Line	Halifax	DeCell Technologies	Halifax
BlockCrushr Labs	Halifax	DeNovaMed Inc	Halifax
Blue C Designs	Halifax	Densitas	Halifax
BlueLight analytics	Halifax	Deprolabs	Halifax
BoomersWork	Halifax	DGI Clinical	Halifax
Brave New World	Halifax	Digital Campaign Solutions	Sydney
Breton SmarTek	Sydney	Digital Diesel Solutions	Sydney
BuildingCast Software	Halifax	DMF Medical	Halifax

Company	City	Company	City
Dockside Pet Treats	Windsor	Hello Focus	Halifax
DocMaster	Sydney	Heterogeneous Nanosystems	Halifax
Dragon Veterinary	Halifax	HiveTrade	Halifax
Dugo	Halifax	HomeExcept	Halifax
Easy Golf Tour	Sydney	Hoops Innovation	New Minas
ECTOGroup	Sydney	Hydrotroniks	Cheticamp
Efficiency Properties	Halifax	Imagine That Technologies	Bedford
Ethical Swag	Sydney	Immunio	Halifax
Electric Puppet	Chester	Impath Networks	Halifax
Emagix	Halifax	Ingenuity Product Solutions	Sydney
Enginuity	Halifax	Insitu Core Labs	Port Hawkesbury
Encyt Technologies	Sydney	InstrideWeb	Halifax
Eosense	Dartmouth	Instrument Concepts	Great Village
Espial Vision	Halifax	Integrated HACCP Solutions	Wolfville
EXPARK	Sydney	Intelligent Dynamics Canada	Halifax
Finleaf Technologies	Brooklyn	InTheSpot Technologies	Wolfville
FIVAMED	Halifax	IOBIO	Halifax
Flock	Halifax	Iron Apple	Halifax
FullPlate Care	Glace Bay	Jetasonic Technologies	Halifax
FundMetric	Halifax	Kilo Communications (Stopper)	Halifax
GenCan Bio	Dartmouth	Kinduct	Halifax
Genus	Sydney	Kracken Robotic Systems	Halifax
GeoForce Group	Dartmouth	Labfundr	Halifax
Glas Ocean Electric	Halifax	Leadsift	Halifax
GMS Surface Tech	Antigonish	Lean MVNO	Sydney
GoBumpFree	Elmsdale	LeeWay Marine	Halifax
Graphite Innovation	Halifax	LED Roadway Lighting	Halifax
Green Power Labs	Dartmouth	LifeRaft	Halifax
Grey Lit Matters	Halifax	Living.Room	Halifax
GroupThing	Halifax	Lixar	Halifax
Guild Solutions	Bedford	Lokol.me	Sydney
Halifax Biomedical	Mabou	MacCormick	Sydney
Harbr	Halifax	MacKenzie Healthcare Technologies	Musquodoboit
HB Studios	Lunenburg	Harbour	
Health Outcomes Worldwide	New Waterford	Manifold	Halifax
Health QR Inc.	Halifax	Manzer Apiary	Digby

Company	City	Company	City
Map Master Technologies	Sydney	Panag Pharmaceuticals	Halifax
Mara Renewables Corp.	Bedford	Peer Ledger	Halifax
Marcato Digital	Sydney	Pelagis Data Systems	Sydney
Maritime BioLoggers	Halifax	Performance Genomics	Truro
MediaSpark	Sydney	PhotoDynamic Inc.	Mount Uniacke
Medivirtual Consultation	Annapolis Royal	Play the Field	Halifax
Medusa Medical Technologies	Halifax	Player Pack	Sydney
Metamaterials	Dartmouth	Precision Biologic	Dartmouth
Mimir Networks	Sydney	Presenter's Podium	Halifax
Mirovia Ocean Technology	Louisdale	Project Disruption	Sydney
Modest Tree Media	Halifax	Proof	Halifax
MoneyFinder	Halifax	Proposify	Halifax
Myconnex	Bedford	Punch Club	Sydney
MyMem	Halifax	Punk Science Studios Inc.	Halifax
Natural Ocean Products	Louisbourg	QRA Corp.	Halifax
Navitas Digital	Sydney	RDA Atlantic	Halifax
Neck Tronics	Conquerall Mills	ReconOcea	Halifax
Neothermal Energy Storage	Halifax	Red Meat Games	Halifax
Neuroquest	Halifax	ResMed	Halifax
NewAE	Halifax	RetiCAD	Halifax
Nexus Robotics	Halifax	Rimot.io	Dartmouth
Novagreen East	Halifax	Rovault	Halifax
NovaResp	Halifax	Sandcastle Application Development	Sydney
NovaSight	Halifax	Satteligit Telemetry Solutions	Bedford
NovaSpectrum	Dartmouth	SayleGroup	Halifax
Oberland AgriScience	Halifax	SaySo Communications	Halifax
Ocean Executive	Halifax	SeaSmart Technologies	Mahone Bay
Ocean Technology Research	Halifax	Securicy Data Solutions	Sydney
Oceland Biologics	Bible Hill	SeeMePly	Halifax
Ogden Pond	Halifax	SGS Solutions	Dartmouth
OHS Data	Halifax	Side Door Access	Halifax
Online Job Market	Halifax	SimplyCast	Dartmouth
Open Ocean Systems	Halifax	Singular	Mahone Bay
OpenBlue Global Services	Bedford	Site 2020	Halifax
Orenda Software Solutions	Sydney	Skyline	Halifax
OrthoMX	Halifax	Slyce Canada	New Waterford

Company	City	Company	City
Solid State Pharma	Halifax	Xeos Technologies	Dartmouth
SONA NanoTech	Halifax	Xona Games	Yarmouth
Spiri	Halifax	Xtidal	Bedford
Spring Loaded Technology	Halifax	Znanja	New Glasgow
Spritely	Halifax		
Squiggle Park	Halifax	New Brunswick	
Sustane Technologies	Chester		
Swell Advantage	Halifax	Aboriginal Millennium Health Products	Tobique
Swept	Halifax	Advanced Publishing	Saint John
Talem Health Analytics	Sydney	AirVM	Saint John
Tenacity Tech Innovations	Sydney	Alongside	Moncton
Tenderithm	Mahone Bay	Atlantic Hydrogreens	Fredericton
The Love Network	Halifax	AVSS	Rothsay
The Rounds	Halifax	BASE Engineering	Saint John
Tileographer	Sydney	Be Ready	Sussex
TrAiner	Sydney	Beauceron Security	Fredericton
Tranquility Online	Halifax	Biomatcan	Fredericton
Treventis Diagnostics	Halifax	Biomolecules for life Inc	Moncton
Trip Ninja	Halifax	Biopolynet Inc	Fredericton
True North Clinical Research	Halifax	BioScript Pharmacy	Moncton
TruLeaf Sustainable Agriculture	Halifax	Black Arcs	Fredericton
Turbulent Research	Dartmouth	Blaze Studios	Moncton
Ubique Networks	Sydney	Blutek	Fredericton
Unified Software Technologies	Wolfville	Bonkk	Fredericton
Upcycle Waste Inc	Halifax	Braveno	Fredericton
UpFront Tickets	Halifax	Canuevo Biotech	Fredericton
UpMyGame (Granite Media)	Halifax	Castaway Golf	Moncton
Velo	Bedford	Chatham Biotec	Riverview
Velsoft	New Glasgow	Chinova Bioworks	Fredericton
Vesuvius Media	Halifax	Cloudlinx	Fredericton
VidSnippets	Halifax	Corruven	Kedgwick
Vineview	Halifax	Credit Card Genius	Moncton
Virtus Analytics	Halifax	C-Therm Technologies	Fredericton
Vitalo	Halifax	DealerMine	Saint John
WoodsCamp Technologies	Mahone Bay	Dgrief	Saint John
Woopla Gaming	Sydney	Doorval	Moncton



Company	City	Company	City
Dovico	Moncton	Kasis Environmental	Moncton
Down to Earth	Fredericton	KnowCharge	Fredericton
eChart	Moncton	Kognitiv Spark	Fredericton
EDRS	Miramichi	Liv9	Fredericton
EduCode	Moncton	Loft1 Media	Fredericton
EhEye	Saint John	LuminUltra Technologies	Fredericton
Eigen Innovations	Fredericton	Lunney Development	New Zion
Elandas	Saint John	Mariner	Saint John
Encore Interactive	Saint John	Masitek Instruments	Moncton
Enkidu	Saint John	Mbissa Energy	Fredericton
Envenio	Fredericton	MotiFIT	Moncton
Eyesover	Fredericton	Mycodev	Fredericton
Fiddlehead Technology	Moncton	NB-Biomatrix	Saint John
FitStats	Moncton	Newpy	Saint John
Food Profit Group	Moncton	Night Puck Technology	Saint John
FoodTender	Shediac	Parental Marketplace	Rothesay
Four Eyes Financial	Saint John	Passiv	Fredericton
Foursum Golf	Moncton	Patchell Brook Equity Analytics	Miramichi
Fox and Foal	Keswick	Pfera	Fredericton
Gemba Software Solutions	Saint John	PHYS Technology	Fredericton
Geode Technology	Fredericton	Picomole	Moncton
Ginglelive.com	Moncton	Populus Global Solutions	Fredericton
Gogii Games	Moncton	Porpoise	Moncton
GradsFinder	Moncton	Practice	Fredericton
Green Imaging Technologies	Fredericton	Precision Plasma	Fredericton
Hinge Paintball	Fredericton	Project QI	Fredericton
Hit the Road Ap	Oromocto	Prooflo	Fredericton
HotSpot Merchant Solutions	Fredericton	Property Guys	Moncton
Hybernate	Fredericton	Quber	Fredericton
iCubemedia	Dieppe	Rabbit Town Whiskey	Fredericton
Introhive	Fredericton	ReadyPass Services	Fredericton
Inversa Systems	Fredericton	Remarketeers Inc.	Hillsborough
IPSNP	Saint John	Remsoft	Fredericton
iTacit	Fredericton	Resson	Fredericton
Itavio	Moncton	Rise	Fredericton
Jaza Energy	Sackville	Rising Tide Technologies	Fredericton

Company	City	Company	City
RtTech Software	Moncton	Newfoundland and Labrador	
Scene Sharp Technologies	Fredericton		
Screening Devices Canada	Hatfield Point	ABA Access	St. John's
Search2go	Saint John	Adfinitum	St. John's
Sensory Friendly Solutions	Quispamsis	Andes VR	St. John's
Serve Us	Fredericton	Avalon Holographics	St. John's
Served	Fredericton	BlueBrick Design	St. John's
Simptek	Fredericton	BlueLine Innovations	St. John's
Smak'nis Maritime Security	Fredericton	Brownie Points	St. John's
Smart NBS Solutions	Fredericton	Celsius Games Studios	St. John's
Smart Skin Technologies	Fredericton	Celtx	St. John's
Smartpods	Moncton	ClearRisk	St. John's
SM-Heart	Fredericton	Clockwork Fox Studios	St. John's
SomaDetect	Fredericton	Colab Software	St. John's
Soricimed Biopharma	Sackville	Creatral	St. John's
Spatial Quest	Fredericton	CSlpix	St. John's
Spinzo Corporation	Saint John	Cyno	St. John's
Stash Energy	Fredericton	DashAll	St. John's
Terra Torran	Fredericton	Drone NL	St. John's
Tieos	Moncton	Empowered Homes	St. John's
TotalPave	Fredericton	Grey Island Energy	St. John's
Trispectra Innovation	Fredericton	GRR Systems	St. John's
Unicare Home Care Services	Miramichi	Hashtag Tutors	St. John's
Unity Project	Fredericton	Help Me Order	St. John's
VeroSource	Fredericton	HeyOrca	St. John's
Vertiball	Fredericton	Metrics Flow	St. John's
Vibes Intelligence	Moncton	Nocland Solutions	St. John's
Vidcruiter	Moncton	Odd Couple Educational Software	St. John's
Vintelligence Digital Solutions	Moncton	Peachy	St. John's
WellTrack	Fredericton	Power HV	Portugal Cove
WEnTech Solutions	Fredericton	Proximas Technologies	St. John's
Woolastog Marine	Fredericton	Radiant360	St. John's
Yanky Sports	Fredericton	Roshell Industries	St. John's
Young Monkey	Fredericton	SafeAlert	St. John's
Zaptap	Fredericton	Sassy Tuna Studios	St. John's
Zecken Laboratories	Sackville	Seaformatics Systems	St. John's



Company	City	Company	City
Seamatica Aerospace	St. John's	Island Abbey Foods	Charlottetown
Sequence Bioinformatics	St. John's	Island Aquatech	Charlottetown
Skyhawks Telematics	St. John's	Island Water Technologies	Charlottetown
SNM Global	St. John's	JKN Inc	Charlottetown
Solace Power	Mount Pearl	Jobsite to Go	Charlottetown
Sucseed	St. John's	Macworth Industries	Charlottetown
Sweett	St. John's	Nautilus Biosciences Canada	Charlottetown
Verafin	St. John's	Neurodyn	Charlottetown
Virtual Marine Technologies	St. John's	Onset Communication	Charlottetown
Vish Solutions	St. John's	Origins Xtractions	Charlottetown
Whitecap Scientific	St. John's	Precise.ai	Kensington
Zambara	St. John's	Quannessence	Summerside
Prince Edward Island		Queen Bee Games	Charlottetown
Airbly	Argyle Shore	Ready2Race	Charlottetown
ARK Bio	Charlottetown	Redrock Power Systems	Charlottetown
BamText Corp	Charlottetown	Retrievium	Charlottetown
Cradle Technology Design	Charlottetown	RevlQ	Charlottetown
CrowdFound	Charlottetown	R-Form	Charlottetown
Discovery Garden	Charlottetown	ScreenScape Networks	Charlottetown
Engineering Technologies Canada	Stratford	Shoplax	Charlottetown
Exit Speed	Charlottetown	Skipthewaitingroom	Charlottetown
FieldEct	Charlottetown	Somru Bioscience	Charlottetown
Forestry.io	Charlottetown	Space O	Charlottetown
Garago Software	Charlottetown	Strue	Charlottetown
GradPeek	Charlottetown	Taylor Pharmaceuticals	Charlottetown
Icejam	Charlottetown	Timeless Technologies	Charlottetown
Ironflow Technologies	Charlottetown	Vitrak	Charlottetown
		Zengo Innovations	Charlottetown

APPENDIX - METHODOLOGY

Over the past four years, we've established our annual startup analysis as the most comprehensive study of a regional startup segment available in Canada. The data comes from two main sources: our survey of startups, and Entrevestor's daily reporting on the community.

Our goal has always been to bring out the metrics on the region's startups, which we define as:

1. A company headquartered in Atlantic Canada, or with dual headquarters that include an Atlantic Canadian head office;
2. A company commercializing innovation;
3. And a company producing a product for the global market.

There are huge grey areas with these definitions, but we have tried to be uniform in applying the same standards across the region, year after year.

For the 2016 report, we partnered with the Atlantic Canadian team going through the MIT Regional Entrepreneurship Acceleration Program, or REAP, to gather data. This year, we have returned to our former methods, surveying individual companies.

We received 171 responses to the survey – representing almost one-third of the startups in the region. We have supplemented this survey with our deep knowledge of the startup community. Entrevestor

has posted more than 3,000 articles on the community since September 2011 and has an intimate knowledge of the startup community. We conduct more than 200 to 300 interviews a year. We pride ourselves on reporting on all four Atlantic Provinces and have used this broad and deep understanding of the community to complement the results of the survey.

Wherever possible, we've used the largest sample size available. We prefer to use the 486 startups we've identified. However, for some data we can only get information from the 171 companies that responded to the survey, or those that responded to the survey supplemented by other information. In each case, we have tried to be as clear as possible about the number of companies we've counted and how we arrived at the details.

Unless we state otherwise, all the data is as of Dec. 31, 2017. In most cases, we have rounded percentages off at the decimal point – we're collecting data that can best be described as messy, and it's a fool's game to be too precise in reporting growth. The important thing is the broad trends. For all people picky about grammar, we use the word "data" as a singular noun. (When was the last time you heard someone use the word "datum" in a sentence?)

We would like to sincerely thank the Atlantic Canadian startups that trusted us with confidential information.

ABOUT ENTREVESTOR

Entrevestor was founded in 2011 by Nova Scotia-based writers Peter and Carol Moreira as a portal to unite and inform the startup community in Atlantic Canada. It posts daily news on Atlantic Canadian startups on its website, www.entrevestor.com, and its articles appear three times weekly in the Chronicle-Herald.

ABOUT THE AUTHOR

Peter Moreira spent more than 30 years in journalism in Asia, Europe and North America. He worked with The Deal of New York, covering M&A, private equity and VC markets in the U.S. and Canada for six years and serving four years as London Bureau Chief. At Bloomberg, he covered European and U.K. banking and finance. He previously worked for the South China Morning Post in Hong Kong, Knight-Ridder Financial in Hong Kong and Seoul, and the Canadian Press's parliamentary bureau in Ottawa. His writing has appeared in USA Today, the Globe and Mail, The Toronto Star, National Post, the Chronicle-Herald and the Independent on Sunday (London). Peter is a graduate of the Canadian Securities Course. He is the author of *Hemingway on the China Front* (Potomac, 2006) and *Backwater: Nova Scotia's Economic Decline* (Nimbus 2009), and *The Jew Who Defeated Hitler*, (Prometheus, 2014). His first novel, *The Haight*, a murder mystery set in San Francisco's Haight Ashbury district in 1968, will be published by Poplar Press in the summer of 2018.

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