

INSTITUTIONAL EQUITY RESEARCH

Todd Coupland, CFA
1 (416) 956-6025
Todd.Coupland@cibc.com

Amy Dyck
1 (416) 594-7232
Amy.Dyck@cibc.com

Stephanie Price, CFA
1 (416) 594-7047
Stephanie.Price@cibc.com

Varun Choyah
1 (416) 956-3229
Varun.Choyah@cibc.com



Information Technology

INDUSTRY UPDATE

Emerging Tech In 2017

May 12, 2017

A Cross Country View Of Innovation



All figures in Canadian dollars, unless otherwise stated.

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Emerging Technology In 2017

Now in the fifth year of writing this report, our perspective continues to benefit from maturing views and a deepening knowledge of new technology across Canada. In 2017, Canada's emerging technology areas are having a strong year. High-quality private companies have gained access to capital, including Thalmic Labs, which raised US\$120 million from Intel Capital, Amazon Alexa Fund and Fidelity Investments Canada in September 2016. On the going-public side, Real Matters recently filed its prospectus to list in Canada at a value of ~\$1.2 billion and plans to raise \$156 million. Improving private and private-to-public trends bode well for the Canadian technology sector.

Broader technology sector context confirms our view; 2016 was a terrific year for venture capital. During the year, venture capital invested in Canada rose by ~41% reaching \$2.3 billion. This was the highest level since 2001 as deal size (up 44%) and the number of deals both increased. Real Matters will be the first Canadian tech IPO since Shopify went public in 2015. While these trends are positive, we predict there will be threshold tests as investor expectations will limit initial public offerings to high-quality companies with durable businesses.

In this year's report, we look at:

- CIBC's sector coverage initiatives;
- Technology centre highlights from across the country;
- Public company themes and valuations; and,
- Top private companies that should be on investors' watch lists.

Sector Coverage Initiatives

CIBC initiatives are designed to enhance our technology research and provide clients unique access to the tech market. In Toronto, our flagship investor conference has been renamed to the *CIBC Technology and Innovation Conference 5.0* (formerly *CIBC Emerging Technology Conference*) and will take place on May 16. This year, investors will have access to over 25 public and private companies. We have added platform demonstrations for the first time and an artificial intelligence theme to the conference with a panel of experts and lead-in presentation from quantum computing company D-Wave Systems.

We also continue to host investor tours of Canada's major technology centres, most recently in Ottawa and Waterloo. Investors have an interest in tracking the next wave of technology companies and our tours provide this access. These experiences give valuable context to Canada's tech centres and help investors decide if they should invest in late-stage private rounds or consider these companies as possible investments if and when they decide to go public.

Technology Centre Highlights

Geographically, Ottawa still claims top honors for the most recent IPOs. The best-performing recent IPOs are Kinaxis and Shopify. Kinaxis has a current price of ~\$85, up from its June 2014 IPO price of \$13. Shopify's shares were at US\$17 in May 2015 and now trade around US\$85. The Kanata/Ottawa region has deep networking experience that began with Nortel, then Newbridge Networks, and now many others contribute to the competitive advantage of companies in the region.

Shopify is the most visible in terms of its growth and hiring plans. In 2017, it plans to add 1,000 people to its staff count of ~2,000. Other smaller companies are also doing well and growing rapidly. Our Ottawa watch list includes Klipfolio, Edgewater Wireless and You.i TV. Video app creator You.i TV has been quietly performing well. Its co-founder and CEO Jason Flick will be speaking at our conference.

Vancouver is a tremendous centre of innovation. Top companies to watch are D-Wave, Hootsuite, Vision Critical, Zafin and Global Relay. Hootsuite has ~1,000 staff and is growing again following its 2015 reset. This news is encouraging for the company and the broader technology market in Vancouver.

The e-commerce segment is also important to the region but we note that many of these companies are struggling. Giants like Amazon, Home Depot and Walmart are having an impact from their advantages in resources of logistics, shipping, customer service and technology. These strategies are working and causing damage to the local Vancouver e-commerce sector. Shoes.com, founded by Roger Hardy (formerly of Coastal Contacts), was shut down in January 2017. Cymax met a similar fate. In 2016, reports of financial distress, auditor warnings and staff layoffs surfaced over the summer.

Jeff Booth, founder of BuildDirect, is also working towards a resetting of its business as well. The company has expanded its product offerings and brands, added clean energy products, and launched a new service that focuses and caters solely to home improvement professionals.

Waterloo is extremely prolific and booming at the moment. The Waterloo region is seeing a new start-up almost on a daily basis. It has turned into a new group of exciting companies. The region is also a centre for Google and Shopify, which is aggressively adding staff to its Waterloo facility. Even Blackberry is refocusing, improving operations, and increasing its own staff. The November 2016 Scoring Tech Report found that the Waterloo region recorded an increase of 74.4% in new technology jobs in 2015. Our 'must follow' companies include Kik, the local unicorn (Canada's only) in messaging with its 2015 \$1 billion valuation, D2L in online learning, Miovision in traffic management and eSentire in cyber security.

In 2016, we saw a new group of Waterloo region tech companies emerge that we believe should be followed closely. That list includes Thalmic Labs, Vidyard, Clearpath Robotics, Magnet Forensics and Aeryon Labs. McKinsey estimates that the Toronto-Waterloo Innovation Corridor has the potential to deliver a \$50 billion increase in direct equity value, \$17.5 billion in direct annual GDP and more than 170,000 high-quality jobs by 2025.

In Toronto, the landscape while diffused, is also very active. We continue to track FreshBooks, PointClickCare and ScribbleLive. This year we have added Wattpad and Nulogy to our profile reports and our watch list.

Toronto is also a global 'hotbed' for artificial intelligence. Its leading lights include Geoffrey Hinton, who is a University of Toronto Professor Emeritus, Google VP Engineering Fellow and now Chief Scientific Advisor to Vector Institute. The new Vector Institute for Artificial Intelligence research was formed as a result of deep learning experts at and around the University of Toronto that came together with the industry. The applications and implications will be seen across sectors from automotive and self-driving to finance. Funding for Vector includes ~\$100 million from the federal and provincial government and more than \$80 million from 30 companies over 10 years.

In Quebec, we are following Montreal-based Lightspeed, which provides cloud-based point-of-sale software. With over \$15 billion in transactions processed and 45,000 merchant clients in retail on an annual basis, we see significant growth for this company in the retail, restaurant and thriving e-commerce market.

Finally, outside of the core technology markets in Canada, we highlight two companies that are advancing AgTech: Farmers Edge based out of Winnipeg and Resson Aerospace Corporation out of Fredericton. Farmers Edge offers variable-rate technology that uses field-centric data to allow growers to make effective decisions. Resson Aerospace is a predictive analysis company that uses data analytics with drones and robotics to help agricultural producers maximize production and margins. Both companies completed significant raises in 2016 (US\$41 million and US\$11 million, respectively) with influential backers.

The Public Technology Markets

On the public side, the S&P/TSX InfoTech Index is up 23% from a year ago, and up ~11% year to date. As a percentage of the TSX, the InfoTech Index continues to grow, now at a weight of ~3%, up from 2.8% in May 2016 and approaching its five-year high of ~3.5%.

What's Changed? In 2016 and so far in 2017, no new companies have been added to the TSX InfoTech Index but Avigilon was removed in September 2016, leaving the index consisting of 12 members. In 2015, Enghouse Systems, Kinaxis, Mitel and Computer Modelling Group were added to the InfoTech Index.

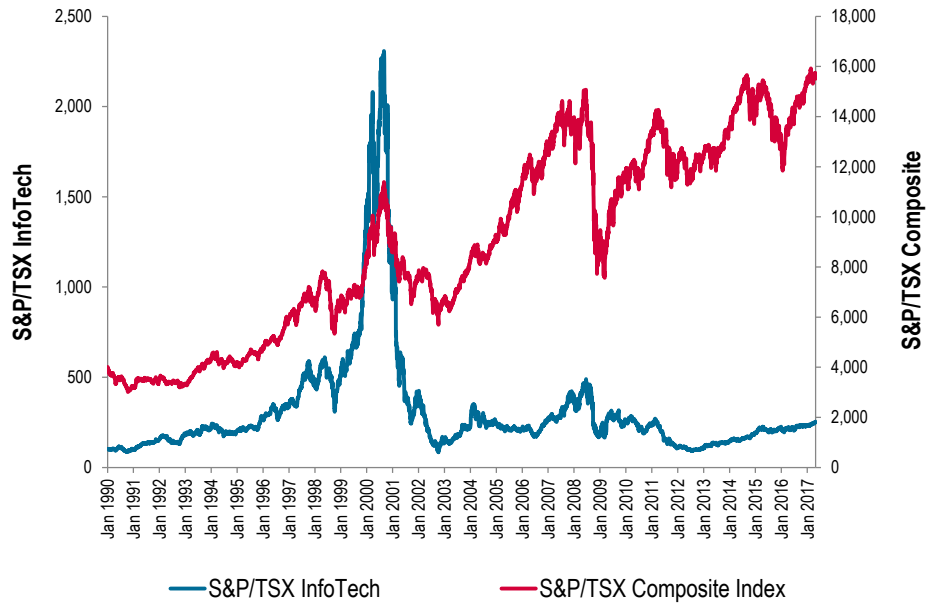
The performance of the index is due to levels of strength from several constituents. In the past year, the leaders of the InfoTech Index include Kinaxis (up 97%), Sierra Wireless (up 71%), Celestica (up 45%), BlackBerry (up 42%) and Open Text (up 37%). Open Text's gains for the year contributed to 27% of the index move.

Laggards in the past year include Avigilon (down 43% until its removal), DH Corp (down 15%, given its impending acquisition by Vista Equity Partners), Mitel (up 7%), Computer Modelling Group (up 11%) and CGI Group (up 12%).

Looking Ahead: Looking forward, we see technology becoming an even bigger part of the TSX Composite.

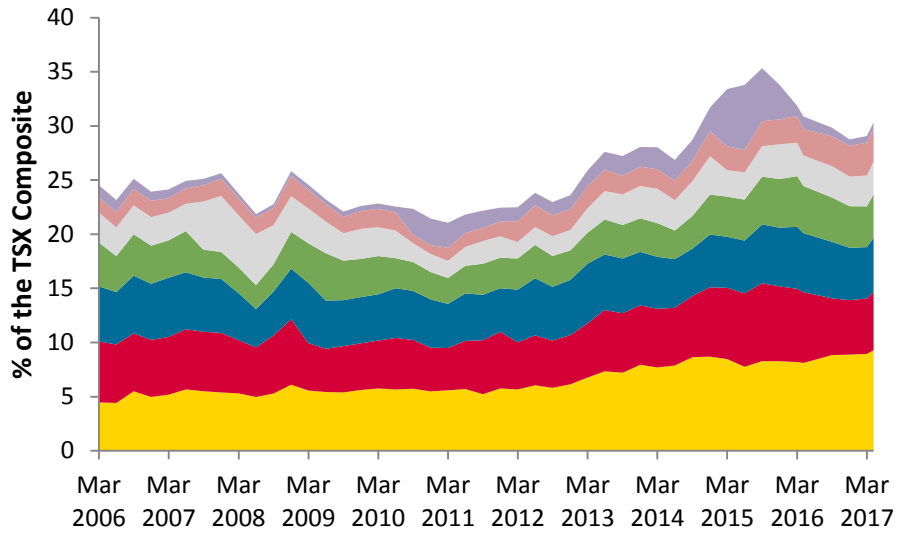
Over the past year, we have seen greater Canadian investor interest in Shopify. As a direct result, we expect Shopify to be added to the TSX Composite Index in June given that its weight of ~500 bps is well above the threshold of 50 bps. Up until recently, the issue holding Shopify back is that its average trading volume of all Canadian exchanges since listing in Canada had been under 100,000 shares. Its trading volume has increased to ~324,000, well above the threshold for the June inclusion.

Exhibit 1. TSX Info Tech Versus The Composite Since 1990 - Material Upside Versus Historical Levels



Source: Bloomberg, company reports and CIBC World Markets Inc.

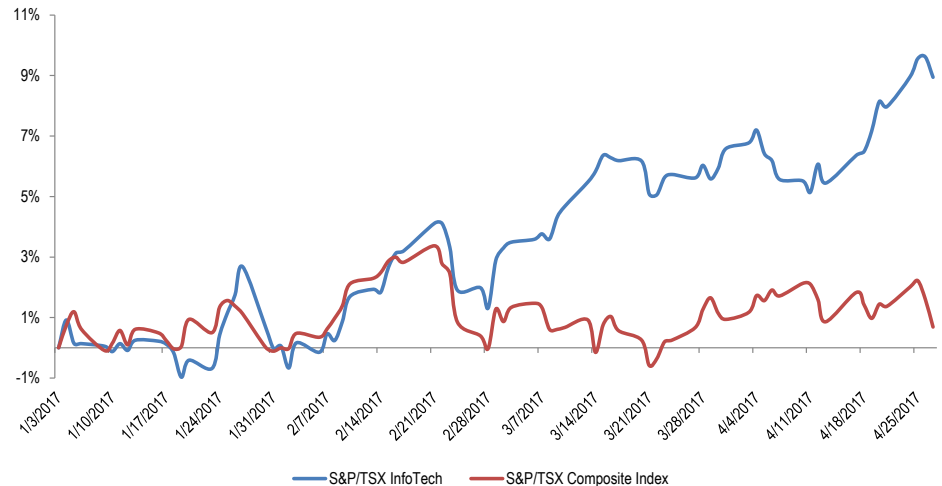
Exhibit 2. Since 2011 TSX InfoTech Is Increasing Its Weighting



■ Industrials ■ Consumer Discretionary ■ Telecommunications
■ Consumer Staples ■ Information Technology ■ Utilities
■ Health Care

Source: Bloomberg, company reports and CIBC World Markets Inc.

Exhibit 3. YTD Price Return - InfoTech Has Outperformed The Composite By ~9% YTD



Source: Bloomberg, company reports and CIBC World Markets Inc.

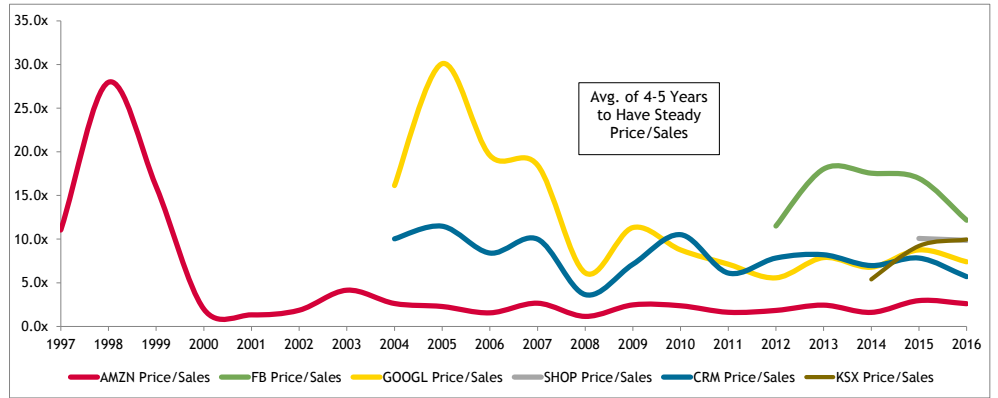
Valuations - Paying For Performance

Valuations for Canadian technology companies have generally improved since 2007. In 2017, the InfoTech Composite Index P/E valuation has stabilized at 24x one-year forward earnings compared to 22.6x in 2007. Excluding high-growth Kinaxis, the average 2017 P/E is 20.2x. P/S multiples are slightly higher than historical levels at 4.3x due to improved performance by companies like Kinaxis and Computer Modelling Group. Although not yet in the S&P/TSX Composite IT Sector Index, Shopify currently trades a forward P/S of ~10x. It is clear to us that as higher-growth companies are included in the averages, the valuations will move up.

In our recent Beyond The Headlines report on Shopify, we compared the long-term valuation of leading platform companies such as Google, Facebook, Salesforce.com and Amazon from their the date of the IPO until the present. On average, these leaders traded at over 10x one-year forward sales for four to five years after going public. From this experience, our argument is that leading technology platform companies will command the correct multiples regardless of what market or country they trade on or in.

We see this for both Shopify, which listed on the TSX and NASDAQ, and Kinaxis, which listed only on the TSX. Shopify has been public for two years and Kinaxis has been public for three years. Our view is these companies, along with other top-performing companies regardless of the trading exchange (Canada or the U.S.), will be valued highly (above the overall averages) as long as their sector-leading performance continues.

Exhibit 4. Forward Price/Sales Since IPOs



Source: Company reports and CIBC World Markets Inc.

Exhibit 5. Forward P/E Valuations Are More Conservative Versus Recent History

April 2017			2010			2007		
S&P/TSX Composite IT Sector Index	Weighting	Forward P/E	S&P/TSX Composite IT Sector Index	Weighting	Forward P/E	S&P/TSX Composite IT Sector Index	Weighting	Forward P/E
CGI Group Inc	28%	17.1x	Blackberry Ltd	76%	2.3x	Research in Motion Ltd	71%	36.8x
Open Text Corp	20%	15.2x	CGI Group Inc	9%	52.7x	Nortel Networks Corp	9%	n/a
Constellation Software Inc/Canada	20%	20.0x	Open Text Corp	6%	41.2x	Cognos Inc	6%	32.1x
BlackBerry Ltd	10%	nm	Celestica Inc	5%	20.8x	CGI Group Inc	5%	16.8x
DH Corp	4%	11.5x	MacDonald Dettwiler & Associates Ltd.	4%	36.5x	Open Text Corp	2%	28.9x
Celestica Inc	4%	10.9x	Average		30.7x	Teranet Income Fund	2%	n/a
Descartes Systems Group Inc/The	4%	21.5x				MacDonald Dettwiler & Associates Ltd.	2%	18.3x
Kinaxis Inc	3%	62.9x				Celestica Inc	2%	11.9x
Enghouse Systems Ltd	2%	30.7x				Emergis Inc	1%	n/a
Sierra Wireless Inc	2%	30.6x				Aastra Technologies Inc	1%	13.4x
Mitel Networks Corp	1%	10.2x				Average		22.6x
Computer Modelling Group Ltd	1%	34.3x						
Average		24.1x						

Source: Company reports, Bloomberg and CIBC World Markets Inc.

Exhibit 6. Forward P/S Valuations Are Slightly Higher Than Recent Historical Levels

April 2017			2010			2007		
S&P/TSX Composite IT Sector Index	Weighting	Forward P/S	S&P/TSX Composite IT Sector Index	Weighting	Forward P/S	S&P/TSX Composite IT Sector Index	Weighting	Forward P/S
CGI Group Inc	28%	1.8x	Blackberry Ltd	76%	0.4x	Research in Motion Ltd	71%	n/a
Open Text Corp	20%	3.5x	CGI Group Inc	9%	4.2x	Nortel Networks Corp	9%	0.1x
Constellation Software Inc/Canada	20%	3.8x	Open Text Corp	6%	7.7x	Cognos Inc	6%	n/a
BlackBerry Ltd	10%	4.9x	Celestica Inc	5%	0.3x	CGI Group Inc	5%	0.8x
DH Corp	4%	1.6x	MacDonald Dettwiler & Associates Ltd.	4%	3.4x	Open Text Corp	2%	2.5x
Celestica Inc	4%	0.3x	Average		3.2x	Teranet Income Fund	2%	n/a
Descartes Systems Group Inc/The	4%	7.5x				MacDonald Dettwiler & Associates Ltd.	2%	n/a
Kinaxis Inc	3%	10.2x				Celestica Inc	2%	0.2x
Enghouse Systems Ltd	2%	4.7x				Emergis Inc	1%	n/a
Sierra Wireless Inc	2%	1.2x				Aastra Technologies Inc	1%	n/a
Mitel Networks Corp	1%	0.9x				Average		0.9x
Computer Modelling Group Ltd	1%	11.1x						
Average		4.3x						

Source: Company reports, Bloomberg and CIBC World Markets Inc.

Exhibit 7. TSX InfoTech Composite Price Levels And Current Year P/E Have Steadied



Source: Company reports and CIBC World Markets Inc.

Venture Investing In Technology

Canadian venture investing saw its seventh straight year of steadily increasing investments and the highest level since 2001. In 2017, the amount of venture capital invested rose by 41% Y/Y to \$3.2 billion for over 530 deals. Ontario and Quebec were the strongest regions while British Columbia received lower levels of funding in the year. With robust activity in both late and early activity, we believe it bodes well for the health of the sector. This also sets up for more activity in exits, either through IPOs or acquisitions.

2016 Venture Investing Highlights

- 11 mega deals (over \$50 million) for a total of \$1 billion, up from five deals for a total of \$335 million in 2015.
- Thalmic Labs had the top deal at \$158 million (US\$120 million).
- Average deal size rose to \$6.1 million, up from \$4.2 million in 2015.
- Ontario increased investment by 55% over 200 deals.
- Quebec was up 47% over 164 deals.
- Exits were limited to acquisitions at 29 transactions for \$521 million. This is down 63% from the \$1.4 billion in M&A exits in 2015.
- Top 10 deals were Thalmic Labs, Dalcour Pharmaceuticals, Real Matters, Zymeworks, Hopper, Blockstream, Farmers Edge, Turnstone Biologics, Medgate and one undisclosed.
- Life Sciences and ICT sectors received the most funding, while Clean Tech Agribusiness and others had just a few deals.

In 2016, later-stage investing rebounded by 63%. This indicates that the next wave of Canadian technology companies is performing and was able to attract significant funding. We view this as an important data point to the Canadian IPO pipeline over the next couple of years.

Early-stage investing had another good year, growing by 30% after a strong year in 2015. The deal count and size increased in this segment. Similar to our thoughts last year, this a good sign for the longer-term future and health of the market. Viable ideas are seeing better funding, and this is positive indicator for the knowledge economy.

The exit trend however was weak in 2016. There were no IPOs and M&A declined to 28 deals, down from 42. The 28 exits that occurred equated to only \$521 million. Bit Stew Systems Inc. was sold to General Electric as the top deal of the year at \$206 million.

Exhibit 8. 2016 Top VC Deals

Company Name	Province	\$ Millions	Disclosed VC Firms	Sector	Stage
Thalmic Labs Inc.	Ontario	\$158	Intel, Amazon Alexa Fund, Fidelity, Spark, First Round, iNovia	ICT	Early Stage VC
Dalcor Pharmaceuticals Inc.	Quebec	\$128	Caisse de Dépôt et Placement du Québec, CTI Partners, Fonds de solidarité FTQ, Canadian private investors	Life Sciences	Later Stage VC
Real Matters Inc.	Ontario	\$100	Kensington Capital Partners Limited, Canadian private investors, Whitecap Venture Partners	ICT	Later Stage VC
Zymeworks Inc.	British Columbia	\$87	BDC Capital, Lumira Capital, joined by Eli Lilly, Celgene, CTI Life Sciences, Fonds de solidarité FTQ, Perceptive Advisors, Teralys Capital, Northleaf, Brace Pharma Capital, Merlin Nexus, others	Life Sciences	Early Stage VC
Hopper Inc.	Quebec	\$82	Accomplice, BDC Capital Inc., Brightspark Ventures, Caisse de Dépôt et Placement du Québec, Investissement Québec, OMERs Ventures	ICT	Later Stage VC
Blockstream Corporation	Quebec	\$76	AME Cloud Ventures, AXA Strategic Ventures, Blockchain Capital, Digital Garage, Future\Perfect Ventures, Horizons Ventures Limited, Khosla Ventures, MV Advisers, Real Ventures, Seven Seas Partners	ICT	Early Stage VC
Farmers Edge	Manitoba	\$58	Avrio Ventures Management Corp., Kleiner Perkins Caufield & Byers, Mitsui & Co., Osmington Inc., Canadian private investors	Agribusiness	Later Stage VC
Turnstone Biologics Inc.	Ontario	\$55	F-Prime Capital Partners, Fight Against Cancer Innovation Trust, Orbimed Advisors, Versant Venture Management	Life Sciences	Early Stage VC
Medgate Inc.	Ontario	Undisclosed	BMO Capital Partners, Georgian Partners Inc., Norwest Venture Partners, Teralys Capital	ICT	Later Stage VC
Undisclosed Company	Quebec	Undisclosed	Undisclosed Investors	ICT	Later Stage VC

Source: Canadian Venture Capital and Private Equity Association.

2017 Emerging Technology Companies

Below we introduce our watch list of emerging technology companies. This report highlights the fastest-growing private and/or under-covered small-cap public companies in Canada. Where possible, for each company we include a profile that includes sales (or estimated sales), growth estimates, headcount, market sizing, venture funding and descriptions. We also qualitatively talk about the industry, company, products and the company's plans moving forward. For companies that have a clear business model, we attempt to lay this out. The majority of these companies are on pace to see material growth for the foreseeable future.

As we view these companies as highly innovative and attention-worthy, we recommend that investors add them to their own watch lists. Exhibit 10 lists the companies and their respective sectors.

Exhibit 9. 2017 Featured Emerging Technology Companies

Company	Status	City	Industry
Aeryon Labs	Private	Waterloo	Unmanned Aerial Vehicle Manufacturing
BuildDirect	Private	Vancouver	e-Commerce
Clearpath Robotics	Private	Kitchener	Robotics
D2L	Private	Kitchener	Learning Management Systems
D-Wave Systems Inc	Private	Burnaby	Quantum Computer Programming
Edgewater	(TSX-YFI)	Ottawa	Wireless Communications and WiFi
eSentire	Private	Cambridge	Network Security
Farmer's Edge	Private	Winnipeg	Precision Farming
Flipp	Private	Toronto	Retail Technology Platform Services
Freshbooks	Private	Toronto	Accounting Software
Global Relay	Private	Vancouver	Cloud Archiving
Hootsuite	Private	Vancouver	Social Media Management
Kik	Private	Waterloo	Mobile Messaging
Klipfolio	Private	Ottawa	Cloud-Based Dashboards
Lightspeed	Private	Montreal	Point-of-Sale Software
Magnet Forensics	Private	Waterloo	Digital Forensics Services
Miovision	Private	Kitchener	Traffic Management
Nulogy	Private	Toronto	Contract Packaging
PointClickCare	Private	Mississauga	Electronic Health Records
Resson Aerospace Corp	Private	Fredericton	Precision Farming
ScribbleLive	Private	Toronto	Content Management Services
Thalmic Labs	Private	Kitchener	Wearable Technology
Vidyard	Private	Kitchener	Video Intelligence
Wattpad	Private	Markham	Internet Writing Platform
You.i TV	Private	Ottawa	Media Software Solutions
Zafin	Private	Vancouver	Financial Technology

Source: Company reports and CIBC World Markets Inc.



Edgewater Wireless

High Density Wi-Fi

Industry

According to Global Web Index, the typical digital consumer now owns 3.64 connected devices - from phones and tablets to streaming sticks, wearables and gaming consoles. The growth of connected devices is also driving demand for data, and the technology of choice for most consumers is Wi-Fi. Along with this growth, Wi-Fi traffic from mobile devices and Wi-Fi-only devices will account for 49% of total data traffic by 2020, a 42% increase from 2015 (Cisco). Globally, the WiFi market is projected to reach \$33.6 billion by 2020 with 20 billion WiFi chipsets forecasted to ship between 2016-2021. Current WiFi chipsets from the likes of Qualcomm, Broadcom and Quantenna are based on a single channel radio architecture.

Company

With over \$60 million invested in the company's core technology, WiFi3™, Edgewater Wireless was spun-off in 2012 by Edgewater Computer Systems. The company is structured into three business units: 1) High-Density WiFi solutions which are powered by WiFi3 and marketed under the newly launched aera, io brand 2) OEM & Licensing of WiFi3 Technology and 3) Intellectual Property / Patent Monetization. In 2015, the company completed a patent deal with Apple and in 2016 was brought into a CableLabs backed accelerator where the technology and market opportunity were further validated.

Products

Backed by 20+ patents, Edgewater's WiFi3™ technology is revolutionizing the WiFi industry by solving the three main issues that impact legacy WiFi performance – interference, capacity and density. In high-density or high-interference applications, legacy WiFi, based on a single-channel radio architecture, performs like a single lane road in heavy traffic. Edgewater's innovative and patented multi-lane approach, WiFi3™, has been designed to allow network vendors and operators to deal with the exponential increase in connected devices and data demand in venues, public areas, large enterprises and the home. WiFi3™ delivers 20-40x greater performance vs. traditional Wi-Fi in high density applications and lowers network infrastructure costs by 30–50%.

Plan Moving Forward

Edgewater Wireless plans to continue the adoption of WiFi3™. The company is also soon to launch in conjunction with a Top 5, Fortune 500 Retailer what is believed to be the world's largest Wi-Fi + IOT deployment in the world. It also plans on commercializing engagements with six MSOs and expanding its distributor and reseller network in key strategic markets.

All figures in US dollars, unless otherwise stated.

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	May 12, 2017
	Wireless Communications Equipment
City:	OTTAWA
Employees:	< 20

Key Ratios and Statistics

2016 Sales:	\$134K
2016 Sales Growth:	48%

TSX-V:YFI (05/09/17)	C\$0.27
52-week Range	C\$0.18 - \$0.63
Shares Outstanding	135.1M
Avg. Daily Trading Vol.	199K
Market Capitalization	\$36.5M
Dividend/Div Yield	\$0/0%
Fiscal Year Ends	April

CEO:	Andrew Skafel
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	2014	2015	2016	2017 YTD
Revenue	\$176K	\$90K	\$134K	\$135K
EPS	-\$0.03	-\$0.02	-\$0.02	-\$0.03

Source: Company reports

Company Description

Edgewater Wireless develops and manufactures multi-channel wireless communications equipment and Wi-Fi technologies.

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Stock Prices as of 05/12/2017:

Avigilon Corporation (2g) (AVO-TSX, C\$16.41)
BlackBerry Limited (2g, 7) (BBRY-NASDAQ, US\$9.38)
Canadian Tire Corporation, Ltd. (2g, 7, 13) (CTC.A-TSX, C\$156.39)
Celestica Inc. (2g, 6a, 12) (CLS-NYSE, US\$14.15)
CGI Group Inc. (2g, 12) (GIB.A-TSX, C\$66.53)
Constellation Software Inc. (2g, 7) (CSU-TSX, C\$684.19)
Corus Entertainment Inc. (2g, 13) (CJR.B-TSX, C\$13.22)
Descartes Systems Group Inc. (2g) (DSGX-NASDAQ, US\$23.65)
DH Corp. (2g, 7) (DH-TSX, C\$25.39)
Kinaxis Inc. (2g) (KXS-TSX, C\$84.73)
MacDonald, Dettwiler and Associates Ltd. (2g) (MDA-TSX, C\$65.81)
Mitel Networks Corporation (2g, 3a, 3c) (MITL-NASDAQ, US\$6.37)
Open Text Corporation (2a, 2c, 2e, 2g, 7, 9) (OTEX-NASDAQ, US\$32.71)
Rogers Communications Inc. (2a, 2c, 2g, 7, 13) (RCI.B-TSX, C\$62.30)
Shopify Inc. (2g, 12) (SHOP-NYSE, US\$92.02)
Sierra Wireless Inc. (2g) (SWIR-NASDAQ, US\$27.80)
Thomson Reuters Corporation (2g) (TRI-NYSE, US\$44.03)

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- 2f CIBC World Markets Corp. expects to receive or intends to seek compensation for investment banking services from this company in the next 3 months.
- 2g CIBC World Markets Inc. expects to receive or intends to seek compensation for investment banking services from this company in the next 3 months.
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- 4a This company is a client for which a CIBC World Markets company has performed non-investment banking, non-securities-related services in the past 12 months.
- 4b CIBC World Markets Corp. has received compensation for non-investment banking, non-securities-related services from this company in the past 12 months.
- 4c CIBC World Markets Inc. has received compensation for non-investment banking, non-securities-related services from this company in the past 12 months.
- 5a The CIBC World Markets Corp. analyst(s) who covers this company also has a long position in its common equity securities.
- 5b A member of the household of a CIBC World Markets Corp. research analyst who covers this company has a long position in the common equity securities of this company.
- 6a The CIBC World Markets Inc. fundamental analyst(s) who covers this company also has a long position in its common equity securities.
- 6b A member of the household of a CIBC World Markets Inc. fundamental research analyst who covers this company has a long position in the common equity securities of this company.
- 7 CIBC World Markets Corp., CIBC World Markets Inc., and their affiliates, in the aggregate, beneficially own 1% or more of a class of equity securities issued by this company.
- 8 An executive of CIBC World Markets Inc. or any analyst involved in the preparation of this research report has provided services to this company for remuneration in the past 12 months.
- 9 An executive committee member or director of Canadian Imperial Bank of Commerce ("CIBC"), the parent company to CIBC World Markets Inc. and CIBC World Markets Corp., or a member of his/her household is an officer, director or advisory board member of this company or one of its subsidiaries.
- 10 Canadian Imperial Bank of Commerce ("CIBC"), the parent company to CIBC World Markets Inc. and CIBC World Markets Corp., has a significant credit relationship with this company.
- 11 The equity securities of this company are restricted voting shares.
- 12 The equity securities of this company are subordinate voting shares.
- 13 The equity securities of this company are non-voting shares.
- 14 The equity securities of this company are limited voting shares.

CIBC World Markets Corp./Inc. Stock Rating System

Abbreviation	Rating	Description
Stock Ratings		
OP	Outperformer	Stock is expected to outperform similar stocks in the coverage universe during the next 12-18 months.
NT	Neutral	Stock is expected to perform in line with similar stocks in the coverage universe during the next 12-18 months.
UN	Underperformer	Stock is expected to underperform with similar stocks in the coverage universe during the next 12-18 months.
NR	Not Rated	CIBC World Markets does not maintain an investment recommendation on the stock.
R	Restricted	CIBC World Markets is restricted (due to potential conflict of interest) from rating the stock.
Stock Ratings Prior To December 09, 2016		
SO	Sector Outperformer	Stock is expected to outperform the sector during the next 12-18 months.
SP	Sector Performer	Stock is expected to perform in line with the sector during the next 12-18 months.
SU	Sector Underperformer	Stock is expected to underperform the sector during the next 12-18 months.
NR	Not Rated	CIBC World Markets does not maintain an investment recommendation on the stock.
R	Restricted	CIBC World Markets is restricted (due to potential conflict of interest) from rating the stock.
Sector Ratings (note: Broader market averages refer to S&P 500 in the U.S. and S&P/TSX Composite in Canada.)		
O	Overweight	Sector is expected to outperform the broader market averages.
M	Marketweight	Sector is expected to equal the performance of the broader market averages.
U	Underweight	Sector is expected to underperform the broader market averages.
NA	None	Sector rating is not applicable.

"Speculative" indicates that an investment in this security involves a high amount of risk due to volatility and/or liquidity issues.

Ratings Distribution*: CIBC World Markets Corp./Inc. Coverage Universe

(as of 12 May 2017)	Count	Percent	Inv. Banking Relationships	Count	Percent
Outperformer (Buy)	148	47.0%	Outperformer (Buy)	147	99.3%
Neutral (Hold/Neutral)	138	43.8%	Neutral (Hold/Neutral)	135	97.8%
Underperformer (Sell)	20	6.3%	Underperformer (Sell)	20	100.0%
Restricted	9	2.9%	Restricted	9	100.0%

*Although the investment recommendations within the three-tiered, relative stock rating system utilized by CIBC World Markets Corp./Inc. do not correlate to buy, hold and sell recommendations, for the purposes of complying with FINRA rules, CIBC World Markets Corp./Inc. has assigned buy ratings to securities rated Outperformer, hold ratings to securities rated Neutral, and sell ratings to securities rated Underperformer. The distributions above reflect the combined historical ratings of CIBC World Markets Corp. and CIBC World Markets Inc.

Ratings Distribution: Information Technology Coverage Universe

(as of 12 May 2017)	Count	Percent	Inv. Banking Relationships	Count	Percent
Outperformer (Buy)	10	50.0%	Outperformer (Buy)	10	100.0%
Neutral (Hold/Neutral)	8	40.0%	Neutral (Hold/Neutral)	8	100.0%
Underperformer (Sell)	2	10.0%	Underperformer (Sell)	2	100.0%
Restricted	0	0.0%	Restricted	0	0.0%

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CIBC World Markets Corp./Inc. Price Chart

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