

Creating World-Class Companies

Do Canadians Start Businesses in World-Class Markets?



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Creating World-Class Companies

"If Canada wants to create world-class companies we need to create them in world-class markets."

Canada has difficulty creating research-intensive world-class companies and there are a number of reasons for this. In past reports we have examined management and financing practices and how they contribute to our challenges at scaling companies. In this report we want to go back to the beginning and look at the nature of technology companies that are being formed in Canada.

Research-intensive and globally competitive technology companies are currently found in four major markets: life sciences, automotive, hardware and electronics, and software. For the most part these companies serve either consumer markets or markets that focus on both consumers and businesses. Leading Canadian technology companies do not have the same focus on consumers.

While world-class life science companies have been created in many countries through the development and acquisition of novel therapeutics, Canada's focus has not been on therapeutics. Three of Canada's leading life science companies are in generic drug manufacturing with a further four operating in the medical marijuana market. This latter market is expected to stay restricted to Canada in the short-term due to legislative restrictions worldwide.

In addition to life sciences companies, leading research-based companies worldwide are often found in automotive markets. While we have an auto industry, we are a "branch plant economy" and do not benefit from a locally developed industry. While many new companies are now being formed worldwide to develop cars and trucks from novel automotive technology, none are located in Canada.

A third area for the development of world-class companies is in electronics and hardware. Companies like Samsung and Apple have developed successful international businesses out of proprietary technology. While BlackBerry was a world leader in this market and may emerge again as dominant through supply to the auto market, we have not created many homegrown businesses focusing on consumer electronics or hardware.

That leaves us with the software market, in which Canada has many locally developed businesses but struggles to turn them into world-class contenders. The markets served by those companies can be broken down into consumer-based, enterprise-based, or a combination of the two. Data from the US and China show the following patterns:

1. The largest new public software companies in the US and China have more consumer-based businesses and those that serve both consumers and enterprise customers.
2. The "best" 21 venture capital (VC) deals (those with the highest returns) struck in late 2017 have centered largely on consumer-based businesses.
3. The top US and Chinese Unicorns are mainly consumer-based companies.

However, Canadian software companies are typically in enterprise and small- and midsize business markets. In terms of markets, size matters, and the number of consumers that exists as potential buyers means that consumer markets are poised to be larger than enterprise markets. Thus, software companies started in consumer markets are likely to be larger than companies started in enterprise markets.

Our analysis suggests that Canada is not entering research-focused technology businesses that serve large numbers of consumers—and this is observed across the life sciences, automotive, electronics and software industries. There are several potential explanations as to why we do not drive the creation of consumer-based companies:

1. We do not start them.
2. We start them but fail to finance them adequately.
3. We do not do a good job of growing them to world class.

If Canada wants to create larger companies, it will need to start building companies that serve consumer markets rather than business markets; and it will need to be able to finance their growth to help them overcome commercialization challenges unique to these markets.

If we want to create world-class companies
we need to create them in world-class markets.

This is what Blackberry did exceptionally well. They built a company that served consumers and businesses and gave it enough fuel to become globally competitive. We have done it before, and we will have to devise appropriate strategies to boost our current track record.

World-Class Businesses

World-class companies are globally competitive firms that boast a leadership position in their respective markets. They sell superior products or services, attract quality talent and investments in public markets, and hold a sizeable portion of the market share. The creation and growth of such firms on a measurable scale has been an elusive goal of Canada's innovation ecosystem.

In past reports, we examined management and financing practices as potential contributors to this challenge. In this report, we shift the focus slightly and look at the nature of companies currently created in Canada. This was motivated in part by a conversation with a prominent individual in the tech space who remarked recently that a likely reason for Canada's failure to create world-class companies was due to our habit of creating the "wrong type" of companies.

But what do we understand as the "wrong" business in this context? And if that is in fact true, then what is the "right" type of company to be nurtured?

Since, according to the Conference Board of Canada, our businesses face particular challenges on the research and development (R&D) and patent fronts, a good place to start would be to identify world-class companies that are on the other side of the spectrum. Table 1 shows the world's leading R&D spenders and assignees of US patents. The list is comprised of businesses operating in a number of industries; they are nearly evenly divided amongst pharmaceuticals, automotive, electronics and hardware, and software segments (Table 2).

Leading International Corporate R&D Spenders and Patent Assignees

Table 1

Company	2016 R&D Spending (US\$ billion)	2016 US Patent Granted
Volkswagen	13.2	98
Samsung	12.7	9,638
Amazon	12.5	1,160
Alphabet	12.3	3,326
Intel	12.1	2,281
Microsoft	12.0	2,733
Roche	10.0	308
Novartis	9.5	246
Johnson & Johnson	9.0	575
Toyota	8.8	1,997
Apple (split estimated)	8.1	2,135
Pfizer	7.7	73
General Motors	7.5	61
Merck	6.7	373

Ford	6.7	1,365
Daimler	6.6	160
Cisco	6.2	980
AstraZeneca	6.0	46
Bristol Myers Squibb	5.9	101
Oracle	5.8	697

Source: The Statistics Portal, US Patent Office

Leading International Corporate R&D Spenders and US Patent Assignees by Industry

Table 2

Industry	Number
Pharmaceutical	7
Automotive	5
Electronics and hardware	4
Software	4

However, another way to break down this list is by the type of customers served by these firms, which includes consumers only, businesses only, or a combination of consumers and businesses (Table 3). While the only company on the list serving exclusively other businesses is Oracle, the firms serving consumers only are pharmaceutical companies. The other leading R&D spenders (including automotive) have products that serve both enterprises and consumers, although many are better known for providing services to consumer-based clients.

Leading International Corporate R&D Spenders by Target Customer

Table 3

Industry	Number
Consumer only	6
Corporate only	1
Combination (consumers and corporate)	13

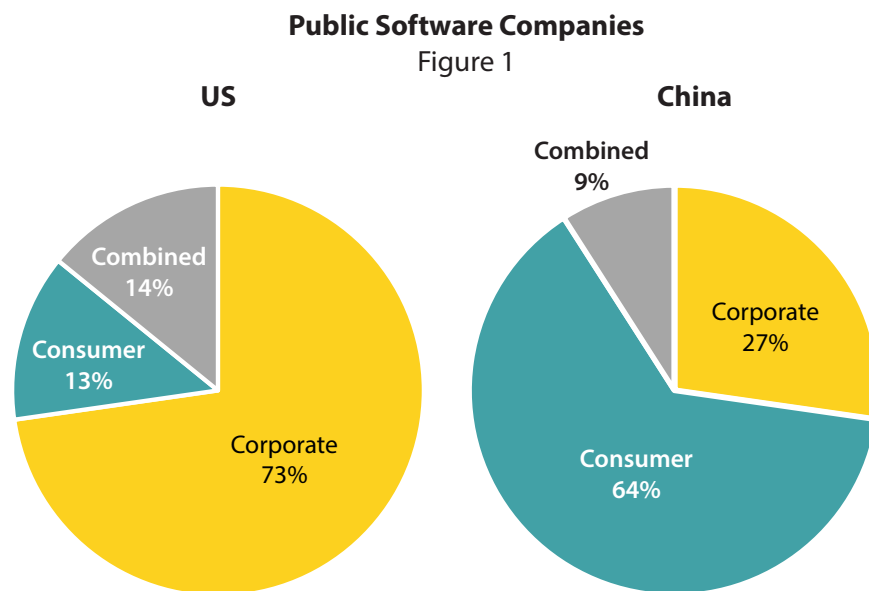
Thus, to be a world leader in the technology sector, driving large spending in research and development, we should heed these four industries (pharmaceutical, automotive, electronics and hardware, and software) and devise appropriate customer and market expansion strategies that would allow Canadian companies to reach globally competitive status.

Let us take a closer look at the customer strategies in the global software industry as an illustrative example.

Software Businesses

Although Canada does not create a sufficient number of hardware or electronics companies for analysis, we have enough software companies to provide a basis for comparison between Canadian and foreign companies. The software industry can be broken down into those serving combined markets or those serving either consumers or enterprises.

Since public companies tend to be larger than privately held firms, they are more likely to have attained “world-class” status. Figure 1 shows the composition of markets served by public software companies headquartered in the US and China.



Source: Google Finance

Figure 1 shows a dramatic difference between companies reaching public markets in China versus the US. US based public companies tend to be more focused on corporate clients than Chinese companies are. One reason for this difference relates back to the age of the companies. The US companies in this study happen to be much older than companies based in China. Chinese companies will have been founded and gone public more recently.

Looking at the history of commercialization of software one can see the reason for this difference. The first large users of software were companies so the US list reflects early corporate adoption of technology. The proliferation of smartphones has driven consumer adoption of technology and this is reflected in the Chinese companies that were started and gone public more recently.

Another perspective on firm performance is the list of companies that have resulted in the highest returns for venture capitalists. Table 4 shows a list of businesses as compiled by CB Insights in November 2017. As an example, WhatsApp had only one investor, Sequoia Capital that had invested US\$60 million before their exit for a return of US\$3 billion. A substantial number of these businesses serve combined or consumer markets, with only a small fraction (19%) targeting exclusively corporations.

Companies with the Highest Venture Capital Returns

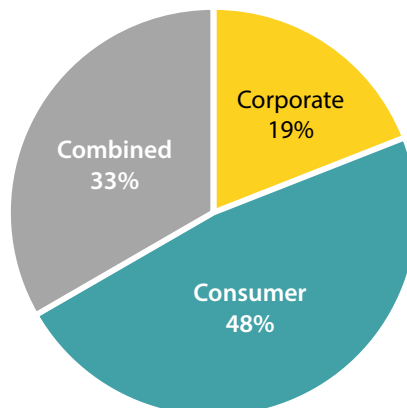
Table 4

WhatsApp
Facebook
Groupon
Cerent
Snap
King Digital Entertainment
UCWeb
Alibaba
JD.com
Delivery Hero
Zayo
Mobileye
Semiconductor Manufacturing International (SMIC)
Meitu
Google
Twitter
Zynga
Lending Club
Genentech
Stemcentrx
Workday

Source: CB Insights

Companies with the Highest Venture Capital Returns By Customer Segment

Figure 2



Source: CB Insights

The concentration of consumer based companies on the top 21 list also reflects the pattern we saw with public companies. Recent VC deals are more oriented towards consumer investments which drive higher returns. This more closely matches the experience of public Chinese companies.

We also explored the customer segments targeted by privately held Unicorns. Table 5 shows the top 10 Unicorns from CB Insights (as of February 6, 2018).

Top 10 Unicorns
Table 5

Uber
Didi Chuxing
Xiaomi
China Internet Plus Holding (Meituan Dianping)
Airbnb
SpaceX
Palantir Technologies
WeWork
Lu.com
Pinterest

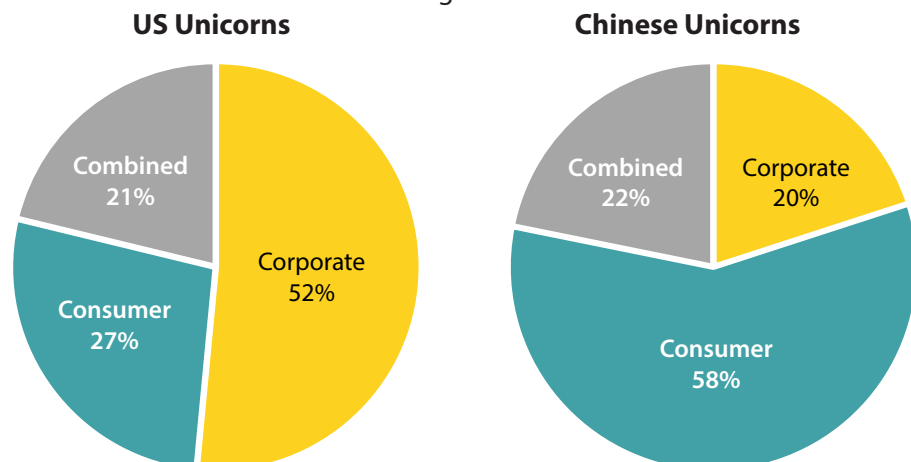
Source: CB Insights

A breakdown by customer segment shows a slightly different approach amongst US and Chinese Unicorns (Figure 3): while 80% of Chinese Unicorns are serving consumer markets, 52% of US Unicorns are serving exclusively businesses with 48% serving consumers or a combination of consumers and businesses.

Thus, in the world of software a very large percentage of the leading companies serve consumer markets, or markets that sell to both consumers and enterprises.

US and Chinese Unicorns by Customer Segment

Figure 3



In 2010 there were 18,500 businesses in the US with over 500 employees and 27.9 million small businesses. 78% of the small businesses had only one employee and these businesses behave more like individuals than enterprises in their purchasing habits. Meanwhile there were 308 million people in the US. Even though the dollar value per customer is bigger in large enterprise markets, there are 17,000 times more consumers than there are large enterprises. These individuals have dramatically increased the size of the software market by their adoption of smartphone technology. It is this market surge that has driven recent success by software firms focusing on consumer markets.

Canadian Technology Markets

Our objective in reviewing Canadian technology markets was to determine whether the pattern of company creation matched that of the leading companies in the US and China, and particularly whether the markets being served have the same world-class potential as those created elsewhere.

Life Sciences

First, we examined Canadian life sciences businesses to understand our track record in creating world-class companies in this consumer-focused market, and the type of markets pursued. Table 6 shows Canada's leading public life sciences companies ranked by revenue. We have two companies on the list that could be considered world-class by virtue of their revenue: Valeant and Concordia.

Leading Canadian Public Life Sciences Companies

Table 6

	Revenue	Currency
Valeant Pharmaceuticals International Inc.	9,536,000,000	CDN
Concordia International Corp.	1,080,000,000	US
Alpha Pro Tech, Ltd.	46,180,000	US
Neptune Technologies & Bioresources Inc	43,220,000	US
MedReleaf Corp.	40,339,000	CDN
Canopy Growth Corporation	39,895,000	CDN
Theratechnologies Inc.	39,067,000	CDN
Aphria Inc.	20,438,483	CDN
Aurora Cannabis Inc.	18,067,000	CDN
CanniMed Therapeutics Inc.	16,687,000	CDN

Source: Google Finance

Both of them are focused on generic and legacy pharmaceutical products and are not world leaders in the development of new drugs. In addition to these companies one should note that Apotex, a \$1 billion plus revenue company also produces generic drugs.

On the other hand, the leading pharma companies worldwide are noted for their development of and investments in novel therapeutics. While Canada has companies developing new therapeutics, they are at this stage relatively small.

Furthermore, four companies on the list are relatively new and are focusing on the burgeoning market for medical marijuana. These companies show great promise for growth given upcoming changes in the laws governing the recreational use of marijuana. Since other jurisdictions are not anticipating such legislative changes, it is not likely that Canada will be creating world-class companies in this sector in the short- to medium-term.

Given these trends, it seems that in the life sciences space, the current emphasis in Canada is on companies that are producing generic drugs or in the case of medical marijuana, serve the local market. We are not placing our focus on creating companies that can grow to world-class status on par with Roche or Merck.

Automotive

In addition to life sciences companies, leading research-based companies around the world are often in automotive markets. While we have an auto industry, we are a “branch plant” economy and do not benefit from a locally developed industry. While many new companies are currently formed worldwide to develop cars and trucks from novel automotive technology, none are located in Canada.

Consumer Electronics and Hardware

A third area for the development of world-class companies is in consumer electronics and hardware. Companies like Samsung and Apple have developed successful international businesses out of proprietary technology. While Blackberry was a world leader in this market and may emerge again as dominant through supply to the auto market, we do not have a track record in homegrown businesses specializing in consumer electronics.

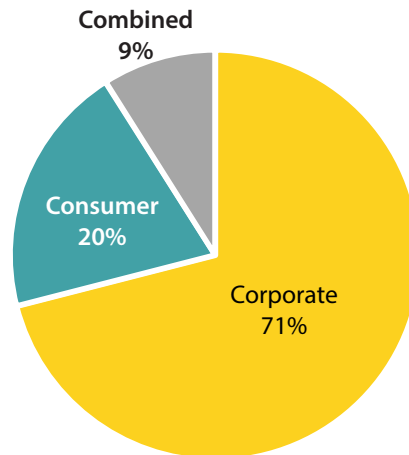
Software

To look at the business of software, we examined the markets served by the top 100 technology companies from Impact Centre’s Narwhal List. This list ranks companies by Financial Velocity, a measure of how quickly businesses acquire and consume capital annually. (For more details regarding this methodology, please consult the Narwhal List Impact Brief published in January 2018.)

While 80% and 48% of leading private Chinese and US Unicorns, respectively, are consumer-focused, there are fewer Canadian companies that start out as consumer-based businesses or that have a mixed customer portfolio including both consumers and businesses. More Canadian tech startups sell to business customers than sell to consumers while more recently established US and Chinese companies focus on consumer markets and this is one factor that is one factor that may be influencing our ability to create world-class technology companies.

Leading Private Canadian Software Companies

Figure 4



Source: CB Insights

In the world of software it appears that startups in the US and China are focusing more recently on consumer markets and Canadian companies are mimicking a strategy that worked 15 – 20 years ago in the US of starting companies that focus on enterprise markets.

What we cannot ascertain from this analysis is whether we are:

1. creating consumer-based businesses but not pursuing the right strategies,
2. creating them but not securing sufficient local financing to support their growth, or
3. simply not launching consumer-based businesses.

If world-class companies are typically consumer-centric, then Canada needs to create or finance more consumer-based businesses if it wants to occupy a leading space in the world of software development.

Methodology

This report examines publicly available data related to R&D spending and patents, along with corporate financial statements from Google Finance and a variety of materials that were obtained from CB Insights.

This study was not intended to be academically rigorous, nor was it intended to be all-encompassing about the topic. It was designed only to add to the conversation on innovation and highlight areas worthy of future research by looking at data available from publicly available sources. We plan to complete further research on this subject in the future.

About the Impact Centre

Science to Society

We generate impact through industry projects and partnerships, entrepreneurial companies, training and research.

We bridge the gap between the university and industry to accelerate the development of new or improved products and services based on physical technologies. We work with graduate students and researchers to help them commercialize their discoveries. We provide undergraduate education and training for students at all levels to ease their transition into future careers.

The Impact Centre conducts research on all aspects of innovation, from ideation and commercialization to government policy and broader themes such as the connection between science and international development. We study how companies of all sizes navigate the complex path between a discovery and its market and how their collective innovations add up to create a larger socioeconomic impact.

Our objective is to understand how we can improve our ability to create world-class technology companies, how governments, companies, and academia can identify and adopt best practices in technology commercialization.

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Contributors

Charles Plant
Author
Senior Fellow
cplant@imc.utoronto.ca
416-458-4850
@cplant

Emina Veletanlić
Editor
Manager, Strategic Initiatives
eveletanlic@imc.utoronto.ca
416-978-1457
@EminaVeletanlic

Lidia Seline
Researcher
lseline@imc.utoronto.ca

James Li

Harim Ulfig



UNIVERSITY OF
TORONTO

Impact Centre
Suite 411 - 112 College Street
Toronto, Ontario
Canada M5G 1L6

Tel: 416-978-3875
info@imc.utoronto.ca
www.impactcentre.ca