British Columbia technology report card

Scaling up BC's tech ecosystem

October 2016

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Foreword

Globally successful hubs like Silicon Valley harness the power of a highly networked ecosystem – one that recognizes the effects of ideas and people on an entire network. Over the past decade, British Columbia has cultivated a vibrant and diverse technology community – an emergent network that can propel BC to becoming a top ten technology ecosystem. Realizing the fullness of this opportunity will require a concerted effort on the part of tech companies, business leaders, post-secondary leaders, supporting organizations and government partners to commit to levels of strategic investments and partnerships that will not only further our advantage, but allow us to move even faster.

The tech sector in BC is already well established and has flourished in recent years. It consists of a growing base of companies across the diverse sub-sectors of information and communications technologies, interactive and digital media, engineering services, lifesciences, and cleantech. The BC technology sector has seen healthy growth in capital investment, thanks to initiatives by both the federal and provincial government. The pace of growth in the sector has continued unabated, driving both economic and job growth in the province.

However, the competitive framework is much broader than just BC and Canada. In order to successfully compete on the world stage, this Report Card illustrates that British Columbia needs to further invest in several key areas: 1) scaling the growth of companies and 2) educating, attracting and retaining the best talent in the world. Not surprisingly, these factors are interconnected, and consistent with the themes set out in BC Tech's *4-Point Plan for Growing the BC Tech Sector.*

British Columbia has cultivated a vibrant and diverse technology community – an emergent network that can propel BC to becoming a top ten technology ecosystem.

In fact, access to talent is the biggest constraint that BC tech companies now face in expanding their businesses. The talent necessary to build global tech companies includes people with specialized technical and business skills, as well as experience with growing companies from start-ups to multibillion-dollar enterprises. While British Columbia produces some of the best technical talent in the world, there is a growing talent gap at all levels to support the further growth of companies, and consequently a growing anxiety about how we will attract and retain key, qualified individuals.

This begs the question: How do we ensure that BC post secondary institutions are supplying the sector with as many great minds as possible with the skills to be successful in the tech sector? How do we ensure that tech companies that choose to stay and grow in BC can fill those specialized roles with international talent when they cannot find it within our borders?

Since 2012, we have teamed with KPMG to assess the impact of the technology sector on the province's economy and to provide a comparative analysis of this sector in BC to that of other provinces and jurisdictions. This 2016 Report Card illustrates that technology continues to be a cornerstone for the provincial economy and that British Columbia has improved in several key measures in comparison to other provincial jurisdictions. Now that our province is home to a vibrant and diverse tech ecosystem, it's up to us to take full advantage of the networks and collaborations already in place to propel us faster towards greater success. Let's position BC to truly become one of the top ten tech ecosystems in the world.

Bill Tam
President and CEO
BC Tech Association

Executive summary

The impact British Columbia's tech sector has on the provincial economy is more evident than ever. With a growing number of prominent companies calling BC home, the technology "ecosystem" in BC has evolved considerably over the past two years and even more in the last decade. Homegrown companies such as Creation Technologies, Hootsuite, FCV Interactive, STEMCELL Technologies, Westport Innovations and multinational giants such as Amazon, Electronic Arts, Microsoft, SAP and Sony Imageworks are active in BC, creating jobs and wealth for the province. Behind these success stories are countless people and organizations that are working hard to ensure that the tech sector can grow and thrive.

The analogy of an ecosystem is used in many sectors, but it never seems more apt than for the tech sector. Successes, such as those above, can only be created through the combined efforts and incredibly hard work of entrepreneurs, investors, educational institutions and government. This ecosystem phenomenon is clear when you look at other tech sectors such as those in San Francisco, Seoul or Tel Aviv. Each of these cities has put the building blocks in place, and is now reaping the rewards of a thriving tech sector.

As you read the report, you'll find summaries, charts, and insights that bring to life some of the statistics which underlie BC's tech ecosystem.

- We begin our report with an overview of what the BC tech sector looks and feels like. By its nature, tech is varied and comprises a number of sub-sectors which run the gamut from infrastructure to software to health, but which all coalesce around the use of technology to drive business value.
- Then we look at *Economic Performance Indicators* which outlines the outputs of our ecosystem in revenues, GDP and jobs. The economic fruits of the sector's efforts.
- Then we end by analyzing *Sector Input Indicators*. These are the inputs to the sector such as talent, capital, and R&D.

From working on this year's edition of the Report Card, analyzing the data provided by BC Stats, reviewing with sector organizations and interviewing tech company leaders in the field, it has become clear that BC has many of the same ingredients as other great tech sectors around the world. BC's statistics also support this very clearly. Sector revenues are growing at a compound annual rate of 6 percent. Tech GDP has grown at double the pace of the provincial economy since the 2008 recession.

But it is also clear that there is substantial room to grow. Our sector remains characterized more by small firms than large, with 81 percent of companies consisting of fewer than 10 employees. As a result, we see revenues and GDP that are competitive on a national scale, but remain well short of the success seen by US states such as Washington, California, Oregon, Massachusetts and New York.

Our work, however, has uncovered an exciting trend: more and more BC tech companies are choosing to stay and grow in BC. Since our last report, we have seen an increase in the number of medium to large-size firms by 16 percent, compared to 6 percent growth for firms with fewer than 10 employees. Our interviews indicate that firms are staying for a variety of reasons such as the natural and social make-up of BC, as well as sound economic fundamentals.

This maturation of the sector contributes to significant growth and points to much more benefit to come. However, it also points to a clear question: How do we as a sector foster this growth and encourage companies to remain and thrive in BC? Or, put another way, how do we further enable BC's tech ecosystem?

Kostya Polyakov
Partner and Greater Vancouver Area Market Leader
for Technology, Media and Telecommunications, KPMG

BC tech sector scores

	Versus other BC sectors		Versus other provincial tech sectors	
Economic performance indicators	**2016**	**2014**	**2016**	**2014**
Economic performance indicators	A	A	B	C+
Sector input indicators	N/A	N/A	B–	C–
Overall	**A**	**A**	**B–**	**C+**

The data and insights that we collected can begin to answer some of these questions around the tech ecosystem:

The tech sector continues to be a significant growth engine in BC.

Unlike other sectors within the BC economy which can have greater fluctuations in performance, the tech sector has been a consistent performer over the past 10 years. There is, however, much more room to grow when compared to US jurisdictions.

The composition of companies within BC's tech sector is maturing.

Since our study two years ago, we now see a greater number of medium and large-size companies. This is a trend that is favourable because larger firms tend to drive greater profitability. This trend needs to continue to accelerate growth in the sector. We need to encourage further growth and scaling of companies through the combined efforts of government and business.

Jobs and talent remain a key issue for the sector.

As companies have grown, and as evidenced by interviews with sector leaders, access to talent has emerged as the biggest issue for most tech companies. The statistics that we gathered for this report show the simultaneous slowing of job growth and escalation in wage levels. BC post-secondary institutions graduate fewer engineering and technology related degrees on a per capita basis and there is a growing challenge in finding senior, experienced growth talent. Unless companies can find sufficient numbers of qualified personnel – both specialized tech talent and senior level executive talent, there is a risk that we could lose the growth opportunity to other regions outside of our province. This issue is examined in depth by the 2016 TechTalentBC Study to be released shortly by the BC Tech Association in collaboration with ICTC.

Capital availability has improved dramatically.

2013–2015 saw a resurgence in venture capital investments. This is a result of a number of growth-stage firms attracting over $1 billion in investment during this period. While this is a welcome and encouraging phenomenon, concerns remain about the ease of companies in securing early-stage funding, which will reinforce the importance of the Province's venture capital fund.

R&D and exports have room to grow.

While there has been progress in recent years, the BC tech sector continues to lag behind the performance of other jurisdictions in terms of R&D and exports. The fact that the sector is primarily made up of small firms seems to inhibit the level of scale found in other jurisdictions, pointing to the need to further encourage and support exports and R&D, particularly in small-scale companies.

We invite you to read this report, draw conclusions of your own, and consider how we want the tech sector's charts to connect the dots in two, ten, and twenty years' time.

Michael Reitsma
Senior Manager, Strategy and Operations
Management Consulting, KPMG

Sector profile and comparative analysis

Introduction

The BC technology sector comprises over 9,500 companies, operating in a number of sectors including Interactive and Digital Media (IDM), Cleantech, Lifesciences, Information and Communications Technology (ICT) as well as IT/ Engineering services.[1] The sector generates over $15 billion in GDP, nearly 90 percent of which is produced by services, and creates more than 90,000 jobs for British Columbians.

This Report Card reviews the BC technology sector and how it has performed in comparison to other industries in BC, its counterparts across Canada, and also on a global basis. We then rate the performance of the BC technology sector today, review its progress since the 2014 Report Card and highlight themes for collective action going forward.

We would like to thank BC Stats for developing a detailed collection of data and analysis for the high technology sector in BC, which greatly enabled our assessment.

[1] There is no universally adopted definition of what the technology (or "high technology") sector should encompass. In any case, such a definition is likely to vary over time as technology evolves. For the purposes of this report, KPMG has used the definition adopted by BC Stats, which allows us to leverage the detailed dataset published by the agency and ensures consistency with the definition used in previous versions of the BC Technology Report Card published by KPMG. The high technology sector, as defined by BC Stats, comprises "industries that produce high technology goods and services as their ultimate outputs", and is based on the North American Industry Classification System (NAICS). In 2016, a total 26 standard industry categories (4-digit NAICS) and 39 subcategories (6-digit NAICS) have been included in the definition.

The technology sector at a glance

Inputs

Labour	Capital	Intellectual property
92,700 Jobs	**$464M** VC Investment	**$3B** R&D Investment
$1,580/week Average weekly earnings	**$107M** Angel Investment	**220** # Canadian patents
		447 # PCT filings
		83 # University licenses

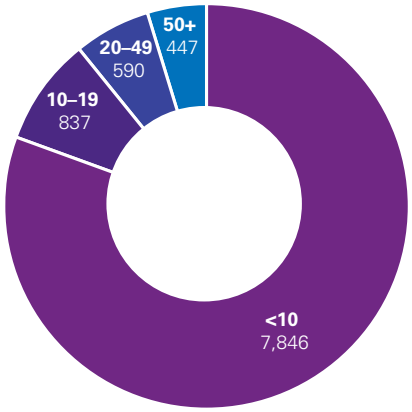
Production

Distribution of Companies by Employee Size 2014

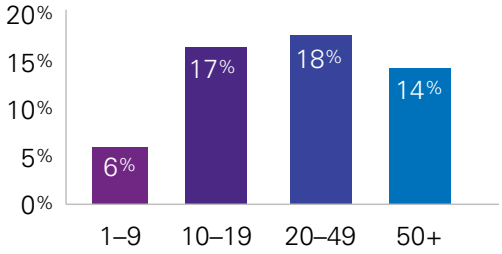
16% growth since 2012

Since last report more and more companies are progressing from small companies to medium to large enterprises.

6% growth since 2012



Growth in Tech Company Count by Employee Size 2012-2014



Outputs

Domestic business	Exports
$15B GDP	**$5B** Exports
$26B Revenues	
90% Services	**77%** Services
10% Goods	**23%** Goods

Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

The green economy has been a focus for growth in new jobs and innovation in the province.

Sector breakdown

The BC high technology sector comprises over 9,500 companies, and the BC Tech Association recognizes five distinctive subsectors, as illustrated in the adjacent chart.

Information & communications technology

The BC Information & Communications Technology segment comprises a diverse range of companies pursuing advances in software, cloud computing, information technology, Internet of Things, telecommunications and electronics manufacturing. Mobile and digital media have been presented separately for the purposes of this report.

Cleantech

As a part of the Province's Climate Action Plan, the green economy has been a focus for growth in new jobs and innovation in the province. BC's tech sector is supported by the Cleantech sector through pursuits of alternative energy generation, storage, environmental remediation and resource management systems.

Interactive & digital media

The digital media and wireless segment of the BC tech sector has seen continued growth over the past two years, driven by new platform technologies for mobile applications, the mainstream expansion of social media marketing, the creation and distribution of entertainment and education content, the emergence of augmented and virtual reality and the proliferation of new consumer experiences in the video game and digital animation segments.

IT/Engineering & other services

The engineering and other services segment includes companies that provide IT, engineering, design and environmental services to the government, industrial and enterprise markets. BC has long had a strong base of engineering services companies that provide the core capabilities for infrastructure projects that relate to the resource, transportation, utilities and government sectors.

Lifesciences

The BC tech industry has historically benefitted from a strong life sciencessector in BC. Spanning the areas of pharmaceuticals, medical devices, research and testing platforms, the lifesciences sector has had strong ties with all of BC's post-secondary institutions.

Key sectors

Information & communication technology

- Cloud computing
- Semi-conductor
- ITsystems
- ECommerce
- Enterprise software
- Communications
- Wireless devices

Cleantech

- Energy management
- Environmental technology
- Water technology
- Energy storage
- Alternative energy
- Natural gas

Interactive & digital media

- Mobile apps
- Web & social media
- Gaming

IT/Engineering services

- IT services
- Engineering services
- Environmental services
- Design/infrastructure

Lifesciences

- Genetics
- Biotechnology
- Diagnostics
- Medical devices
- Healthcare technology

Part A: Economic performance indicators

The BC technology sector is, by definition, a dynamic sector that is always progressing – and these last two years have been no different, with growth across all major indicators. This section of the report outlines how the BC technology sector is performing across GDP, revenues, employment, wages and exports.

On a relative basis, the BC technology sector ranks well amongst its peer provinces in Canada as far as contribution to GDP and revenue growth. There has also been significant growth in tech wages since the last report card was released but this coincides with a decidedly slower rate of growth in new tech jobs compared to what we have seen in the past.

BC technology sector – 2016 report card grades

	Versus other BC sectors	Versus other provincial tech sectors
Economic performance indicators		
Revenues	N/A	→
Gross domestic product	↗	→
Employment	→	→
Wages	↗	↗
Exports	N/A	→
Grade	**A–**	**B**

Highlights

The indicators in the chart beside are more fully appreciated in a broader context:

Versus other BC sectors

- **A "top 5" sector:** Continues to contribute more to the economy than traditional BC industries (forestry, mining, oil & gas) with $15.5B GDP in 2014.
- **Strong growth:** Continues to outpace the growth in the overall BC economy by nearly two to one. Having grown by 91 percent in 15 years, the tech sector continues to be one of the biggest contributors to BC's economy.
- **High-paying jobs:** Average yearly earnings are 76 percent higher than the BC industrial average. Aggregate wages now exceed $7.6 billion, representing almost $1 billion in increased earnings in the tech sector over the last two years.

Versus other provincial technology sectors

- **Closing the gap:** In comparison with other Canadian provinces, the GDP and revenue of BC's tech sector each have one of the fastest growth rates. More specifically, BC tech is catching up to the larger provincial tech sectors in the GDP and revenue categories, and has surpassed them in average wages.
- **Leading in productivity:** BC's tech sector is one of the most productive, matching Ontario and exceeding the Canadian average in terms of revenue per employee.
- **Underperforming in terms of the number of mid to large size firms:** BC has more and more mid to large size companies but we still trail other more mature Tech sectors like Québec.

Revenues

The BC technology sector generates a significant revenue base and is growing quickly compared to its provincial counterparts. On an absolute basis, BC trails the larger provinces, ranking third in the country. But on a per-employee basis, revenue grew by 11 percent, surpassing Ontario.

Comparison of sector revenues

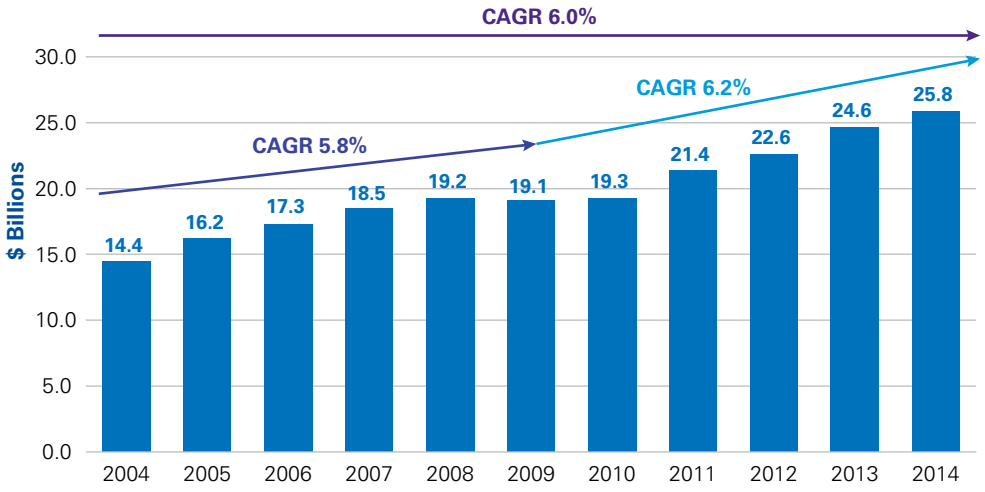
	Versus other provincial tech sectors
Revenues	→
Revenue growth	↗
Summary	→

Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Going deeper

BC's technology sector revenues continue to have an upward trajectory following a rebound from the 2008 recession, recording $25.8 billion in 2014. Over the last two years, the technology sector revenue grew an impressive 14.4 percent. The sector exhibits a five-year compound annual growth rate of 6.2 percent, up from the 4.1 percent exhibited between 2008–2012.[2,3]

Growth in BC technology revenues



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

BC technology sector revenues have grown at 6.2 percent annually since 2009.

[2] Revenue figures are not adjusted for inflation. For inflation-adjusted output values, please refer to the GDP section of this analysis.

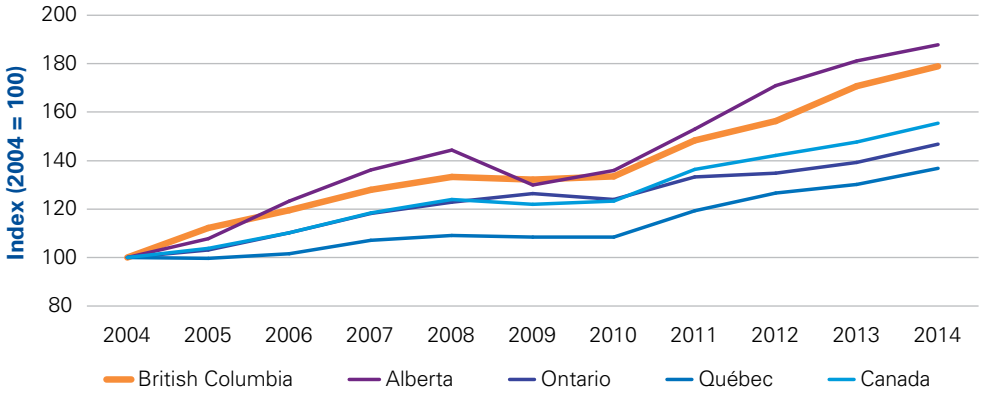
[3] Sector revenue figures for BC are based on establishments. That is, for firms headquartered in BC, only the revenues generated from their BC operations are included in the revenue figures.

Index of technology industry revenue

On an absolute basis, BC's tech revenues are smaller than its counterparts in Alberta, Ontario and Québec. On growth measures, BC is a clear leader in Canada. At 6.2 percent compound annual growth rate (CAGR) BC is second only to Alberta, outpacing the national average by 25 percent. Per-employee revenue in BC's tech sector, at $278,000, is higher than that in both Ontario and Québec.

Revenue growth continues to outperform the Canadian average, second only to Alberta.

Index of technology industry revenue (2004 = 100)

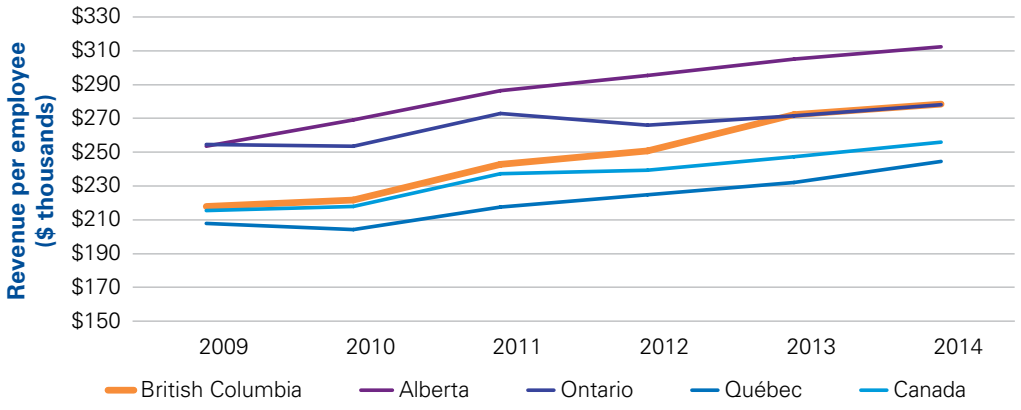


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Compared with other Canadian provinces, BC has one of the most productive tech sectors:

BC's tech sector is one of the most productive, matching Ontario in revenue generated per employee and exceeding the Canadian average.

Technology sector revenue per employee

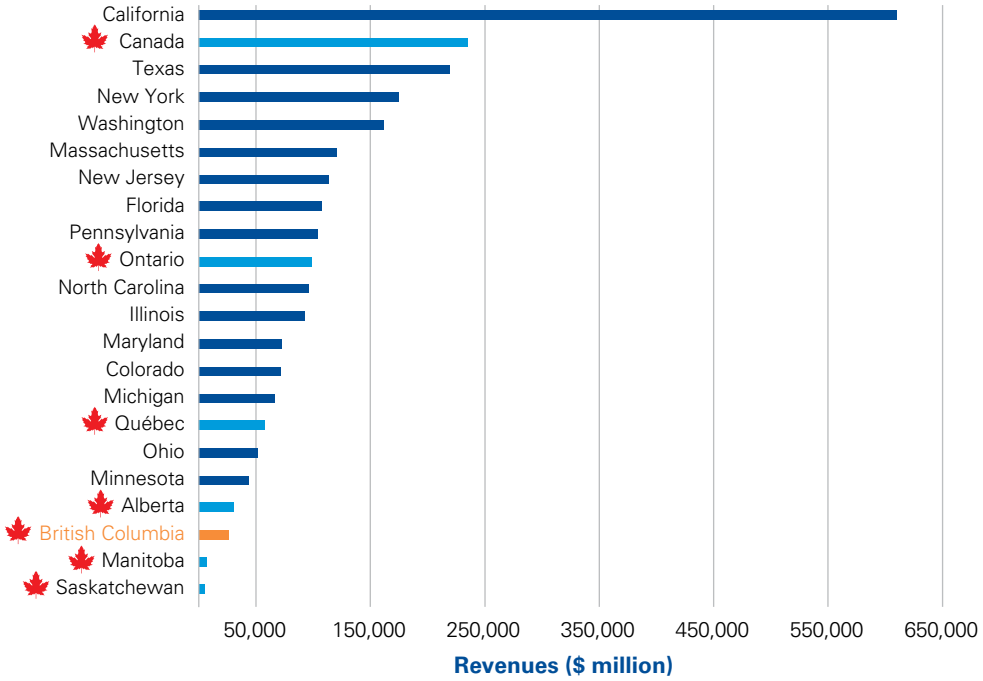


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Despite the strong growth of the BC technology sector, the sector's revenues still lag behind major tech centres in the US. Not only is this indicative of the magnitude of the US economy versus Canada's, but it also highlights the potential for continued growth and expansion for the BC tech sector. California jumps out as the clear leader in this space with over $600B in revenues from their enviable tech sector versus $26B for BC, $58B for Québec, and $98B for Ontario. In fact, California's tech sector revenue is more than double that of all of Canada's tech sector combined.

When compared with other major North American technology sectors, BC's technology sector has substantial room to grow.

Technology sector revenues 2014



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Gross domestic product

The technology sector is responsible for 7 percent of the BC industrial economy[4] and continues to be one of the largest contributors to the provincial GDP at $15.5B in 2014. Tech GDP grew 13.4 percent over the last two years. While the BC tech sector is strong and has exhibited positive growth, there is still opportunity for further accelerated growth when compared to other provinces and US states.

[4] BC Statistics has revised the data for BC technology sector GDP following a survey methodology change and comprehensive revision from Statistics Canada. In 2012, BC technology sector GDP as a share of the BC economy was 6.7 percent and not 7.6 percent as previously reported. This revision will affect all further analysis using GDP as a key metric. For more information, please refer to Statistics Canada's announcements titled "The Integrated Business Statistics Program," published in June 2015, and "Comprehensive Revision of the Canadian System of Macroeconomic Accounts", published in November 2015.

Comparison of GDP

	Versus other BC sectors	Versus other provincial tech sectors
Technology GDP	↗	→
Technology GDP growth (2 year)	→	↗
Summary	**TBD**	**TBD**

This report highlights the current value GDP and the chained 2007 GDP value. Please note that, where available, analysis will use chained dollar amounts[5] to allow for comparisons across sectors and provinces as this format is used more widely by BC Statistics and Statistics Canada.

BC technology GDP, chained 2007 versus current

	Metric	BC technology Sector	BC industrial aggregate
Current	2014 GDP	$15.5B	$219.4B
	5-Year CAGR	5.7%	3.9%
Chained 2007	2014 GDP	$13.5B	$203.1B
	5-Year CAGR	3.3%	2.6%

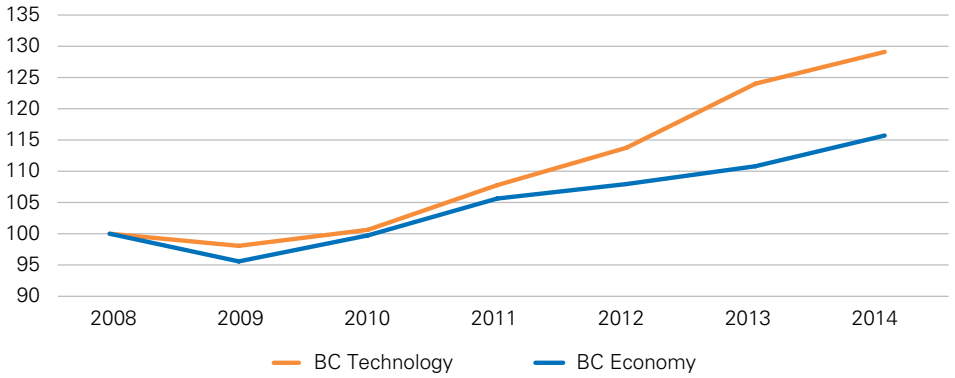
CAGR = compound annual growth rate

Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

5 Growth in a nominal value aggregate includes inflationary changes. Chained dollar calculations eliminate the effect of inflation, leaving only the volume effect for consideration. For more information, please refer to Statistics Canada's research paper titled "Chain Fisher Volume Index Methodology," published in November 2003.

Since the 2008 recession, BC tech has grown almost 30 percent, nearly double the pace of the provincial economy.

Index of GDP contribution (2008 = 100)



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Going deeper

Consistent with previous findings, BC technology continues to be one of the top five contributors to the provincial economy, outperforming traditional BC sectors such as forestry, mining, and oil & gas.

GDP growth by sector

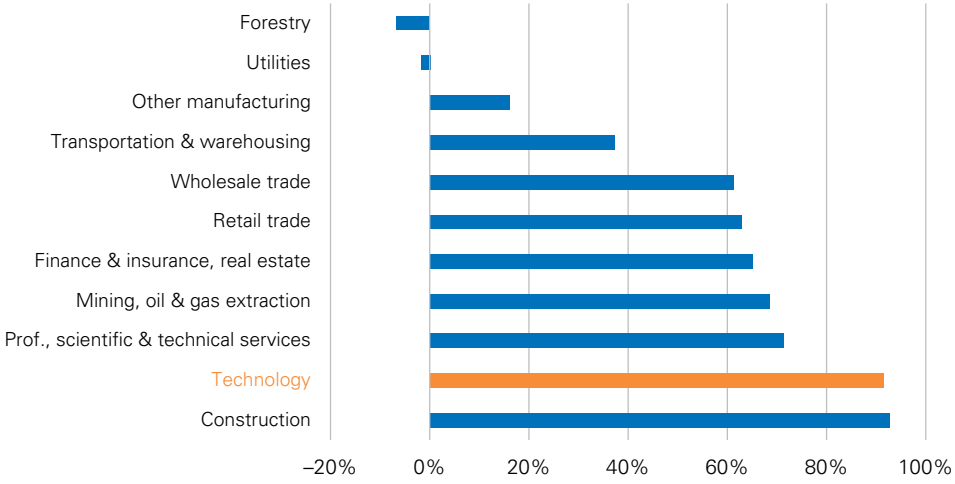
	2014 Chained GDP ($Million)	5 year CAGR
Finance & insurance, real estate	48,274	3.4%
Construction	17,039	3.2%
Other manufacturing	14,625	3.2%
Technology	13,489	3.3%
Mining, oil & gas extraction	12,284	6.1%
Retail trade	12,010	2.2%
Professional, scientific & technical services	11,282	2.9%
Transportation & warehousing	11,044	2.5%
Wholesale trade	9,225	5.0%
Utilities	3,493	0.4%
Forestry	1,819	8.1%

CAGR = compound annual growth rate

Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Having grown by 91 percent in 15 years, the tech sector continues to be one of the biggest contributors to BC's economy.

Industry GDP growth 1999–2014



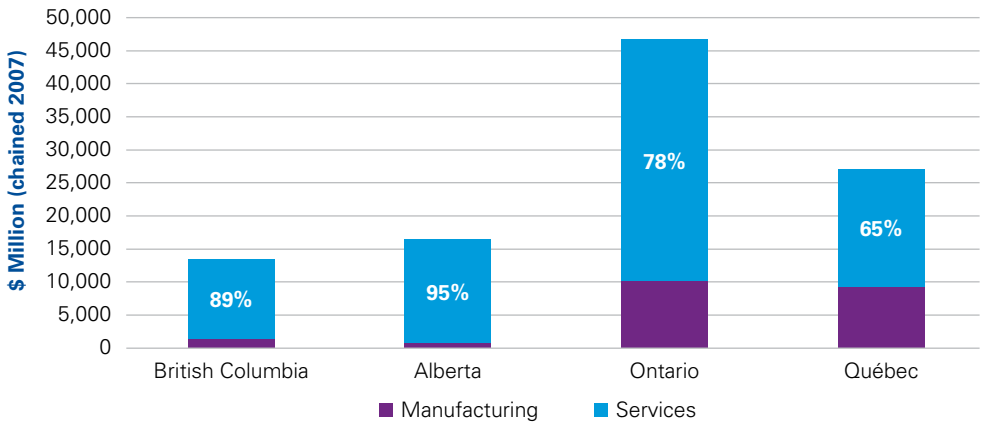
Utilities/transport/construction/wholesale/mining – goods producing
Others – services producing
Technology

Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Alberta's technology sector continues to be the closest comparable to BC's both in size and composition (services versus manufacturing). Since the last report card, the composition of BC's technology sector has remained consistent while Alberta has shifted slightly to an increase in services. Ontario and Québec, in comparison, are much larger in size and have a greater focus on manufacturing.

The same split between services and manufacturing reported in the 2014 report continues to exist in the BC tech sector.

Technology GDP contribution and share of services and manufacturing sectors 2014

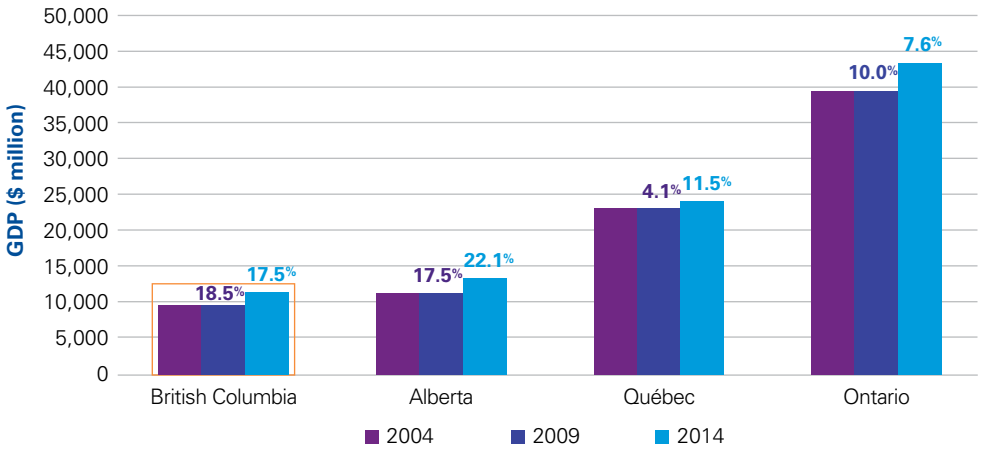


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Compared to other major Canadian tech provinces in Ontario, Québec and Alberta, BC's tech GDP ranks fourth but has been closing the gap. BC has consistently exhibited one of the highest tech sector growth rates over time, indicating that BC should continue to narrow the gap in comparison to other provinces.

BC's tech sector is growing faster than the tech sector in Canada and the US overall.

GDP and GDP growth between 2004, 2009, 2014

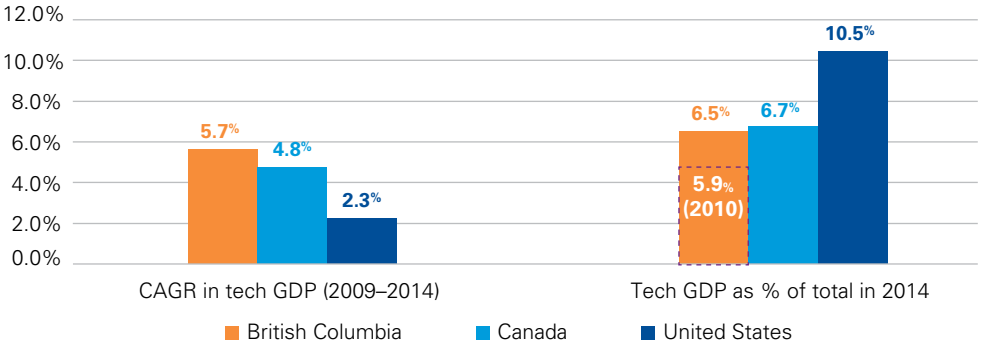


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

The GDP of BC's tech sector is growing faster than both the tech sector in Canada and the US with a five-year compound annual growth rate of 5.7 percent. In 2010, the technology sector in BC represented only 5.9 percent of GDP versus Canada's overall technology sector, which was 7 percent of GDP. As of 2014, BC has closed the gap in comparison to Canada overall. However, the BC tech sector still lags in comparison to the US, where the tech sector accounts for 10.5 percent of the economy.

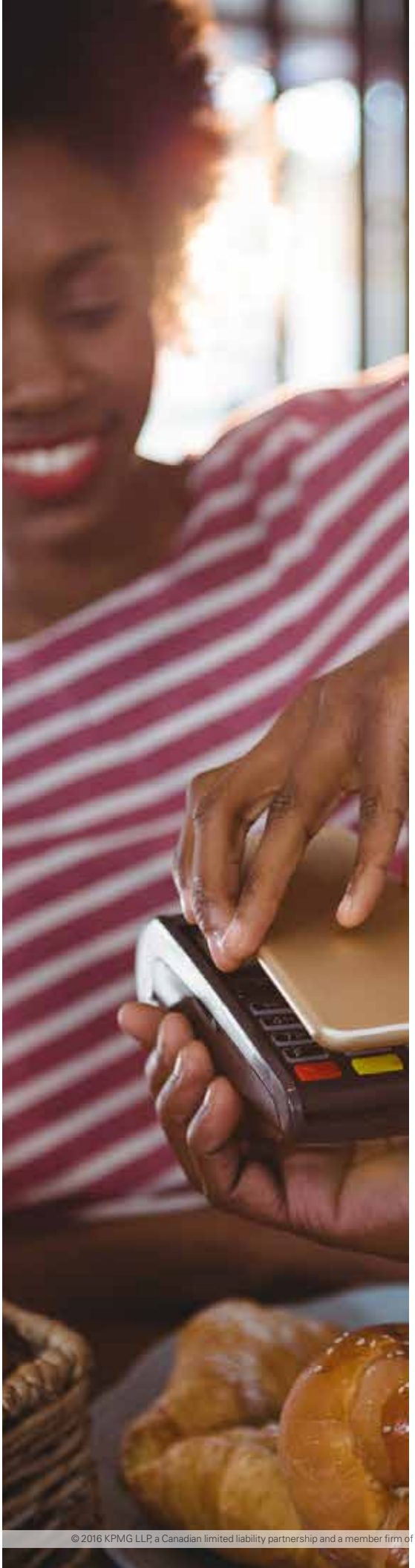
Compared with both the tech sector in Canada as a whole and the tech sector in the US, BC's tech sector is growing faster.

Technology GDP as a percent of total GDP



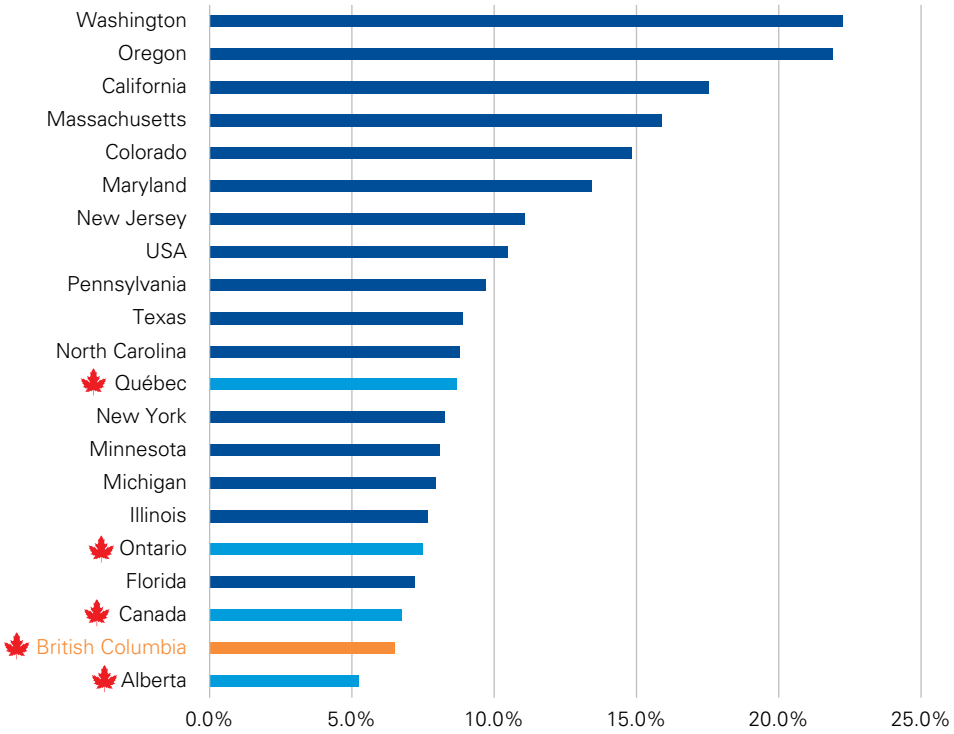
CAGR = compound annual growth rate

Source: KPMG analysis of data from the Profile of the British Columbia High Technology Sector, BC Stats, September 2016 and World Bank National Accounts



Despite the fact that the BC technology sector is growing at a faster pace than both the Canadian and the US average, the performance of leading US states show the extent to which a tech sector can contribute to an economy. While the tech sector in BC contributes 7 percent of the province's GDP, states like Washington record an impressive 22.2 percent of their GDP as coming from technology. Washington in particular, is illustrative of the impact that giants such as Microsoft can have on a local economy.

Percentage of GDP from technology sector 2014

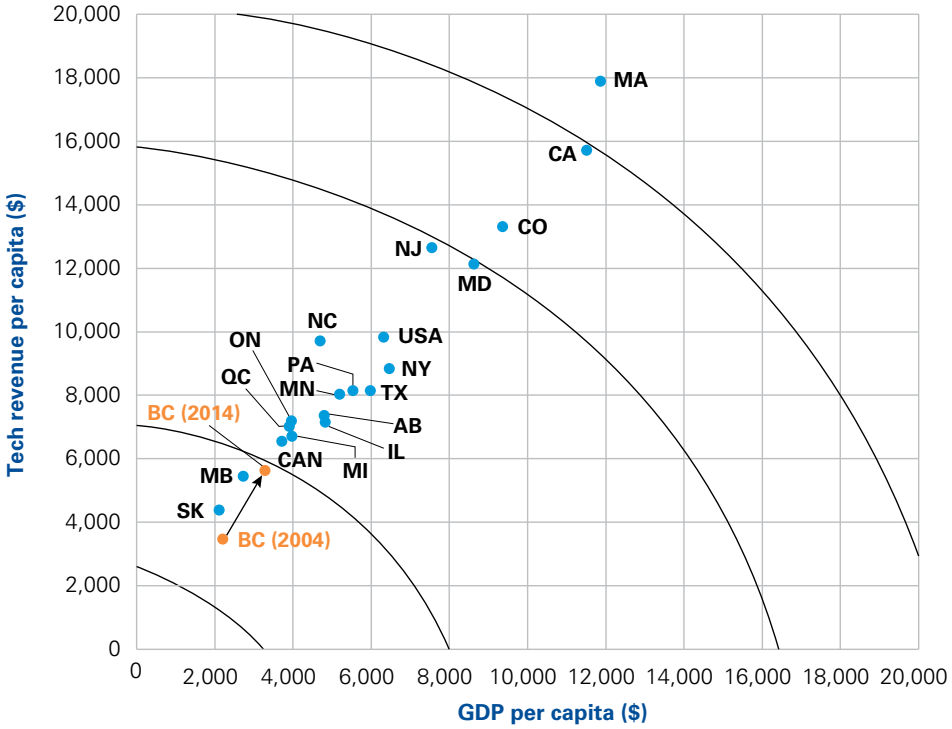


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Note: Oregon data is from the Oregon Office of Economic Analysis, from 2013 statistics

When you place the revenues and GDP of a variety of tech sectors from Canada and the US on a plot graph, normalized by population, the possible trajectory of BC begins to come to light. BC has been quickly moving up in terms of revenue and GDP. Each of the jurisdictions on this map show different pathways and options for BC to consider in its growth path.

Technology GDP per capita vs. tech revenue per capita 2014



Source: BC Stats, US Census, Bureau of Economic Analysis US Department of Commerce

Insights on output growth

Sector leaders interviewed by KPMG made the following observations with regards to the growth of BC's technology sector.

- All groups interviewed commented that BC tech sector is vibrant and has seen great growth in the past few years, and represents an important contribution to BC's economy.
- Government programs such as SR&ED and the province's venture capital fund are making a difference and are important programs to maintain or even grow.
- BC is a more cost effective place to do business based on labour rates (compared with the US) and taxes, although there is continued pressure to keep costs down. The rising cost of real estate in Vancouver has had an impact on finding affordable manufacturing space and attracting/retaining talent.
- Close proximity to US markets such as Seattle and Silicon Valley is seen as an advantage and a major growth driver, but also a contributor to talent retention challenges.
- Large homegrown BC companies and the growing base of multinationals have provided the "anchor" for continued growth of both small and large companies.

Employment and wages[6]

Since 2004, employment in BC's technology sector grew 29 percent, outpacing counterparts such as Ontario and Québec, and outpacing the Canadian average by 70 percent. Over recent years, this job growth has flattened while wages have grown considerably, suggesting a new dynamic in the supply of talent versus demand.

Comparison of employment

	Versus other BC sectors	Versus other provincial tech sectors
Sector employment	↗	→
Sector employment growth	→	↗
Summary	→	→

Comparison of wages

	Versus other BC sectors	Versus other provincial tech sectors
Sector wages	↗	↗
Sector wages growth	↗	↗
Summary	↗	↗

6 Refers to both salaried and hourly employee pay.

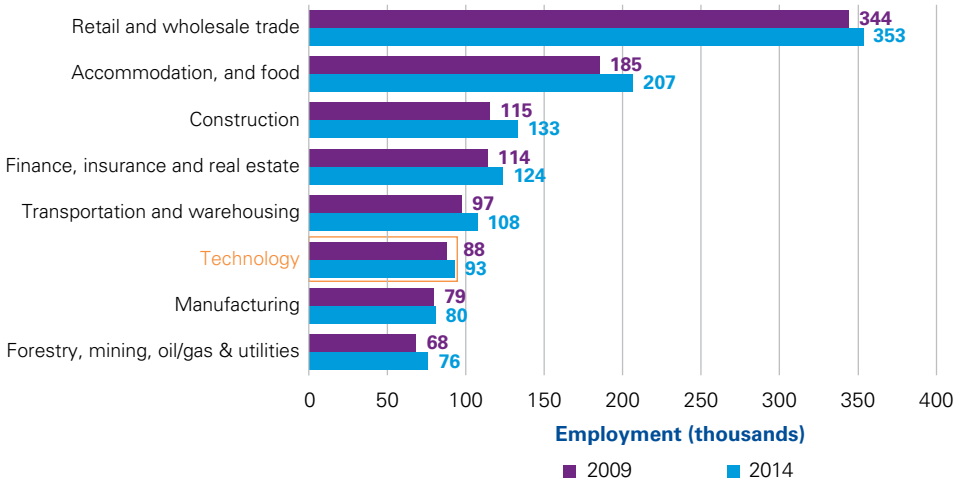
Going deeper

Employment

Adding over 5,000 jobs since 2009, the BC tech sector grew to 92,700 people in 2014. This compares favorably against traditional industries such as forestry, mining and oil & gas, but lags behind that of large service oriented industries such as retail trade and accommodation.

The BC tech sector employs more people than forestry, mining, oil & gas and utilities combined.

Employment in 2009 vs 2014

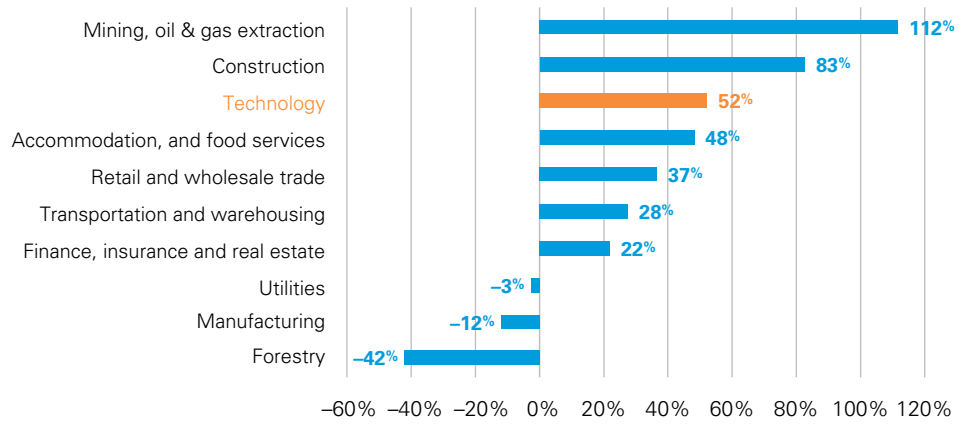


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

The BC technology sector has had one of the strongest employment growth rates over the last 15 years at 52.3 percent which is annualized at 2.8 percent. However, the growth rate has softened in the last 5 years, growing at just 5.7 percent, versus 22 percent growth from 2004–2009. The slowdown in job growth may be attributed to a growing imbalance in talent supply versus demand. Labour demand has remained strong as a result of a growing number of multinational firms and overall growth in locally headquartered tech firms. The consequence of strong demand growth has been the growing constraints in supply of talent, some of which is reflected in the muted job growth numbers.

The BC tech industry continues to create jobs and opportunities, with employment growing by 52.3 percent since 1999.

Employment growth between 1999 and 2014

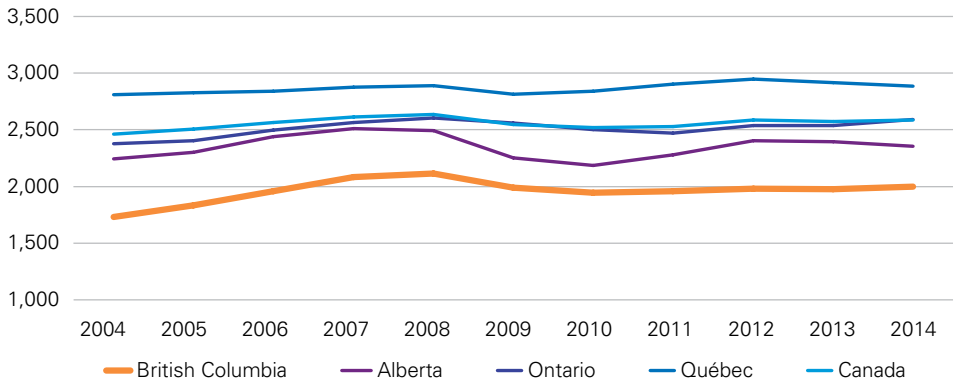


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

BC's technology sector employment per capita has been stable since 2009 at around 2,000 jobs per 100,000 people. Along with Ontario's, BC's tech sector managed to maintain a positive growth rate in 2014 while Alberta's and Québec's both declined slightly, possibly due to weaker employment growth.

BC tech employment per capita has been steady since 2009.

Technology jobs per 100,000 population

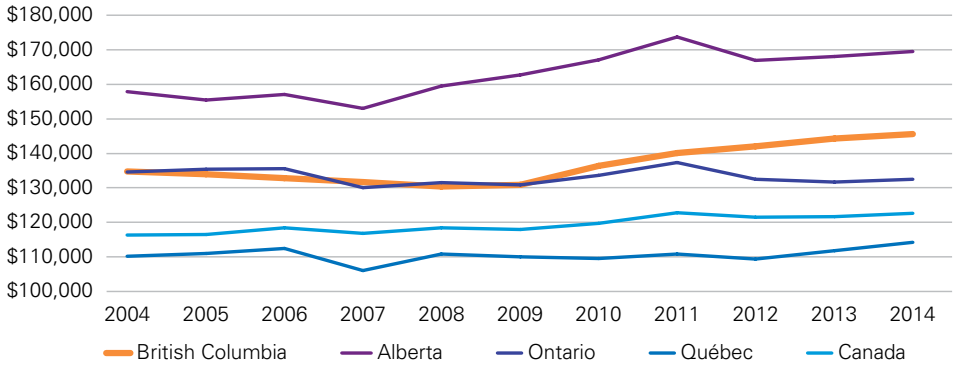


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

BC's productivity performance in the technology sector has continued to improve in recent years. BC has been widening the gap with the Canadian average in terms of technology GDP per person employed in the sector.

BC's tech sector is more productive than that of Ontario, Québec and Canada overall.

Technology industry GDP per person employed



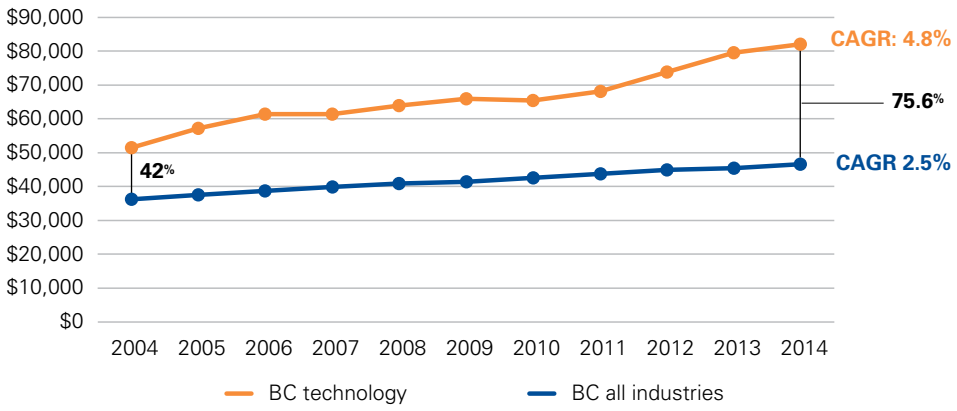
Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Sector wages

Technology jobs in BC pay significantly more than the BC industrial average. In 2014, the wage premium grew to a commanding 75.6 percent compared to 42 percent in 2004. In fact, BC tech weekly wages grew at a ten-year compound annual growth rate (CAGR) of 4.8 percent, double that of the BC industrial average.

Jobs in the BC tech sector pay 75.6 percent more than the provincial average.

Average yearly earnings – BC technology versus BC



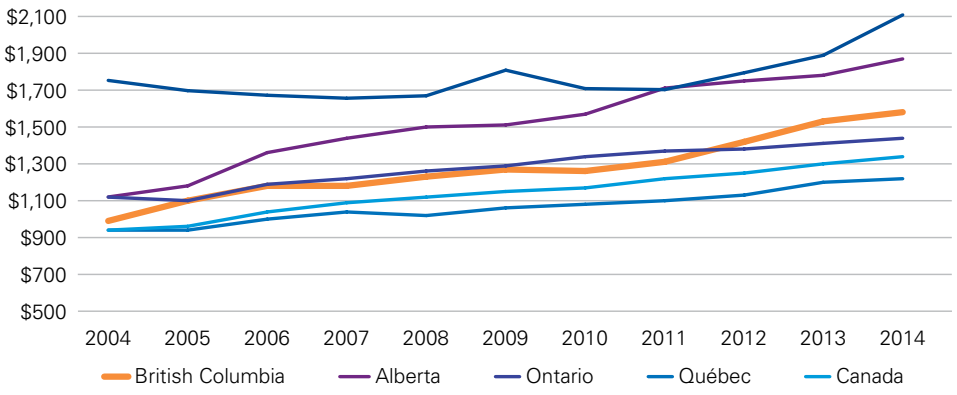
CAGR = compound annual growth rate

Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

In comparison to Canada overall, the weekly wage in the BC technology sector has grown at twice the pace of the national average over the last three years, and—impressively—has surpassed Ontario's average wage.

Employees in the BC tech sector enjoy higher weekly wages than both Ontario and Québec.

Real weekly wages (in 2014 prices)



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

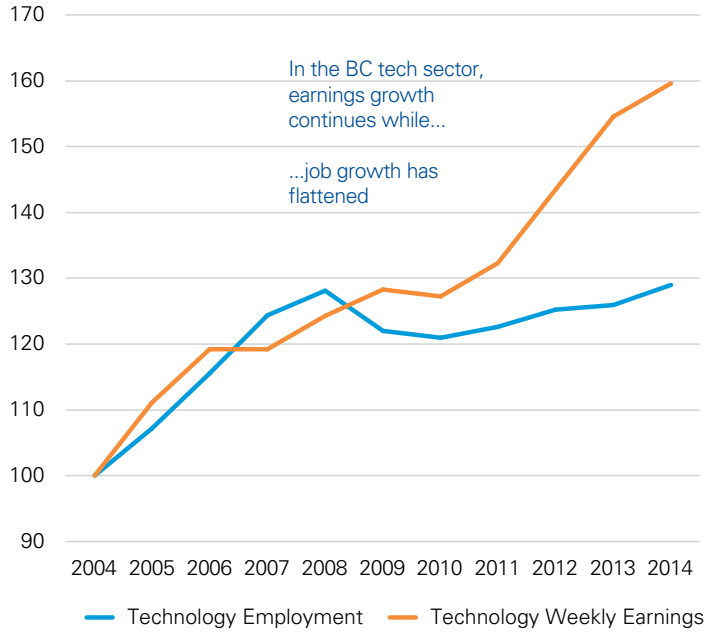
Insights on availability of skilled personnel

Talent is one of the top issues which arose from our interviews. While the tech sector continues to provide among the highest paying jobs, the companies trying to recruit are increasingly sounding the alarm on the talent crisis, particularly in technical and executive roles. From the data perspective, tracking supply and demand of people requires a focused study to understand how international and interprovincial migration, new grads and retirees, and the general churn of the sector results in imbalances in occupations. BC Tech is currently undertaking one of these studies, which will shed further light on the subject.

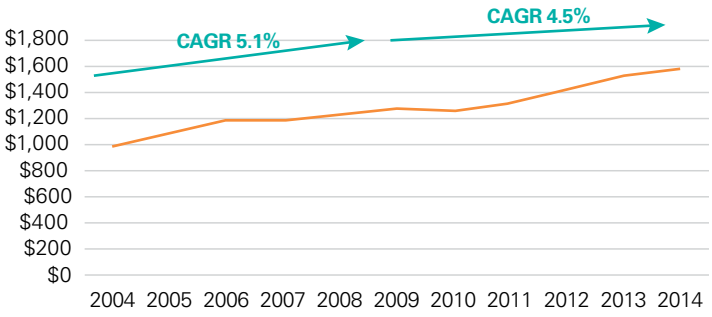
In the meantime our data shows some trends that point to a labour supply issue. Since 2008 the growth of wages has consistently outpaced the growth of jobs. Assuming demand for jobs has remained robust based on the continued growth of the sector, supply and demand theory would point to a lack of supply as a primary reason wages are increasing and growth in the number of jobs has slowed.

Comparing jobs and wages

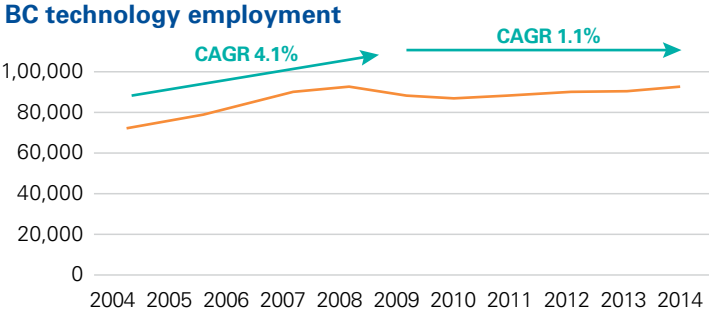
Index of jobs and weekly earnings (2004 = 100)



BC technology average weekly wages



BC technology employment



CAGR = compound annual growth rate

Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Exports

BC technology sector exports has shown strong growth rates in the last few years, growing at 7 percent annually. However, in comparison to the national average, BC still underperforms on tech exports. This indicates potential for significant room to expand BC's tech exports.[7]

Comparison of exports

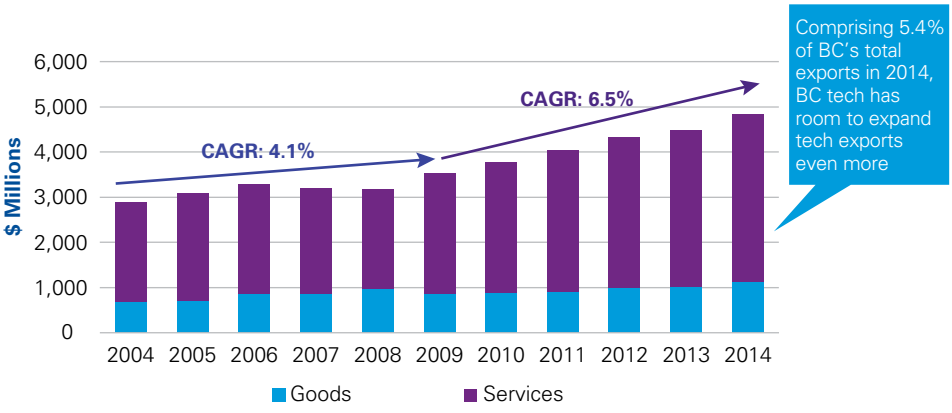
	Versus other provincial tech sectors
Sector exports	→
Sector exports growth	→
Summary	→

Going deeper

In 2014, BC exported $4.8 billion in goods and services, with services accounting for just over three-quarters of the total, a ratio that has remained consistent over time. Over the last 5 years, BC technology exports grew 37 percent, representing an average annual growth rate of 6.5 percent.

BC technology exports

Exports of BC tech goods and services have been growing steadily over the last several years.



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

[7] The data and analysis presented in this section is based on the best available data to date. However, services exports data may be an underestimate of the true level of service exports. As noted by BC Stats, data for service exports is challenging to measure since it cannot be tracked through customs databases. Instead, it is estimated using surveys and other information available to BC Stats (Profile of the British Columbia High Technology Sector, 2016).

"Creation Technologies works with a diverse group of global OEMs to develop and manufacture their technology at all stages of maturity, and one thing we all share is the belief that through innovation we have the power to change the world. But in order to change the world, we have to reach the world, and therefore exports are critical – not only the export of products, but the exchange of ideas. At a time when local and federal governments are actively investing in infrastructure and education to support innovation, I believe that by strengthening our local technology communities and partnerships, we also further our opportunities as leaders in the global supply chain."

Bhawnesh Mathur
President & CEO,
Creation Technologies

Despite the growth in exports, the technology sector accounts for only 5.4 percent of BC's total exports. There remains significant potential for growth in technology exports in BC.

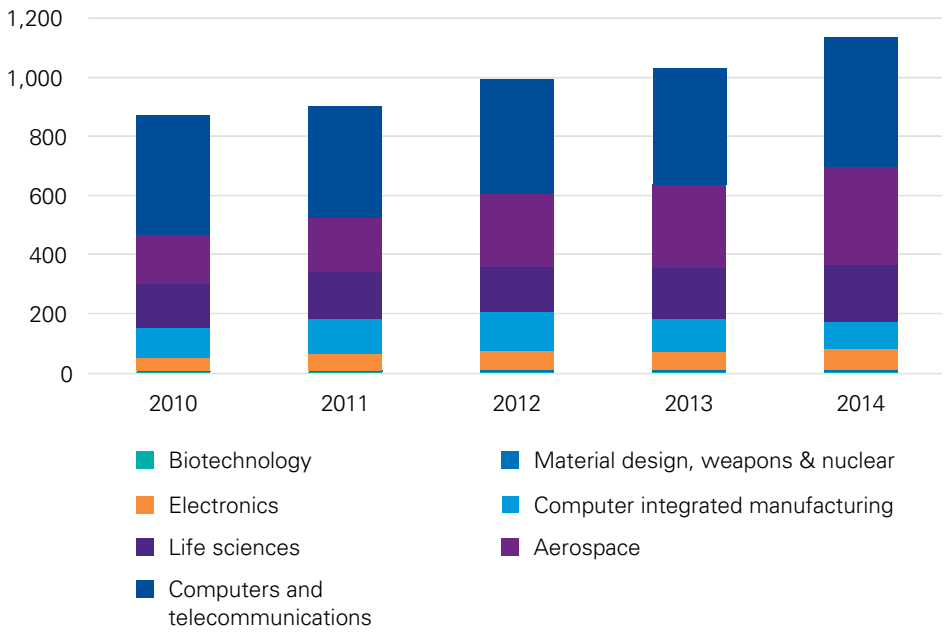
Comparison of export measures in BC and Canada

	BC	Canada
Tech goods exports	1.1B	27.2B
Tech services exports	3.7B	26.7B
Tech sector exports as % of total exports	5.4%	8.6%
Tech sector goods as % of goods exports	2.2%	5.1%
Tech sector services as % of services exports	9.1%	27.9%

Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Computers and telecommunications make up the largest share of tech exports in BC, followed by aerospace products. Most export categories have grown over the last 5 years, and aerospace has exhibited the largest five-year growth rate of all categories at 137 percent.

Technology goods export by commodity group

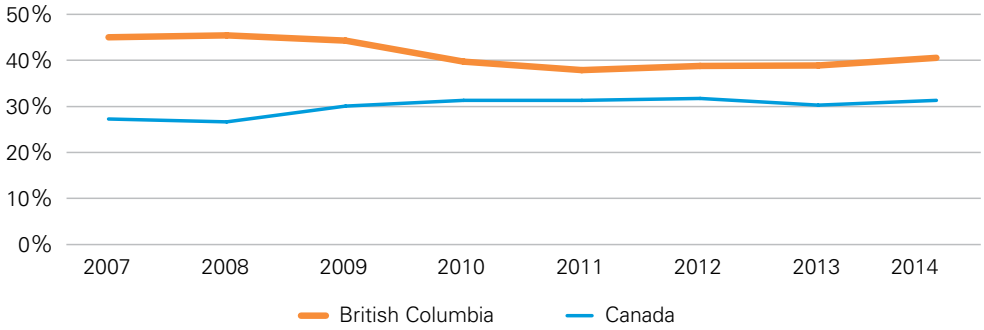


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

BC's technology sector exports make up a smaller share of provincial tech GDP compared to Canadian tech exports, indicating a relatively lower export intensity. However, BC's export performance has been improving over time, now at 35.9 percent of tech GDP, versus 30.8 percent in 2009.

BC tech exported 31 percent of its total output in 2014, compared to 41 percent nationally.

Technology exports as a % of technology GDP



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

A deeper look into BC's technology goods exports reveal a shift since the last report. While the US remains our largest export partner by far, the Pacific Rim and other countries have become a larger consumer of BC technology goods over the past 10 years. This is consistent with the globalization of the economy and the ease by which technology products can cross borders.

Export destinations (snapshot of 2004, 2009, 2014)

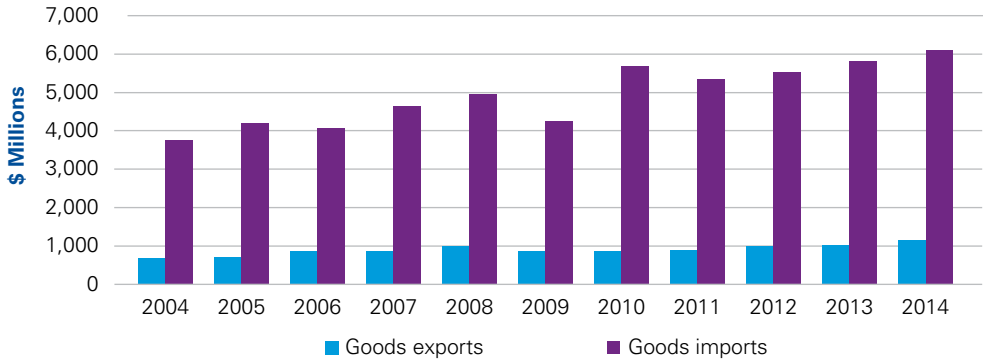
	As % of total technology goods exports		
	2004	**2009**	**2014**
United States	74.2%	67.8%	61.0%
European Union	9.6%	14.5%	13.4%
Pacific Rim	9.7%	9.8%	13.5%
All other countries	6.6%	7.9%	12.1%

Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

BC continues to be a significant net importer of technology goods, with its imports growing at a faster rate than its exports. Nearly 30 percent of imports come from the United States, and over 40 percent from the Pacific Rim.

BC imported $6.1 billion in technology goods while generating $1.1 billion in exports.

BC technology goods exports and imports



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Insights on exports and market access

Of the 9,500 technology companies in BC, nearly 90 percent have fewer than 20 employees, potentially limiting their capacity to expand into global markets. Sector leaders across the sectors noted that access to foreign markets is key for them and emphasized the importance of reinforcing free trade. As the sector matures we expect that an increasing number of BC firms will start to resemble the global sales patterns of large established firms. As export activity advances, we also expect continued diversification of markets beyond the US and Europe.

Economic performance indicators – summary

Consistent with the findings of the 2014 Report Card, the BC technology sector continues to be one of the strongest and among the fastest growing sectors in the province. The BC tech sector has continued to narrow the gap versus other jurisdictions. To gain more perspective on these results, the following section analyzes sector input indicators of the BC technology sector.

Part B: Sector Input Indicators

The BC technology sector continues to perform well compared to other BC sectors, and has gained ground relative to other provinces. In the global context, British Columbia still lags behind the tech sectors of the countries in the Organization for Economic Co-operation and Development (OECD), particularly in the areas of talent, and research and development (R&D). A closer assessment of BC's technology sector inputs offers a glimpse into key issues and highlights areas where appropriate and targeted investment may serve to enable the sector's future performance.

BC technology sector – 2016 report card

Sector input indicators	Versus other provincial tech sectors
Talent availability: tech grad focus	→
Access to capital	↗
Research & development	→
Intellectual property	→
Grade	**B–**

Highlights

- **Challenges in availability of local tech grads:** BC continues to trail other jurisdictions in the number of degrees granted per capita and in the proportion of people that choose to attain technical degrees. Furthermore, BC remains below the OECD average in granting technical doctoral degrees.
- **Improving conditions for venture capital:** At $464 million of venture capital invested in BC in 2015, the province ranks third in Canada for venture capital investment after Québec and Ontario. This is a significant increase since the 2014 report.
- **Stagnant investments in R&D:** Despite robust growth in the sector and more maturing firms, R&D levels remain flat.

"The tech sector is one of the fastest growing segments of the B.C. economy and access to talent is critical for companies in the industry. Vancouver, Victoria and Kelowna are now well-recognized tech hubs and we should continue to develop local talent via our top-notch educational institutions, do more to attract skilled workers, and keep the costs of doing business in B.C. low."

Johann Starke
CEO FCV Interactive

Talent availability: tech grad focus

Talent is a critical resource for the technology sector, driving innovation and powering growth. From information & technology to engineering & other services to life sciences, each sector relies on the availability of a skill-specific talent pool to meet existing business demands and generate new growth ideas. BC technology firms can source talent locally from new grads of BC tech programs, bring in talent through inter-provincial or international immigration or retrain existing BC residents. While BC has made great strides in talent availability since the last report card was released, increasing the talent pool in BC will only continue to drive the sector forward in terms of output and innovation.

Against other provinces, BC graduates the third highest number of students from technical programs, but on a per capita basis this is lower than larger provinces such as Ontario, Québec, and Alberta. Furthermore, BC also lags behind other OECD countries in terms of technical doctoral degrees granted per capita.

Talent availability: tech grad focus

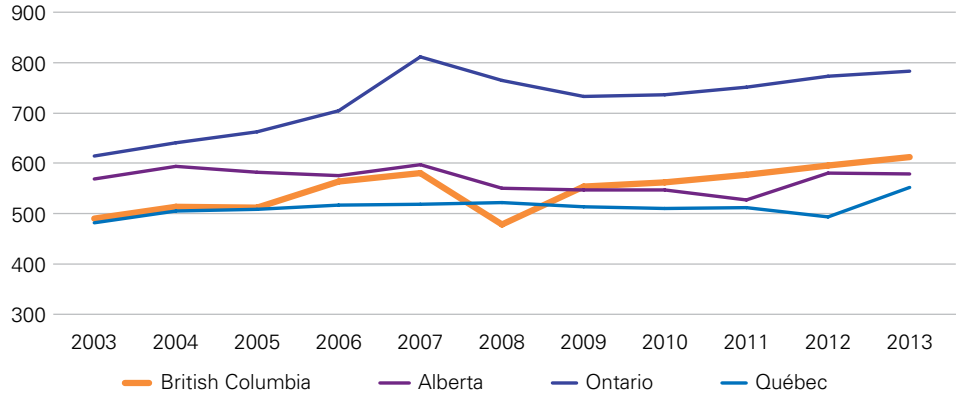
		Versus other provincial tech sectors
Undergraduate degrees		→
Undergraduate technology degrees		→
Graduate technology degrees		→
Summary		→

Going deeper

Using degrees granted per capita as indicative of talent availability, BC continues to grow at a stable pace. Compared to Alberta, Ontario, and Québec, BC performs better in terms of undergraduate than graduate degrees, having been second only to Ontario since 2009 but situated behind that province by a considerable margin.

BC performs better than both Alberta and Québec in the number of undergraduate degrees per capita.

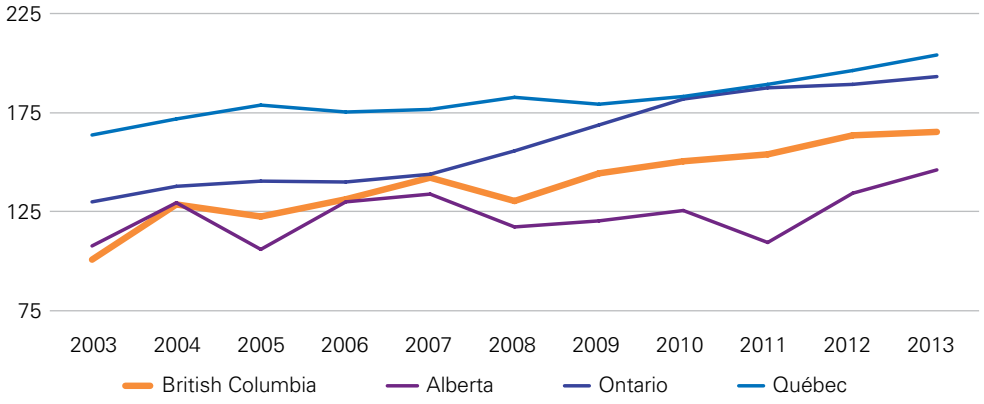
Undergraduate degrees per 100,000 population



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

BC schools award fewer graduate degrees per 100,000 people than other provinces.

Graduate degrees per 100,000 population

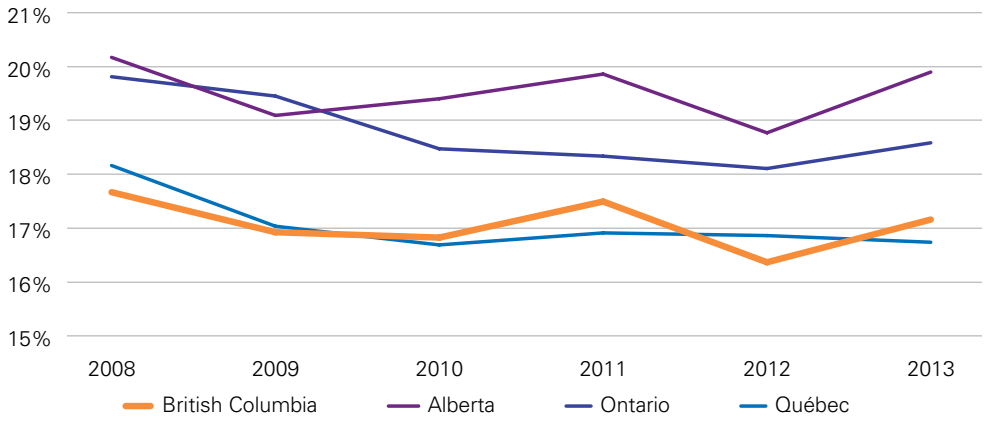


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

The tech focus of BC students, however, lags behind other provinces with only 17.2 percent of BC undergrad students focusing on tech compared to 19.9 percent in Alberta and 18.6 percent in Ontario. The data for graduate studies only serves to widen this issue, with BC at 22.2 percent compared to 33.7 percent in Alberta and 30.2 percent in Ontario.

The percentage of undergraduates who choose to pursue technical degrees in BC has increased in the past year, but still ranks below Ontario and Alberta.

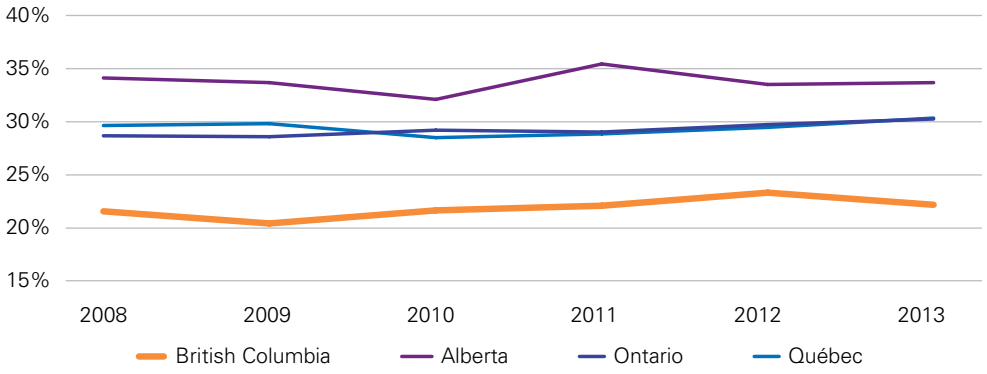
Percent of total undergraduates with technology degree specialization



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

In comparison to other provinces, BC has one of the lowest percentages of master's graduates with technical degrees.

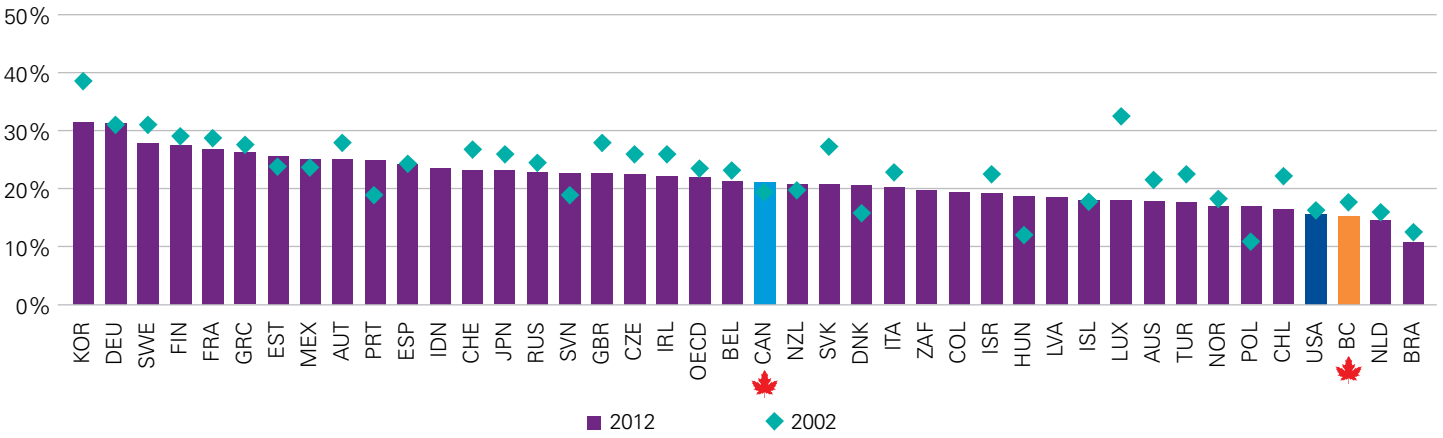
Percent of total masters degrees with technology specialization



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Globally, Canada performs slightly below the OECD average for granting doctoral degrees that are technology related, as a percentage of tertiary level graduates.[8] KPMG analysis indicates that BC has dipped by 2.4 percent over the past decade and has been surpassed by previously lagging countries such as Hungary and Denmark. However, most other countries have also experienced a drop in this metric, likely due to the continued diversification of education options.

Technical doctoral graduates as percentage of reference education level



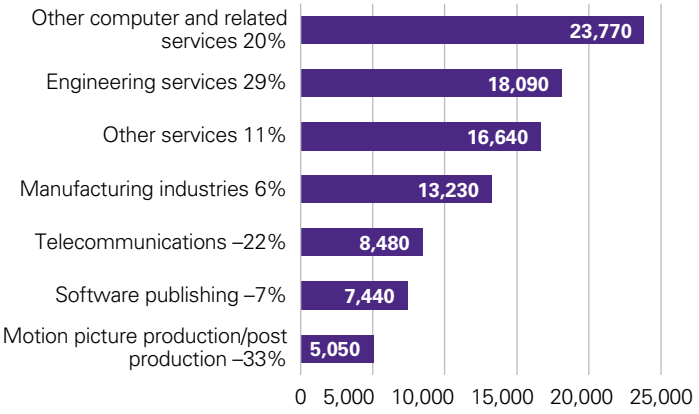
Source: KPMG analysis of BC Stats data and OECD science, technology and industry scorecard 2015, OECD, 2015

Employment and talent availability

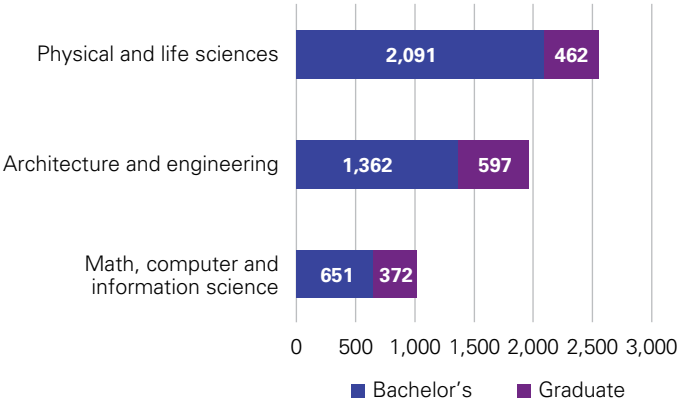
One of the largest areas of employment in BC tech is other computer and related services, growing 20.4 percent since 2009 to employ 23,770 people in 2014. However, local talent growth in math, computer and information science is almost stagnant, producing 1,023 degree holders in 2013, 60 more than in 2012. Architecture, Engineering, and related technology degrees have increased by 159 over the same period while Physical and Life Sciences degrees have increased by 84. Aligning seats and graduates to highest growth areas is a ongoing challenge which needs to be addressed.[9]

Employment and graduates by the numbers

BC technology sector employment and growth 2009–2014



BC technology graduates in 2013



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

8 OECD defines tertiary level graduates as individuals who have obtained a degree at ISCED-97 Levels 5A or 6.
9 For more information, the BC Tech Association is conducting a labor market study, slated for publication by November 2016.

Insights on talent availability

Leaders in the tech sector almost universally agree that access to talent has become the most significant issue facing their firms. Leaders relate concerns over a tightening of talent availability over the last few years, including software and web development, a lack of local executive talent and a need to expand the available talent pool in areas such as specialized marketing, sales and technical roles.

The challenges in talent availability have been heightened by the arrival of multinational companies and the exciting trend for local businesses to stay and grow locally. While this is good news for the BC tech sector, it highlights the ever-growing need for more talent in the marketplace. With a relatively constrained talent pool, the competition for available resources has increased, and with it, compensation levels have risen. In order to manage the talent pool constraints in BC, in some cases, BC-based companies have established or grown their operations outside of BC where talent is less expensive and more available.

Leaders agreed that the long-term success of this sector will require an expanded talent pool, developed by improving the quantity and quality (job readiness) of post-secondary degree programs as well as attracting talent from outside of BC and Canada. While attracting talent from outside of BC and Canada is a solution to the constrained talent pool, leaders identified several challenges with bringing overseas talent into Canada – primarily from a visa and immigration standpoint. The time it takes to bring a qualified individual into Canada through the immigration process can be a deterrent both for the individual as well as the business. In addition, the cost of real estate in BC, particularly in Vancouver, was cited as a barrier for attracting outside talent, leading to additional relocation costs.

Access to capital

Increased capital investment

Since the last Report Card, the BC technology sector has seen healthy growth in capital investment. In recent years, there has been significant effort to improve access to capital for early stage funding. For example, in 2013, the federal government launched a venture capital action plan that aimed to deploy $400 million in new capital.[10] In 2015, the BC provincial government announced the creation of a $100 million technology innovation venture fund to further support local firms.[11]

These efforts and a resurgence in the market has helped BC venture capital (VC) investment increase in recent years. A closer look reveals that while the majority of investments continues to be later stage, the share of early-stage investments is growing.

Access to capital

		Versus other provincial tech sectors
Access to angel investment		→
Access to VC		↗
Summary		↗

[10] More details regarding the Venture Capital Action Plan are available on the Government of Canada website at https://www.fin.gc.ca/vcap-pacr/index-eng.asp

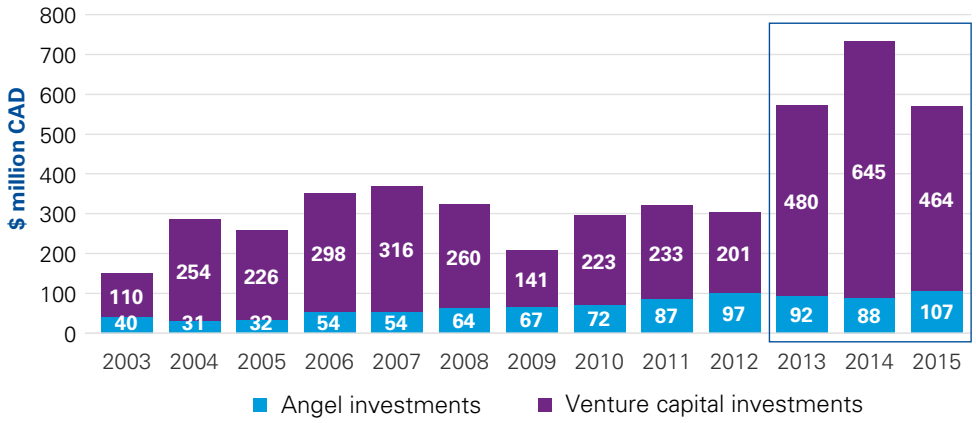
[11] More information about the planned BC Tech Fund is available on the Province of BC's website at https://news.gov.bc.ca/releases/2015MTICS0033-001951

Going deeper

The BC technology sector's access to capital is improving, with angel investment holding steady and VC investments growing by nearly 140 percent in 2013, amounting to a $480 million spend compared to the previous year's $201 million. BC has sustained this increased level of investment through to 2015.

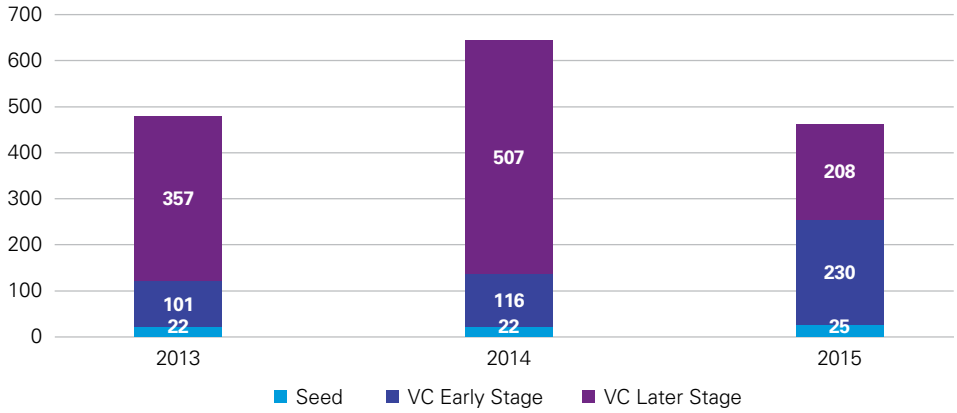
In the past three years, BC has experienced notable increases in early-stage financing, depicting a different outlook for the availability of venture capital for BC tech compared to previous years:

Capital by stage of investment



Source: BC Tech Association analysis of CVCA and BC investment branch data

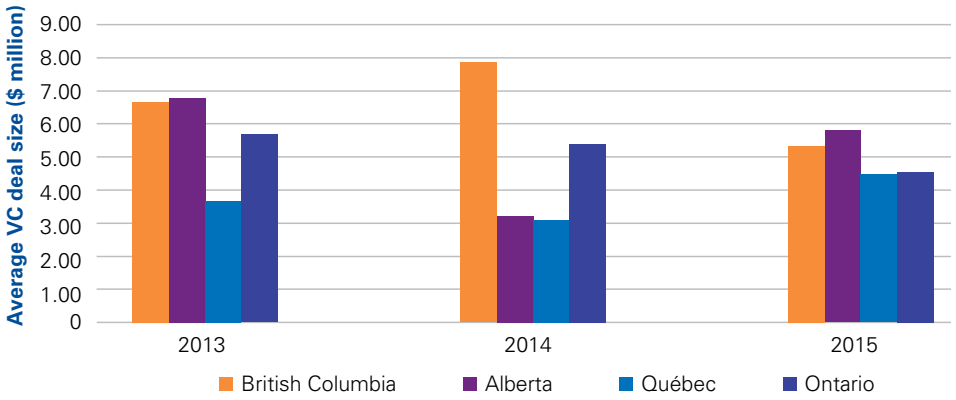
Venture capital by type of investment



Source: BC Tech Association analysis of CVCA and BC investment branch data

Compared against Alberta, Québec, and Ontario, BC also performs well on an average dealsize basis. With an average investment of 5.3 million, BC ranks just behind Alberta in 2015.

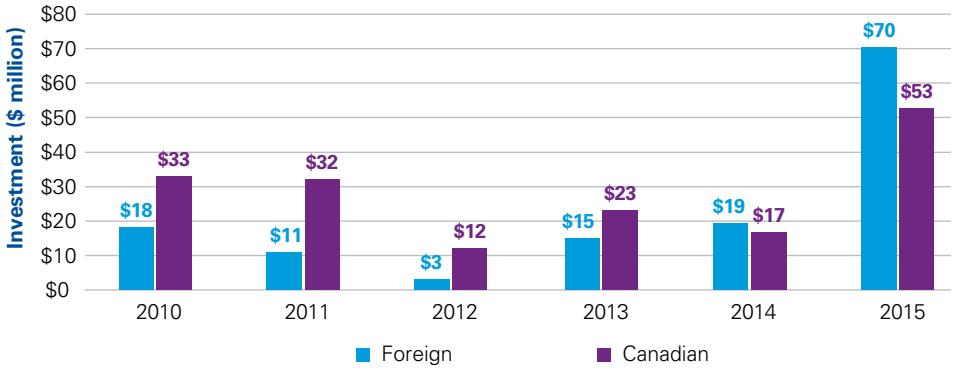
Average venture capital deal size



Source: BC Tech Association analysis of CVCA data

First time early-stage VC investments have also increased in the past few years from both domestic and foreign sources. This improvement is indicative of (a) higher activity levels in tech investments, and (b) an increase in the number of companies financed.

Early stage first time VC investment by source



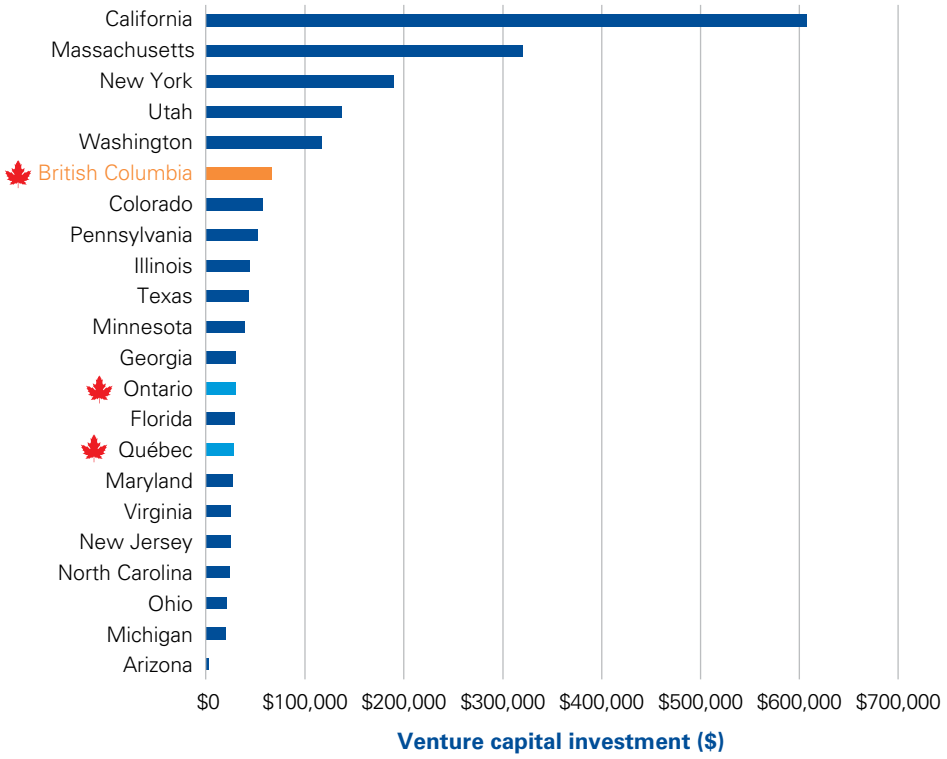
Source: BC Tech Association and KPMG analysis of Thomson Reuters data

"Local funding for early stage startups is table stakes for a vibrant tech ecosystem like BC. We have the ingredients needed for tech to take off, but establishing and retaining stable funding sources must be a top priority."

Matt Switzer
SVP Labs, Corporate & Business Development, Hootsuite

Compared with a number of states in the US, BC does well in attracting capital to this relatively small market. On a per company basis, 2014 saw BC attract a relatively high amount of capital.

VC per technology company, 2014



Source: KPMG analysis of BC Stats, CVCA and CompTIA data

Industry insights on risk capital investment

The technology sector leaders interviewed recognized that there is a healthy local angel network in BC. In addition, BC firms identified that funding over the 10 million dollar mark has been made accessible through the increase of capital from major investors in areas such as the Silicon Valley. However, securing stage two venture capital financing in BC is seen as a challenge, making it difficult for early stage start-ups to grow. Sector leaders within the lifesciences subsector and clean tech echoed this sentiment, noting that stage 2 funding requirements can even be higher when needing to fund projects within their subsectors.

Overall, the opinion was that in BC, relative to other thriving tech sectors, the venture capital ecosystem remains undersized and lacking sufficient capacity – all of which has led to uncompetitive valuation and terms for growing companies.

"Investment in R&D is critical for any tech company, in BC or elsewhere. This is absolutely true at STEMCELL. To advance and grow with the global life science industry, we need services – such as GMP manufacturing – to be available locally. Investment from an individual firm isn't going to be enough to build these kinds of capabilities and grow large tech businesses and clusters. In BC and in Canada we suffer from a shortage of role model Canadian technology companies that can compete globally. Government needs to focus on working with companies who have proven the ability to grow in order to create the ecosystem where Canadian technology will thrive."

Andrew Booth
Chief Financial Officer,
STEMCELL Technologies

Research and development

R&D expenditure is the long-term investment that supports the sector's future economic performance. Since 2008, R&D expenditure in BC has remained stagnant at around $3 billion per year. As such, BC ranks lower than Ontario and Québec when comparing R&D as a share of GDP. BC is not alone in this trend; the average Canadian R&D spend has also remained flat over the last five years. The mix of sources of R&D expenditure (business, higher education/non-profit, government) in BC has also remained relatively constant, with just over half originating from business enterprises, followed by higher education and private non-profit.

Research and development

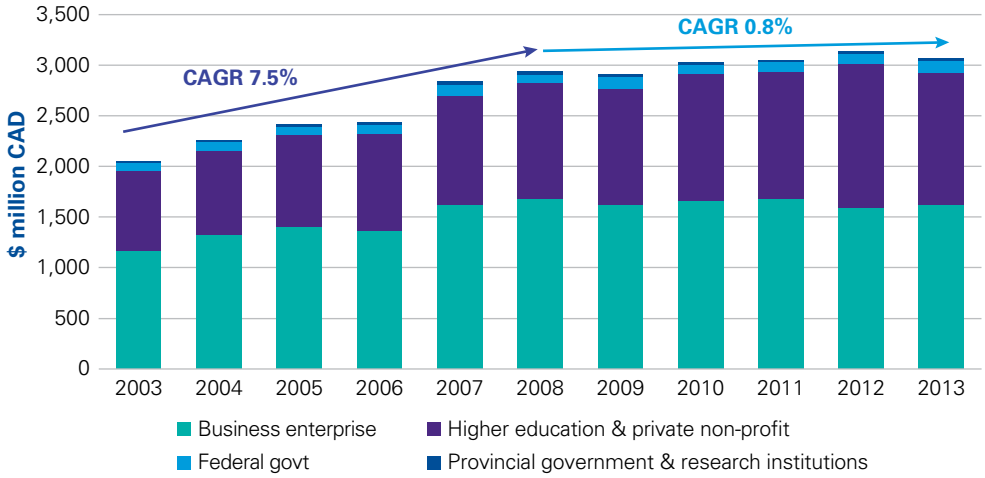
		Versus other provincial tech sectors
R&D as a percentage of GDP		→
BERD as a percentage of GDP		→
Summary		→

Going deeper

Since 2008, total R&D expenditures in BC have hovered around $3 billion yearly. While still roughly the same in composition, the past few years have seen a slight shift towards more R&D within higher education and private non-profit, which increased to 42.5 percent since 2011. Over the same period, business enterprise expenditure share declined slightly to 53 percent.

The level of yearly R&D expenditure in BC has been around $3 billion since 2008.

R&D expenditures in British Columbia

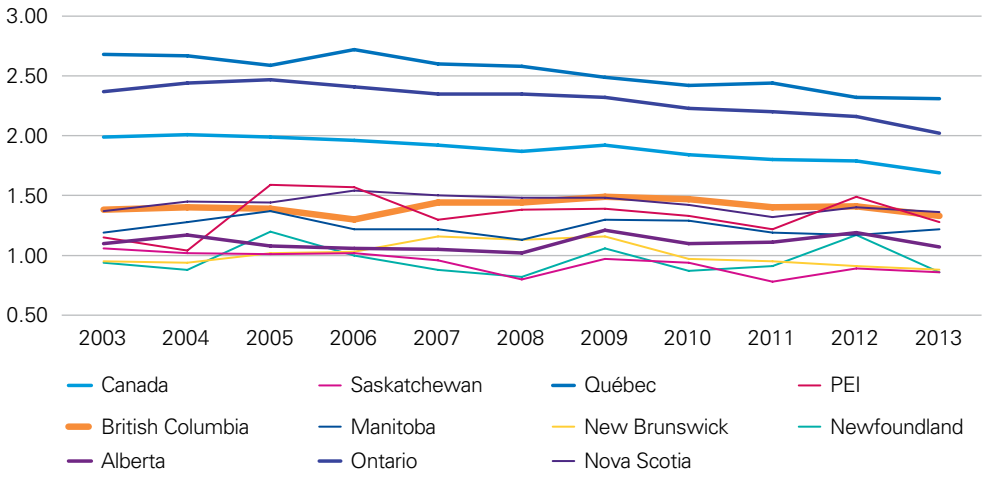


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Across Canada as a whole, R&D expenditure as a percentage of GDP has been on a slight decline since 2009. This seems to be due to flat R&D expenditures and an ever-growing economy. BC remains ahead of Alberta for R&D as a percentage of GDP, although it has declined from 1.40 percent in 2011 to 1.33 percent in 2013.

Most provinces have been exhibiting yearly decreases in R&D as a percent of GDP since 2009.

R&D as a percent of GDP



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

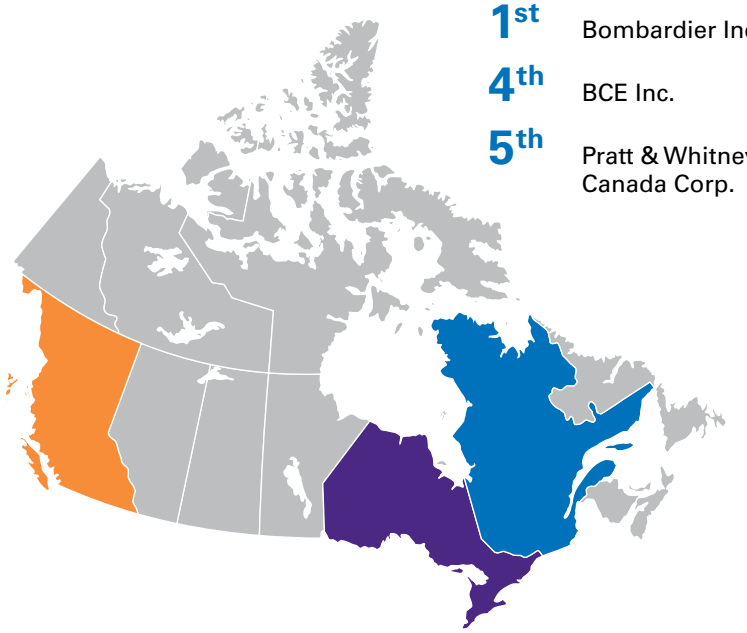
Top 2015 R&D spenders in Canada by firm location

British Columbia

		R&D spend ($MM)
17th	TELUS Corporation	194
23rd	MDA	140
31st	Sierra Wireless Inc.	91
32nd	Westport Innovations Inc.	86
34th	PMC-Sierra Ltd. (foreign subsidiary)	78

Québec

		R&D spend ($MM)
1st	Bombardier Inc.	2,022
4th	BCE Inc.	546
5th	Pratt & Whitney Canada Corp.	542



Ontario

		R&D spend ($MM)
2nd	Blackberry Limited	785
3rd	Magna International Inc.	546

Source: Adapted from Canada's Top 100 Corporate R&D Spenders, Canada's Innovation Leaders, 2015

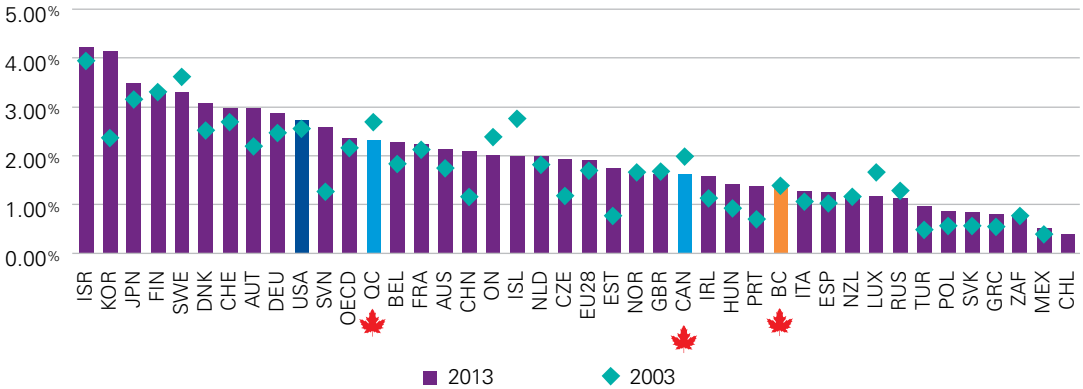
As can be seen above, a lack of large firms in BC reduces the level of R&D spend in BC relative to other provinces.

R&D expenditure

While BC has improved slightly, it continues to lag in R&D investment in comparison to OECD countries.

BC has improved by 6 places in the ranking in the past decade, but remains below the national and OECD average.

R&D expenditure as a percent of GDP

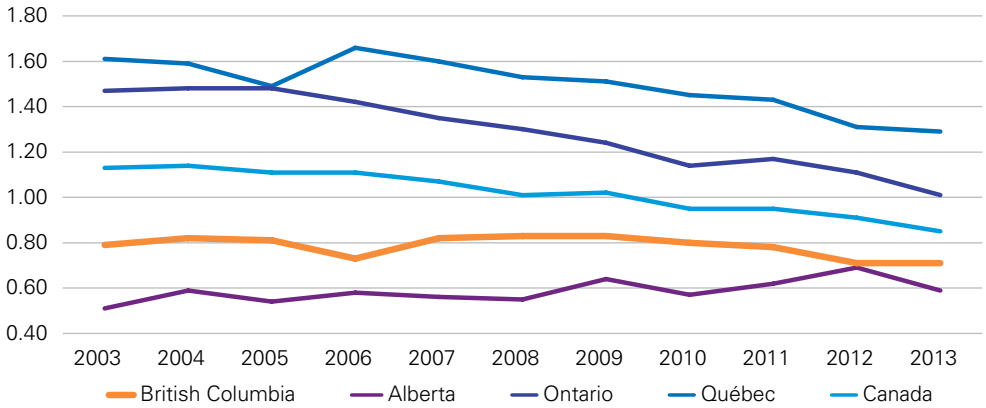


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016 and OECD science, technology and industry scorecard 2015, OECD, 2015

BC continues to be positioned behind other provinces when it comes to Business Expenditure on R&D (BERD), significantly trailing Ontario, Québec, and also Canada overall. From 2012 to 2013, BC's BERD stayed constant at 0.7 percent of BC GDP while other provinces declined over the same period.

With the exception of BC, the BERD ratio fell for all other provinces that have a significant technology sector.

Business expenditure on R&D as a percent of GDP



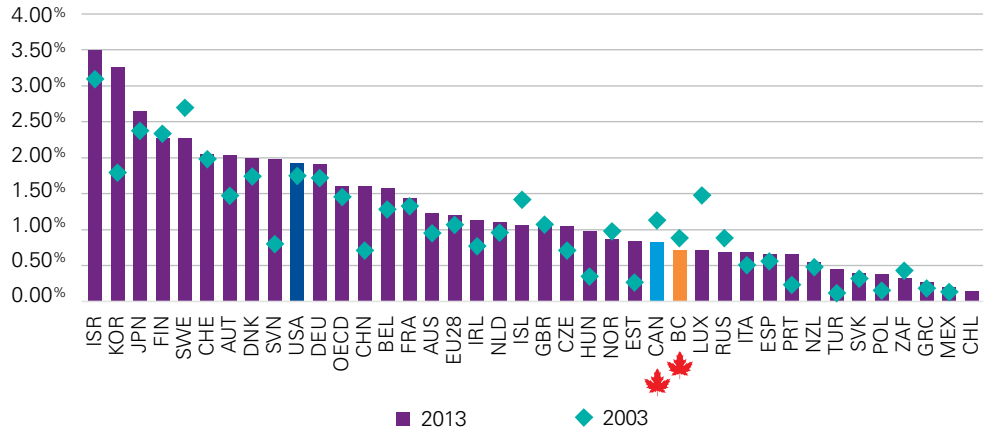
Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

Business expenditure on R&D as a percent of GDP

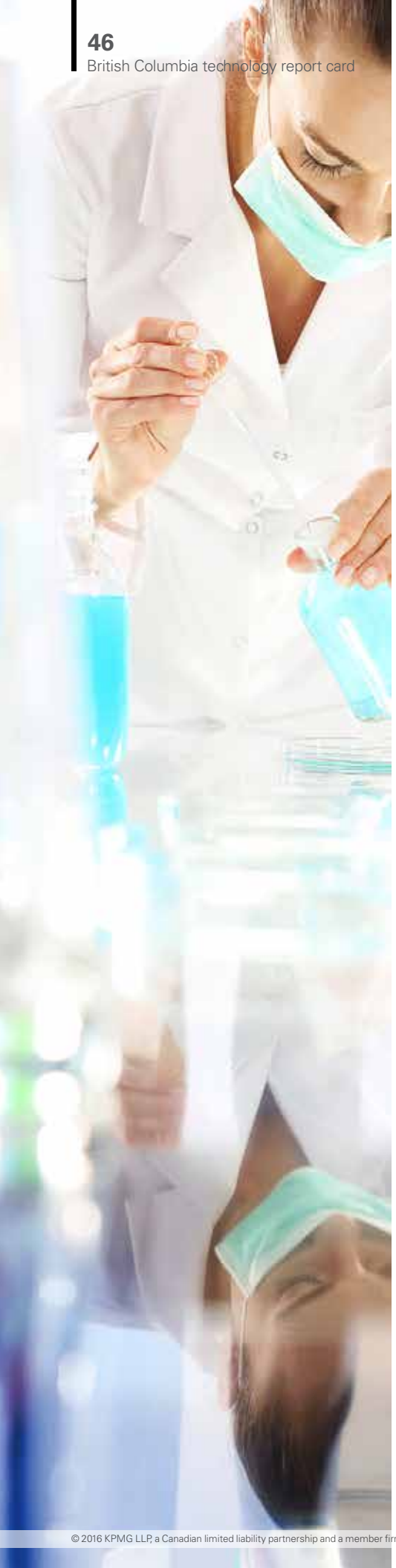
As one of the few countries that declined in this metric in the past decade, Canada performed at near half of the OECD average. The same can be said of BC, which has advanced 4 places in the ranking since 2003.

Business expenditure on R&D remains below the OECD average.

Business expenditure on R&D as a percent of GDP



Source: KPMG analysis of BC Stats data and OECD science, technology and industry scorecard 2015, OECD, 2015



Intellectual property

Intellectual property is a reflection of successful R&D expenditure and potential commercialization. While IP also includes copyrights, trademarks and trade secrets, we have focused on patents as they are a useful measure for the level of innovation in the technology sector, and are particularly important to life sciences firms. For Canadian patents, BC lags in comparison to other provinces on both an absolute and per capita basis. However, a closer look at Patent Cooperation Treaty (PCT) filings, which are indicative of IP activity with a wider reach, reveals that BC performs better than most other provinces, with Vancouver leading as the most active city in Canada.

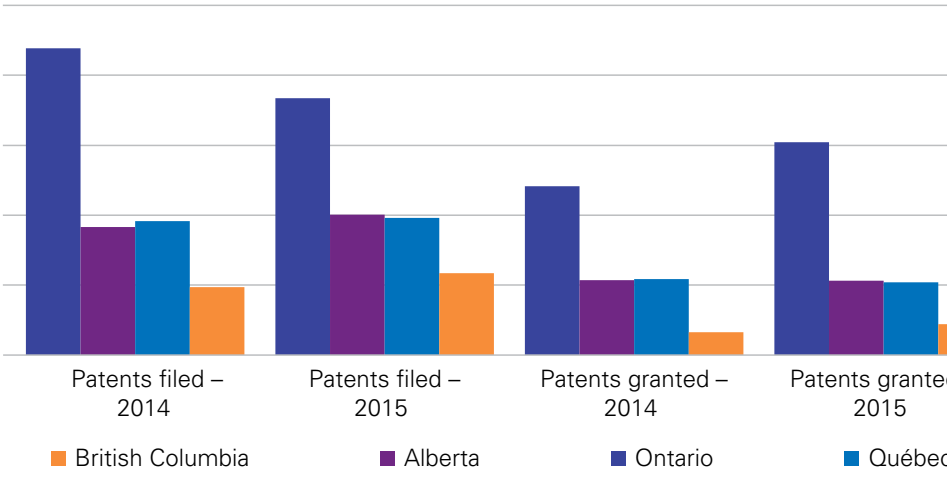
Intellectual property

		Versus other provincial tech sectors
Canadian patents granted		↘
Patent cooperation treaty filings		↗
Summary		→

Going deeper

For patents granted through the Canadian Intellectual Property Office, BC continues to rank below Ontario, Alberta and Québec with the fewest applications and as a result, the fewest patents granted. As Canadian patents are concentrated in construction, utilities and more recently, electronic product manufacturing, it may explain the other provinces' relatively stronger activity.

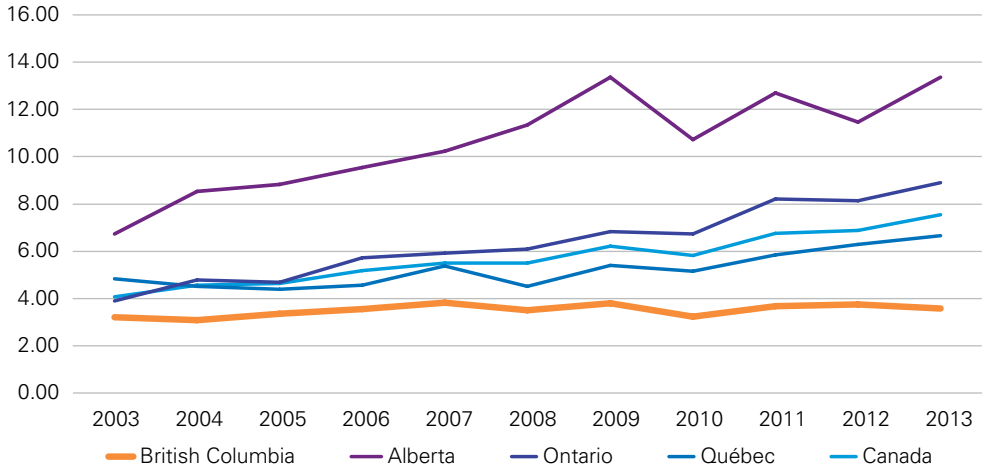
Canadian patents filed and granted



Source: Canadian intellectual property office

BC is the only province out of those with a significant tech sector to have exhibited a decrease in patents awarded per capita in the past two years.

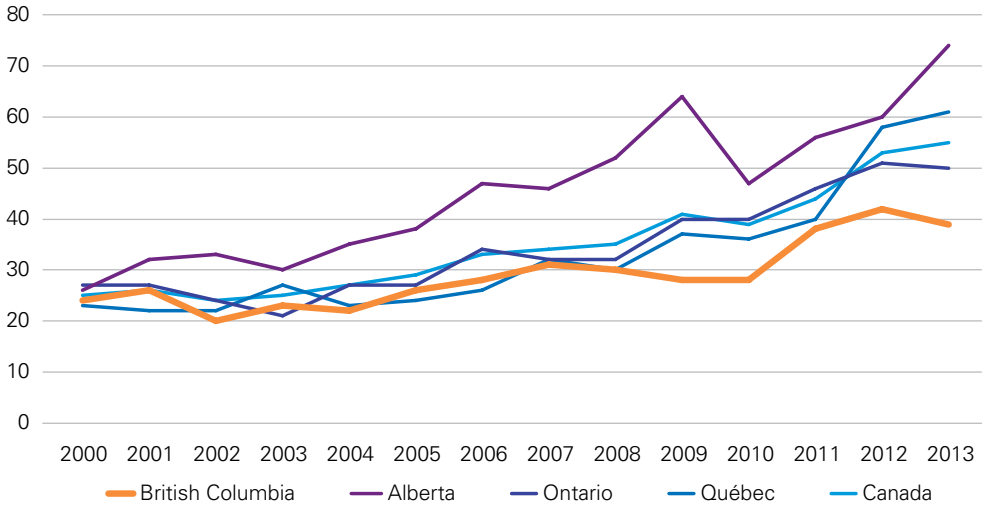
Patents awarded per 100,000 population



Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

At 39 percent, BC has the second lowest patent success rate out of provinces with a significant tech sector. With over 95 percent of high technology firms in BC having fewer than 50 employees, BC firms on the whole are small and may have limited ability to access the expertise needed to pursue patents.

Patents granted as a percent of patent applications

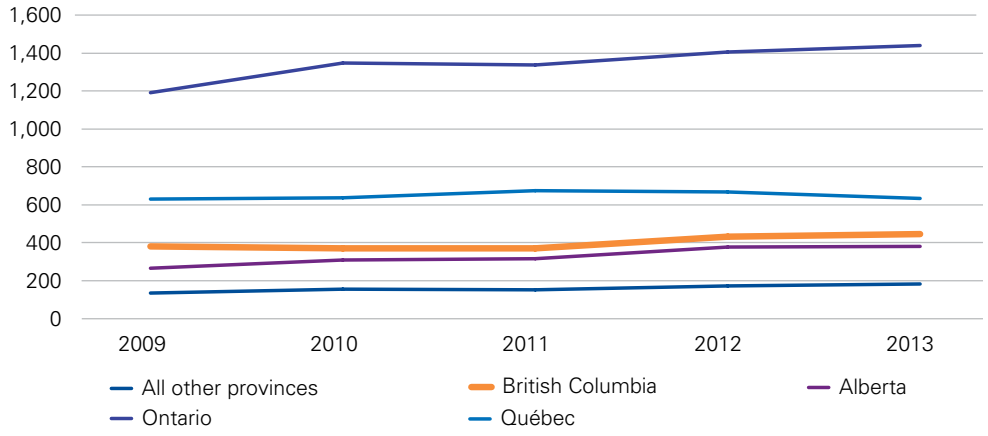


Source: Profile of the British Columbia high technology sector, BC Stats, September 2016

That being said, patents for protection in Canada are only a part of the picture, with many firms choosing to apply in the US[12] and through a PCT filing. PCT filings allow for the applicant to claim the same filing date at the country of application as for each of the 150 contracting countries. This grants the applicant both a potential global reach and a time advantage. For many firms, this may be preferable to filing in each target market separately. With 447 PCT filings in 2013, BC ranks above Alberta with respect to this indicator.

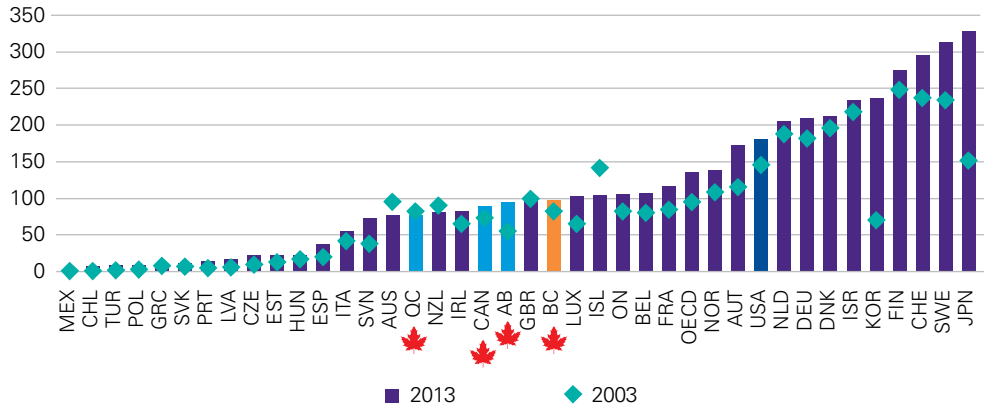
On a per capita basis, BC ranks second in Canada after Ontario in number of PCT filings, having surpassed Québec in 2012.

PCT filings by province



There is further growth potential for BC as it outpaces Canada in terms of PCT filings per capita. At present, our province remains more than 30 percent below the OECD average.

PCT filings per million population 2013



Source: OECD and World Bank

[12] For example, in 2015, the USPTO reported 7,492 patent grants to Canadian residents, while the CIPO reported 2,992.

Conclusion

The indicators, statistics and figures presented in this report show us that BC's tech sector has advanced significantly and is ready for its next growth phase. The overall picture painted by the economic indicators suggests that our tech sector is not merely functioning, it's thriving.

To maintain and accelerate this growth, continued support for some critical ecosystem elements is required.

Our call to action

The data reveals some issues to address. Technology leaders have expressed the importance of confronting these issues to ensure the BC tech sector is capable of going to the next level.

- The risk to BC is that unless these small and mid-sized companies find it valuable to stay and expand their businesses here, through finding sufficient numbers of qualified personnel, capital to increase R&D activity, and the means to export their products and services, we could lose them to more fertile ground outside of our province.
- Access to talent remains the biggest issue for most tech companies. BC post-secondary institutions graduate fewer engineering and technology related degrees, on a per capita basis, compared with other Canadian provinces, and BC remains below the OECD average in granting technical doctoral degrees. To achieve our full potential, the tech sector needs to educate, attract and retain the best talent in the world - both specialized tech talent as well as senior level executive talent with the expertise necessary to help companies to scale to global leaders.

By observing the growth trajectory of tech sectors in other jurisdictions (see chart on page 21), BC can take inspiration. But first we need to enable companies to stay in BC and to grow in BC. It appears the tech sector ecosystem in British Columbia has proven a good one for start-ups and mid-sized companies, given that the vast majority of tech companies consist of 50 employees or fewer. The risk to BC is that unless these small and mid-sized companies find it valuable to stay and expand their businesses here, through finding sufficient numbers of qualified personnel, capital to increase R&D activity, and the means to export their products and services, we could lose them to more fertile ground outside of our province.

This points to the issues that the tech sector leaders that we interviewed are raising. Access to talent remains the biggest issue for most tech companies. BC post-secondary institutions graduate fewer engineering and technology related degrees, on a per capita basis, compared with other Canadian provinces, and BC remains below the OECD average in granting technical doctoral degrees. To achieve our full potential, the tech sector needs to educate, attract and retain the best talent in the world – both specialized tech talent as well as senior level executive talent with the expertise necessary to help companies to scale to global leaders.

Success for the BC tech ecosystem depends on one key characteristic – adaptability. Can we adapt quickly enough to take advantage of the opportunity. Will BC's tech companies find the resources they need to stay innovative and agile on our soil? It's up to us how we will grow from here.

Acknowledgements

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