KPMG
cutting through complexity

British Columbia Technology Report Card 2012

Assessing Performance – Gauging Potential

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Cleantech

Featuring companies in energy generation, energy transmission and storage, energy use in transportation, energy efficiency and resource management.

- 6,400 jobs
- 202 companies
- $1.7 billion in revenues

Wireless

Featuring companies in all areas of the mobile ecosystem, including mobile operators, platform providers and device manufacturers.

- 10,200 jobs
- 1,200 companies
- $3.0 billion in revenues

Life Sciences

Featuring companies involved in biopharmaceuticals, medical devices, bioproducts and bioenergy, and greater life sciences.

- 10,200 jobs
- 340 companies
- $0.8 billion in revenues

Digital Media

Featuring companies in video gaming, animation and visual effects, social media, interactive marketing and e-learning.

- 14,000 jobs
- 900 companies
- $1.2 billion in revenues

Information and Communications Technology (ICT)

Featuring companies in telecommunications, software development, computer services, manufacturing and wholesaling, but excluding wireless and digital media, which have been presented separately for purposes of this report.

- 40,000+ jobs
- 6,000+ companies
- $7.9 billion in revenues

Note: Figures are based on Industry Association estimates as of 2009 to be consistent with the study year in this report. Figures may include overlapping estimates.

Foreword

Technology has become a transformative global force affecting all aspects of our lives. Whether it's digital media, life sciences, wireless, information and communication, or cleantech, technology is not only permeating and shaping every business sector, it is also blurring the lines between industries to increase interconnected business paradigms. As the pace of innovation accelerates, new technologies, products, services and business models will emerge to replace slower, less efficient and more expensive incumbents. We believe that the world is entering a period of intense competition for innovation investment and that economies that understand and embrace this transition will ensure their future competitiveness and prosperity.

British Columbia is well-positioned to exploit this transformation. We have a wealth of talent and a diverse base of technology companies that often punch well above their weight class. We have world-class universities and experienced entrepreneurs capable of building internationally competitive tech companies. We also have a Provincial government that has created a competitive climate for business investment.

Recognizing this tremendous potential and the urgent need to be more strategic and intentional in building BC's technology industry we have collaborated with KPMG to prepare this report. Our objective is simple—to baseline the status of our technology industry in British Columbia and across Canada as a first step to zeroing in on actionable priorities that can accelerate the growth of our industry.

This KPMG report card puts the performance of BC's technology sector squarely in front of all British Columbians. The report card clearly shows that technology is a cornerstone of the provincial economy, performing well in relation to other sectors and contributing significantly to gross domestic product (GDP) growth and job creation. However, the data also shows that compared to technology sectors in other jurisdictions in Canada we are underperforming. With some exceptions, the relatively weak competitive metrics should be taken as a wake-up call and a clear indication that building the BC technology industry will require much more collaborative thinking, strategic planning and targeted action. We need to raise our game.

What's next? Over the coming weeks and months, we will be meeting with tech sector colleagues, business leaders in BC, post-secondary institutions, municipalities, investors and the federal and provincial governments to develop a strategic plan for accelerating our competitive capabilities. This will involve addressing some key priority areas: 1) access to customers; 2) access to capital; 3) growing and developing our talent base; and 4) accelerating growth and expanding access to markets. We believe this is a critical opportunity for the BC technology industry that can help to build a more vibrant society for our children and subsequent generations, one based on well-paid, knowledge-based jobs that make a real difference in the lives of individuals and strengthen our economy. We look forward to working with you to make this happen.

Bill Tam, President and CEO, British Columbia Technology Industry Association

Howard Donaldson, President and CEO, DigiBC

James Maynard, President and CEO, Wavefront

Jonathan Rhone, Chair, BC Cleantech CEO Alliance

Executive Summary

The BC technology industry is at a turning point. At first glance, there is much to celebrate. The industry has grown steadily within the provincial economy and is a leader in GDP and job creation. BC has the people, the companies and the stored potential to be an important technology force, both in Canada and globally. But when it comes to competing outside the province, the results are not as favourable.

The following report card summarizes the performance of the BC technology industry compared to the traditional sectors of the BC economy and the technology sectors in other large Canadian provinces (Ontario, Quebec and Alberta). The ratings clearly show that the BC technology industry is **outperforming its industry peers provincially**, but is **underperforming in comparison to its technology sector peers in other provinces**.

BC Technology Industry – 2012 Report Card		
	Versus Other BC Industry Sectors	**Versus Other Provincial Tech Sectors**
Economic Performance Indicators	A	C
Industry Input Indicators	Not Applicable	C-
Overall	**A**	**C**

The comparative results with other provincial tech sectors reflect a long-term historical issue: BC started as a resource economy with a limited industrial base compared to other provinces, especially Ontario and Quebec. Consequently, BC tech had a relatively late start and, with little industrial core to build from, has been coming from behind. In absolute terms, BC tech trails in many key metrics. However, the trend in the last decade is generally positive and the BC tech sector is catching up in many areas.

KPMG undertook this report card to examine the BC technology industry as it stands today—provincially and nationally. In addition, while beyond the scope of this report to do a full comparison of BC to other international jurisdictions, we have provided certain international comparisons to enhance our analysis. We looked at five key sectors—cleantech, digital media, wireless, life sciences and ICT (information and communications technology).

Overall, this 2012 BC technology report card reaches three key conclusions:

- **The BC technology industry is a significant economic engine for the province** and is outpacing our traditional resource-based industries in revenue and employment, both in current size and growth rate. The BC technology industry:
  - Employs **over 80,000 people**, more than the forestry, mining and oil and gas sectors combined.

  - Was the **second fastest creator of new jobs** in the private sector over the past decade.
  - Contributes more to the provincial GDP than any of the traditional resource-based sectors.
  - Has grown revenue from $12.1 billion in 2001 to $18.9 billion in 2009, an average of 5.7% annually, more than double the rate of overall provincial GDP growth.
  - Has **grown technology exports** from $2.2 billion in 2001 to $4.1 billion in 2009, which now represents 10% of all BC exports.
- **In spite of recent growth, the BC technology industry is underperforming relative to its potential**.
  - The GDP associated with the technology sector compared to the total GDP of the province is significantly lower than the Canadian and US averages.
  - Technology industry employment, as a percentage of total BC employment, is behind that of the other provinces with significant technology industries.
  - The number of technology-related graduate degrees granted in BC ranks near the bottom on a per capita basis in a comparison with other Canadian and international jurisdictions. BC ranks 33rd out of 38 jurisdictions examined.
  - BC ranks 29th out of 42 jurisdictions examined in terms of R&D expenditures as a percentage of GDP.
  - BC performs somewhat better in terms of venture capital availability, ranking 15th out of 30 jurisdictions examined and receiving proportionally more venture capital funding than Ontario but less than Quebec.
  - BC's rate of patents granted per capita is significantly below that of Alberta, Ontario, Quebec and most of the OECD countries.
- **The global technology market is enormous, growing rapidly, and represents a significant opportunity for the province.** Realizing BC's full potential will require a heightened level of intention in terms of policy and industry development:
  - Global technology industry revenues for 2011 are estimated at $8.8 trillion, representing 14% of global GDP of $63 trillion.
  - The growth rate of the global high technology manufacturing industry averaged 7.4% over the period 2001-2010.

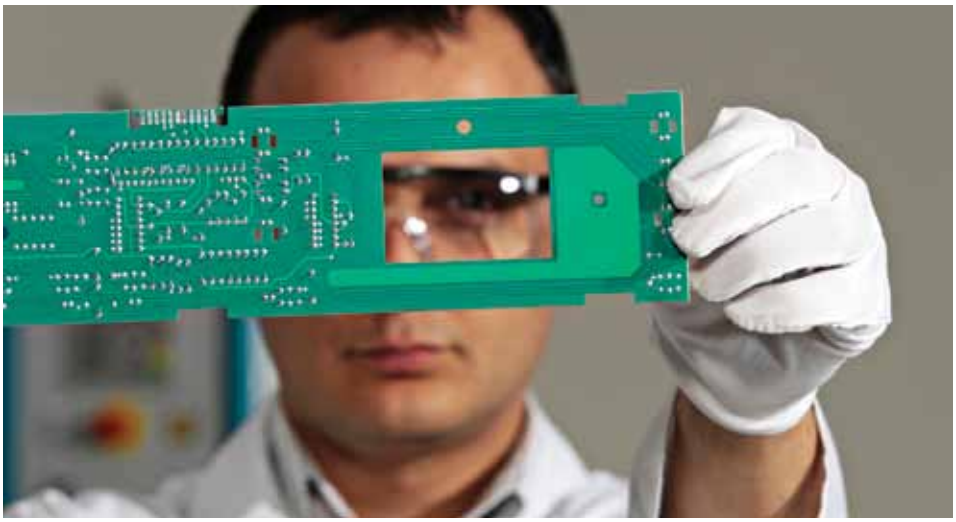
- BC's share of the global market is miniscule – estimated at 0.22%.
- BC's technology GDP as a percentage of provincial GDP stands at 5.9%, which is 21% lower than that of Canada overall. If BC's tech sector GDP were to equal that of the Canadian average, BC's economic output would rise dramatically, increasing overall GDP by $2.5 billion and adding upwards of 23,000 new jobs.

Success in technology is no longer an option. It's a prerequisite for economic success. Consider how innovative technology fields influence traditional sectors: biotechnology in healthcare and life sciences; clean technology in energy and water; information technology in mining and oil and gas; communications technology in retail and consumer. Technology is the backbone of every industry, impacting virtually every aspect of the economy as competitive forces propel us to become more flexible and more efficient.

There is clearly room for improvement if we are to meet our full potential. Other jurisdictions in Canada and around the world have already recognized the importance of nurturing a strong technology sector – and many have moved quickly to claim their position. The trend in BC is generally positive and given BC's fundamental strengths and stored potential, the opportunity for continued improvement is clear and should be exercised with a renewed sense of urgency. Taking BC technology to the next level of growth in terms of job creation, investment and leadership requires a renewed commitment and partnership between government, industry and investors. We hope that this report will provide the impetus to fuel the discussion and accelerate the pace of industry growth, leading to significant economic benefits for our province.

Anthony D. Lindsay
KPMG LLP, Greater Vancouver Market Leader
Technology, Media and Telecommunications

1 Economic Performance Indicators



The economic performance of the BC technology industry was reviewed on the basis of five key economic performance indicators: revenues, GDP, employment, wage levels and exports of goods and services. The resulting report card immediately presents BC's technology predicament: strong performance within the province but not outside it, with the notable exception of exports.

BC Technology Industry – 2012 Report Card

	Versus Other BC Industry Sectors	Versus Other Provincial Tech Sectors
Economic Performance Indicators		
Industry Revenues	↗	↘
Gross Domestic Product	↗	→
Exports of Goods and Services	↗	↗
Employment	↗	↘
Wage Levels	↗	→
Grade	**A**	**C**

Highlights

Versus other BC industry sectors:

- **Strong Employment** – Employs over 80,000 people, more than the forestry, mining and oil and gas sectors combined.
- **Job Creation** – Second fastest creator of new jobs in the private sector over the previous decade.
- **Growing Economic Contribution** – Contributes more to the provincial GDP than any of the traditional resource-based sectors.
- **Growth** – Revenue grew from $12.1 billion in 2001 to $18.9 billion in 2009, an average of 5.7% annually, more than double the rate of overall growth in provincial GDP.
- **Strong Exports** – Technology exports grew from $2.2 billion in 2001 to $4.1 billion in 2009, and now represent 10% of total BC exports.

Versus other provincial tech sectors:

- **Lagging Economic Performance** – GDP is significantly lower than the Canadian and US averages.
- **Lower Per Capita Employment** – Employment, as a percentage of total BC employment, is behind that of the other provinces with significant technology industries.

Industry Revenues

Industry revenue metrics provide a sharp illustration of this report's contention that BC's technology performance is not living up to its potential. While the industry ranks highly for revenue growth (the measure of potential) it ranks lower in overall revenue—the more important measure of performance.

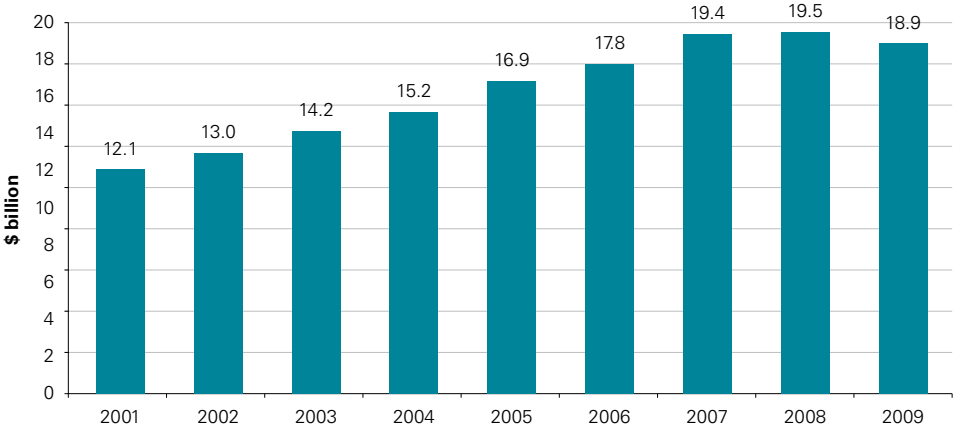
Comparison of Industry Revenues

	Versus Other BC Industry Sectors	Versus Other Provincial Tech Sectors
Industry Revenues	Not Applicable	↘
Industry Revenue Growth	↗	↗
Summary	↗	↘

Going deeper

The BC technology industry experienced seven consecutive years of growth following the dot com crash of 2000/01, but cooled off slightly during 2008 and 2009. Nonetheless the sector is still up a significant 56% over the period 2001-2009, representing a compound annual growth rate (CAGR) of about 5.7%, approximately double the overall BC growth rate.[1]

BC Technology Revenues



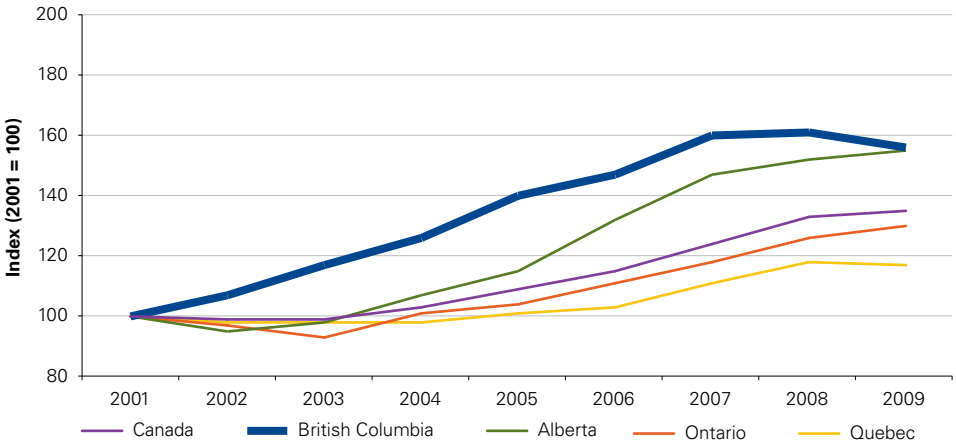
Industry revenues grew 56% from 2001-2009.

Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

[1]Estimated based on relative growth of sectoral GDP contributions. Comparable revenue statistics for each industry sector were not available.

Moreover, the sector's revenue growth rate outperformed that of the two provinces with the largest technology sectors in Canada, Quebec and Ontario, over the period 2001 to 2009.

Index of Technology Industry Revenue (2001 = 100)

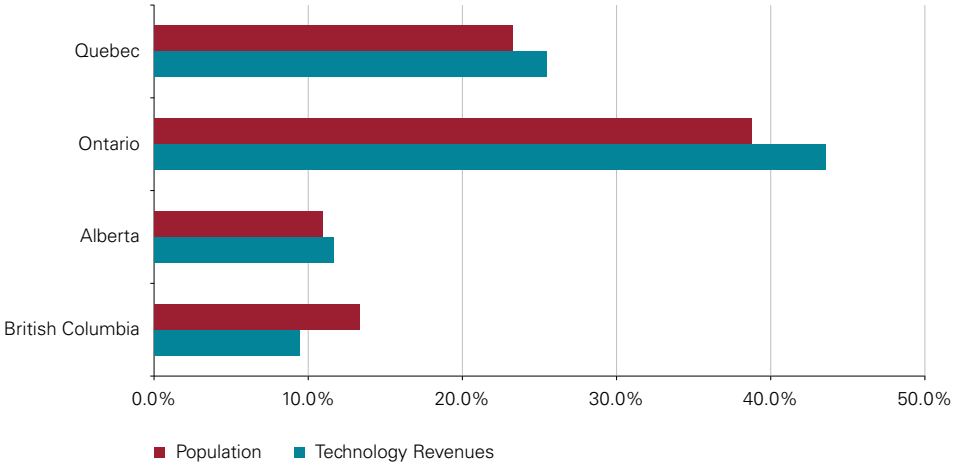


BC's tech sector rate of growth was 20% higher than Canada overall.

Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

Despite these favourable growth trends, BC technology industry revenues still only accounted for 9.4% of the overall Canadian technology industry revenue in 2009, well below its proportionate population of 13.1%. This places BC far below the other provinces in terms of per capita industry revenues.

Population and Technology Revenues as Percent of Canadian Totals



BC technology trails in per capita revenue.

Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

Overall, BC's technology industry is showing marked potential in terms of industry revenue growth but has yet to achieve comparable levels to other large provinces in terms of per capita revenue.

Gross Domestic Product

As for industry GDP, BC shows high growth/potential but relatively low performance in comparison to its peers.

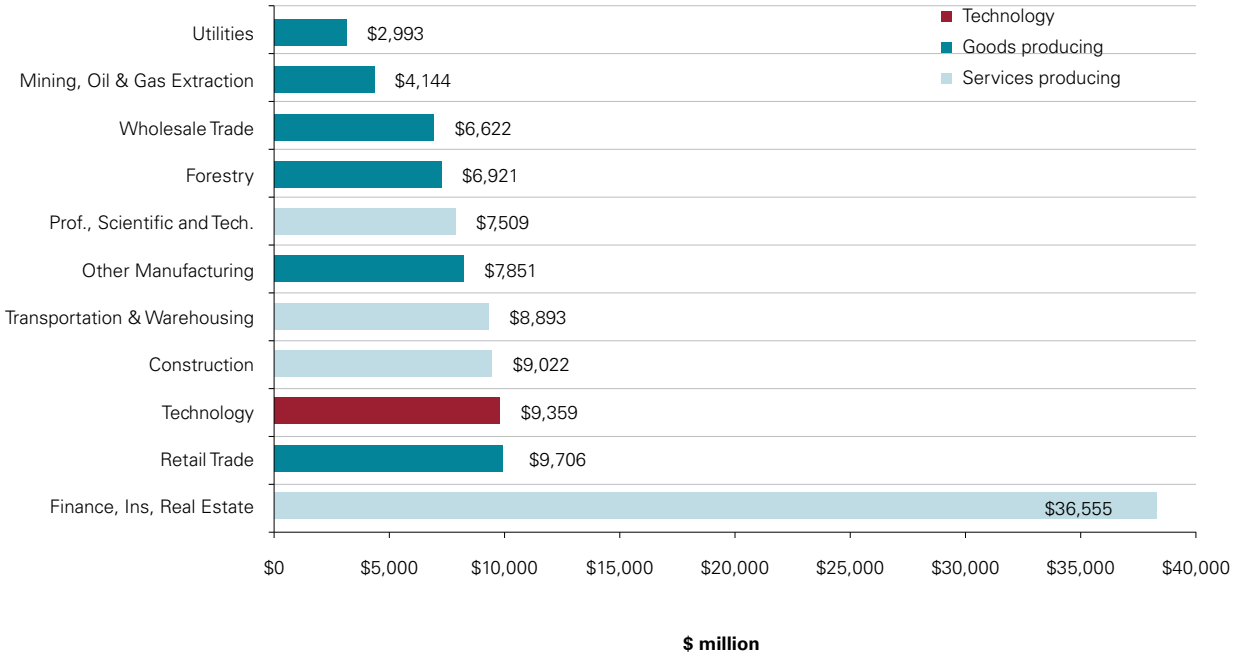
Comparison of GDP		
	Versus Other BC Industry Sectors	Versus Other Provincial Tech Sectors
Industry GDP	↗	↘
Industry GDP Growth	↗	↗
Summary	↗	→

Going deeper

The GDP contribution of the technology industry to the provincial economy is strong, topping traditional sectors such as construction, transportation & warehousing, mining and forest products. Technology is also a key driver in enhancing the competitiveness of all sectors. This means that GDP growth across all sectors is to some degree a function of the success and growth of the technology sector.

BC technology has risen to #3 in provincial GDP contribution.

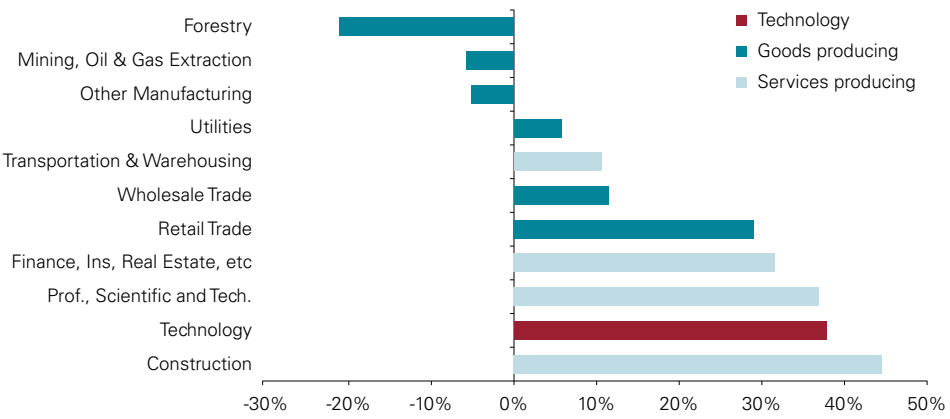
GDP Contribution, 2009 (chained 2002 dollars)



Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011

The technology sector in BC has had the second fastest rate of growth in GDP among private sectors and industries.

Growth Rate of GDP Contribution 2002 - 2009

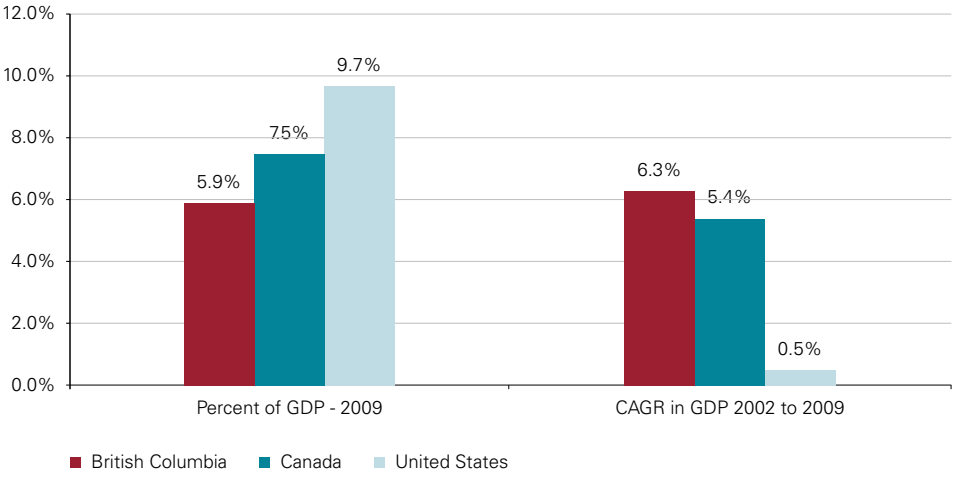


Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

BC technology grew twice as fast as the province overall.

The caveat here is that, despite its contribution to the BC GDP, the technology sector accounts for a much smaller proportion (5.9%) of overall provincial GDP than does the technology industry for Canada or the US as a whole. By comparison, the technology industry in the US accounts for nearly 10% of overall GDP. The potential, however, remains strong due to BC technology's faster rate of growth compared to those jurisdictions.

Technology GDP as a Percent of Total GDP



Source: KPMG analysis of BC Stats data.

BC technology GDP as a percentage of total GDP is 20% behind Canada and 40% behind the US.

Exports

International trade is a significant feature of the global technology sector, and particularly important to Canada. The domestic market is generally not large enough for the industry to achieve the economies of scale necessary to be competitive. Exports offer the natural vehicle for augmenting volumes, growing the industry, increasing efficiency and enhancing overall competitiveness.

The exports numbers provide a mix of results. While the BC technology industry ranks highly against other sectors of the BC economy and other provinces in terms of growth and exports of services, it performs poorly in terms of exports of goods.

Comparison of Exports

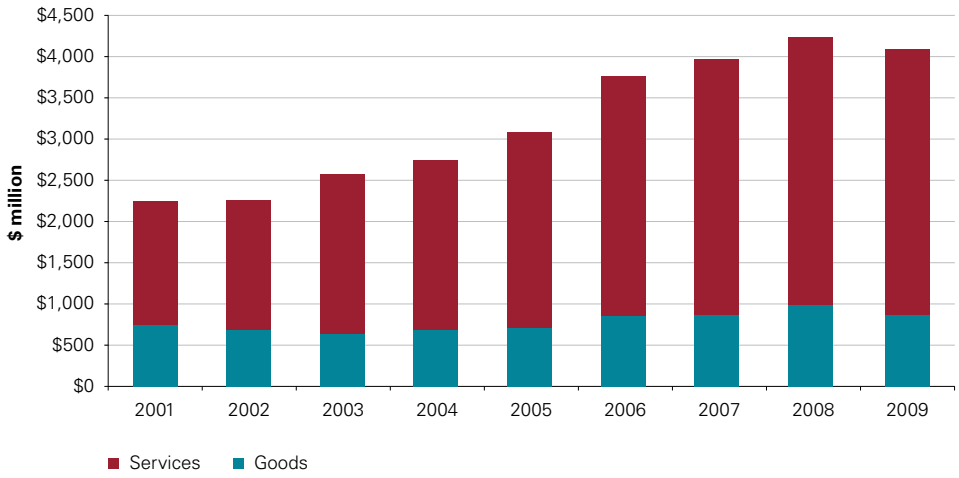
	Versus Other BC Industry Sectors	Versus Other Provincial Tech Sectors
Exports of Goods	↘	↘
Exports of Services	↗	↗
Export Growth	↗	↗
Summary	↗	↗

Going deeper

Exports of BC technology goods and services almost doubled over the period 2001 to 2009, from $2.2 billion to $4.1 billion. This represents a compound annual growth rate of about 8.1%, an impressive figure considering that over this same period, the province's total export performance actually declined. Virtually all of the growth has been in the exports of technology services (including software, communications and digital media products), suggesting that the creative industries and soft goods represent an increasingly important area of future growth.

Technology exports accounted for 10.5% of BC's total exports of goods and services in 2009, despite only representing 5.9% of provincial GDP. The technology sector has proven to be an important export workhorse for the province.

BC Technology Exports

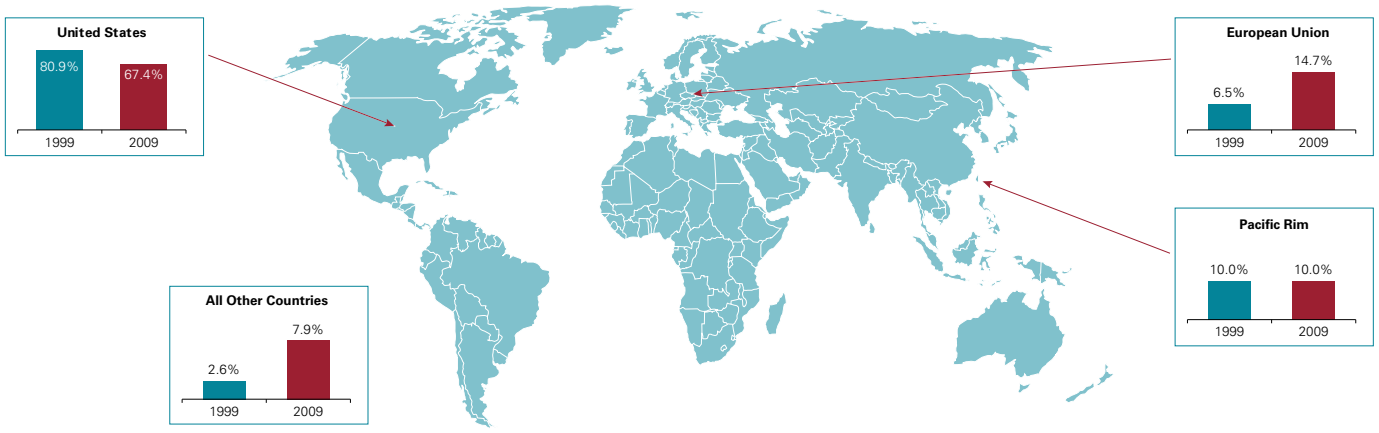


BC technology exports nearly doubled in past 8 years.

Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

A closer examination of technology goods exports shows that the US continues to be the principal destination of BC exports, though the importance of this market has declined over the past decade. Meanwhile, Europe's importance over this period has increased. Surprisingly, exports to the fast-growing Pacific Rim markets has remained static at 10%.

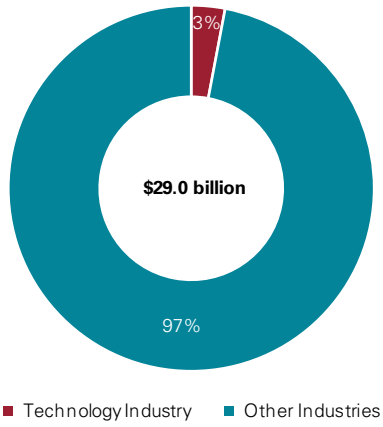
Destinations of Technology Goods Exports



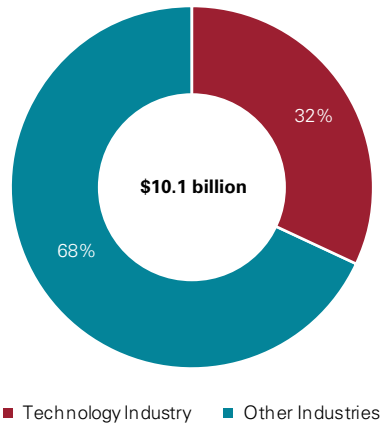
Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

BC's technology goods exports of $865 million in 2009 are small in comparison to total goods exports of about $29 billion. On the other hand, exports of technology services of $3.2 billion represent about 32% of total BC exports of services. On a blended basis, BC's technology exports (goods and services) now stand at 10.5% of BC's total exports.

BC Goods Exports 2009



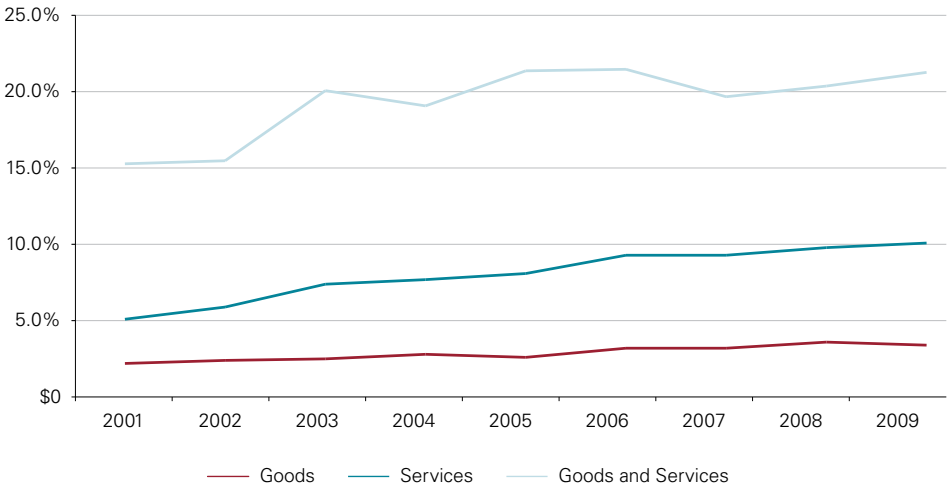
BC Services Exports 2009



Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

On a national level, however, BC continues to underperform. The BC technology industry increased its share of Canadian technology goods and services exports in the period 2001 to 2009, growing from about 5% to 10%. On a per capita basis, however, BC accounts for significantly less than its proportionate share of 13.1% of the Canadian population. In breaking down goods versus services exports, BC accounted for over 20% of total Canadian exports of technology services in 2009, but in the same time frame, technology goods exports amounted to only 3.4% of total Canadian goods exports.

BC as Percent of Canadian Exports of Technology Goods and Services



BC's share of Canadian technology exports doubled during the period 2001 to 2009.

Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

Employment and Wages

The BC technology sector has had much higher employment and wage growth than other sectors of the BC economy.

Comparison of Employment		
	Versus Other BC Industry Sectors	Versus Other Provincial Tech Sectors
Industry Employment	↗	↘
Industry Employment Growth	↗	↗
Summary	↗	↘

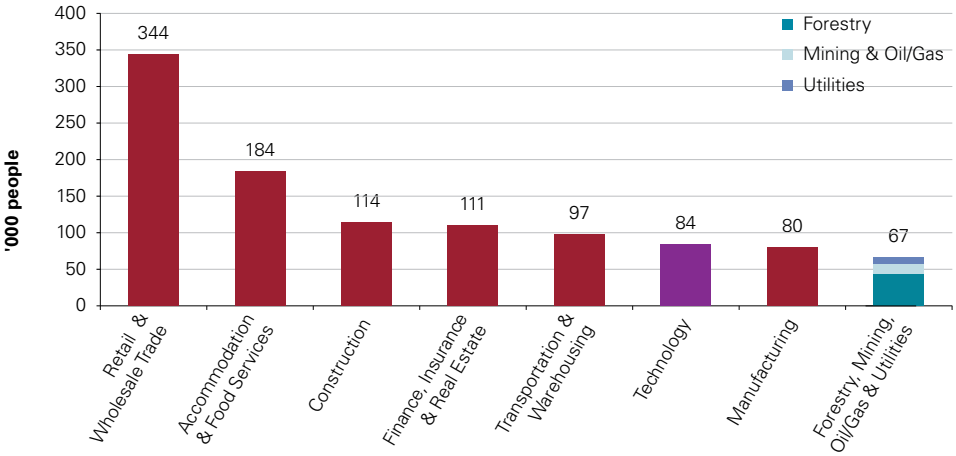
Comparison of Wages		
	Versus Other BC Industry Sectors	Versus Other Provincial Tech Sectors
Industry Wages	↗	→
Summary	↗	→

Going deeper

Employment

In 2009, BC technology employed 84,000 people—more than the combination of forestry, mining, oil & gas and utilities. It is now among the top six industry employers, approaching the employment levels of several other traditional sectors.

Employment in 2009

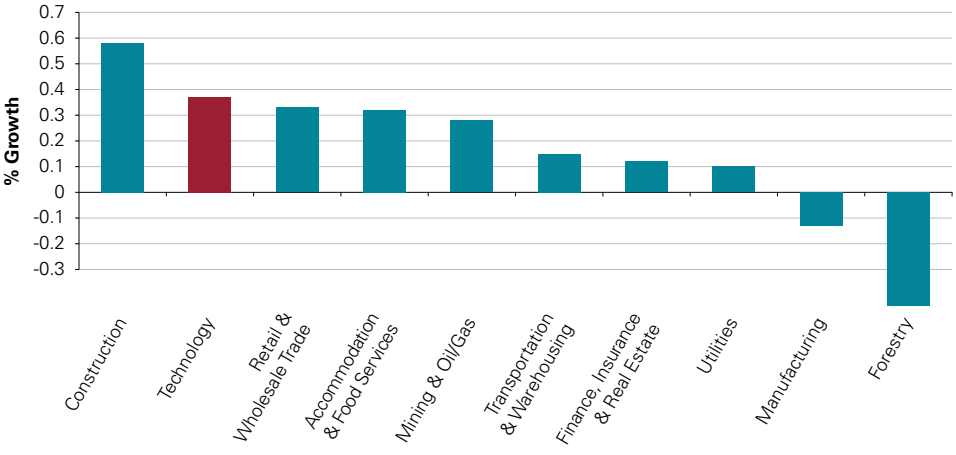


BC technology sector is a top six employer overall.

Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

Between 1999 and 2009, employment in the BC technology sector grew faster than any other private industry or economic sector, other than construction.

Employment Growth between 1999 and 2009

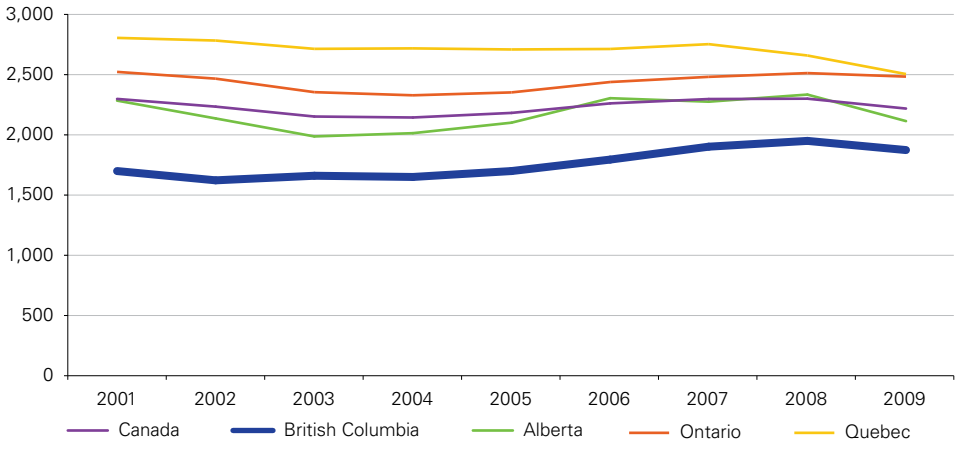


BC technology sector grew by 22,000 jobs between 1999 and 2009.

Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

The lag in performance nationally, however, continues with employment. Though BC's total technology sector work force of 84,000 is third overall nationally, BC lags significantly in terms of the number of technology industry jobs per 100,000 population, well behind Alberta, Quebec and Ontario, and 15% below the Canadian average.

Technology Jobs per 100,000 Population



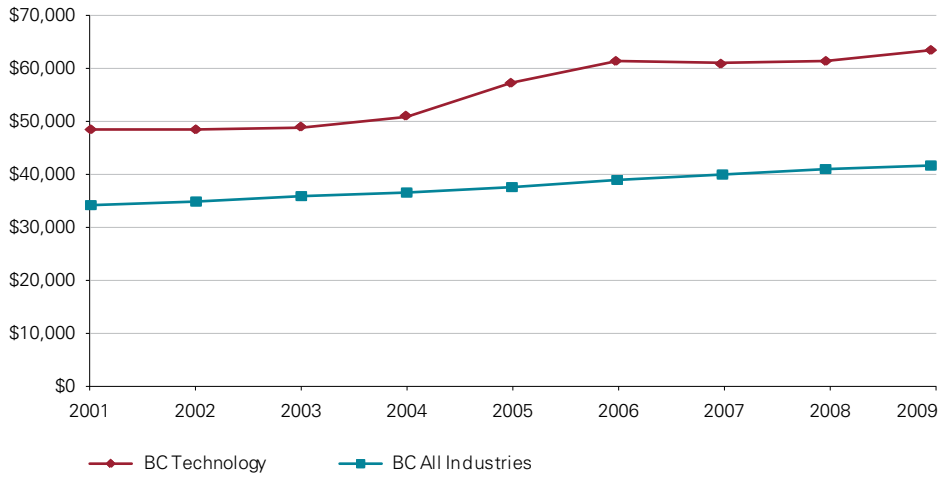
BC is 15% below the Canadian average in technology jobs per capita.

Source: KPMG analysis and Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

Industry Wages

The BC technology industry provides well-paying jobs, with wages significantly exceeding the province's average industrial wage. That differential continues to grow. In 2009, average wages in the tech sector were 53% higher than the average for the economy as a whole, versus 41% in 1999.

Average Earnings – BC Technology versus BC

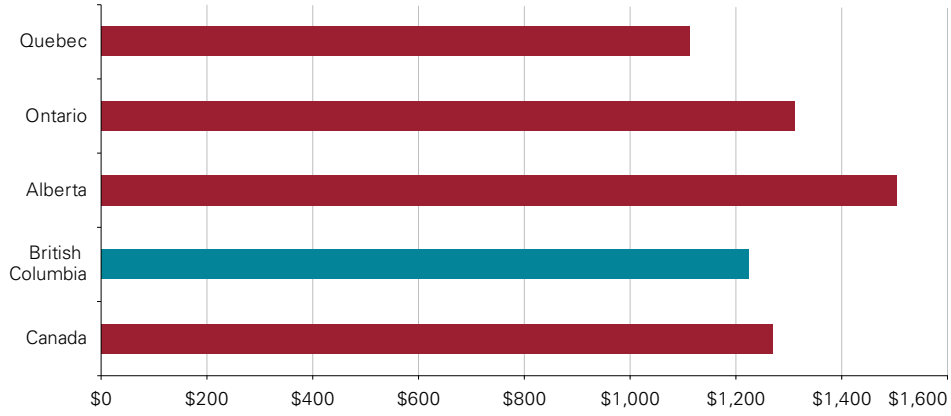


BC technology jobs earn 53% more than the BC average wage.

Source: KPMG analysis and Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

The average weekly wage for employees of the technology sector in British Columbia are generally similar to those of the other provinces, with the exception of Alberta, where wages in all industries of the province are typically much higher than elsewhere in Canada.

Technology Industry – Average Weekly Wage – 2009



Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

Economic Performance Indicators—Summary

BC's economic performance indicators provide a range of results that are both hopeful and concerning—a mix of strong numbers within the provincial economy, but generally disappointing numbers nationally. Part Two of the report will take a closer look at how BC's industry input indicators compare to other jurisdictions, providing further insights into the root causes of lagging economic performance.

2 Industry Input Indicators

Highlights

- **Shallow Talent Pools** – The number of technology-related graduate degrees granted in BC ranks near the bottom on a per capita basis in a comparison with other Canadian and international jurisdictions. BC ranks 33rd out of 38 jurisdictions examined.
- **Lagging R&D Performance** – BC ranks 29th out of 42 jurisdictions examined in terms of R&D expenditures as a percentage of GDP.
- **Lower Levels of Venture Capital** – BC performs somewhat better in terms of venture capital availability, ranking 15th out of 30 jurisdictions examined and receiving proportionally more venture capital funding than Ontario but less than Quebec.
- **Fewer Patents** – BC's rate of patents granted per capita is significantly below that of Alberta, Ontario, Quebec and most of the OECD countries.

The Industry Input Indicators Report Card highlights many of the fundamental challenges that underlie the trailing economic performance of BC's technology industry. Among most of the key input categories, BC is underperforming compared to other provinces, with the notable exception of access to capital where it has done comparatively better. The ratings also reflect a long-term historical issue: a lack of anchor companies and the absence of a large industrial base relative to other parts of Canada, especially compared to Ontario and Quebec, mean BC is coming from behind in many of these key metrics. The results are even more concerning when one considers that Canada itself is significantly behind most other OECD nations and many developing countries in these key input measures and is significantly trailing in access to capital.

BC Technology Industry – 2012 Report Card	
	Versus Other Provincial Tech Sectors
Industry Input Indicators	
Talent Availability	↘
Access to Capital	↗
Research and Development	↘
Intellectual Property	↘
Grade	**C-**

Talent Availability

There are two essential talent pools necessary to propel accelerated growth in the sector: technical talent and leadership talent. Leadership talent is a mix of business development, sales, marketing, finance and operational skills needed to support all aspects of growth. Technical talent relies on the creativity and knowledge that accompanies skilled labour that hails from post-secondary technology training and education.

With only 4% of technology companies in BC employing 50 or more employees, BC suffers from the absence of a large pool of senior leadership and middle management. This in turn has impacted the relative hiring mix, resulting in a greater emphasis in technical talent rather than the leadership talent necessary to accelerate growth.

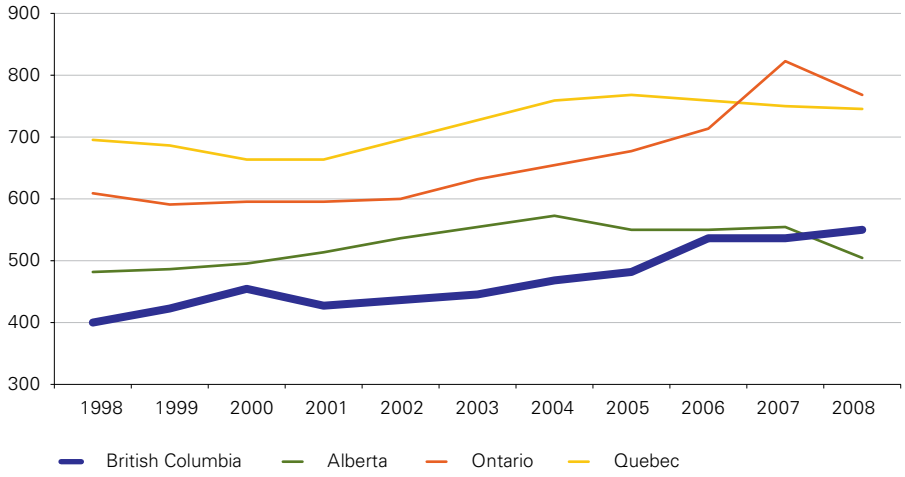
In terms of technical talent, the university cohort comprising undergraduate and graduate degrees in technology represents a significant portion of the talent pool for the industry. Based on this key metric, the BC technology industry rankings are mixed.

Talent Availability	
	Versus Other Provincial Tech Sectors
Undergraduate Degrees	↘
Undergraduate Technology Degrees	→
Graduate Technology Degrees	↘
Summary	↘

Going deeper

One specific measure of skilled labour availability is the annual number of degrees granted (undergraduate or graduate) per 100,000 population. From 1998 to 2008, BC trailed the other provinces (though in 2008, it surpassed Alberta) in the granting of undergraduate degrees. BC would need to increase its university undergraduate degree granting capacity and student population by nearly 40% to catch up to the per capita level of degrees granted in Ontario and Quebec.

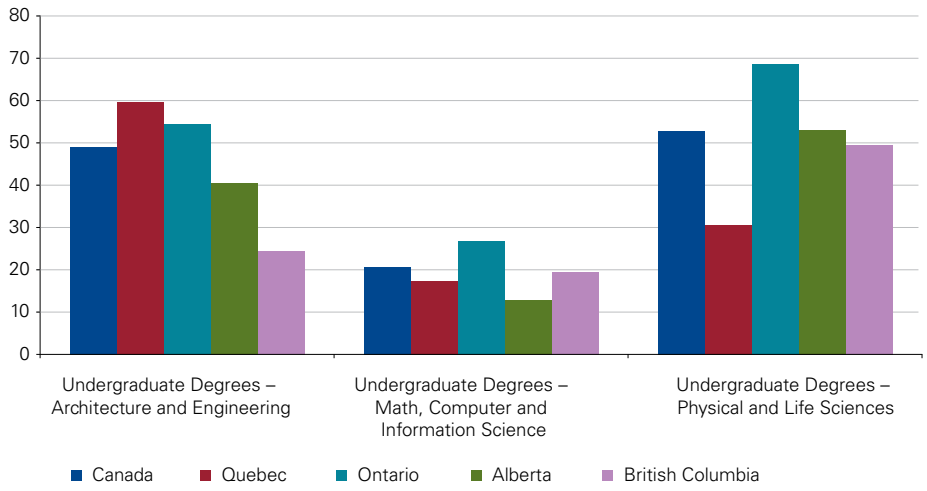
Undergraduate Degrees per 100,000 Population



BC produces 25% fewer undergraduate degrees per capita than Ontario and Quebec.

On the technology-related undergraduate and graduate degree front, the picture is slightly different. For undergraduate degrees, BC is well behind the Canadian average and the degree rates of other provinces in architecture and engineering, but is closer to the Canadian average for math, computer and information sciences, and physical and life sciences.

Annual Undergraduate Degrees per 100,000 Population

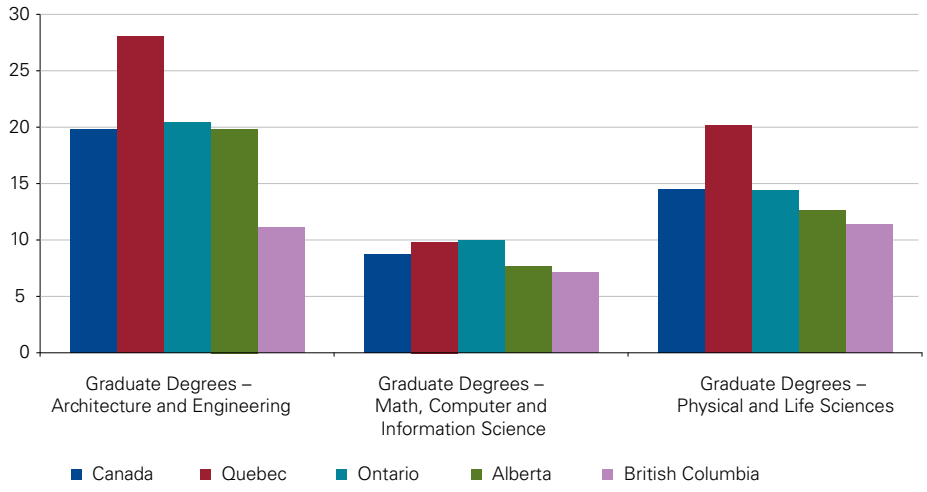


Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

BC produces half the number of engineers as the Canadian average.

For graduate degrees, BC is well behind the Canadian average and the degree rates of other provinces in architecture and engineering while closing the gap in math, computer and information sciences, and physical and life sciences. Overall, the province still lags behind the Canadian average and the graduate degree rates of other provinces with significant technology sectors.

Annual Graduate Degrees per 100,000 Population



Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

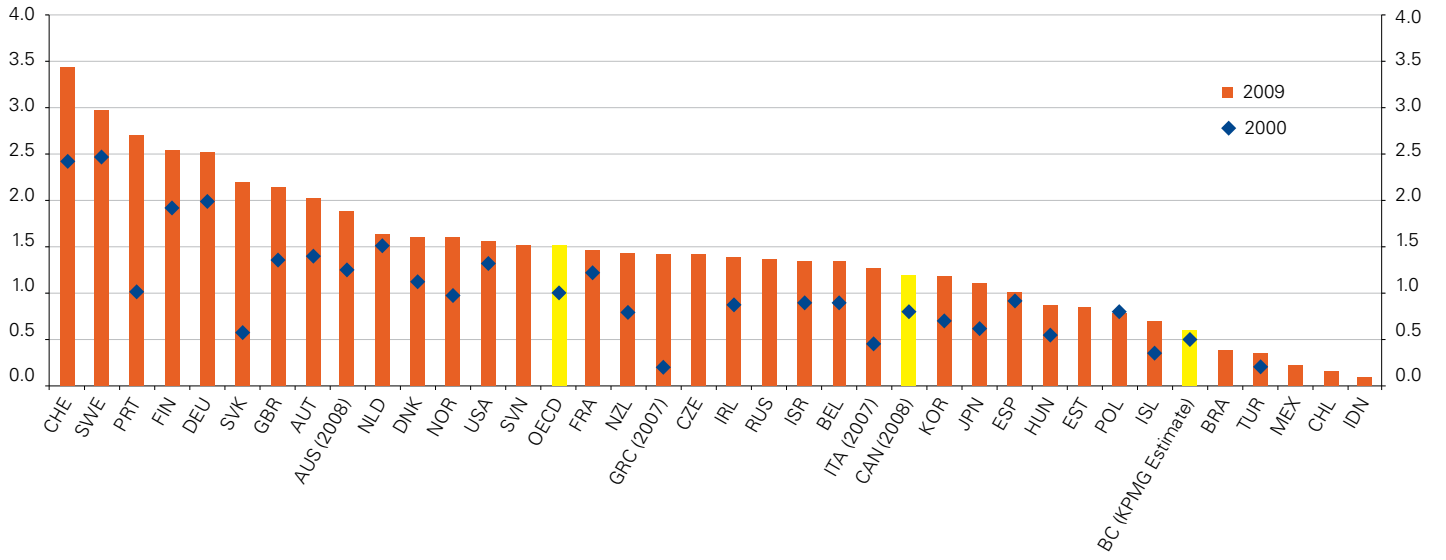
BC trails in all science and technology Graduate degrees.

Over the decade 1998 to 2008, the rate of granting of graduate degrees has grown significantly more slowly in BC than in the other provinces shown in the charts above, with the exception of the math, computer and information sciences, where BC only slightly underperformed Ontario and Alberta and performed better than Quebec.

Globally, Canada's rate of 1.2 technology-focused doctoral degrees per 1,000 population, in the reference age cohort, is 20% below the OECD average and well below that of the leaders. KPMG estimates BC's rate of doctoral degrees as being about one-half of that of Canada, placing it in the bottom quartile of the jurisdictions reviewed. Moreover, the fact that many of the countries ahead of Canada and British Columbia as of 2009 were actually behind us in 2000 presents a particularly discouraging global scenario.

BC produces less than one-fifth of the PhDs as leading OECD countries.

Technology Related Doctoral Degrees as Percentage of Population in Reference Age Cohort



Source: KPMG Analysis, and OECD Science, Technology and Industry Scorecard 2011, OECD, 2011.

These metrics strongly suggest that increasing our talent capacity with a greater emphasis on granting technology-related academic degrees will be a crucial element in moving BC technology towards a more competitive stance, both nationally and globally.

Access to Capital

The BC technology industry ranks high within Canada but poorly in comparison to other global jurisdictions when it comes to accessing venture capital.

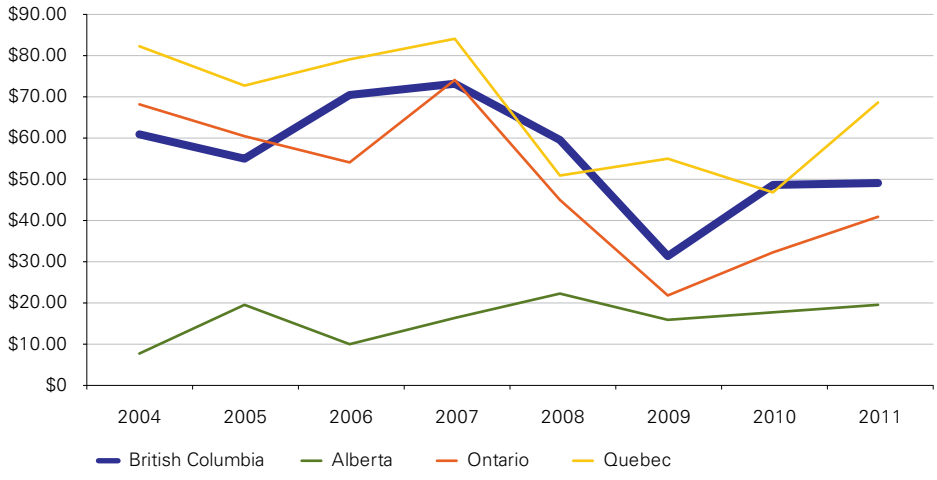
Access to Capital	Versus Other Provincial Tech Sectors
Access to Venture Capital	↗
Summary	↗

Going deeper

BC has fared well compared to other provinces, capturing between 15 and 20% of Canadian venture capital investment over the past eight years. In general, BC has received slightly more than its share (on a per capita basis) of total venture capital invested in Canada. As illustrated in the following chart, two trends are obvious:

- BC's technology sector has fared well in terms of access to venture capital compared to the other provinces, with the exception of Quebec.
- The availability of venture capital is highly volatile.

Technology Sector Venture Capital – Per Capita

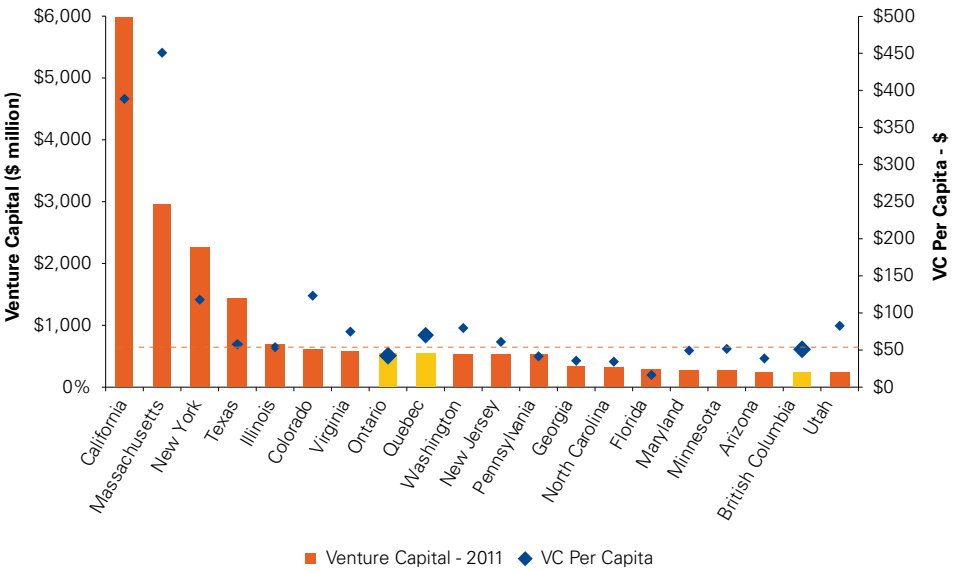


Source: KPMG Analysis of Thomson Reuters Data.

BC per capita venture capital exceeds the rest of Canada, with the exception of Quebec.

When compared to other North American jurisdictions, BC performed in the middle of the pack in terms of venture capital investments per capita, ranking 12th out of the 20 North American jurisdictions for which information is available. Compared against the average venture capital per capita of the top five states, however, BC trailed by a significant factor of 4 to 1.

Venture Capital Investments – 2011



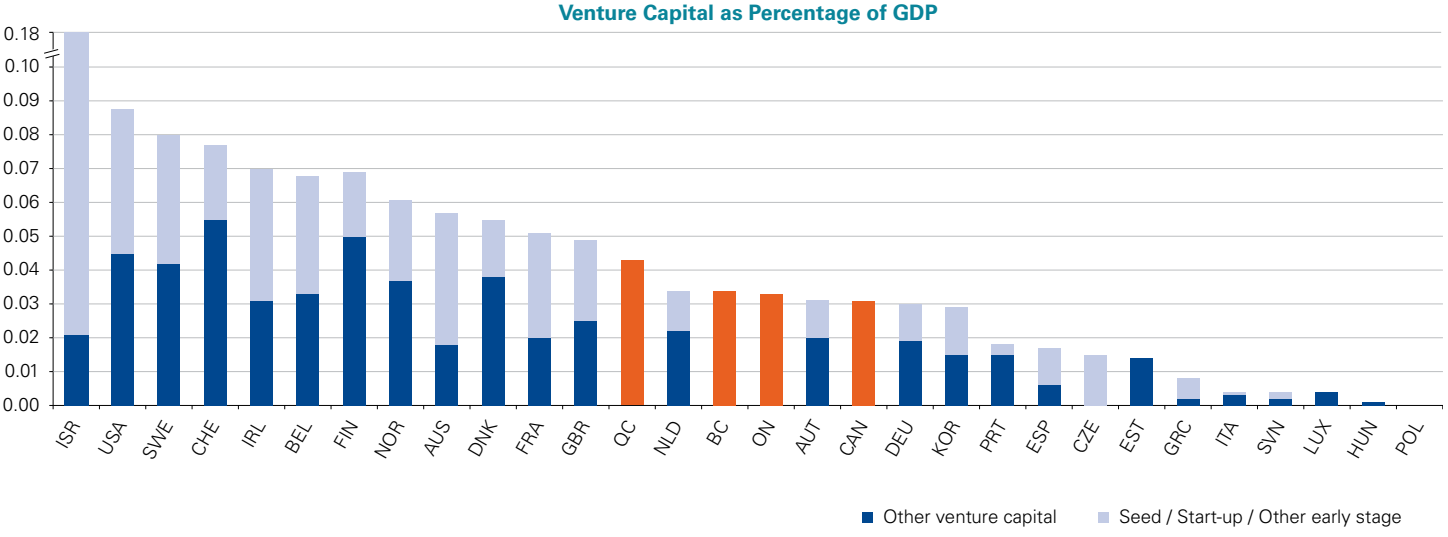
BC's per capita venture capital is one-quarter of the top five states.

Source: KPMG Analysis of Thomson Reuters Data.

When compared to other countries, Canada and the individual provinces of BC, Ontario and Quebec are also in the middle of the ratings. BC ranks 15th out of the jurisdictions analyzed. Again, the top five countries outperform BC by a ratio of more than 2.5 to 1, illustrating a wide gap between the top jurisdictions and the province.

BC is one-third the level of the US in Venture Capital as a percentage of GDP.

Venture Capital as Percentage of GDP



Source: KPMG Analysis of Thomson Reuters Data and OECD Science, Technology and Industry Scorecard 2011, OECD, 2011.

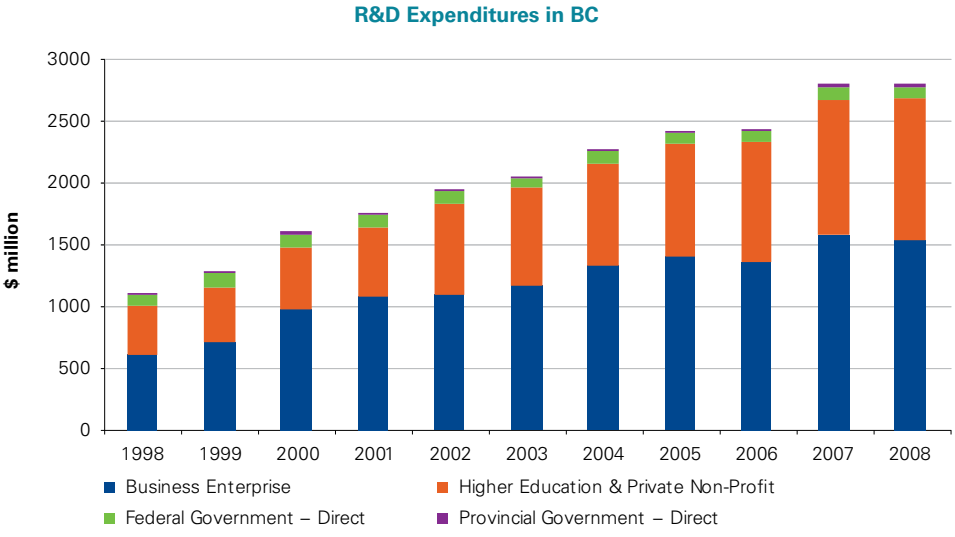
Research and Development

Research and development (R&D) is ultimately an investment in the future productivity of the economy, and if fostered appropriately, it will translate into jobs and GDP growth over time. The key relevant metrics are R&D as a percentage of GDP and business expenditure on research and development (BERD) as a percentage of GDP. Although R&D expenditures in BC have grown significantly, BC still fares poorly all around for this particular input factor, which is consistent with a long-term historical challenge – the lack of anchor companies and the absence of a large industrial base relative to other parts of Canada, especially compared to Ontario and Quebec.

Research and Development	
	Versus Other Provincial Tech Sectors
R&D as Percentage of GDP	↘
BERD as Percentage of GDP	↘
Summary	↘

Going deeper

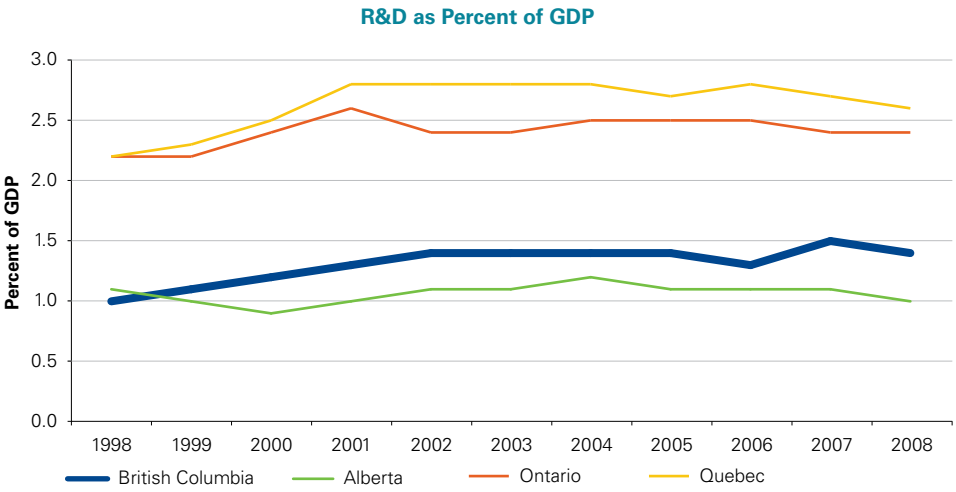
R&D spending in BC tripled from just over $1.0 billion in 1998 to nearly $3.0 billion in 2008, an increase largely attributable to private sector and higher education R&D spending (as opposed to dierct government R&D spending). Some of the higher education funding is provided by government through programs such as NSERC.



Overall R&D has nearly tripled since 1998.

Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

Over the same period, total R&D spending increased from about 1.0% of provincial GDP to nearly 1.5%. While BC has passed Alberta in this regard, the level is only 60% of the R&D expenditure levels in Ontario and Quebec.

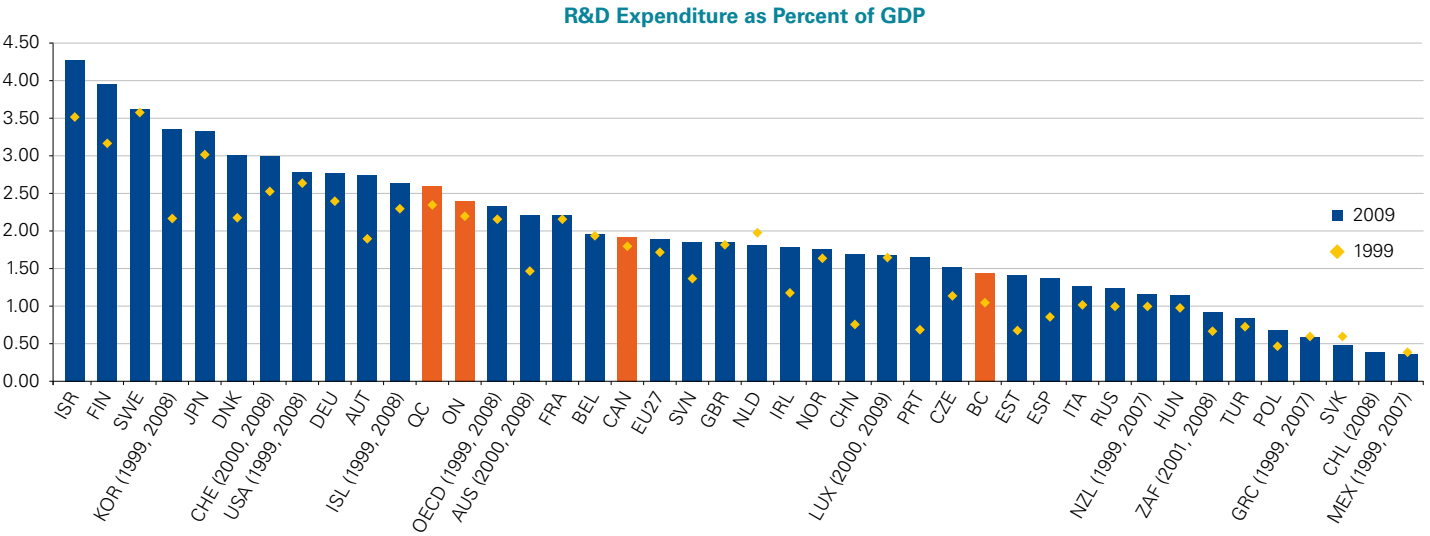


BC's level of R&D as a percentage of GDP is 40% lower than Ontario and Quebec.

Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

From the global perspective, Canada's R&D expenditures of 1.9% of national GDP are about 20% lower than those of OECD countries as a whole, and significantly lower than those of the leading countries. BC drops even further down in the ranking, falling well below Ontario and Quebec.

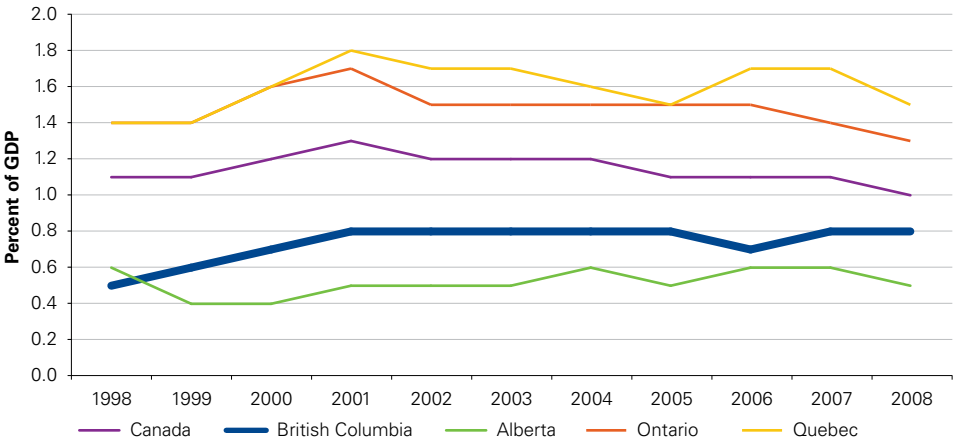
BC's R&D expenditures are less than half that of leading OECD countries.



Source: KPMG Analysis of BC Stats Data and OECD Science, Technology and Industry Scorecard 2011, OECD, 2011.

The BERD ratio reflects the level of industry commitment to the technology industry and may reflect the underlying environment for the technology industry. Canadian business currently contributes about 1.0% of GDP in terms of expenditures on R&D while businesses in Quebec and Ontario spend about 1.5% and 1.3% respectively. In British Columbia, the number is much lower than either group, at about 0.8%, further illustrating the industry challenge of having a disproportionate number of small technology companies.

Business Expenditure on R&D as Percent of GDP



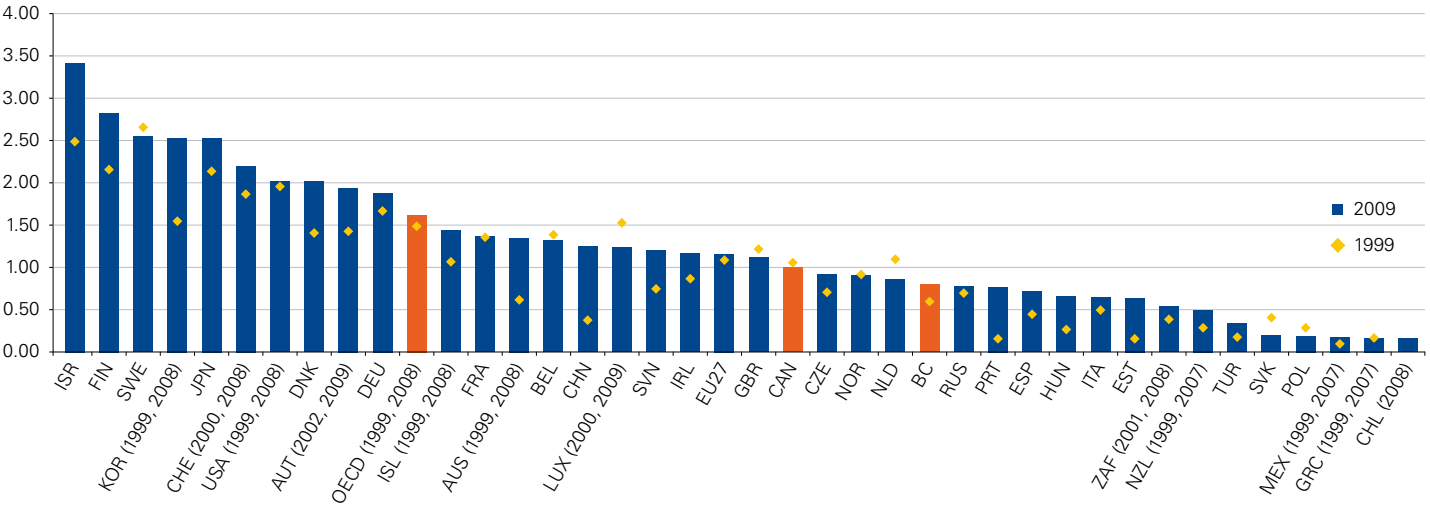
Business R&D as a percentage of GDP in BC is 20% lower than Canada overall.

Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

Moreover, if BC's BERD is poor relative to Canada overall, it's even more concerning to note that Canada ranks lower globally for BERD than it did for R&D as a percentage of GDP. Canadian business only invest at two-thirds the level of the OECD average as a percentage of GDP and underperform the average of the top five countries by a factor of nearly three to one. The rankings also clearly show that Canada has lost significant ground in this respect between 1999 and 2009 with a number of countries surpassing Canada in that period.

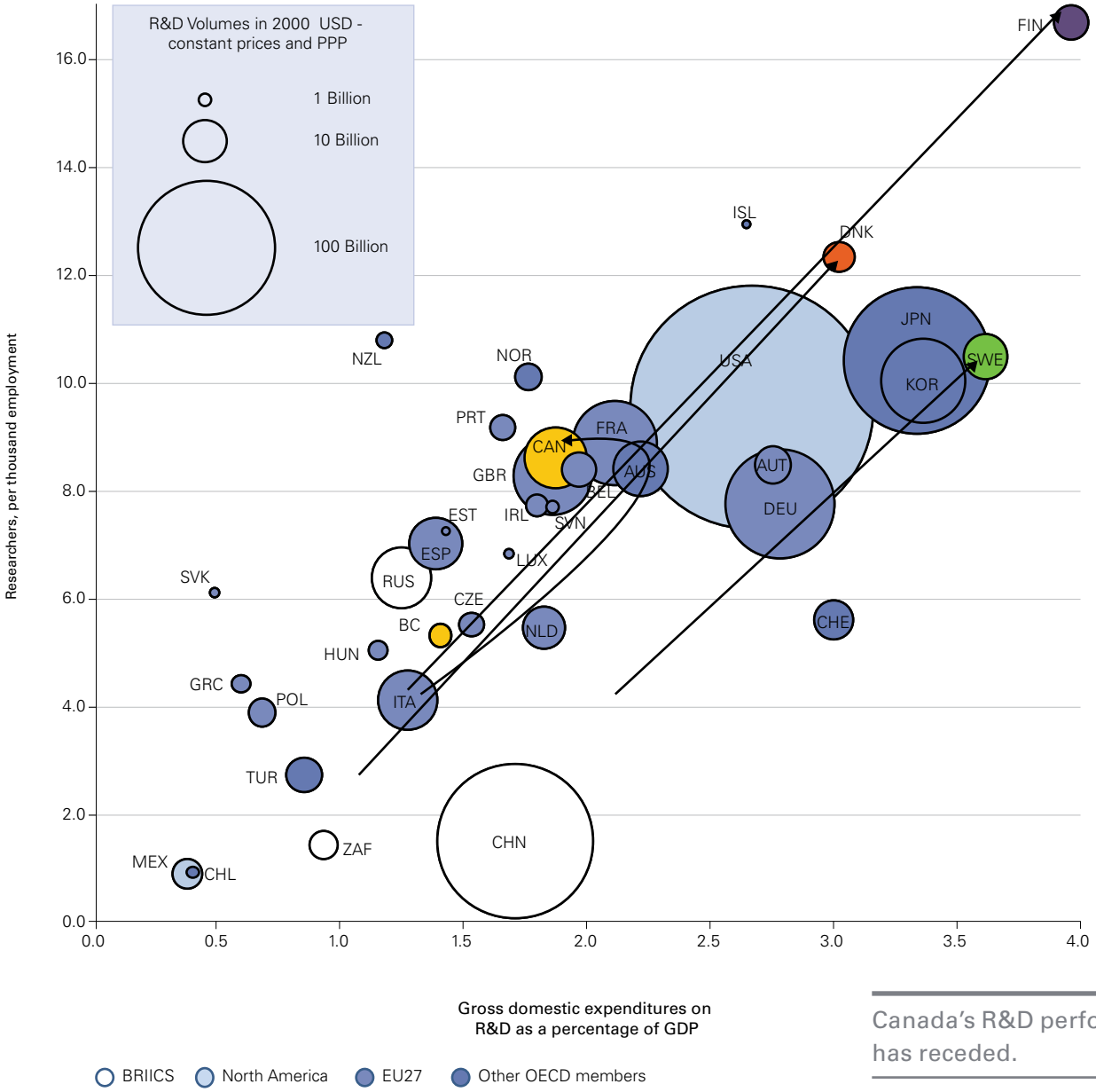
Business R&D in BC is one-third the level of leading OECD countries.

Business Expenditure on R&D as Percent of GDP



Source: KPMG Analysis of BC Stats Data and OECD Science, Technology and Industry Scorecard 2011, OECD, 2011.

A comprehensive measure of global R&D strength can be established by combining R&D expenditures as a percentage of GDP, overall R&D expenditures and the number of researchers per thousand employed workers in a jurisdiction, as illustrated in the following chart. This combination of metrics shows both dollar and percentage values, but also indicates the size of the research network supporting knowledge growth and sharing in each country. By this standard, Canada stands in the middle of the pack, but the R&D activity levels in the province significantly trail most countries.



Canada's R&D performance has receded.

Source: KPMG Analysis and OECD Science, Technology and Industry Scorecard 2011, OECD, 2011.

One of the more interesting aspects of this research lies in plotting the trajectories of individual countries over the past 30 years. These are illustrated for Canada, Denmark, Sweden and Finland. The Nordic countries were chosen because their economies are typically viewed as being similar to Canada's. Although all four countries began from similar positions in 1981, the three Nordic countries have set R&D targets at 3.0% of GDP—which they have achieved—and have been steadily successful in growing employment in the research sector. Canada, on the other hand, leveled off on research employment growth and regressed on R&D as a percentage of GDP.

Intellectual Property

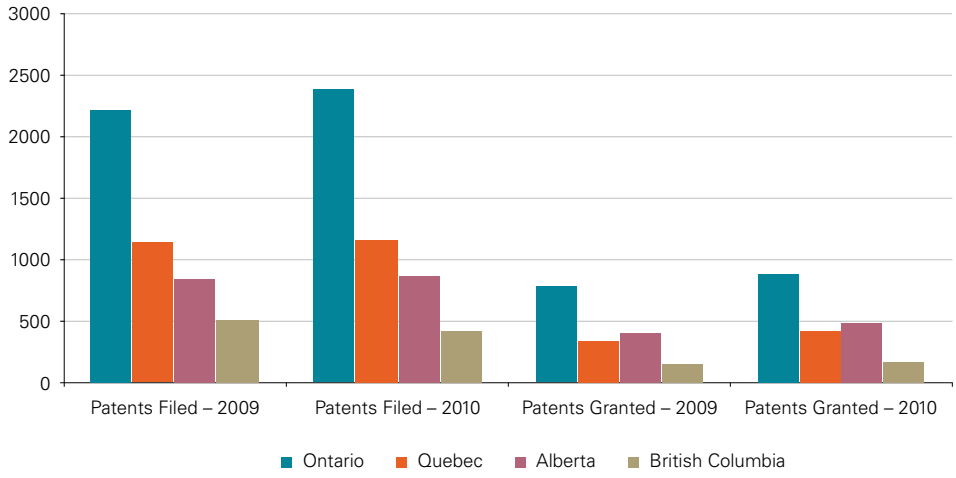
Intellectual property is a direct outgrowth of successful research and development. As good R&D yields new patents, individual universities, the technology sector and the provincial economy all benefit through royalty payments, enhanced reputation, new jobs, income and tax revenues. The relevant metric is the number of patent applications submitted and granted, an area where BC fares poorly on all levels.

Intellectual Property	
	Versus Other Provincial Tech Sectors
Patents Granted	↘
Summary	↘

Going deeper

Compared to other provinces with significant technology industries, BC trails in terms of the number of patents applied for and granted both on a total and per capita basis. The following two charts provide a summary of the rankings.

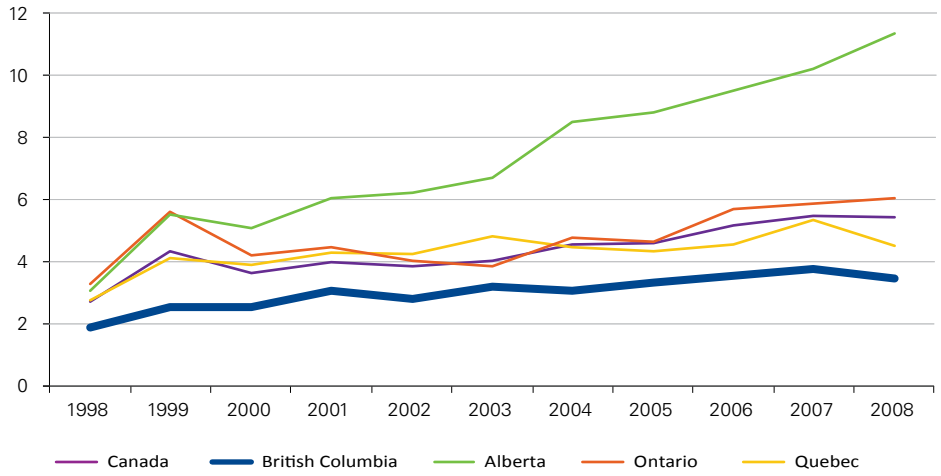
Canadian Patents Filed and Granted



Source: Canadian Patent Office

BC's patent performance significantly trails other provinces.

Patents Awarded per 100,000 Population



Source: Profile of the British Columbia High Technology Sector, BC Stats, July 2011.

BC is awarded 30% fewer patents per capita than Canada overall.

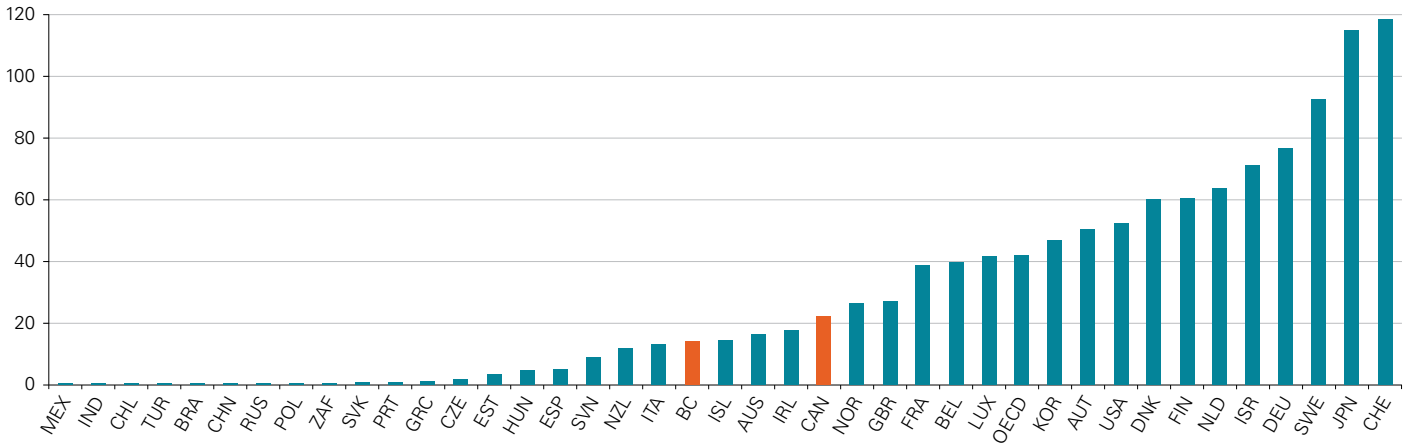
On the international front, the OECD has devised a method for measuring patent activity. To mitigate the variations and limitations introduced by national patent offices and allow patent activity to be internationally comparable, the OECD tracks "triadic patent families," that is, "patents taken at all three of these major patent offices – the European Patent Office (EPO), the Japan Patent Office (JPO) and the United States Patent and Trademark Office (USPTO)."[1]

[1] OECD Factbook, 2009.

As indicated in the following chart, Canada ranks 18th and well behind the leading countries in terms of the number of triadic patent families per million population. KPMG estimated BC's ranking on the chart by considering the relative proportions of patents awarded in BC versus Canada as a whole, on a per capita basis. By this measure, BC ranks even further down the list.

BC's patent performance is one-fifth the level of leading OECD countries.

Triadic Patent Families Per Million Population



Source: KPMG Analysis of BC Stats Data and OECD Science, Technology and Industry Scorecard 2011, OECD 2011.

Industry Input Indicators—Summary

BC's performance with respect to the industry input indicators is generally weak and represents a structural challenge that could undermine the growth potential of the industry. BC need not, and should not, continue to languish. More intentional focus on capital investment, talent development, technology-related education and furthering R&D investments will be essential in supporting BC's realization of its full potential in both the national and global context.

3 The Global Market – A Strategic Opportunity for BC

The Global Market

BC technology revenues of $18.9 billion represent 0.22% of the global market while the five sectors profiled in this report represent $14.6 billion in revenues and 0.17% of the global market.

Estimated Size of Global Market for Key BC Technology Industries

Profiled Industry Sectors	Annual Revenues (Cdn $ Billions)		BC's Share of Global Industry
	BC	Global	
Digital Media	$1.2	$ 368	0.33%
Life Sciences	0.8	2,160	0.04%
Cleantech	1.7	1,071	0.16%
Wireless*	3.0	2,173	0.14%
Information and Communications Technology (ICT)	7.9	3,000	0.26%
Profiled Industry Total	**$14.6**	**$8,772**	**0.17%**
Other Technology**	4.3	n/a	n/a
All Industry Total	**$18.9**	**$8,772**	**0.22%**

Note: The $18.9 industry total is from the Profile of the British Columbia High Technology Sector, BC Stats, July 2011, while the relative allocation to specific sectors has been estimated by the Industry Associations and may include overlapping estimates.

** includes wireless service revenue*
*** includes engineering services, film and post-production and other services*

BC's Technology Industry Potential

This report has looked at hard facts, presented statistics and analyzed metrics to try and confirm our strengths, expose our weaknesses and provide a glimpse of the future. It may now be time to simply ask ourselves, "What if?"

What if we:

- Better harnessed and nurtured our technological creativity to improve our intellectual property output?
- Carefully adapted the intentional strategies other places have successfully used and applied them in BC?
- Elevated the importance of R&D and cultivated an appreciation for technology and innovation?
- Made technology adoption a core element in driving the competitiveness of all our industries?
- Worked harder to break down barriers between technology-based industries, communicated more and took charge of shaping our joint technological future?

We don't have all the answers, but here's one that should give the BC technology industry pause—and cautious optimism:

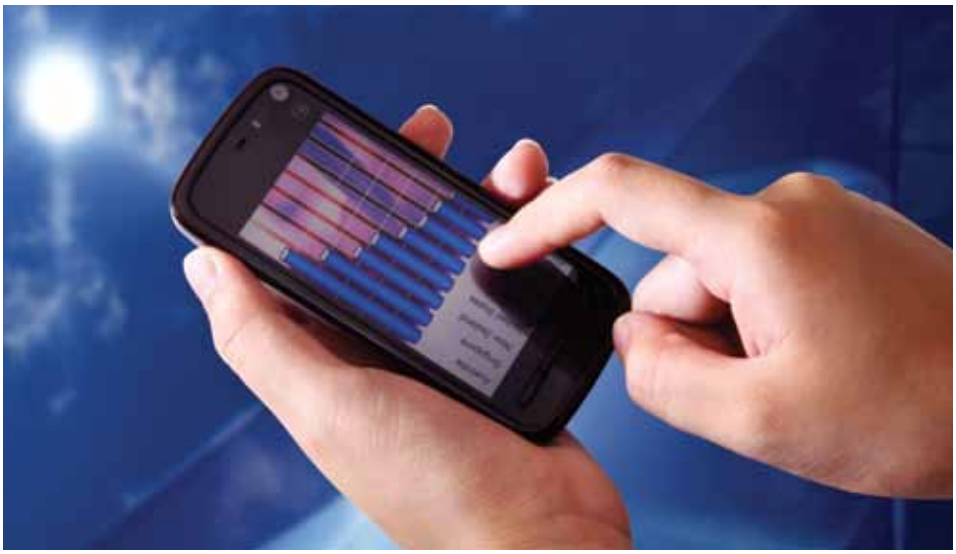
If:

- The technology GDP in BC, as a percentage of overall GDP, were equivalent to the Canadian average (5.9% versus 7.5%), BC's economic output would change as follows:

	Technology GDP Equal to Canadian Average
Incremental Industry Revenue	$5.1 billion
Incremental GDP	$2.5 billion
Incremental Employment	23,000 jobs
Incremental Employment Income	$1.4 billion
Incremental Personal Income Tax (Federal and Provincial)	$350 million

The global market is massive and growing rapidly and with it the BC technology industry has a great opportunity to grow. If the industry can harness its potential and improve its performance, the province will reap tangible benefits.

Conclusion – Realized Potential Means a Dynamic Future



This report has demonstrated that, provincially, we occupy a strong position as a leading economic engine. But despite many positive trends over the last decade, we have been challenged to step into the big picture nationally and globally. Success in technology is no longer an option for future economic prosperity, it is a prerequisite. Technology isn't just the wave of the future—it is the future. No aspect of human endeavour will remain unaffected. Social interaction, energy consumption, entertainment, and communications: everything we do will be enabled, enhanced and encompassed by some form of technology, and BC needs to be part of that future. And we are well positioned to do so.

With strong growth, a base of talent, diversified companies, world class universities, and an entrepreneurial spirit, the BC technology industry holds much promise. However, we need to act now to turn this tremendous promise into a dynamic future of national and global success, before our industry momentum slips, critical action points pass us by and our tech talent moves on to greener pastures. And the benefits of success are clear – including more revenue, more jobs and more tax revenue.

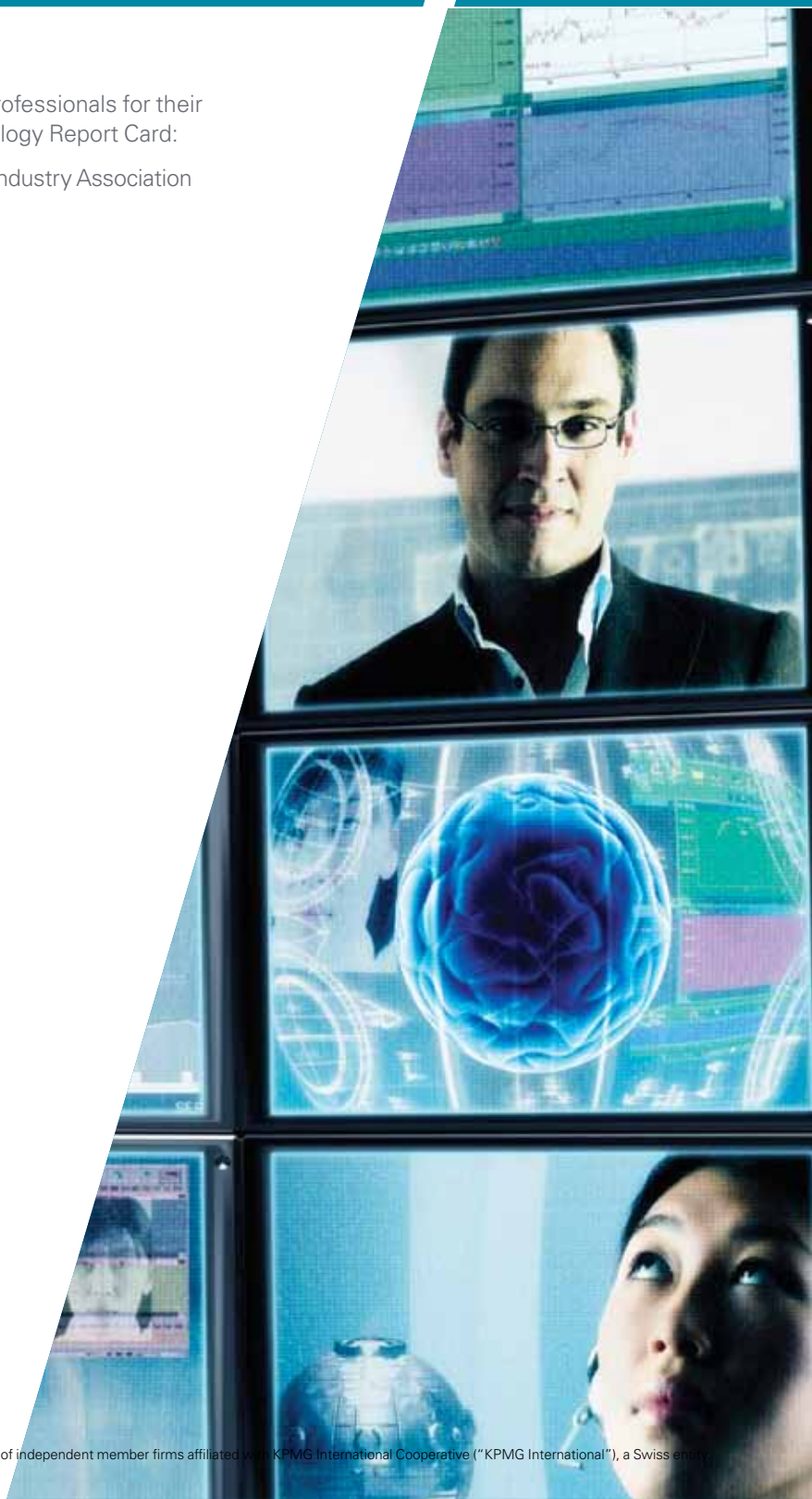
The hope is that this report will inspire discussion and response; that political leaders, industry players, savvy investors and an energized public will all speak to the issues described here. The iron is hot in BC, and the time to become a national and global technological force is now, but there is work to be done. Continued government support in the form of intentional strategies, international promotion, funding and initiatives to attract and retain talent is important, but BC's technology leaders also need to build drive and determination within their own industry, talk across sectors, remove barriers and understand that technology is increasingly the link between all types of businesses—and all levels of success.

When potential is released, it can be explosive. The fuse is set.

Acknowledgements

KPMG would like to gratefully acknowledge the following professionals for their significant participation in and contribution to the BC Technology Report Card:

- **Bill Tam**, President and CEO, British Columbia Technology Industry Association
- **Howard Donaldson**, President and CEO, DigiBC
- **James Maynard**, President and CEO, Wavefront
- **Jonathan Rhone**, Chair, BC Cleantech CEO Alliance
- **Stuart MacKay**, President, MMK Consulting



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