

## Business Indicators ♦ May 2007

### Inputs and Outputs of BC's High Technology Sector

Although relatively small compared to nearby states and the larger Canadian provinces, British Columbia's high technology sector continues to grow in importance, contributing a significant portion of the province's gross domestic product (GDP) and offering high-paid employment to a large number of British Columbians. In 2005, the high technology sector in BC generated about 5.1% of the province's GDP and employed over 70,000 people, or 4.1% of the total provincial workforce.

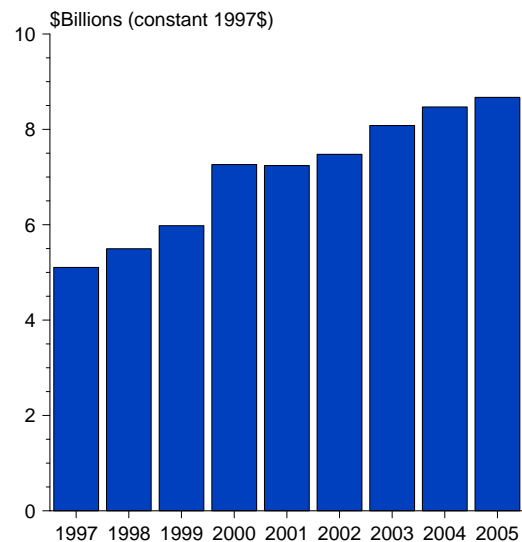
While there is obvious value in monitoring these "outputs" of the high technology sector, information about the processes that give rise to those outputs are also of key importance, both for potential investors interested in the infrastructure available in the province and for policy-makers that require this data to make informed policy decisions. This report will take a brief look at both the outputs of the high tech sector in BC, as well as the inputs that go into producing these outputs. This article is a summary of two larger reports produced by BC STATS: *Input Indicators of the British Columbia High Technology Sector* and *Profile of the British Columbia High Technology Sector*.<sup>1</sup>

#### BC's High Technology Outputs

British Columbia's high technology GDP edged up 2.4% in 2005, to almost \$8.7 billion (1997 constant dollars), although growth was confined to the service sector as GDP in high technology manufacturing operations in the province slipped 2.7% compared to

2004. The decline in manufacturing GDP was offset by a 3.5% jump in GDP for high tech services. BC's high tech GDP has been climbing steadily over the last decade, with growth trailing that of BC's industrial aggregate only twice in that span – in 2001, when high tech was suffering the effects of the dot com crash, and in 2005, the latest year for which high tech data is available.

#### BC's high technology GDP has been increasing steadily over the last decade



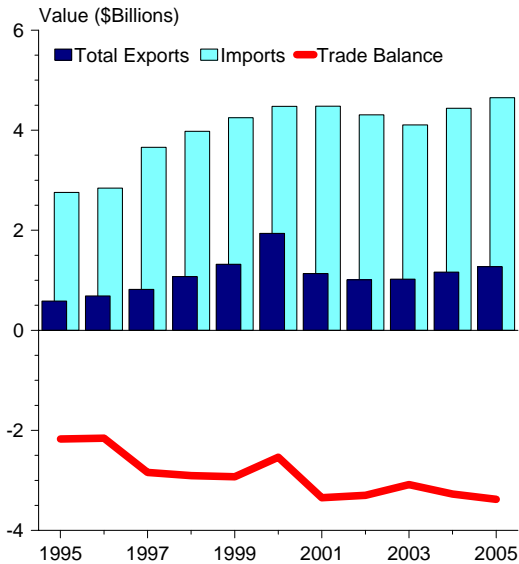
Source: BC Stats

International trade is an important aspect of the high technology sector, contributing significantly to its overall performance. In 2005, there was a modest 2.6% increase in the value of high technology commodity exports from British Columbia, climbing to almost \$704 million. However, high tech comprised only 2.1% of total BC commodity exports. Imports of high tech goods into the

<sup>1</sup> Available online at:  
[www.bcstats.gov.bc.ca/data/bus\\_stat/busind/hi\\_tech.asp](http://www.bcstats.gov.bc.ca/data/bus_stat/busind/hi_tech.asp)

province far exceed the value of exports. In 2005, BC imported \$4.6 billion worth of high tech goods from other countries, driving the deficit in trade in high tech goods to almost \$3.4 billion.

### BC imports far more high tech goods than it exports



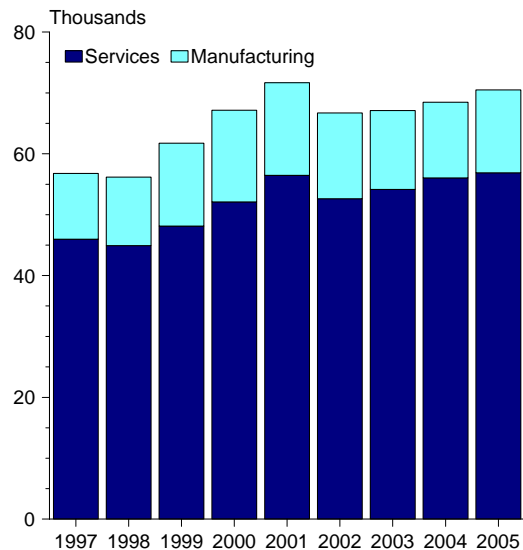
Source: BC Stats

Perhaps it is not surprising, considering that services comprise such a large portion of the high tech sector, that the value of exports of high tech services from the province far exceeds that of goods: BC exports of high tech services jumped 12.1% in 2005 to almost \$2.3 billion, or 23% of the province's total service exports. However, it is also true that the service sector is larger than the goods sector in the overall BC economy, yet exports of goods are valued at about four times that of services. The difference in the high tech sector is that the manufacturing sector is far more oriented to the domestic market, whereas high tech services often target the international market. For example, BC's motion picture industry is largely concentrated in production of foreign (usually American) films and television series and a significant portion of computer systems design work is done for foreign customers. In contrast, a substantial portion of high tech goods manufactured in the

province are destined for Canadian customers, often the Canadian high tech industry itself.

As with GDP and exports, employment in the high tech sector in BC also grew, rising 2.9% in 2005 to 70,490 as both the service (+1.5%) and manufacturing (+9.4%) sectors took on more workers. The increase in manufacturing jobs occurred despite slumping revenues (-8.4%) and a downturn in manufacturing GDP. This could be the result of a lag in hiring as manufacturing jobs continued to disappear in the last couple of years despite the turnaround that occurred in revenue and GDP in 2003 and 2004. It is possible that in anticipation of continued success, manufacturers ramped up their staffing, unaware that revenues would drop.

### Employment in BC's high tech sector has been recovering steadily from the crash in 2001



Source: BC Stats

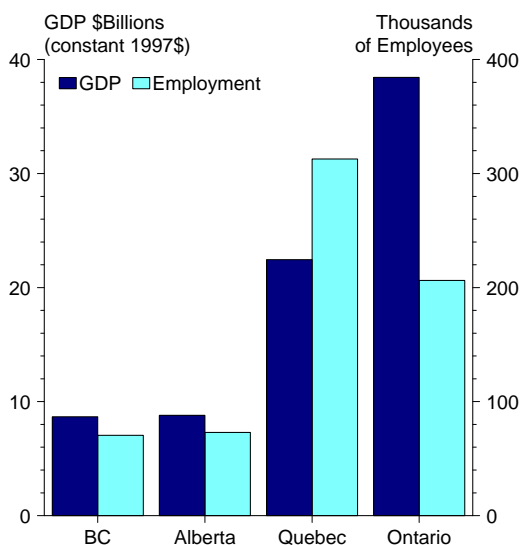
However, the manufacturing sector employs about only one of every five workers in BC's high technology sector, with the large majority working in service industries. Overall employment in BC's high tech sector has increased in each year since the dot com crash in 2001. More people worked in high tech industries in 2005 in British Co-

lumbia than in the forest sector, which includes logging, silviculture and wood and paper manufacturing industries (approximately 59,900 employees).

As employment increased in BC's high tech sector, so too did wages and salaries, which climbed 4.8% from the pay doled out in 2004. Average weekly earnings for employees in high tech industries also increased in 2005 (+1.8%), although the hike was well below the 2.8% increase in compensation for workers in the province as a whole. Nevertheless, employees working in high tech industries earn far more, on average, compared to the industrial aggregate for British Columbia. In 2005, high tech workers in BC earned an average of \$1,010 per week, compared to only \$720 for employees in all industries.

Viewed within the confines of British Columbia, it appears that the high technology sector is a growing and vibrant part of the economy; however, when put into context with other provinces and nearby states, it appears that BC's tech sector needs to experience significant growth in order to reach world class status.

### BC trailed the other high tech provinces in most measures of high technology in 2005



Source: BC Stats

Within Canada, BC trails each of the other three "high tech" provinces (Ontario, Quebec and Alberta) in each of the measures of GDP, revenue, employment and value of commodity exports.

Compared to the United States, BC trails at least 30 states in terms of the share of GDP and employment comprised of high technology. BC also trails approximately 30 states in absolute numbers for both GDP and employment.

Although the sector as a whole does not rank prominently compared to other high tech jurisdictions, BC is home to some high tech clusters, such as fuel cell development and motion picture production, that are world class and, in some cases, world leaders. Nevertheless, there are areas in which BC can improve its standing and further develop its high technology sector. In order to achieve growth in the sector, there are some factors that need to be present, which is where the "input" side of the equation enters the picture.

### BC's High Technology Inputs

High technology operations often require a specific set of skills and knowledge and, as such, a broad base of highly educated population from which to draw is an important factor to enable expansion of a region's high tech sector. While BC scores well in terms of the proportion of high school graduates in its population, the province trails the other high tech provinces in terms of post-secondary credentials, including in key degree areas such as engineering and computer science.

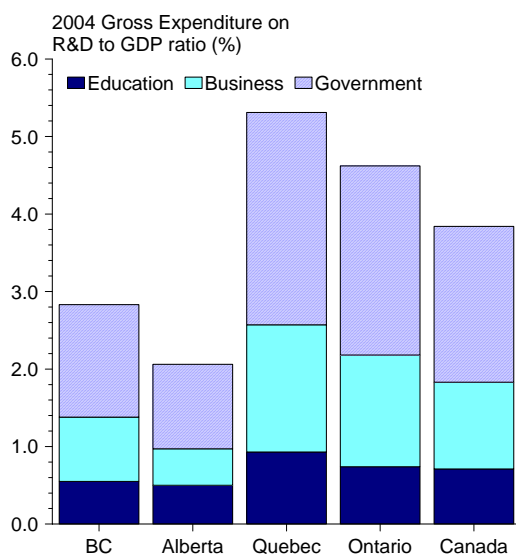
Despite having fewer post-secondary degrees per capita compared to other provinces, BC tends to be a leader in terms of technology adoption. BC leads the country in terms of percentage of households with computers and proportion of households using the Internet.

British Columbia is also ahead of the curve when it comes to technology licensing and

patents at its universities. The University of British Columbia is far and away the top university in the country in terms of gross income earned from technology licenses and ranked second in terms of US patents granted over the last five years (2000-2004). However, BC lags other provinces in terms of research and development in its higher education sector. In 2004, BC's ratio of higher education performance of research and development to GDP was 0.55%, well below the national average of 0.71%.

The mixed performance of BC's higher education sector is echoed in the province's business community. BC's business sector trails other provinces in terms of patents granted and research and development, but has had a little more success in terms of venture capital investment. British Columbia has had far more success in attracting venture capital compared to Alberta, but still trails Ontario and Quebec with less venture capital investment per capita than those two provinces.

### BC spends less on research and development



Source: BC Stats

The lack of research and development activity is a common theme for the government sector as well. BC trails the national average in terms of gross expenditure on research

and development as a proportion of GDP in all three sectors: education, business and government. However, BC does outpace Alberta in each of these measures and, excluding the education sector, generally outpaces all the other provinces with the exception of Ontario and Quebec. Nevertheless, it appears that spending on research and development is one area in which BC can invest in order to boost its high tech sector.

There are other areas in which BC has an advantage compared to other provinces, such as lower tax rates and a higher quality of life and these are important for attracting high quality labour. The fact that BC is the only province other than Alberta to record a net inflow of interprovincial migrants in each of the last three years indicates that the province has an advantage over much of the country in attracting people.

The areas to which BC needs to pay more attention include encouraging the pursuit of higher education, particularly in technology related fields, and putting more emphasis on research and development. BC has many of the elements necessary for a successful high technology sector already in place and if government, the education sector and business work together, the province could eventually become a world leader in the technology field.

For a more detailed look at British Columbia's high technology sector, refer to the 2006 editions of *Input Indicators of the British Columbia High Technology Sector* and *Profile of the British Columbia High Technology Sector*. Updates to these publications should be available sometime in the winter and fall of 2007 respectively.