

# **The Benefit of the Wireless Telecommunications Industry to the Canadian Economy**

April 2011





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# 1 Executive summary

This study assesses the impact of the wireless industry in Canada on the Canadian economy. We are grateful to the members of the CWTA for the data that they have provided.

The Canadian wireless communications services industry has continued to see growth during challenging economic times. Revenues from wireless services increased in 2009 and the rate of capital expenditure showed a marked increase during the year.

The strength of the industry means that it continues to provide economic value to the wider economy in Canada. The industry stimulates growth, generates wealth and creates value for the government through taxes and spectrum licence fees.

We have concluded that the wireless communications industry generates significant value for the Canadian economy. The total value of direct GDP contribution, output multiplier and consumer surplus is a significant economic value of over \$41bn<sup>1</sup> which compares to \$39bn in 2008.

This value is much more than the revenues earned by the operators, dealers and service providers resident in Canada. The direct economic impact of the Canadian wireless telecom services industry in 2009 included the following:

- the wireless communications services industry in Canada generated \$16.9bn in revenues in 2009 an increase of 6.0% from the previous year<sup>2</sup> and the industry directly contributed \$17.22bn to Canadian gross domestic product (GDP)<sup>3</sup>. The greatest contribution to the national GDP from the wireless communications services industry comes from the mobile operators and the support services sector
- when this direct contribution to GDP is complemented by the Statistics Canada output multiplier<sup>4</sup> of 0.87 this leads to a total economic benefit from the supply of services of \$32.2bn
- \$2.95bn was invested in capital expenditure during 2009, which represents 17.5% of revenues. This is a marked increase when compared to the network investment of around 13% in the each of the previous 4 years. In 2008 the operators incurred an additional capital expense of the AWS auction payments which generated \$4.26bn for

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<sup>1</sup> Note: unless otherwise stated, all financial figures in this report are expressed in Canadian dollars

<sup>2</sup> CRTC Communications Monitoring Report 2010, Ovum's estimate of 2009 Capex and previous report

<sup>3</sup> Statistics Canada states that the GDP of an industry represents the value added by labour and capital in transforming inputs purchased from other industries into output.

<sup>4</sup> The 'output multiplier' is a statistical tool which enables the economic impact of demand on contributing suppliers in the supply chain to be assessed, based on the demand for end-user services. Statistics Canada provides a multiplier of 0.87 for the integrated telecommunications industry. This has been applied to the wireless sector in this study.

the public benefit. Over the period 2005-2009 capital expenditure in the industry grew at a CAGR of 20.5%<sup>2</sup>

- the use and availability of wireless telecom services and products created a consumer surplus of approximately \$9.044bn. This is the difference between what end-users are willing to pay for a service and what they are actually having to pay and is an additional economic value to Canada
- the Canadian wireless telecommunications industry creates 261,200 direct, support, and indirect jobs
- the wireless sector offers high value employment – it has an average salary level of \$60,031. This compares to an average Canadian salary of \$43,895
- the \$17.22bn value of the Canadian wireless industry compares favourably with other major Canadian industries such as food manufacturing (\$18.8bn) and agricultural crop production (\$16.1bn). Within this total value:
  - the use of mobile broadband and other data services is experiencing strong growth stimulated by the availability of advanced 3G service capabilities, which in 2009 were available to 96% of the Canadian population, an increase of 5 percentage points from 2008<sup>5</sup>
  - the mobile broadband sector generated \$4.17bn revenues from data services in 2009, 25% of total revenues<sup>5</sup>
  - the mobile content sector generated around \$227 million in 2009<sup>6</sup>, which compares to \$176 million in 2008. Although currently of modest value, this is a sector which is expected to grow strongly as users adopt mobile broadband.

The wireless industry in Canada has made substantial investments over many years. Incumbent operators and new entrants continue to invest heavily, despite challenging economic conditions. They are doing so to meet the increasing demand for high performance services which are enabled by new technologies. This investment is in the form of additional network nodes, fibre and microwave backhaul and new core network infrastructure.

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<sup>5</sup> CRTC Communications Monitoring Report 2010

<sup>6</sup> Based on operator survey and estimate of proportion of revenue directly to non-operator application stores

## 2 Introduction

### 2.1 Scope of the study

This study was commissioned by the Canadian Wireless Telecommunications Association (CWTA)<sup>7</sup> as an update to the report published by the CWTA in April 2010. This report assesses the beneficial impact that the Canadian wireless industry has had in 2009, and will continue to have, on the Canadian economy.

This independent report has been prepared to demonstrate that the mobile industry continues to provide significant economic value to the wider economy in Canada well beyond the revenues which flow to the network operators and service providers. The industry is at the forefront of enabling mobile broadband services to the vast majority of the Canadian population, a service area which is projected to see rapid growth over the coming years.

The focus of the report is to quantify the economic impact of the industry in terms of the GDP, jobs and productivity gains for both the supply side and demand side of the economy.

The key objectives of the study are:

- to identify and demonstrate the supply side economic benefits of mobile services in Canada in terms of contribution to gross domestic product (GDP) and employment
- to identify the productivity gains that accrue from wireless services
- to assess the consumer surplus - the welfare and social benefits that mobile services provide for consumers, from a quantitative and qualitative perspective.

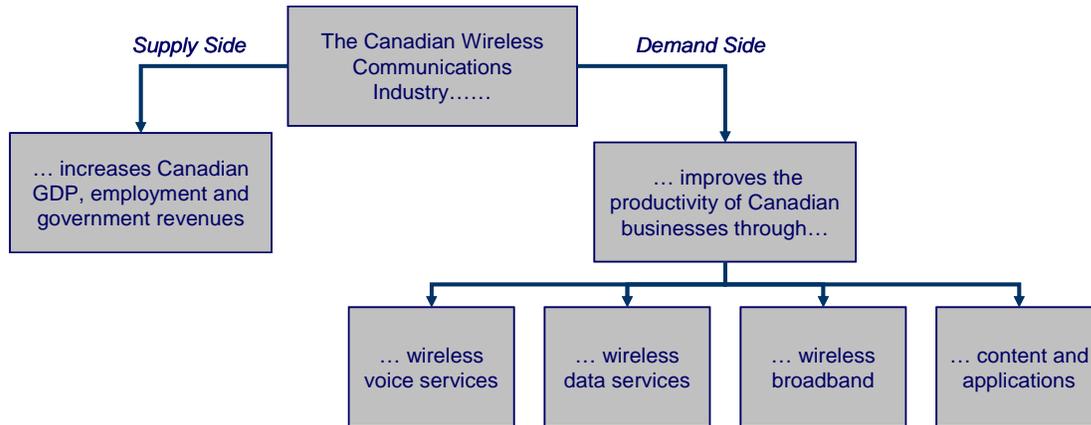
This report builds on the study published by the CWTA in April 2010<sup>8</sup>, with minor adaptations to improve the methodology and provide a more detailed analysis of mobile broadband services. The April 2010 report was based on data for 2008 and this 2011 report is based on data from 2009.

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<sup>7</sup> CWTA is the authority on wireless issues, developments and trends in Canada. It represents cellular, PCS, messaging, mobile radio, fixed wireless and mobile satellite carriers as well as companies that develop and produce products and services for the industry.

<sup>8</sup> The Benefit of the Wireless Telecommunications Industry to the Canadian Economy

Figure 1: Principal economic impacts of the Canadian wireless industry on the Canadian Economy



Source: Ovum

## 2.2 The structure of the report

The Canadian mobile services industry is performing strongly. We consider in this report what economic benefits the supply and use of mobile services is generating for the Canadian economy.

The report is structured as follows:

- Section 3 provides an overview of the Canadian wireless industry sector.
- Section 4 presents our estimates of the end user revenues generated by the mobile services industry in Canada, how these flow along the value chain and what value add is captured by which suppliers. It also estimates the GDP which is retained within Canada and the number of jobs in Canada which are dependent on the industry.
- Section 5 quantifies the consumer surplus generated by the industry to end users and describes the social benefits provided by the sector to the general economy.
- finally in Section 6 we present our conclusions.

## 3 Canadian wireless industry sector overview

### 3.1 Strong growth and investment during recession

The Canadian government recognises that the ICT industries have a major role to play in supporting economic growth and enhanced productivity. This is demonstrated by the recent speech by the Minister of Industry<sup>9</sup>. It is fortunate therefore that the Canadian wireless industry bucked the overall economic trend and that it remains heavily committed to improving the availability and performance of wireless broadband services.

The Canadian wireless market is characterised by:

- a need to serve a huge geographic area. With a population density of 4 people per sq km, Canada is much more sparsely populated than Europe, which has 70 people per sq. km. and the US which has 30 people per sq. km. It is laudable that Canadian operators manage to cover 99% of the population with voice services, and achieve 3.5G coverage for 96% of the population<sup>10</sup> – which does inevitably require a high level of capital expenditure
- as of Q4 2009, the geography of Canada was served by 56 licensed operators. This includes three national operators plus regional and local operators. At the end of 2009, one new entrant operator had launched and several other were preparing to launch.
- high operating costs for network operators. This is explained by the low population density in many provinces, which involves higher network deployment costs, but also increased expenses resulting from the operation of new networks able to support high levels of data traffic.

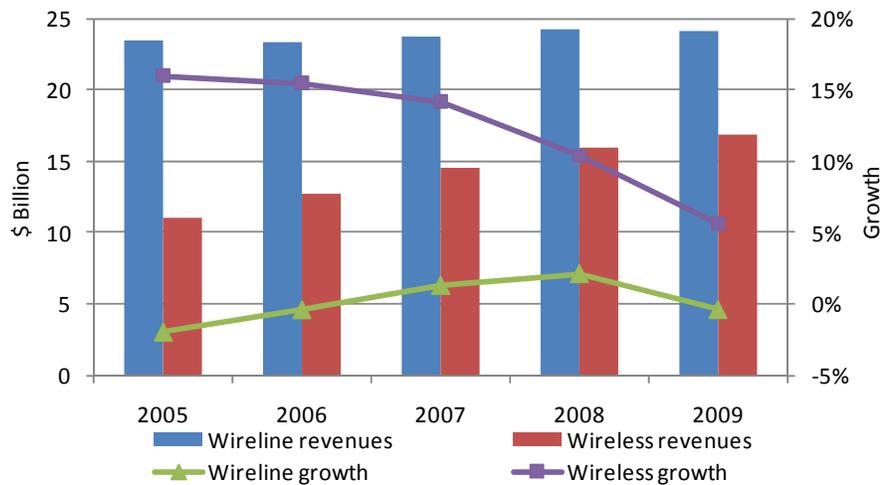
Despite these characteristics, the wireless industry is still the driving force of the Canadian telecommunication industry.

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<sup>9</sup> <http://de-en.gc.ca/en/home/>

<sup>10</sup> CRTC Communications Monitoring Report 2010

Figure 2: Canadian wireless revenues continue to grow



SOURCE: CRTC COMMUNICATIONS MONITORING REPORT 2010

In 2009, the Canadian wireless communications market generated revenues of \$16.9bn, an increase of 6.0% from \$15.94bn in 2008. This represents 41% of all Canadian telecommunication revenues and the sector showed a 11.3% compound growth in revenues in the four years from 2005 to 2009<sup>11</sup>. Although the rate of growth has eased slightly in 2009 it compares favourably with the wireline side of the industry, which saw revenues drop by 0.5%. Wireless minutes of use continued to grow, but with lower ARPU for voice services, which fell by 1.5% between 2008 and 2009 - driving an overall slight drop in revenue per line from \$59 to \$58, a drop of 1.7%. However, connections increased by 7.7% from 2008 to 2009, with a CAGR of 8.3% from 2007 and total wireless connections stand at 23.8 million by the end of 2009. The decline in voice revenues is attributable to a number of reasons: greater competition, more attractive voice calling plans which include a greater number of minutes and lower roaming use, as tight economic conditions impact travelling.

Analysis of the Canadian wireless communications industry has to be considered against the situation in the overall national economy. Industry Canada's statistics of the Canadian Economy<sup>12</sup> show that the economy contracted by 2.8% in 2009, with the goods-producing industries particularly effected with a sector contraction of 9.3% compared with 2008. Other countries and regions also saw a decline in national GDP in 2009, 2.6% in the USA and 3.9% in the Euro area<sup>13</sup>.

<sup>11</sup> CRTC Communications Monitoring Report 2010

<sup>12</sup> [http://www.ic.gc.ca/eic/site/cis-sic.nsf/eng/h\\_00013.html](http://www.ic.gc.ca/eic/site/cis-sic.nsf/eng/h_00013.html)

<sup>13</sup> World Bank, World Development Indicators

The growth in the industry is not just in terms of revenues, coverage, access speeds and subscriptions. There is growth in investment and the number of market players is also increasing, with new entrant operators investing during 2009 to build their networks to take advantage of their 2008 spectrum acquisitions.

## Mobile data and broadband services

The mobile access market provides a range of services, including mobile telephony, mobile data, roaming, wireless Internet access and paging services. As is the case in many other countries in the world, the importance of mobile data services is growing. Across the industry, operators reported that wireless data revenues grew at an annual rate of approximately 36% in 2009, primarily due to mobile broadband services, and that wireless data accounted for approximately 24% of total wireless service revenue.<sup>14</sup>

To ensure continuing world class service for Canadians the operators are continuously evolving their wireless networks and Canadian national wireless carriers migrated to HSPA+, bringing the benefits of mobile broadband services of up to 21Mbit/s to consumers, albeit with higher operating costs to operators. As mentioned above, by the end of 2009, approximately 96% of Canadians had access to 3.5G or equivalent mobile broadband services with speeds of up to 21 Mbit/s<sup>15</sup> using handheld mobile devices.

Due to the unceasing demand from Canadians for world class mobile technology and services the industry requires continual capital expenditure on new generation systems to address the evolving nature of technology. In 2009, the Canadian wireless industry increased its average network capital expenditure to spend an average of \$123.91 per subscriber connection, an increase from \$113.15 per subscription in 2008 (excluding AWS spectrum fees).<sup>16</sup>

The growth in mobile data, driven by mobile broadband is being seen in many advanced markets. Figure 3 shows the level of world-wide voice and data traffic, with the latter driven by mobile broadband, smart-phones and laptop connectivity. At the end of 2009 data traffic exceed voice traffic for the first time.

Cisco prepares an annual report which monitors the development of mobile broadband and their report projects data traffic growth at a CAGR of 102% from 2010 to 2015, as shown in Figure 4. This is fully expected by the operators and they recognise that continued investment will be needed to support this trend.

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<sup>14</sup> Operator Annual Reports and CRTC Communications Report 2010

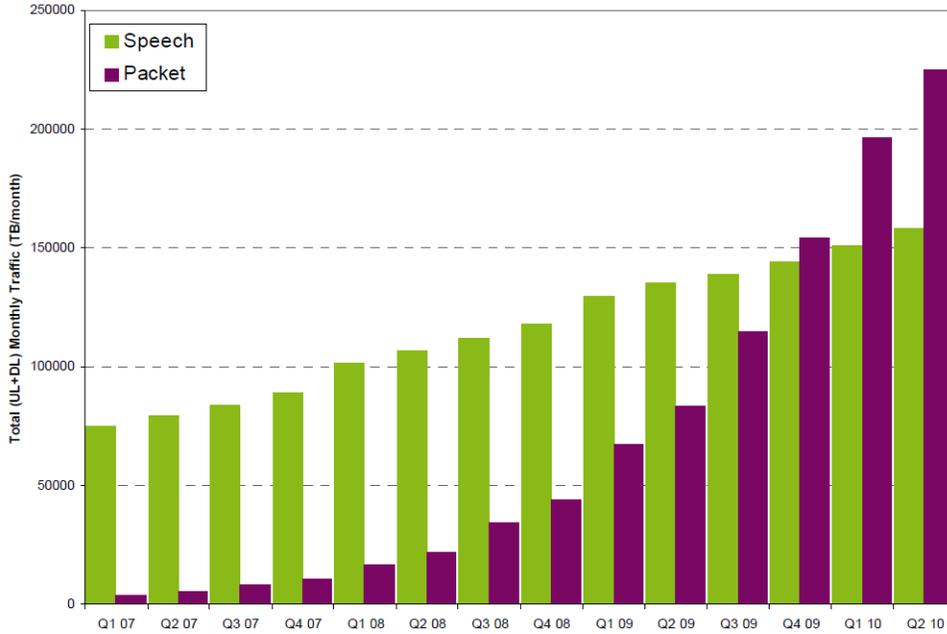
<sup>15</sup> Rogers Wireless Next Generation 21 Mbps HSPA+ Network Goes Live in Canada's Five Largest Cities, Rogers Wireless Press Release, September 14, 2009

Bell clients to access the fastest, largest national wireless network deployment ever starting next month, Bell Canada Press Release, October 5, 2009

TELUS to launch Canada's largest 3G+ network on November 5, TELUS Press Release, October 26, 2009

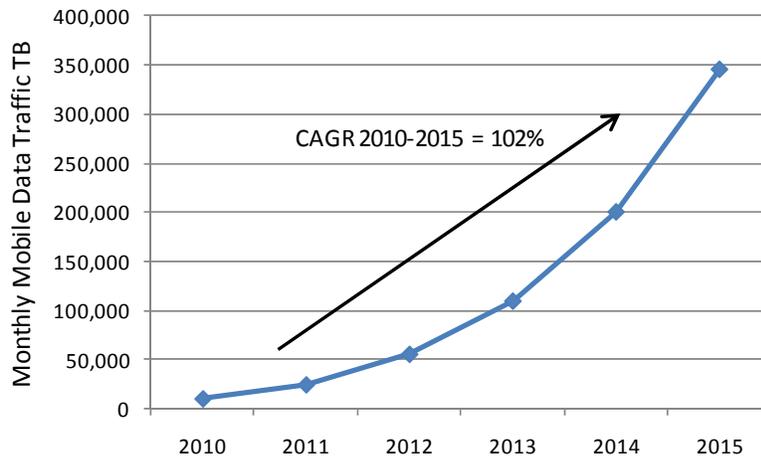
<sup>16</sup> Based on Ovum 2009 capex analysis and CRTC Communications Report 2010 subscriber data

Figure 3: Worldwide monthly mobile traffic (Uplink and Downlink)



Source: Ericsson – North American Investor Relations Forum, San Jose, 12 August 2010

Figure 4: Worldwide mobile data traffic projection

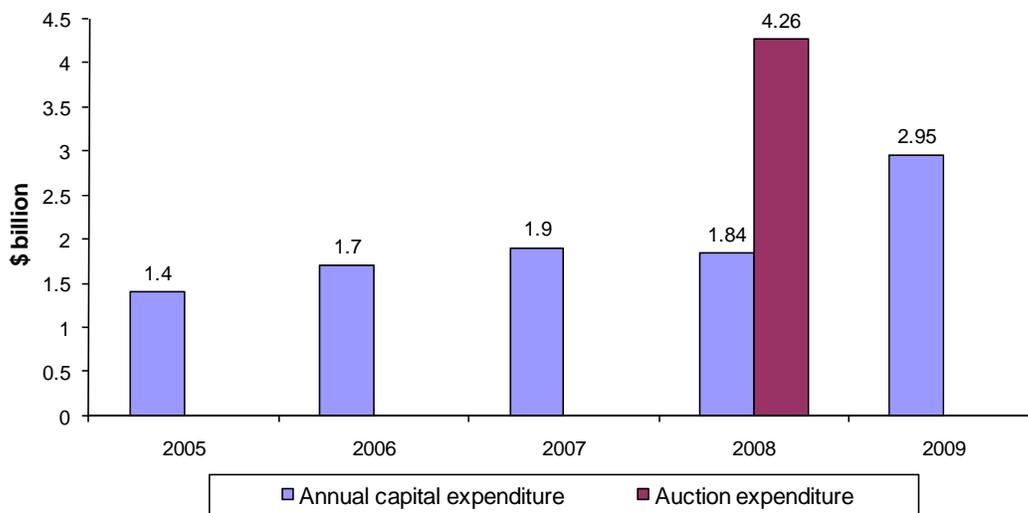


Source: Cisco VNI

## Capital investment

There is clearly a continued need for operators to invest in new technology. Prudent business management requires that this investment is spread reasonably evenly from year to year and, from 1996 to 2007 the industry invested between \$1.1bn and \$1.9bn every year in capitalised equipment and services. In 2008, the amount of wireless capital expenditure increased dramatically, to \$6.1bn, due to the cost of AWS spectrum. In 2009, network capital expenditure increased significantly from 2008 (i.e. excluding spectrum costs). This was due to the continued investment by the established operators to increase their coverage and network performance, and investment by those new operators that bought spectrum rights in 2008 as they deployed their networks. Through research with the operators and analysis of company reports and statements, Ovum estimates that the total capital expenditure in the sector was \$2.95bn during 2009, which is a 60% increase in network capital expenditure over 2008<sup>17</sup>. This growth and expenditure is one of the factors that has contributed to the sector's contribution to national GDP during the year in which the overall economy was in recession. Figure 5 illustrates the most recent trends in wireless capital expenditure.

Figure 5: Canadian cellular network investment



Source: 2005-2008, CRTC Communications Monitoring Report 2010; 2009, Ovum estimate based on operator survey, company reports and statements

<sup>17</sup> Although the CRTC Communications Monitoring Report 2010 refers to wireless capital investment in 2009 of \$2.2bn, we consider that this understates actual investments.

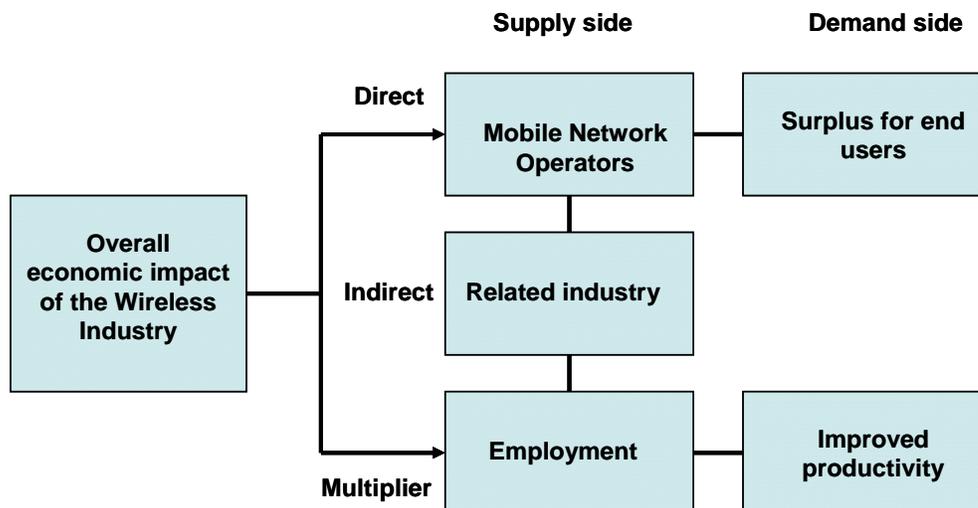
In addition to these network investments are the significant ongoing costs and one-time costs of the spectrum licences required to operate these networks. Until 2010, the incumbent cellular/PCS operators paid \$130 million annually for the spectrum that was not awarded by auction. Since 1998, Industry Canada has had a policy to award mobile spectrum licences via auction. In 2001, Canada’s wireless operators transferred \$1.482bn to the government for 10 year PCS licences. In 2008 the industry transferred \$4.26bn to the government for AWS spectrum.

Each licensing process results in intensified capital spending as new networks are deployed to make use of the spectrum. The AWS auction in July 2008 resulted in significant capital investment by operators across the sector, which will continue for many years as the operators invest to deliver services with their newly acquired spectrum.

### 3.2 The economic contribution of wireless telecoms services

This report provides an independent assessment of economic impacts that the Canadian wireless telecom industry had on the Canadian economy in the year 2009 and considers how some of the metrics have changed from 2008. The conclusions reached in this study are based on Ovum’s economic model for the Canadian wireless telecoms services industry.

Figure 6: Principal economic impacts of the wireless industry on the Canadian economy



Source: Ovum

The model incorporates:

- financial and business data received under NDA from the major operators
- publicly available data concerning wireless carriers, wireless handset, equipment manufacturers and the overall wireless telecom industry
- Ovum's own independent analysis, research and forecasts.

Our analysis indicates that in 2009 the wireless telecommunications industry in Canada has had the following impact on the Canadian economy:

- the Canadian wireless telecoms services industry contributed \$17.22bn to national GDP in 2009, this compares to \$16.3bn in 2008. Of this \$17.22bn contribution to GDP, \$12.06bn was retained in the Canadian value chain and \$5.15bn was sourced outside Canada
- we estimate that the sector contributed directly and indirectly to employment of 261,200 in Canada. If induced employment is taken into account, this rises to more than 278,000 employed.

## 4 Supply side impacts of the Canadian wireless industry

### 4.1 Supply side impacts: our methodological framework

In this section of the report we discuss the supply side – the provision of services by mobile network operators and service providers – and the supply side benefits that are generated. These are considered for the year 2009 and exclude any supply side benefits that come into the country which are generated by systems and device vendors which export to other parts of the world.

The Canadian wireless communications industry includes both suppliers that were founded in Canada (e.g. RIM, Ericsson Canada (Nortel) and Sierra Wireless) as well as a number of other manufacturing companies such as Alcatel Lucent, Huawei, Motorola, Nokia, Nokia Siemens Networks and others. Most of these companies undertake R&D in the country (RIM, in particular, invests heavily in R&D which brings many positive externalities to the wireless industry) and increasingly the major vendors undertake operational support roles for their customers and provide network operations and management services.

In order to estimate the impact of the supply side, we adopt the following three step process:

- Step 1: we start by quantifying the value chain for the industry - from the purchase of services and terminals by end users through to the creation of the components which go into making the network equipment used to supply these services
- Step 2: we then consider how the value added at each step in the chain is distributed geographically. In this report we simply look at the division of the value add<sup>18</sup> between the Canada and the rest of the world
- Step 3: we then use our findings to estimate the GDP and employment generated by the wireless communications services industry in Canada.

It is important to note that:

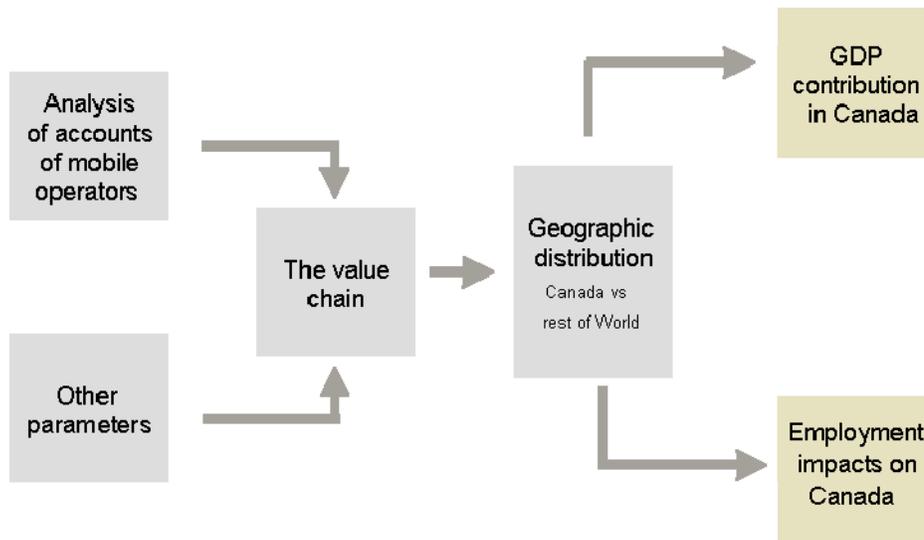
- we estimate the supply side economic impacts of the Canadian wireless services industry alone. We do not estimate the supply side impacts of the rest of the world's wireless services industry on Canada

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<sup>18</sup> We use the terms *value add* and *GDP contribution* interchangeably since they are both terms for labelling the contribution to overall national GDP which a firm makes. In our simplified model, GDP is considered to be the sum of the value of final products and services sold.

- the estimates include the impact of inbound and outbound roaming revenues but assume that the flow of roaming revenues between Canada and the rest of the world is balanced.

Figure 7: Ovum's model for estimating supply side effects

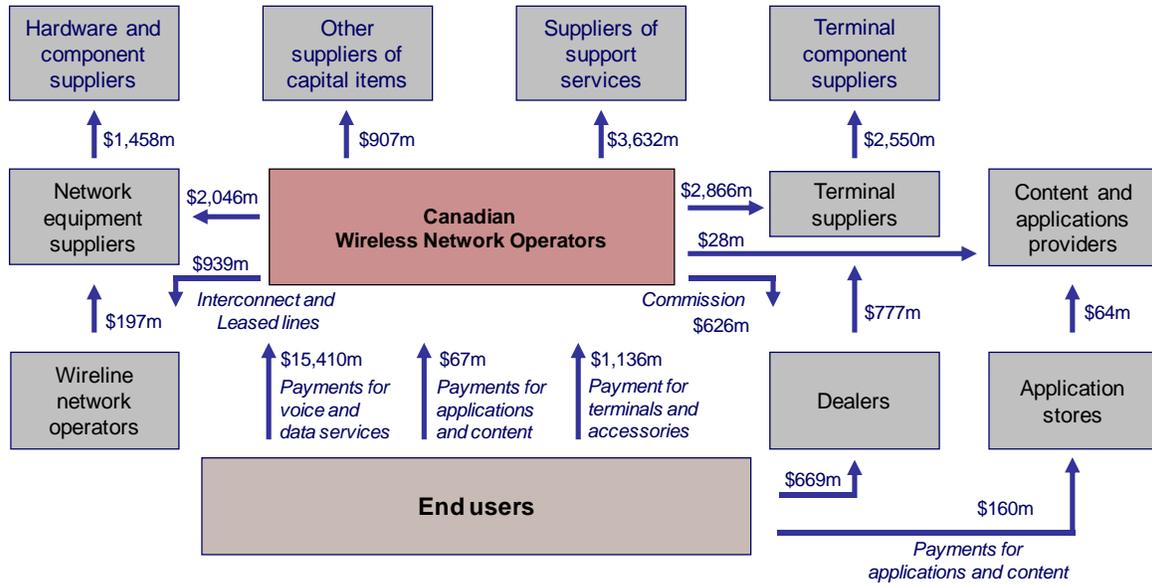


Source: Ovum

## 4.2 Canada's wireless value chain

Ovum has developed a model to estimate the value added (GDP contribution) and the effects on employment generated by the wireless sector in Canada. The model is based on a simplified version of the Canadian wireless sector value chain, as shown in Figure 8.

Figure 8: The value chain for wireless services in Canada



Source: Ovum. Note: definitions of value chain categories are provided in Annex A

We use the model to estimate:

- 1 the GDP (or value add) generated by Canada's mobile services industry. This is broken down in the model by industry sector (Figure 8), geographic region (Canada and the rest of the world), and the component of value add (wages, other operating costs and depreciation, and taxes, profit and interest)
- 2 the direct, support services, indirect and induced employment generated within Canada by the mobile sector.

The Ovum model is built up as follows:

- basic statistics on the total revenues generated by the industry sourced from Statistics Canada, and the operators. These are combined with the detailed accounting breakdowns which were provided to us by the operators and relevant account information derived from industry accounts. These enabled us to estimate and provide a relevant breakdown of the costs and revenues across the mobile services industry
- these estimates are combined with other key input parameters to estimate the revenue flows along the value chain and the value added by each industry segment. The value added is then distributed by geography (Canada and rest of world) and component. It uses, among other sources, estimates of the geographic distribution of the value added by terminal supplier
- the model then calculates the number of jobs generated by Canada's mobile services industry by dividing the relevant value add by the relevant average annual unit wage cost for the industry segment

- finally, the model calculates the value add per employee in the mobile sector (within wireless operators and dealers) and compares it with the value add for the average worker in Canada.

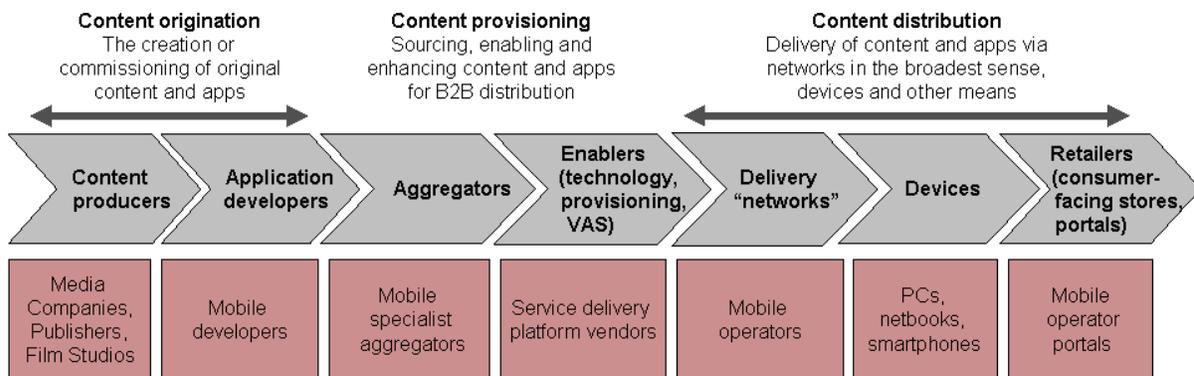
## Content and applications value chain

The use of mobile broadband and associated data services is growing rapidly. The market for applications and content is also developing, and consumers have several routes to acquire content:

- from their mobile service provider;
- from application stores such as Nokia’s Ovi, Apple’s iTunes stores, RIM’s Blackberry App Store and also businesses new to the industry, such as Amazon; and
- direct from application developers and vendors.

The products acquired may be chargeable or free to use, and includes personalised content, mobile games, music, mobile TV and other content (e.g. alert services, premium/branded news and information service subscriptions; betting and gambling).

Figure 9: Content value chain



Source: Ovum

These services and applications are an important and developing sector of the mobile industry, enabled by higher speed, lower priced mobile broadband and devices designed to exploit the content.

For this 2009 market results from the operators in Canada have been used to develop an estimate of the market size for applications and content. The market is still quite modest, with a value of \$227 million, with \$160 million going directly to app stores, and \$67 million to the mobile service providers.

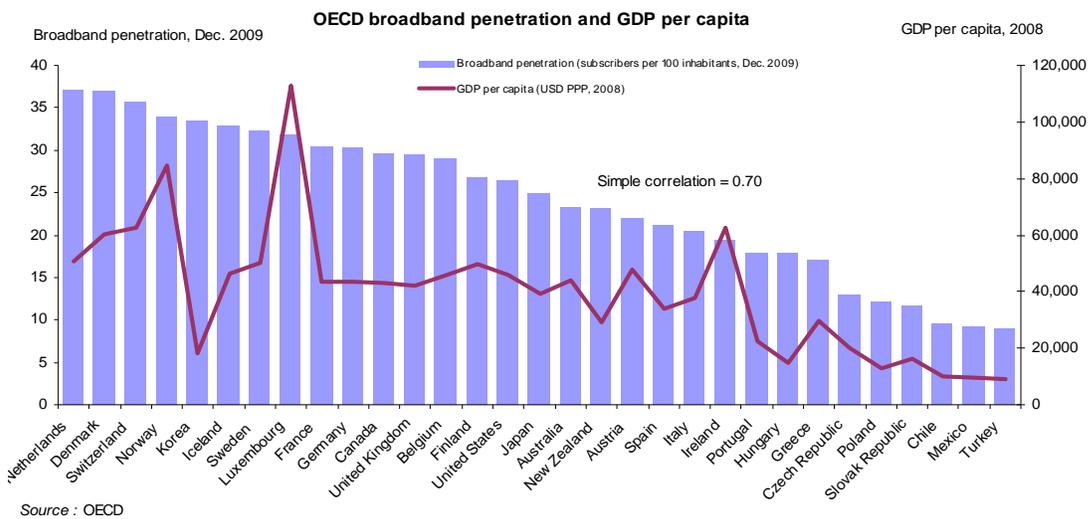
## Economic value-add of broadband

In Canada, approximately 95% of all households have access to fixed broadband services. Furthermore, approximately 96% of all individuals are able to access broadband services through mobile devices.<sup>19</sup> In order to further improve these coverage rates, the Canadian government's budget in 2009 specifically earmarked \$225 million that Industry Canada will be able to spend over the next three years on broadband development, specifically improving broadband coverage to underserved areas<sup>20</sup>.

While broadband penetration rates remain substantially below the availability percentages, particularly with regard to mobile broadband, the value that broadband services adds to an economy is potentially sizable and, thus, an important consideration.

In many countries it has been shown that improving broadband penetration creates significant economic value. Indeed, in a comparison across 31 countries, the OECD clearly demonstrates a correlation between fixed broadband penetration rates and GDP per capita.

Figure 10: Broadband penetration rates and GDP per capita



<sup>19</sup> CRTC Communications Monitoring Report July 2010.

<sup>20</sup> Contrast this amount to the wireless industry's single year investment of \$2.95 bn

The value that broadband brings to an economy can be considered along two dimensions: first, an improvement in the country's GDP and, second, an enhancement of consumer surplus. In this section we examine each of these dimensions for the fixed broadband market before presenting a discussion on the potential value that mobile broadband might contribute to the Canadian economy.

### **Improvement in GDP**

A number of studies have attempted to calculate the impact that broadband has on a country's GDP.

One study, which focused broadly on the OECD countries showed that "a 10 percentage-point increase in broadband penetration raises annual per-capita growth by 0.9-1.5 percentage points".<sup>21</sup> This is in line with the results of a recent World Bank study which focused on low- and middle-income countries and showed that a 10 percentage-point increase in broadband penetration raises economic growth by 1.38 percentage points.<sup>22</sup> A more recent study conducted by the Boston Consulting Group (BCG) shows that the Internet contributes approximately £100bn (\$179bn at 2009 exchange rates) to the UK economy.<sup>23</sup>

Whilst these studies differ in their estimations and in the way in which they quantify broadband, they do provide a measure the economic impact of broadband. These and other studies enable us to estimate the broadband contribution to GDP in Canada in 2009 to be \$102bn.

We stress that this value is a rough estimation and simply serves to provide an indication of the likely magnitude of the broadband contribution to GDP in Canada. A much more rigorous analysis of the value of broadband would need to be conducted to obtain a more precise estimate and, even then, any estimation will struggle to account for the many indirect effects of broadband that might add economic value but are not directly measurable.

### **Enhancement of consumer surplus from broadband access**

While the economic value of broadband can be assessed in terms of its contribution to GDP, another measure is the additional consumer surplus that is derived as a result of broadband connectivity.

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<sup>21</sup> Czernich, N., Falck, O., Kretschmer, T. and Woessmann, L. 2009. Broadband Infrastructure and Economic Growth. CESifo Working Paper No. 2861.

<sup>22</sup> Kim, Y., Kelly, T. and Raja, S. 2010. Building Broadband: Strategies and Policies for the Developing World. GICT Department, World Bank.

<sup>23</sup> The Connected Kingdom: How the Internet is Transforming the UK Economy. BCG Report, October 2010.

A 2009 study showed that broadband connectivity in the US yielded US\$32bn of consumer surplus in 2008; this represents a 58% improvement in broadband consumer surplus from 2005 when the surplus was approximately US\$20bn.<sup>24</sup> This value of US\$32bn appears reasonably consistent with values in other studies.<sup>25,26</sup>

We have used the amount of US\$32bn in our estimation to determine a comparable value for the Canadian market. By combining population data for Canada and the United States with data on the number of broadband subscriptions in each country, we calculate broadband penetration rates for the two countries, and by assuming that the ratio of consumer surplus derived from broadband connectivity and broadband penetration for the United States is the same as the ratio for Canada, we calculate the consumer surplus derived from fixed network broadband connectivity in Canada to be \$4.52bn.

### **The economic impact of mobile broadband**

The above analysis focuses exclusively on the fixed broadband market. As mobile broadband becomes more prevalent and penetration increases, assessing the economic impact of this type of broadband will become more and more important. The nature of mobile broadband, however, is such that attaining an accurate measure of individual usage is extremely difficult; this, in turn, means that valuing the economic impact of mobile broadband is challenging. Before considering the economic value, we will consider the substantial productivity gains which have already resulted from the growing deployment and use of wireless broadband services. At a personal level these benefits range from the simple, e.g. being able to access personal data, information and content which may be stored in cloud-based services, through to more advanced services, e.g. GPS-based resource location services linked to maps. These applications also benefit commercial users, for whom mobile broadband has become an essential component of business life. With many employees needing to travel within their business, mobile access to email and the internet are now a necessity. Productivity gains come from more specialised applications that support staff engaged in field service, healthcare, utility operations, sales, courier and delivery services - in fact just about every manufacturing and service sector. The benefits are available to large organisations and small, and the latter may benefit more as it is no longer necessary to have the backing of a large enterprise to be able to benefit from tailored services.

According to Ovum estimates, the number of mobile broadband users in Canada at the end of 2009 was approximately 2.5 million, in line with the CRTC reported figure of 2.6 million. Ovum forecasts that this will increase to over 15 million users in 2014. As illustrated in Figure 11, growth is expected in both the consumer and enterprise markets.

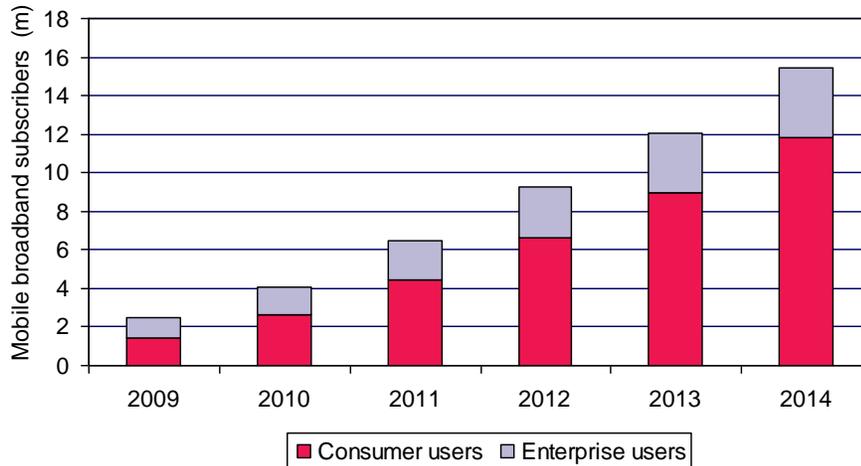
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<sup>24</sup> Dutz, Orszag and Willig. 2009. The Substantial Consumer Benefits of Broadband Connectivity for U.S. Households.

<sup>25</sup> Rosston, G., Savage, S. and Waldman, D. 2010. Household demand for Broadband Internet Service. FCC.

<sup>26</sup> Horrigan, J. 2010. Broadband Adoption and Use in America. FCC.

Figure 11: Forecast of mobile broadband users in Canada



Source: Ovum

It is not straightforward to estimate the benefit that mobile broadband brings to the economy in financial terms. However, as discussed above we estimate that fixed broadband services in Canada generated a benefit to the economy in 2009 of \$4.52bn, which is derived from 9.9 million broadband connections. The 2.5 million mobile broadband connections in 2009 extend the reach of broadband to users outside of fixed networks while also providing broadband services on the move. With mobile broadband providing 25% of the number of connections provided by fixed broadband, a modest assumption that it provides 20% of the benefit (per connection), leads to an estimated \$228 million economic value from mobile broadband.

A 2009 GSMA Report entitled the "European Mobile Observatory" indicates that the number of mobile broadband subscribers in Europe increased from 2 million in 2006 to 13 million in 2008 (a CAGR of 155%). Furthermore, the report predicts that productivity gains resulting from mobile broadband could increase global GDP by 3 to 4% - a strong indication that mobile broadband is expected to contribute significant economic value. If this GSMA prediction is applied to Canada, then an economic contribution of \$40bn could be achieved by 2014.

These figures should not be too surprising, as mobile broadband already contributed 24% of Canadian wireless revenues, and, as shown in Section 3 of the report, wireless is the sector of the communications industry which is demonstrating the preponderance of the growth.

### 4.3 Total value add generated by the Canadian wireless sector

We quantify the monetary flows between key players in the value chain. In 2009, we found that:

- the total end user spend on wireless services and devices in the Canadian economy is \$16.9bn. This comprises:
  - \$15.41bn directly from consumers to mobile network operators for communications services
  - \$1.805bn spent by consumers on handset terminals and accessories. Of this \$1.136bn flows directly to wireless operators and \$669 million to independent dealers. Operators pay terminal manufacturers \$2.866bn. The difference between their receipts and payments is due to handset subsidies by the operators, and the difference is included in the \$15.41bn, above.
- the wireless operators reward independent dealers for sales to end users through commission payments of \$626 million giving dealers a total revenue of \$1.295bn. Of this total revenue, we estimate that approximately \$777 million is paid to terminal suppliers
- terminal suppliers receive the bulk of their revenue from wireless operators in Canada, with \$2.866bn flowing to them from this source. Of their total revenue of \$3.643bn, roughly \$2.55bn, or 70%, is paid for terminal components, to suppliers or internally, within the same corporate organisation
- in addition to commission payments, wireless operators also have a number of other outgoing revenue flows:
  - Ovum estimates that wireless operators make significant payments to the sum of \$3.632bn to support service suppliers. These services cover those which have traditionally been handled by external agencies, such as advertising, professional services (lawyers and accountants) and IT, but which now also encompass customer support and outsourced network operations and maintenance services. These payments represent around 28% of wireless operators' total costs (excluding free cash flow)
  - additionally, wireless operators undertake total capital expenditure of \$2.953bn, of which \$2.046bn flows to network equipment suppliers. The continued investment in high performance mobile data access systems underpins much of the increase in capex
  - finally, wireless operators make payments of \$939 million to wireline operators, primarily for leased lines
- wireline operators also play a role in the total value added of the Canadian wireless sector. Roughly 20% of the revenue they receive from wireless operators for leased line and other services is paid to network equipment suppliers for the equipment used to provide these services and for network construction. This gives network equipment

suppliers total revenue of \$2.243bn of which \$1.458bn flows to suppliers of the network equipment component vendors.

Table 1 below summarises the contributory value added generated by each part of the value chain as a result of these payment flows:

Table 1: Value added in Canada which is generated within the value chain

	<b>Value Added (\$ million)</b>	<b>Percentage of total value added</b>
Dealers and app. stores	518	3%
Wireless operators	5,530	32%
Wireline operators	742	4%
Support service suppliers	3,632	21%
Network equipment suppliers	785	5%
Hardware and components	1,458	8%
Terminal suppliers	1,093	6%
Terminal component suppliers	2,550	15%
Other capex suppliers	907	5%
<b>Total</b>	<b>17,215</b>	<b>100%</b>

Source: Ovum. Note definitions of value chain categories are provided in Annex A

When assessing the value of industries to the Canadian economy, the Government statisticians use a modelling technique which is referred to as the 'output multiplier'. This is a statistical tool which enables the economic impact of demand on contributing suppliers in the supply chain to be assessed, based on the demand for end-user services. Statistics Canada provides a multiplier of 0.87 for the integrated telecommunications industry. We have applied it to the wireless sector in this study, which leads to a total economic benefit from the supply of services of \$32.2bn (\$17.22bn \* 1.87).

## 4.4 Geographic distribution of value add

Of the total value add accruing from the wireless sector in Canada in 2009 (\$17.22bn), roughly \$12.07bn (70%) of the total GDP generated by the wireless operators and the companies which provide support services, is retained in Canada. The main areas of value which are not retained in Canada are generated by the terminal suppliers as the components that they source for device manufacture are typically manufactured in the US, Europe and Asia. While there are significant national developers of mobile equipment, devices and applications, our analysis includes only the value that this company derives

from its sales of devices and the use of wireless services in Canada. We do not include the significant value that is generated in other regions of the world.

Table 2 below shows how the value add is distributed between Canada and the rest of the world for each player in the value chain.

Table 2: GDP impact of wireless services in Canada

	Value Added (\$ million)	Percentage of total value added	Value added, and retained in Canada (\$ million)	Percentage of retained total value added
Dealers and app. Stores	518	3%	518	4%
Wireless operators	5,530	32%	5,254	44%
Wireline operators	742	4%	727	6%
Support service suppliers	3,632	21%	3,632	30%
Network equipment suppliers	785	5%	236	2%
Hardware and components	1,458	8%	365	3%
Terminal suppliers	1,093	6%	197	2%
Terminal component suppliers	2,550	15%	229	2%
Other capex suppliers	907	5%	907	8%
<b>Total</b>	<b>17,215</b>	<b>100%</b>	<b>12,065</b>	<b>100%</b>

Source: Ovum

## 4.5 Wireless services compared with other sectors

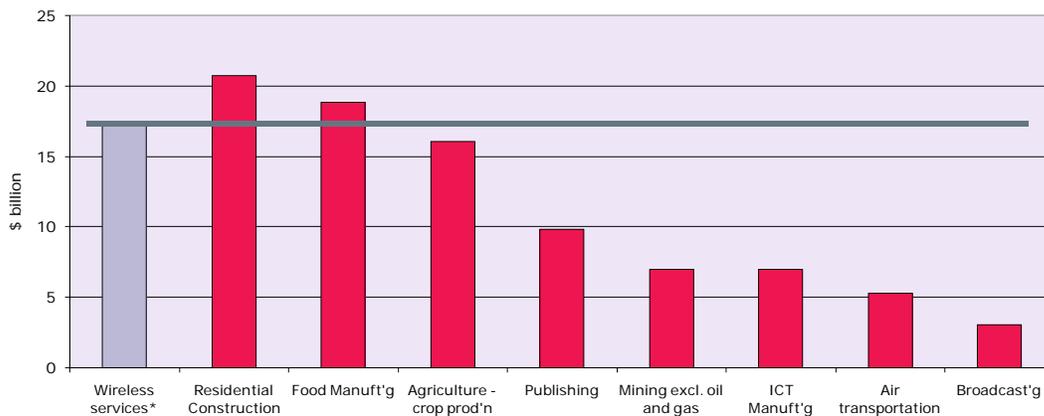
Industry Canada notes that the sectors of the Canadian economy can be regrouped to form five largely goods-producing industries and fifteen services-producing industries. The former are primarily associated with the production of goods:

- Agriculture, forestry, fishing and hunting
- Mining and oil and gas extraction
- Utilities
- Construction
- Manufacturing.

The services sector is considered in fifteen wide-ranging sectors, which range from wholesale and retail trade, transportation and warehousing, finance and insurance, through to the public administration sector. Wireless communications services are included in the Information and Cultural Industries category.

The statistics for the major good-producing industries are well established and it is instructive to compare the contribution that the wireless telecommunications services sector makes to the Canadian economy against them. Figure 12 presents a selection of data points for other industry sectors which are recognised as major contributors to the economy. The wireless communications sector contributes \$17.22bn to GDP. Not only does this represent a significant contribution, comparable to other major economic sectors, but a comparison with industry data over the preceding year indicates that while recessionary times have led to most other industry sectors contributing lower amounts to GDP, the wireless sector has actually improved its contribution (from \$16,271bn in 2008), thereby highlighting the resilience and importance of this sector.

Figure 12: Comparison of contribution to GDP 2009 – selected sectors



Source: Statistics Canada; \*Ovum

## 4.6 Employment effects

Ovum's model also provides an estimate of the total employment created in Canada as a result of the wireless sector. This has been achieved in the following manner.

We first disaggregate the employment effects into:

*Direct employment* – the number of workers employed directly by the various players in the value chain. We estimate this based on the total value add accruing from wages for each part of the value chain divided by average wage for that part.

*Support employment* – the number of workers employed by firms providing support services (e.g. professional services, IT, outsourced customer support and outsourced network operations and maintenance) to the various players in the value chain. We estimate this using the total value add accruing from other operating expenses for each part of the value chain divided by average wage for the Canadian economy.

*Indirect employment* – we assume that the tax, interest payments and profit component of value added also generates employment, as the spending by Government using tax revenues and the spending by financial institutions and shareholders using their income from Canada's mobile services industry will create new jobs. As with support employment, we divide by the average wage for the Canadian economy.

*Induced employment* – is due to the beneficial effect of the spending power of those employed directly in the industry or in support services. As consumers, these employees will spend some of their income on products and services which contribute further to employment and tax revenues to the government. Induced employment differs from the indirect employment effect, which is the beneficial effect derived from tax and interest to the Government and financial institutions.

The results of our analysis of the employment in Canada due to the wireless communications sector are summarised In Table 3. This shows Ovum's estimates of the employment created by each part of the Canadian wireless sector value chain. The estimate of the number of employees within the wireless network operators is based on full time equivalent staff numbers from major operators, pro-rated for the whole industry. Our methodology and the effect of induced employment are discussed below and in Annex C which discusses induced employment multipliers.

The calculation of employment in the network equipment supply sector, and in other sectors, is based on the value-added by the sector, divided by the estimated average wage within the sector. Two additional points should be noted with respect to the network equipment supply sector:

- this estimate is based only on those staff employed in the production of systems for use in the Canadian wireless service industry
- staff in the network equipment supply industry, involved in network operations and support are included in the support service sector.

The network equipment suppliers play an important role in the Canadian wireless industry. Whilst the staff who are directly involved in equipment supply are fairly modest in number, a far greater number are involved in supplying support services to the network operators, e.g. systems installation, commissioning, network operations and management.

The value to the economy is not just the jobs created in the provision of mobile networks and the delivery of wireless services – the employment benefits flow deeply throughout the rest of the value chain. This is particularly noticeable in the support services sector, which leads to the employment of nearly 83,000 – demonstrating the contributory benefit throughout the economy. The total direct, support and indirect employment in Canada

which results from the wireless telecommunications services industry is 261,200, which is 2.4 times that of the employment generated by the wireless network operators (108,700 in total, of which 29,800 are directly employed). The size of the support services is a reflection of the interdependence of many industries. Not only are traditional support services (advertising, legal, accounting, etc.) included in this category, but so too are some of the network support functions as wireless network operators come to rely on outsourced services from vendors and managed services companies. The outsourcing of services can ensure that the operator can employ centre of excellence teams, and at the same time help achieve cost savings.

Table 3: Canadian employment from mobile communications services<sup>27</sup>

(000)	Direct	Support	Indirect	Total
Dealers and app. Stores	5.6	3.5	3.5	12.7
Wireless network operators	29.8	22.2	56.7	108.7
Support service suppliers (incl. n/w support)	12.4	53.8	16.5	82.7
Wireline network operators	4.9	6.8	3.0	14.8
Other capex suppliers	8.3	8.3	4.1	20.7
Terminal suppliers	1.7	2.0	0.4	4.1
Terminal component suppliers	2.0	2.4	0.5	4.8
Network equipment supply	2.0	2.4	0.5	5.0
N/w IT platforms and component suppliers	3.1	3.7	0.8	7.7
<b>Total</b>	<b>69.8</b>	<b>105.1</b>	<b>86.3</b>	<b>261.2</b>
<b>Total with Induced Employment factor of 1.1</b>	<b>76.8</b>	<b>115.6</b>	<b>86.3</b>	<b>278.7</b>
<b>Total with Induced Employment factor of 1.7</b>	<b>118.7</b>	<b>178.6</b>	<b>86.3</b>	<b>383.6</b>

Source: Ovum

We have determined the employment figures in Table 3 by dividing the value added in each sector, by the associated estimated wage rates.

As noted in Annex C, the impact of induced employment can be shown by use of a multiplier within the range 1.1 to 1.7, as shown in Table 3. The final result is that we

<sup>27</sup> Note: some of these employment figures are lower than those presented in the report published in April 2010. This is due to the methodology used to determine the figures, which has been refined and improved, not a reflection of staff reductions in the industry.

estimate that the number of jobs dependent on the Canadian wireless services industry is within the range 278,700 to 383,600.

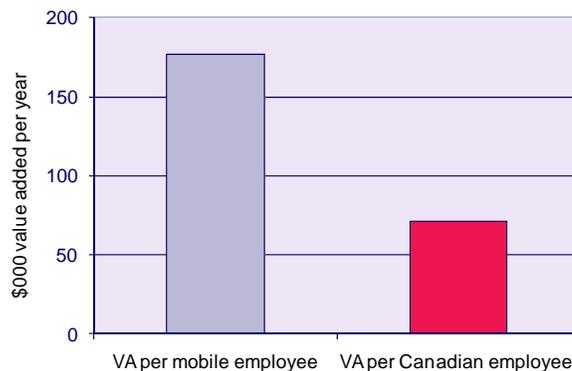
Our analysis estimate for Canada is that the wireless communications services sector in Canada contributes around 1.44% to GDP, which excludes any induced contribution factor. This is based on the value added by the sector as a percentage of Canadian 2009 GDP.

## 4.7 Employee value add

We can also use the information above to calculate the value added per employee in the wireless sector (including dealers and mobile operators), using the following formula:

- $\Sigma [\text{Value add (wage costs) + Value add (profit, interest, tax)}] \div \Sigma \text{Employment}$
- Our estimates suggest that the value added per employee in Canada is considerably higher in the wireless sector, at \$166,000<sup>28</sup> per year, than for the economy as a whole, in which there is an added value per employee of \$71,000<sup>29</sup>. This figure for the wireless sector compares with \$195,000 in last year's report. The reduced value-add is attributed to two factors: the increase in staff numbers in the new entrant operators, which are in their network build and start-up phase, and are not generating revenues that might be expected when their businesses are fully developed; an increase in the numbers of dealers engaged in the business.

Figure 13: Value add - wireless services versus average Canadian employee



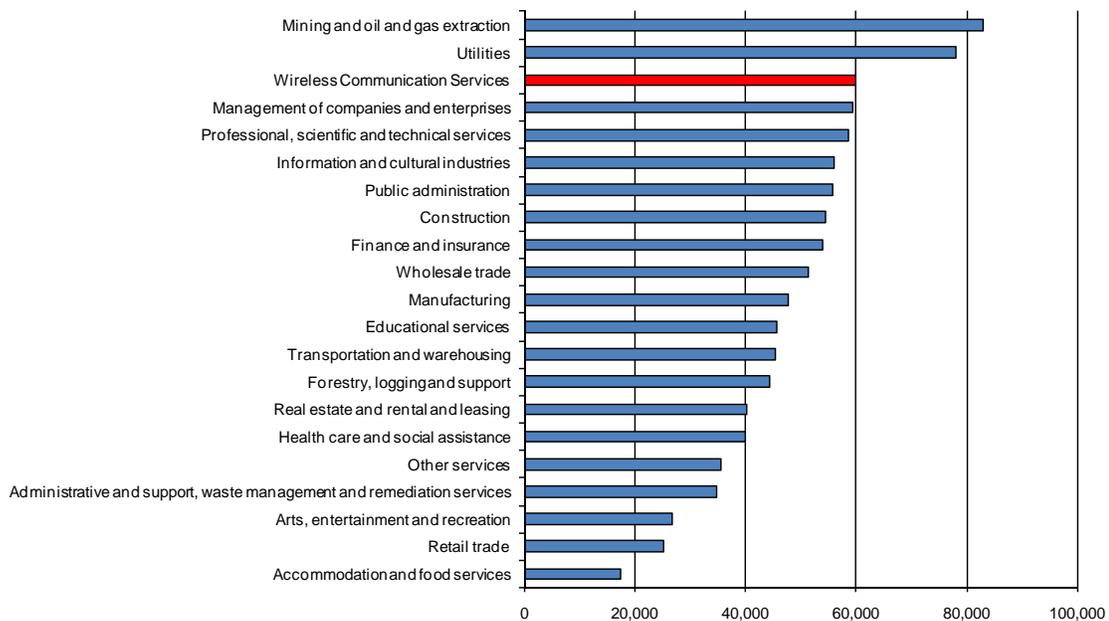
Source: Ovum

<sup>28</sup> The value added per employee in the wireless sector is derived from: [Wireless operator revenues - (commission to dealers + payments to terminal suppliers, network equipment vendors + other capex + payments to wireline operators + support services) + (70%\*dealer revenues)] / (wireless and dealer staff)

<sup>29</sup> Statistics Canada

As can be seen from Figure 13, the value added in the wireless services sector compared against Canadian average value added per employee, and the comparison of average Canadian salaries shown in Figure 14, the wireless communications services industry values its employees highly when compared with others industry sectors. This reflects the efficiency of the sector, the need for highly skilled staff to respond to demands for continual innovation and the value added in the sector.

Figure 14: Average annual earnings (\$) across Canadian industry sectors



Source: Statistics Canada – Average Weekly Earnings by Industry<sup>30</sup> and Ovum

<sup>30</sup> <http://www40.statcan.ca/l01/cst01/labr73a-eng.htm>

## 5 The consumer surplus from wireless services

### 5.1 Summary

The consumer surplus is the amount that consumers benefit by being able to purchase a product for a price that is less than they would be willing to pay. It therefore reflects value that the consumer enjoys, above and beyond what they have to spend on the service.

Our estimates suggest that the consumer surplus accruing from the use of wireless services in Canada is a minimum of \$9.044bn. This is the additional benefit or satisfaction that consumers get from wireless services, above and beyond what they pay for the services. A consumer surplus such as this indicates that consumption is likely to grow, as more people become aware of the value that the services add to their lives and businesses.

As we have stated, \$9.044bn is a lower bound figure which is derived from our model. This represents a slight increase in consumer surplus (from \$8.862bn). This increase is primarily due to the decrease in the average cost per minute paid to the mobile operators. These lower prices generate additional consumer surplus. We expect that consumer surplus will grow over the coming years due to increased penetration and greater adoption of broadband services, but this has not been included in this analysis. Additionally, as access speeds increase, often without a significant increase in price, so the benefits to the consumer become more extended.

### 5.2 Consumer surplus as a measure of economic welfare

Consumer surplus is a standard measure which is used by economists to quantify the benefits that consumers receive. The concept was formally developed by Alfred Marshall in his *Principles of Economics*<sup>31</sup>. It can be defined as the difference between what a consumer would have been willing to pay for a certain quantity of a good, and what that consumer actually has to pay. In Marshall's words:

*“the price which a person pays for a thing can never exceed and seldom comes up to that which he would be willing to pay rather than go without it: so that the satisfaction which he gets from its purchase generally exceeds that which he gives up in paying its price: and he thus derives from the purchase a surplus satisfaction. The excess of the price which he would be willing to pay rather than go without the thing,*

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<sup>31</sup> *Principles of Economics*. 2009 ISBN: 978-1-60520-802-2 Alfred Marshall

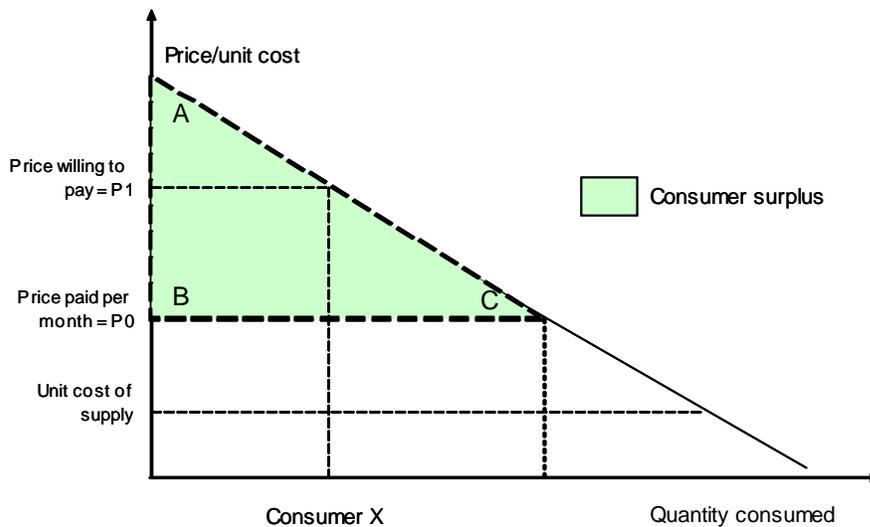
*over that which actually does pay, is the economic measure of this surplus satisfaction."*

In order to calculate the total consumer surplus within an industry, all individual consumer surpluses are summed together. The consumer surplus which Canadian consumers and businesses enjoy as a result of using wireless services therefore is a function of:

- 1 the price which users are prepared to pay, on average, for wireless service, less
- 2 the price which they actually pay, multiplied by
- 3 the number of subscribers.

Consumer surplus is depicted by the area ABC shown in Figure 15.

Figure 15: A definition of consumer surplus



Source: Ovum

If Consumer X is willing to pay a price P1 per month for mobile service, but actually pays price P0, then Consumer X will enjoy a consumer surplus of P1 less P0 per month. The area ABC represents the total consumer surplus for all consumers, which covers both early adopters, with a high valuation of wireless services, and marginal consumers, for whom the current price just tempts the use of wireless services. The consumer surplus measures the combined social and commercial benefits which Canadian users generate from purchasing wireless mobile services.

### 5.3 Estimate of the current consumer surplus

Consumers in the telecommunications industry derive satisfaction not only from actually making a call but also from being able to access the telephone service, an element that can be thought of as an option value of holding a subscription.<sup>32</sup> However, such an option value is extremely difficult to quantify and, for this reason, consumer surplus calculation in this industry typically focuses exclusively on the surplus arising from the calls an individual makes. We duly stress that the consumer surplus we estimate here is a lower bound.

In order to accurately determine this consumer surplus we would require a complex set of data, including the number of subscribers and detailed pricing information, including discounts, price changes, and the prices of service bundles. This detailed data for Canada was not available at the time of this study and we are not aware of any other studies or reports which have previously made estimates of the consumer surplus for the Canadian wireless sector. We have therefore followed an approach previously used by Ovum to estimate a lower bound for consumer surplus.

The approach is to produce a proxy lower bound demand curve by plotting the revenues per minute of voice services from mobile network operators, at actual prices, against the total number of billable minutes per year.<sup>33</sup>

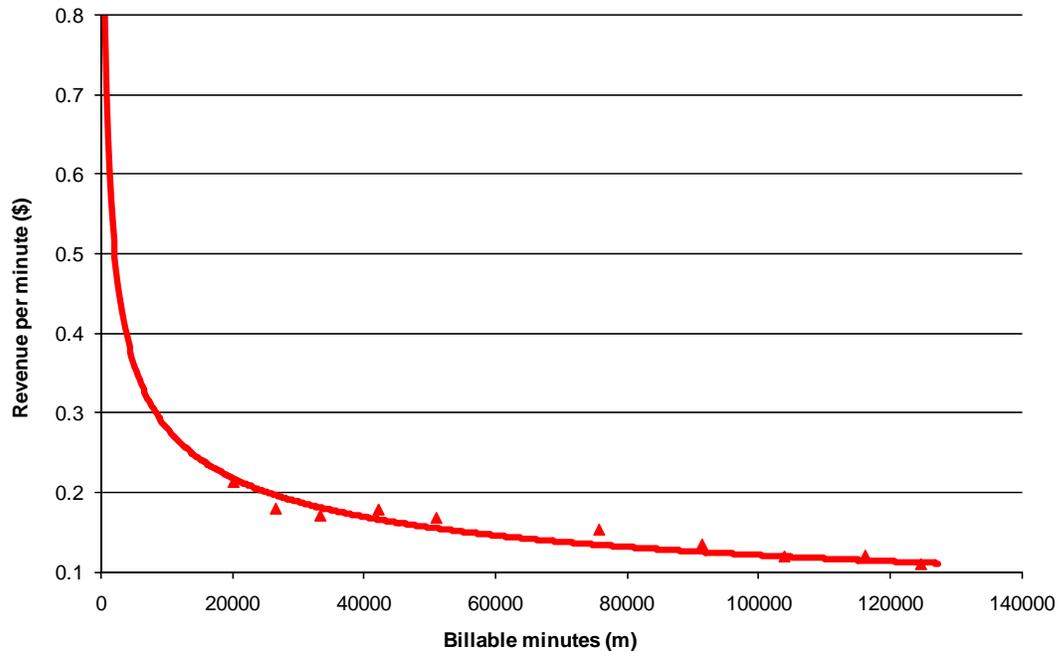
Using data for the post-paid market in Canada between January 2000 and December 2009, we have estimated the lower bound demand curve shown in Figure 16. As can be seen, the lower boundary for P0 is around \$0.1 per minute, which is the average rate per minute over the year.

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<sup>32</sup> Lee, D and Lee, D. 2006. Estimating consumer surplus in the mobile telecommunications market: The case of Korea. *Telecommunications Policy* 20, 605-621.

<sup>33</sup> A similar approach was recently adopted by the Australian Communications and Media Authority (ACMA). In their December 2009 report entitled "Consumer benefits resulting from Australia's telecommunications sector" they used "average revenue per call minute" as the price variable and "call minutes per subscriber" as the quantity variable when modelling changes in consumer surplus for mobile calls. Our approach, however, differs slightly from the ACMA study as we do not impose the restrictive assumption that the demand curve is linear.

Figure 16: A lower bound of the current consumer surplus in Canada



Source: Ovum

The area below this curve provides a proxy for the lower bound on consumer surplus in the Canadian post-paid wireless market, which we estimate to equal \$7.052bn. As the post-paid market comprised on average 78% of subscribers during this period, to obtain a lower bound on consumer surplus for the total wireless market (i.e. both post-paid and pre-paid), we scale up our estimate of \$7.052bn by 22%, to give a final estimate for the lower bound of consumer surplus of \$9.044bn.

It should be noted that this is only a lower bound approximation using available data on voice services. In practice the demand curve:

- is likely to shift to the right over time as wireless sector services develop and the market matures, and
- will include additional services, e.g. SMS, MMS, mobile broadband and an increasing range of mobile applications and content services.

The effect of these points will be to significantly increase the consumer surplus.

The consumer surplus for the Canadian wireless communications sector can be put into perspective with the operating revenues of the wireless service providers and the contribution to GDP.

With the sector generating revenues of \$16.9bn in 2009 and contributing 1.44% to the country's GDP, our estimated consumer surplus of \$9.044bn is quite significant. The

consumers benefit from the rapidly increasing breadth and depth of mobile communications services, which range from keeping in touch with family and friends, social networking – whether through voice or basic data / SMS services; business communications, improving efficiencies in the private and public sectors; personal security and social cohesion; entertainment; and more. It is the value of these personal, social and commercial benefits which contribute to the overall consumer surplus.

## 6 Conclusions

We reach the following conclusions from this study.

The wireless communications industry continues to generate significant value for the Canadian economy. This value is much more than the revenues earned by the operators, dealers and service providers resident in Canada:

- in terms of direct contribution through the sale of goods and services, the sector generates \$16.9bn
- using the Statistics Canada 'output multiplier' for the sector, it generates an additional \$15bn benefit due to the economic flow through to contributing suppliers in the supply chain
- there is an additional consumer benefit, in that consumers are provided with services which they value by \$9bn more than they pay for the services.

The wireless industry continues to show growth and invest strongly well ahead of most other industry sectors and against the national recessionary decline of 2.8% in GDP:

- revenues grew by 6.0% to \$16.9bn, with mobile data and broadband performing strongly
- network capital expenditure in the sector increased by 60% in 2009 to an estimated \$2.95bn. Note, this excludes the extraordinary costs of spectrum incurred in 2008.

The wireless industry contributes to employment. We estimate that:

- nearly 30,000 staff are employed by the mobile network operators
- a total of nearly 70,000 are employed directly as a result of the industry and 105,000 in services which support those directly employed
- a further 86,000 are employed indirectly – as a result of spending by government of tax revenues and spending by financial institutions and shareholders
- for all of these employees, there will be further induced employment, by virtue of the employees spending in the economy. Our total estimate is that over 261,000 people are employed in Canada as a result of the wireless industry.

The wireless communication industry is continually evolving and in need of investment to bring new services to a growing and demanding market. Operators have already established mobile broadband services to 96% of the population and demand for these service is generating new and strongly growing revenue streams. In the future new entrants to the Canadian market need to invest to grow their businesses and established operators have to maintain their investment to bring new services to market and to satisfy exponential growth for broadband mobile data services.

The link between ICT investment and productivity is recognized by the Bank of Canada and industry investment should be encouraged by government and regulatory policy

makers, particularly as the economy seeks to recover from a recessionary period and a Canadian trade deficit.

Government and policy makers should recognise the wider benefits of wireless and set policy and operational processes that will allow the sector to maximise the value and contribution to the national economy. In particular, the significant contribution made by the wireless industry to the Canadian economy should be taken into account when policy and strategy are being developed.

## Annex A: Value chain categories

### **Dealers and application stores**

Retail outlets which are independent of the wireless network operator. The dealers may be shops, franchises or online stores selling handsets, devices, terminals and accessories. More recently, online application stores have become established, selling applications and content (music, videos) for smart phones.

### **Wireless network operators**

The companies which operate wireless networks and provide retail mobile voice, data and broadband communications services.

### **Support service suppliers (incl. n/w support)**

This is a broad category. It includes two broad groups of suppliers:

- professional service firms such as accountants, lawyers, advertising agencies and associated media, corporate IT services
- outsourcing companies providing network and customer support services, such as call centres, network management, operations support services. It should be noted that some of the services in this category may be provided by the network equipment supply vendors.

### **Wireline network operators**

The companies which operate wireline networks and provide retail and wholesale services. It is the wholesale services, such as leased lines, and, if applicable, interconnect charges which are relevant to this study.

### **Other capex suppliers**

This is a broad category which includes office IT systems, vehicles and other non-network capital expenditure.

### **Terminal suppliers**

The manufacturers and vendors of handsets, terminals, network cards/ dongles and smart phone devices.

### **Terminal component suppliers**

The manufactures and vendors of components used in the terminals, such as displays, batteries, processors, chipsets, casings, keypads, operating systems and applications software.

### **Network equipment supply**

The voice and data switching and routing systems used in the radio access network and core network, including ancillary equipment, such as frames, towers, power systems.

### **Network hardware and component suppliers**

This is a broad category of systems and components which are supplied to the network equipment vendors. The category includes components used in the switching and routing systems, hardware platforms and base station equipment including towers, cables and power supplies.

## Annex B: Mobile licensees

There are 56 licensed cellular operators in Canada<sup>34</sup>.

<b>Cellular 800 MHz / PCS 1900 MHz / AWS</b>	
	Bell
	MTS Allstream Inc.
	Rogers Communications Inc.
	SaskTel
	TELUS COMMUNICATIONS
<b>Cellular 800 MHz / PCS 1900 MHz</b>	
	Amtelecom Limited Partnership
	BROOKE TELECOM CO-OP LTD
	EXECULINK TELECOM INC
	GOSFIELD NORTH COMMUNICATIONS
	HAY COMMUNICATIONS CO-OPERATIVE
	HURON TELECOMMUNICATIONS
	LANSDOWNE RURAL TELEPHONE CO
	MORNINGTON COMMUNICATIONS
	NEXICOM MOBILITY INC.
	NORTH FRONTENAC TELEPHONE CO
	NORTH RENFREW TELEPHONE CO LTD
	Peoples Tel Limited Partnership
	QUADRO COMMUNICATIONS CO-OPERATIVE
	ROXBOROUGH TELEPHONE CO LTD
	TBayTel
	TUCKERSMITH COMMUNICATIONS
	WIGHTMAN TELECOM LTD
	WTC COMMUNICATIONS

<sup>34</sup> Source: <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09431.html>;  
<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09269.html>; <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09439.html>

<b>Cellular 800 MHz</b>	
	BRUCE TELECOM
	CITY OF PRINCE RUPERT (SPEC LIC.)
	Cochrane Telecom Services of the
	COMPAGNIE DE TELEPHONE DE LAMBTON
	COMPAGNIE DE TELEPHONE DE ST-VICTOR
	COMPAGNIE DE TELEPHONE DE WARWICK
	COMPAGNIE DE TELEPHONE UPTON INC
	COOPTEL
	FIRST NETWORKS OPERATIONS INC.
	LA CIE DE TELEPHONE DE COURCELLES
	Latitude Wireless Inc.
	LE TELEPHONE DE ST-EPHREM INC
	NorthernTel L.P. (Vendor: 20027589)
	ONTEL INC. o/a ONTERA
	SOGETEL MOBILITE INC
	Telebec L.P. (Vendor: 0020027589)
	TELEPHONE GUEVREMONT INC
	TELEPHONE MILOT INC
	The Corp. of the City of Dryden
<b>PCS 1900 MHz</b>	
	Blue Canada Wireless Inc.
	ICE WIRELESS INC.
	Lynx Mobility Inc.
	Novus Wireless Inc.
	Public Mobile Inc. (6934579 Canada Inc.)
	Yamatech Group Incorporated
<b>PCS 1900 MHz/AWS</b>	
	Globalive Wireless Management Corp.
<b>AWS</b>	
	7140282 Canada Inc.
	ALO Mobile Inc.
	Bragg Communications Inc. (Eastlink)
	Celluworld Inc.
	Data & Audio-Visual Enterprise Wireless Inc. (Mobilicity)
	Shaw Communications
	Vidéotron Ltée

## Annex C: Induced employment

Induced employment is generated by the spending of those employed either directly in the communications sector or in the support services to the sector. A number of economic studies have made estimates of the induced employment effect, which is presented as a multiplier of the direct and support services employment. A summary of the results of these studies, which shows that the multiplier ranges from 1.1 and 1.7, is provided in Table 4.

Table 4: Multiplier benchmarks

Title of study	Multiplier
The contribution of mobile phones to the UK economy. O2 for ONS	1.13
Ovum studies on economic impact of mobile telephony in Bangladesh and USA, based on review of various other studies*	1.6
Association Française des Opérateurs Mobiles*	1.7
Economic impact of spectrum use in the UK. Europe economics, based on ONS	1.1
Sicrana, R., and de Bonis, R.: "The Multiplier Effects of Telecommunications Investments on Economic Growth and Restructuring" **	1.5
Radio authority, UK 1995, Economic impact of radio	1.4
Deloitte for GSMA, 2006, Economic Impact of mobile telephony in East Africa	1.2
Deloitte for GSMA, 2006, Economic Impact of mobile telephony in Pakistan	1.4
Atkinson et al (2009) in the US (modified by Katz and Suter (2009)) <sup>1</sup>	1.13
Strategic Networks Group, 2003	1.4
Range	1.1 - 1.7

Notes: \* On employment, \*\* On GDP

Original Source: As given in table

<sup>1</sup> Atkinson, R., Castro, D. and Ezell, S. 2009. The digital road to recovery: A stimulus plan to create jobs, boost productivity and revitalise America. Katz, R. and Suter, S. 2009. Estimating the economic impact of the broadband stimulus plan

Source: Deloitte, 2008 and Ovum

The approach of considering induced employment is recognised in other studies. ComReg, the national telecommunications regulatory authority in Ireland, has made an assessment of the contribution that radio communications services have on the Irish economy. In 2006 ComReg estimated that mobile network services contributed nearly €3bn or 1.7% of Ireland's GDP and that nearly 31,000 direct jobs were supported by the use of radio spectrum.<sup>35</sup>

<sup>35</sup> ComReg presentation 27 May 2009;  
<http://www.comreg.ie/fileupload/publications/Irelandinnovationhub.pdf>

A report prepared for the GSMA 'European Mobile Observatory' found that in 2008, mobile communications services operators contributed approximately €138bn to the economy (1% of total EEA GDP); generated an estimated 3.5 million jobs for Europeans, of which 610,000 were directly employed and induced employment of 2.9 million more; contributed approx. €130bn to public funding, of which €44bn came from mobile operators and estimated that productivity gains of mobile broadband could increase GDP by 3 to 4% worldwide.



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