



[**WIRELESS COMMUNICATIONS**]
Canada's competitive advantages

CANADA'S WIRELESS COMMUNICATIONS SECTOR

Canada offers foreign investors unique advantages in several wireless communications verticals, including mesh networks, WiMAX, Radio Frequency Identification (RFID), Ultra Wide Band (UWB), Software Defined Radio (SDR), as well as broadband, satellite and fibre-optic applications. Foreign investors as well as domestic Canadian companies and research institutions have major R & D centres in Canada, which they are leveraging to serve their customers globally.

NEXT GENERATION NETWORKS (NGN)

Canada is at the forefront of developing NGN technologies. Long Term Evolution (LTE) technology is already available to mobile users in Canada's major cities and large telecom players continue to invest heavily in their LTE networks, creating strong revenue opportunities for foreign developers.¹ Key Canadian NGN strengths include: transmission technologies, backhaul communications, infrastructure testing and microelectronics and photonics.

MACHINE-TO-MACHINE (M2M)

Canada boasts key industry leaders including Sierra Wireless, one of the top-three global manufacturers of M2M cellular embedded modules, QNX Software Systems Limited (BlackBerry), with its leading embedded operating system, Vecima Networks Inc., for advanced fleet management solutions, and Kore Wireless Canada Inc.'s platform layer for M2M operations. Notable Canadian M2M strengths include: intelligent transportation systems (ITS) and connected vehicles, fleet and asset tracking, billing and mobile payments and video.

CLOUD COMPUTING

Canada is a global leader in the adoption of cloud computing platforms and related data centres. Canada provides foreign investors with a unique advantage for locating their North American data centres. The longer and cooler Canadian winters are ideal for cooling data centres, which drastically reduces energy costs for operating these facilities. The carrier-neutral data centre located in Toronto houses the largest amount of fibre in Canada and is the second largest facility of its kind in North America.

SATELLITE COMMUNICATIONS

As a world leader in satellite communications and related technologies, Canada is home to the fourth largest fixed satellite service provider worldwide. Canadian technology is also used in over 80 percent of all commercial communications satellites. Leading companies in Canada include: Telesat, MacDonald, Dettwiler and Associates (MDA), C Com Satellite Systems, Honeywell and Skywave Mobile.

¹ Conference Board of Canada. *Canada's Telecommunications Industry*.

WIRELESS COMMUNICATIONS CLUSTERS

SNAPSHOT: WHO'S IN CANADA?

ABB Analytical Instruments | Accedian Networks | Alcatel-Lucent | Amazon.com, Inc. | AT&T Inc. | Avaya Inc. | Baseband Technologies Inc. | Bell Canada Enterprises (BCE) | BlackBerry | BLiNQ Networks Inc. | Ciena Corporation | Cisco Systems, Inc. | COM DEV International Ltd. | Deutsche Telekom | DragonWave Inc. | Ericsson Canada Inc. | EXFO Inc. | GLENTEL Inc. | Guest-Tek Ltd. | ITG Global, LLC | JDS Uniphase Corporation | MacDonald Dettwiler and Associates Ltd. | Miranda Technologies | Neptec Design Group Ltd. | NETGEAR | Nokia Solutions & Networks | Norcada Inc. | NovAtel Inc. | On4 Communications, Inc. | Polar Mobile Group Inc. | Redknee Inc. | Redline Communications Inc. | Rogers Communications Inc. | RuggedCom Inc. | Samsung Electronics Co., Ltd. | SDP Telecom Inc. | Shaw Communications Inc. | Sierra Wireless | Sony Electronics Inc. | Star Solutions International Inc. | Teledyne DALSA Inc. | TELUS Communications Company | TeraXion Inc. | Telesat | the Ultra Electronics Holding plc | Vecima Networks Inc. | Vidéotron | Wedge Networks | Wi-LAN Inc. | Wmode Inc.



BRITISH COLUMBIA

- » **Vancouver:**
Software and Games, Computer Systems Design/Data Processing, Electronic Instruments, Microelectronics

ALBERTA

- » **Calgary:**
Computer System Design, Wireless Technologies, Geomatics, Electronic Instruments

ONTARIO

- » **Toronto:**
Software, Digital Media, Microelectronics
- » **Ottawa:**
Networking, IT Infrastructure, Photonics, Software
- » **Kitchener-Waterloo:**
Wireless Technologies, Software, Mobile Media

QUEBEC

- » **Montréal:**
Computer System Design & Services, Software (including Digital Media), Telecom Equipment, Microelectronics/Photonics

CANADA'S ADVANTAGES

A highly educated and experienced workforce, competitive labour costs, world-class R & D, favourable tax rates and accelerator programs that invest in world-class ideas make Canada a leading investment destination for wireless communications companies.

A CANADIAN PRIORITY SECTOR

The Government of Canada has identified ICT as one of four priority sectors in its Science and Technology Strategy, and has increased funding for research and innovation through the federal granting councils, the Institute for Quantum Computing, the National Optics Institute, the Industrial Research Assistance Program (IRAP), the Microelectronics Innovation Centre, Canada's Advanced Research and Innovation Network (CANARIE), the Canadian Digital Media Network and the Graphics, Animation and New Media Canada Network.² These institutions and programs offer foreign direct investors in wireless technologies opportunities to jump-start their operations through funding for innovative R & D and access to world-class facilities across Canada.

A PROFITABLE MARKET

Canada is one of the most profitable markets globally for wireless communications. Canada is among the top 15 countries in smartphone penetration (56.4 percent),³ creating an attractive, high average-revenue-per-user market and allowing wireless technology companies to break into the operator space with innovative data and voice applications.

HIGHLY QUALIFIED AND DIVERSE GLOBAL WORKFORCE

Canada's ICT workforce is highly educated, with 75 percent of all workers having graduated from post-secondary programs.⁴ Canada's advantage lies in its ability to produce highly qualified ICT workers while attracting internationally educated professionals (IEPs) from virtually every corner of the globe.

COMPETITIVE COSTS

Canada offers a very competitive cost environment for telecom equipment manufacturers. According to KPMG's Competitive Alternatives 2014 study, specialized telecom equipment operations based in Canada typically enjoy a 12.5 percent savings on total labour costs (including benefits) relative to their U.S.-based counterparts. In fact, when all cost factors are considered, Canada has the lowest cost structure among all G-7 countries.

STRONG WIRELESS INFRASTRUCTURE

Canada has 1.3 million square kilometres of network coverage. This coverage provides wireless access to 99 percent of the Canadian population. Canadian wireless carriers have invested \$30 billion in their communications infrastructure.⁵

"2013 marked Ericsson's 60th anniversary in Canada. As one of the top R & D investors in the country, we see the Ottawa R & D Centre playing a key role in the development of our Heterogeneous Network Strategy, developing small cell technology, as well as integrating Carrier Class WiFi capabilities as part of that strategy. Having invested nearly \$4 billion in Canadian R & D we are committed to the continual strengthening of Canada's ICT ecosystem."

Mark Henderson, President,
Ericsson Canada Inc.

² Industry Canada. *Growing the Information and Communications Technology Industry*. (2013)

³ Google. *Our Mobile Planet. Q1.2013*.

⁴ The Information and Communications Technology Council: *Analysis of Labour Force Survey Data for the Information Technology Occupations 2000-2010*. (2011)

⁵ Canadian Wireless Technology Association. (2010)

SUPPORT PROGRAMS AND INNOVATION

Canada's federal, provincial and municipal governments offer foreign direct investors incentives and world-class programs that enable investors to ramp up their innovation at substantially reduced costs compared to other North American destinations.

- **Scientific Research and Experimental Development (SR&ED)** provides income tax credits and refunds for expenditures on eligible R & D activity in Canada on wages, materials, some overhead and SR&ED contracts.
- **Mitacs** is a not-for-profit organization that provides co-funding for internships and fellowships with employers through Canadian universities.
- **National Research Council Canada - Industrial Research Assistance Program (IRAP)** provides innovation assistance to foreign direct investors, including small and medium-sized enterprises in areas such as advisory services, funding for innovation, networking and youth employment.
- **National Research Council Canada - Youth Employment Program** provides financial contributions towards the salary of a post-secondary graduate for R & D and commercialization.
- **Natural Sciences and Engineering Research Council of Canada - Strategic Project Grants** provides ICT project funding for academic researchers working with industry to develop new knowledge and technologies.
- **Export Development Canada (EDC)** and **Business Development Bank of Canada (BDC)** provide flexible financing programs and solutions tailored to support foreign direct investment in Canada.

STRONG R & D CAPABILITIES

Telecommunications companies in Canada spend over \$6.2 billion annually on R & D.⁶ In R & D-intensive sectors such as computer, telecom and electronic development and testing, Canada offers an 18.5 percent cost advantage over the United States - the lowest cost structure in the G-7.⁷

Research centres, incubators and accelerators in Canada's wireless communications sectors include:

- 4D LABS (Vancouver, British Columbia)
- Accelerator Centre® (Waterloo, Ontario)
- Centre for Research in Photonics (Ottawa, Ontario)
- Centre for Optics, Photonics and Lasers (Québec City, Quebec)
- Communtech HYPERDRIVE (Waterloo, Ontario)
- Edmonton Research Park (Edmonton, Alberta)
- Emerging Communications Technology Institute (Toronto, Ontario)
- FounderFuel (Montréal, Quebec)
- GrowLab (Vancouver, British Columbia)
- INcubes (Toronto, Ontario)
- Innovate Calgary (Calgary, Alberta)
- Launch36 (Moncton, New Brunswick)
- MaRS (Toronto, Ontario)
- Microelectronics Research Chair (Sherbrooke, Quebec)
- National Optics Institute (INO) (Québec City, Quebec)
- Photonics Research Laboratories (Hamilton, Ontario)
- TECTERRA (Calgary, Alberta)
- Telecommunications & Signal Processing Laboratory (Montréal, Quebec)
- Wavefront (Vancouver, British Columbia)
- Wireless Internet Performance Laboratory (WIPL) (Calgary, Alberta)

⁶ Industry Canada. *ICT Sector Intramural R & D Expenditures, 2011.*

⁷ KPMG, *Competitive Alternatives 2014.*

INVEST IN CANADA TO ACHIEVE GLOBAL EXCELLENCE

A WELCOMING BUSINESS ENVIRONMENT

Canada is ranked as the best country for business in the G-20.

Source: Forbes and Bloomberg

A HIGHLY EDUCATED WORKFORCE

Canada's workforce is the most highly educated among members of the OECD, with half of its working-age population having a tertiary-level education.

Source: Organisation for Economic Co-operation and Development (OECD)

LOW TAX RATES

Canada's overall marginal effective tax rate on business investment is by far the lowest in the G-7 — about 17 percentage points lower than that of the United States.

Source: Department of Finance Canada

COMPETITIVE R & D ENVIRONMENT

Canada offers the lowest business costs in the G-7 for R & D-intensive sectors, with a 15.8 percent cost advantage over the United States.

Source: KPMG

FINANCIAL STABILITY

For six consecutive years, the World Economic Forum has declared Canada's banking system to be the soundest in the world.

Source: World Economic Forum (WEF)

UNPARALLELED MARKET ACCESS

Canada's NAFTA advantage gives investors access to 470 million consumers. Many Canadian production hubs are actually closer to U.S. markets than American production sites — of Canada's 20 largest cities, 17 are within an hour-and-a-half drive of the U.S.

Source: The World Bank

A GREAT PLACE TO INVEST, WORK, AND LIVE

Canada is one of the globally most multicultural countries with world-class universities, a universal health care system and clean and friendly cities in addition to having the second highest standard of living in the G-20, as measured by GDP per capita.

Source: The World Bank

Unless otherwise noted, all values in this publication are in Canadian dollars. Content is based on the latest available information at time of publication.

Image page 5: photo courtesy of Telesat Canada.



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