



**[ SCIENCE, TECHNOLOGY AND INNOVATION ]**  
Canada's competitive advantages

# SCIENCE, TECHNOLOGY AND INNOVATION

## INNOVATE IN CANADA

Recognized as one of the most competitive economies in the world, Canada is also a global leader in science, technology and innovation (STI). As such, it is a partner of choice for collaborating on innovation.

Innovation is the driving force behind Canada's prosperity, standard of living and quality of life. Increasing productivity through the creation of new products and services and building an inclusive, compassionate society are significant factors in Canada's success.

## SCIENCE, TECHNOLOGY AND INNOVATION LANDSCAPE

Investors, business partners, entrepreneurs and research and development (R&D) collaborators from around the world are attracted to Canada for multiple reasons, including its:

- internationally recognized research community;
- strong academic institutions and highly regarded scientific talent;
- highly educated and highly skilled workforce;
- solid support for R&D, domestic innovation and international collaboration; and
- highly competitive financial incentives and tax environment.

"Canada has a long history of innovation—technological, social, economic, cultural and political. Indeed, Canada itself has been called a bold experiment in diversity and multiculturalism."

Governor General David Johnston

## CANADA: AN INNOVATIVE NATION

Canada has long been a pioneering achiever in science, technology and innovation. From the birchbark canoe to the BlackBerry smartphone, Canada is a nation built on innovation. Canada's STI accomplishments have contributed to global progress in numerous ways. The following are among Canada's many innovation and scientific breakthroughs:

- Amplitude modulation
- Analytical plotter (3D maps)
- Artificial blood cell
- BlackBerry smartphone
- CADPAT (Canadian disruptive pattern) digital camouflage
- Canadarm (aerospace)
- Cardiac pacemaker
- CPR manikin
- Computerized Braille
- Cystic fibrosis gene (identification)
- Electric cooking range
- Electric wheelchair
- Film colourization
- Garbage bag (polyethylene)
- HIV-suppressing drug 3TC
- Hydrofoil boat
- IMAX film technology
- Insulin (discovery of)
- International Standard Time
- JAVA software programming
- Jolly Jumper exerciser for babies
- Kerosene distilling process
- Key frame animation
- Lawn sprinkler
- Newsprint
- Postal sorter (automatic)
- Robertson screwdriver
- Snow blower
- Snowmobile
- Telephone
- Telephone handset
- Train axle oiler

# INNOVATION STRENGTHS



## ENVIRONMENT AND AGRICULTURE

Canada is a world leader in biotechnology, air pollution control, green building and waste management. Canada is recognized globally for expertise in ocean and Arctic research. Agricultural research and innovation in Canada has led to record productivity gains and more sustainable modern agricultural practices.

## HEALTH AND LIFE SCIENCES

Canada has proven research strengths in areas such as genomics, bio-informatics, immunotherapy, regenerative medicine and neuroscience. Canada is a global leader in digital radiography, in-vitro diagnostics, cardiovascular devices, dental implants and materials, and home health-care products.

## INFORMATION AND COMMUNICATIONS TECHNOLOGIES

Recognized internationally for its competitive position in mobile media, new generation networks and connected vehicles, Canada is home to well-established ICT clusters, including wireless technology, digital media and software and computer services.

## NATURAL RESOURCES AND ENERGY

Canada is the world's fifth-largest energy producer and is a major hub for energy R&D. Canadian provinces lead the world in such innovative sectors as carbon capture and storage, advanced hydrogen and fuel cell technology, geothermal energy production, tidal energy technology and wind and solar energy production.

## ADVANCED MANUFACTURING

Canada's manufacturing sector outpaces all other domestic industries in the introduction of process, organizational, product and marketing innovations. Canadian manufacturers are investing in production facilities to increase agility, expand mass customization capabilities, capitalize on market niches and optimize prototyping and new product introductions.

# RESEARCH AND DEVELOPMENT EXCELLENCE

## CANADA'S COMMITMENT TO STI

Fostering commercialization and industry-driven research are priorities for Canada. The Government of Canada plays a multi-faceted role in Canada's highly diversified STI landscape through policy and regulatory mandates and by funding and administering partnership programs, supporting industry and academic partners, undertaking government-based R&D work and supporting and encouraging private-sector investment in innovation.

## A PRIORITY AT ALL LEVELS

Accounting for more than \$30 billion in R&D spending every year, science, technology and innovation is a priority in Canada at all levels of government, as well as in industry and academic institutions. Business accounts for half of R&D activities undertaken in Canada, followed by higher education institutions with about 40 percent, the federal and provincial governments with about eight percent, and private non-profit organizations with most of the rest.

## COLLABORATIVE AND MULTIDISCIPLINARY PARTNERSHIPS

Canada recognizes that the cost and complexity of so much contemporary research means we must collaborate and engage globally. Collaborative multidisciplinary partnerships between private industry, government institutions and academia are a key part of the "Canadian way" of pursuing research excellence. Various cities across the country are renowned for their R&D clusters, where stakeholders intersect and R&D flourishes.

## TALENT

Canada is the second most talent-competitive country in the G20, according to the Institute for Management Development, and a top destination for researchers. With more than half of its population aged 25 to 64 having a post-secondary education

(such as college or university), Canada is home to the most educated talent pool among OECD countries.<sup>1</sup> Among the world's top one percent of researchers most cited in their fields, 96 are Canadian, ranking Canada sixth in the world, just behind countries with significantly larger populations.<sup>2</sup> In 2015, no fewer than 24 Canadians won prestigious international awards and prizes in science, engineering, health, medicine, the social sciences and humanities.<sup>3</sup>

## STRONG INSTITUTIONS

R&D spending in higher education as a share of GDP is higher in Canada than in any other G7 country, according to the OECD.<sup>4</sup> A large network of Canadian universities and colleges is actively engaged in research across many fields, making Canada a G7 leader in research and development performed by the higher-education sector.

## WORKING WITH GLOBAL PARTNERS

Viewing international STI collaboration as integral to global advancement, quality of life and prosperity for all, Canada is deepening collaborative ties and two-way knowledge flow with partners from around the world. International partnerships are an essential catalyst for STI, as these collaborations often accelerate the pace of discovery and result in improved commercialization.

Canada has built innovation networks around the world and forged formal STI relationships and partnerships with several countries, including Brazil, China, France, Germany, India, Israel and Japan, as well as with the European Union. In addition, Canada and South Korea are in the process of ratifying an STI agreement.<sup>5</sup>

Bilateral STI agreements and arrangements provide a forum for government, researchers, industry and other stakeholders to collaborate and to leverage R&D and technological advancement in key areas.

<sup>1</sup> Education at a Glance 2015: OECD Indicators

<sup>2</sup> Science, Technology and Innovation Council's State of the Nation 2014 report

<sup>3</sup> Presentation by Governor General David Johnston, at the Natural Sciences and Engineering Research Council of Canada Awards, Feb. 16, 2016

<sup>4</sup> OECD, Main Science and Technology Indicators 2014

<sup>5</sup> At the time of publication

# SUPPORT PROGRAMS FOR INNOVATION

**The Canadian Trade Commissioner Service (TCS)** assists Canadian companies and innovators to find R&D and business contacts; commercialize innovation abroad; assess market potential; find sources of support; prepare for international markets; and resolve business issues.

**Canada Foundation for Innovation** co-funds leading-edge research infrastructure in universities and hospitals.

**Canadian Institutes of Health Research** is the major granting agency responsible for funding health research in Canada.

**Canadian International Innovation Program (CIIP)** funds industrial R&D partnerships between Canadian companies and foreign partners with a view to accelerating commercialization and facilitating market access.

**CANARIE** provides resources for the advancement of Canada's knowledge and innovation infrastructure.

**Canada Research Chairs Program** invests approximately \$265 million annually to attract and retain world-class scientists and scholars.

**Canadian Technology Accelerators (CTA)** help high-growth, market-ready Canadian companies from priority sectors access entrepreneurship services, strategic partners and global markets.

Collaboration with Europe: Canada's most important programs for STI collaboration with Europe are **Horizon 2020**, **EUREKA** and the **Enterprise Europe Network**.

**MITACS** is a not-for-profit organization that builds partnerships between academia, industry, and foreign partners, developing and providing funding for internship and fellowship programs with industry.

**Networks of Centres of Excellence** supports large collaborative networks to bring researchers and industry together through 48 active networks.



Arctic station testing. Credit: Université Laval

**National Research Council – Industrial Research Assistance Program** provides technical and business-oriented advisory services and has funds available to assist with the growth and expansion of Canadian SMEs.

**Natural Sciences and Engineering Research Council of Canada** provides grants for research in the natural sciences and in engineering.

**Sustainable Development Technology Canada** supports the development of cleantech solutions.

**Social Sciences and Humanities Research Council of Canada** promotes and supports post-secondary-based research and training in the humanities and social sciences.

**Scientific Research and Experimental Development Tax Incentive Program** provides a tax refund or credit of up to 35 percent to those conducting industrial R&D in Canada.

# INVEST IN CANADIAN INNOVATION TO ACHIEVE GLOBAL EXCELLENCE

## **A WELCOMING BUSINESS ENVIRONMENT**

Canada is ranked as the best country for business in the G20.

Source: Forbes and Bloomberg

## **A HIGHLY EDUCATED AND TALENTED WORKFORCE**

Canada's workforce is the most highly educated among members of the OECD, and one in five Canadians speaks one of over 200 languages in addition to English and French.

Source: Organisation for Economic Co-operation and Development

## **COMPETITIVE TAXES**

Canada is the most tax-competitive country in the G7.

Source: KPMG

## **COMPETITIVE R&D ENVIRONMENT**

Canada's tax-based, business-friendly R&D support is very generous by international standards.

Source: Canada Revenue Agency

## **A GREAT PLACE TO INVEST, WORK AND LIVE**

Canada—one of the world's most multicultural countries, with world-class universities, a universal health-care system and clean, friendly cities—has the second-highest GDP per capita in the G20.

Source: The World Bank

## **SIMPLE BUSINESS ENVIRONMENT**

Compared with other countries, Canada has the fewest number of procedures to launch a business.

Source: Global Competitiveness Index, World Economic Forum

## **LOW BUSINESS COSTS**

Canada's overall business costs are the lowest in the G7.

Source: KPMG

## **DUTY-FREE MANUFACTURING TARIFF REGIME**

Canada is the first country in the G7 to offer a tariff-free zone for industrial manufacturers.

Source: Department of Finance Canada

**Cover image:** Stephen Mihailov, National Research Council of Canada (NRC), aligns an optical system for writing fiber Bragg gratings used in sensors that operate in extreme conditions. Credit: NRC.

**Inside image:** Eye of neutrinos. Credit: SNOLAB



THE CANADIAN TRADE COMMISSIONER SERVICE - INNOVATE

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