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SEIZING CANADA'S MOMENT:

MOVING FORWARD IN SCIENCE, TECHNOLOGY AND INNOVATION 2014

SUMMARY

Canada

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Cat. No. lu37-4/2-2014E-PDF

ISBN 978-1-100-25475-3

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Aussi offert en français sous le titre *Un moment à saisir pour le Canada : Aller de l'avant dans le domaine des sciences, de la technologie et de l'innovation 2014 - Sommaire*.



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PRIME MINISTER'S MESSAGE



Prime Minister of Canada

Stephen Harper

The success of our economy, the prosperity of our communities and the well-being of our families depend on advancing cutting-edge science, technology and innovation in Canada.

While our Government has already significantly ramped up support for Canada's quest for knowledge, we recognize that remaining competitive in the global marketplace of ideas demands a long-term commitment and strategy.

That is why we are launching *Seizing Canada's Moment: Moving Forward in Science, Technology and Innovation*, a new strategy that leverages the expertise and resources of post-secondary institutions, industry and government to translate brilliant theories and ideas into applications that will improve the day-to-day lives of Canadians and generate economic growth and jobs across the country.

For years Canadian researchers, inventors and entrepreneurs have expanded the boundaries of knowledge and experience, building a proud, progressive and strong country. As Canada approaches the 150th anniversary of Confederation, our Government is proud to build on that remarkable foundation through new investments in science, technology and innovation that will be of benefit to this generation and an invaluable inheritance for generations to come.

MINISTER OF STATE'S MESSAGE



Minister of State (Science and Technology)

Ed Holder

Today, science, technology and innovation drive the prosperity of nations. Canada has great strengths in this regard including many of the world's brightest minds; as a result, Canada is well-positioned to seize its moment on the world stage, ensuring long-term jobs, opportunities and prosperity for Canadians.

Our Government, under the leadership of Prime Minister Stephen Harper, has made record investments in science, technology and innovation to push the boundaries of knowledge, create jobs and opportunities, and improve the quality of life of Canadians.

While the global economy remains fragile, Canada has come a long way. We boast a welcoming and predictable business environment thanks to low taxes, a sound banking sector and a modern regulatory framework.

In *Seizing Canada's Moment: Moving Forward in Science, Technology and Innovation*, our government is delivering on our commitment to renew Canada's science and technology strategy with a vision to strengthen Canada's position as a global leader in scientific research and innovation.

The renewed strategy builds on two existing pillars, People and Knowledge, and introduces a third pillar, Innovation.

People Pillar: We will inspire, develop, attract and retain the highly talented researchers needed to meet the demands of the modern global economy both in the lab and in the boardroom while encouraging young Canadians to seek rewarding careers in science, technology, engineering and mathematics.

Knowledge Pillar: We will tackle national and global challenges by supporting world-leading research through legacy investments like the Canada First Research Excellence Fund for the long-term economic benefit of Canada.

Innovation Pillar: We will encourage greater partnerships among Canadian businesses, universities and colleges to drive innovation and encourage the adoption of new processes and technologies that help Canadian businesses prepare to compete and win in the global marketplace.

Our government's renewed science, technology and innovation strategy will strengthen Canadian science and business to ensure they remain world-leading. I look forward to sharing the excitement of new Canadian discoveries, breakthroughs and innovations along with the boundless promise they hold for Canadians.

Canada's future in science, technology and innovation is bright. Canada and Canadians must be prepared to lead and to remain at the frontier of discovery. Together, we will seize Canada's moment.

MOVING CANADA FORWARD

As we approach our 150th anniversary, Canada stands at the threshold of a new era of opportunity and achievements as a nation that has established a quality of life envied around the globe. In a fast-changing world driven by science, technology and innovation, we aspire to lead with our people, knowledge and innovation:

PEOPLE: Canada will be a place where curiosity is encouraged, our youth are inspired by science, technology and innovation, and where the best and brightest minds from around the world come to share in our aspirations of pushing the frontiers of knowledge and making ground-breaking technology advancements to help Canada succeed in the global economy.

KNOWLEDGE: Canada will continue to be recognized world-wide for its research excellence and knowledge infrastructure. We will be a nation where our talented researchers and entrepreneurs can pursue their aspirations and ideas for the benefit of Canadians and people around the world.

INNOVATION: Drawing on the skills and knowledge of Canadians as well as our strong research capacity, Canada will be a place where businesses embrace innovation and successfully compete on the world's stage. Businesses will adopt the latest technological advancements and foster partnerships within the science and technology community to bring ideas from the lab to the global marketplace.

Canada's new science, technology and innovation strategy, *Seizing Canada's Moment*, provides a road map for how Canada will build on its world-leading strengths and begin its next 150 years of scientific achievement, discovery and economic success. It is based on four principles:

- promoting world-leading excellence
- encouraging partnerships
- enhancing accountability
- focusing research on priorities where Canada demonstrates global leadership, strength and opportunity:
 - **health and life sciences**
 - **natural resources and energy**
 - **information and communications technologies**
 - **environment and agriculture** (expansion of the 2007 priority)
 - **advanced manufacturing** (new priority)





MOVING PEOPLE FORWARD: GROWING CANADA'S TALENT

Canada has a legacy of innovative people who, decade after decade, have contributed their ideas, curiosity and know-how to create products, knowledge and services that have benefited the world. People are at the heart of discovery and innovation, and they will remain our greatest asset and the source of our ability to lead in the knowledge economy.

Building on Strength

- Canadian institutions attract some of the world's brightest minds. We have seen a brain gain over the past decade.
- Our researchers and scientists benefit from global ties, networks and research collaborations.
- Among OECD members, Canada has the highest share of university and college graduates in its working-age population.
- Canadians perform at the top tier globally with respect to reading, mathematics, problem-solving skills and science.
- The number of science and engineering doctoral degrees continues to grow.

What We've Done

- Through the **Canada Excellence Research Chairs Program**, we have attracted 22 world-class researchers who bring not only their skills and ideas but also their global networks, research collaborations and partnerships to extend the breadth and depth of Canada's global ties.
- Similarly, the **Banting** Postdoctoral Fellowships, **Vanier** Canada Graduate Scholarships and **Canada Graduate** Scholarships have attracted, both nationally and internationally, and retained the world's brightest emerging researchers at Canadian universities.
- Initiatives such as Mitacs' **Accelerate** and the **Youth Employment Strategy** have helped young people obtain industry-relevant research and entrepreneurial experience.
- The new **Canada Job Grant** program helps connect Canadians with available jobs and ensure they obtain the skills employers are seeking to strengthen business innovation.
- Reforms to Canada's immigration system will help attract greater numbers of skilled and entrepreneurial newcomers with the education and experience our economy demands.

What We Will Do

- Prepare younger Canadians for innovation by encouraging education and careers in science, technology, engineering and math through initiatives such as **PromoScience**, challenging their curiosity, supporting better information about employment opportunities and working with partners to address the under-representation of women in certain disciplines.
- Encourage science-to-industry jobs by supporting post-secondary programs, such as **Mitacs Elevate**, that provide work experience to develop, attract and retain tomorrow's research leaders and experts.
- Focus federal investments in youth employment by reviewing the **Youth Employment Strategy** to align it more effectively with the evolving realities of the job market and by strengthening youth programs.
- Support global connections that bring elite minds to study, conduct research and teach in Canada, and develop strategic partnerships with key countries through the **Global Markets Action Plan** and the **International Education Strategy**.
- Foster an innovation culture by working with business schools to increase corporate management capacity, creating a **Canada Excellence Research Chair** in business sector innovation, continuing to improve the immigration system to recruit more foreign entrepreneurs and, in partnership with the provinces and territories, improving foreign credential recognition processes.



MOVING KNOWLEDGE FORWARD: MAINTAINING CANADA'S LEADERSHIP IN SCIENCE AND TECHNOLOGY

Science and technology are essential to Canada's prosperity and improving our quality of life. Research and discoveries shed light on the world around us and open doors to new possibilities. Canada's global research excellence, supported by world-class research facilities, pushes the frontiers of science and technology and has helped attract leading researchers to Canada from around the world.

Building on Strength

- Canada ranks first among G7 nations for investments in R&D in universities and colleges relative to the size of our economy.
- Canada's researchers produce more scientific publications per capita than most industrialized countries. In fact, with less than 0.5 percent of the world's population, Canada produces more than 4 percent of the world's research papers and nearly 5 percent of the world's most cited papers.
- Canada's post-secondary institutions have leading-edge research programs and infrastructure that facilitate and stimulate collaborations and networks.
- Universitas 21, an international network of universities, continues year after year to recognize Canada's higher education system as one of the best in the world.

What We've Done

- Through support to the **granting councils**, the **Research Support Fund**, **Genome Canada** and the **Canada Foundation for Innovation**, our government has invested in discovery-driven and applied research.
- Federal departments and agencies perform world-class research and contribute to knowledge, including more than 4,000 publications in the fields of natural sciences and engineering.
- Significant support for arm's-length, not-for-profit organizations helps them deliver a wide range of innovation-related activities across Canada. These include **TRIUMF**, the **Perimeter Institute for Theoretical Physics**, the **Thunder Bay Regional Research Institute**, the **Canadian Institute for Advanced Research**, the **Institute for Quantum Computing** and **CANARIE**.
- During the economic downturn, additional investments helped stimulate the economy as well as support science and technology objectives, including investments to modernize federal laboratories and \$2 billion through the **Knowledge Infrastructure Program** to support 520 R&D facilities at Canada's colleges, polytechnics and universities.

What We Will Do

- Continue to provide support across the full spectrum of research endeavours in Canada's universities, colleges and polytechnics, and continue to foster R&D excellence including the launch of the **Canada First Research Excellence Fund**, a legacy \$1.5-billion commitment over the next decade.
- Expand Canada's research priorities that are of strategic importance to Canada by:
 - expanding the environment priority to include agriculture, a major sector in Canada's economy, to focus on research and innovation that can provide growth and sustainability; and
 - adding advanced manufacturing as a fifth priority to help harness the opportunities offered by new disruptive and enabling technologies for Canadian researchers and businesses.
- Increase public access to the results of research through open science policies and practices as part of the **Action Plan on Open Government** and the digital government pillar in **Digital Canada 150**.
- Enhance Canada's research capacity through investments in transformative infrastructure projects that underpin world-class research and that enrich Canada's research landscape. This will include developing a digital research infrastructure strategy and improving long-term planning for **Major Science Initiatives**.
- Support federal laboratories and scientific facilities across Canada. This will include new investments of \$380 million for repairing and upgrading of federal laboratories, coordinating activities of federal science-based departments and agencies to foster their leadership in genomics research, and launching the **National Disaster Mitigation Program** that will draw on the latest research and technologies to mitigate risks.
- Ensure researchers in Canada spend their time advancing science and not doing paperwork. To reduce the administrative burden associated with research while upholding high standards of research excellence and accountability, our government will seek advice from a range of stakeholders on how to make Canada the most effective and least administratively burdensome research country in the G7.
- Review and identify emerging areas of comparative advantage to keep our research priorities dynamic and capitalize on new opportunities.



MOVING INNOVATION FORWARD: STRENGTHENING CANADA'S BUSINESS INNOVATION

Canadians have a strong entrepreneurial spirit and have shown how to bring ideas to life. Supported by a capacity for world-class research, Canadians have become agents of change. Canada must now leverage those strengths and embrace a broader business innovation culture—experimenting with new technologies and processes and exploring new business horizons. We are on the right path to unlocking Canada's potential to become a global leader in innovation.

Building on Strength

- *Forbes* magazine ranks Canada one of the best countries for business to grow and create jobs.
- We have the lowest overall tax rate on new business investment among G7 nations.
- The World Economic Forum ranks Canada as having the soundest banking system in the world.
- Bloomberg ranks Canada as second in the world in its list of top locations for doing business.

What We've Done

- Canada provides a solid and predictable environment for businesses to invest and grow, with its strong financial sector, low tax rates and modernized policy frameworks.
- Initiatives such as the **Business-Led Networks of Centres of Excellence** and the **Centres of Excellence for Commercialization and Research** have helped move knowledge from the lab to the marketplace and have supported the creation of new companies and jobs.
- We have fostered partnerships between industry and colleges and polytechnics for applied research and, since 2008, have helped create more than 500 partnerships between companies and colleges under the **College and Community Innovation Program**.
- We funded 22 **College Industrial Research Chairs** and invested in 21 **Technology Access Centres** at colleges.
- We made significant investments to support innovative ideas and investments in major economic sectors, including aerospace and space (through the **Strategic Aerospace and Defence Initiative** and other investments in space exploration technologies), manufacturing and automotive (through the **Automotive Innovation Fund** and the **Advanced Manufacturing Fund**), renewable resources (through the **Forest Industry Transformation** initiative, **Growing Forward 2** and **Clean Energy Fund**), and health (through the **Isotopes Technology Acceleration Program**, **Applied Public Health Chairs** and **Strategy for Patient-Oriented Research**).
- We have concluded critical international trade agreements that have expanded opportunities for trade, participation in global supply chains, and innovation. Since 2006, Canada has successfully concluded negotiations on free trade agreements with no fewer than 38 countries, including the European Union and Korea.
- Canada's intellectual property and copyright regimes have been modernized and streamlined.

What We Will Do

- Foster a digital economy through the **Digital Canada 150** initiative, which includes measures to connect Canadians, to protect them online, to help them tap into the economic opportunities of the digital age to engage them through digital government and to make Canadian digital content available.
- Help ensure private sector information and systems are secure, as outlined in **Canada's Cyber Security Strategy**.
- Encourage stronger links between the public and private sectors and make it easier for businesses to work with partners in the innovation system—including through the **Business Innovation Access Program**, the **National Research Council of Canada's Concierge Service**, social innovation research projects at colleges and polytechnics, and enhanced global innovation networks—by evaluating the outcomes of the **Technology Demonstration Program** and refining policies that support the mobilization of research from academia and federal laboratories.
- Strengthen support for business innovation through programs such as the **Canada Accelerator and Incubator Program** and regionally based innovation programs delivered through the federal regional development agencies so more Canadian firms embrace innovation-based strategies.
- Maximize the impact of successful programs and make them more accessible to businesses.
- Assist Canadian businesses, in particular small and medium-sized enterprises, in protecting their intellectual property.
- Leverage the new **Space Policy Framework** to work with industry and the Canadian space research community to take advantage of existing resources and encourage further technology development opportunities.
- Continue to make it easier for businesses to work with government through the **Red Tape Reduction Plan**.
- Apply the **Industrial and Technological Benefits policy**, which includes a weighted and rated value proposition for evaluating bids for defence and major Canadian Coast Guard procurements.
- Improve access to international markets through the **Global Markets Action Plan** and provide Canadian businesses with opportunities, services and tools to compete internationally.
- Strengthen performance indicators through collaborative work with other jurisdictions in Canada and internationally.

HOW WE GOT TO WHERE WE ARE

In 2006, our government set out to make science, technology and innovation a source of Canadian advantage. In the years since, we have built a legacy of achievement.

- 2007—Canada's science and technology strategy, *Mobilizing Science and Technology to Canada's Advantage*, set an agenda for action through which federal science and technology policies and programs would be more strategic, efficient, effective and accountable for delivering results.
- 2008—The federal budget announced new investments in international and world-class research through the Vanier Canada Graduate Scholarships and Canada Excellence Research Chairs and investments in the granting councils and Genome Canada.
- 2009—Canada's Economic Action Plan provided stimulus funding to support university and college infrastructure, the Canada Foundation for Innovation and industrial research internships, as well as additional funding for small and medium-sized businesses through the Industrial Research Assistance Program.

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- 2010—In its second year of stimulus funding, the Economic Action Plan announced new funding for post-doctoral fellowships and college and community innovation, as well as investments in research through the granting councils, TRIUMF and Genome Canada.
 - 2011—The Economic Action Plan focused on a low-tax plan for jobs and growth with investments in research through the granting councils, Canada Excellence Research Chairs, Perimeter Institute and College and Community Innovation Program.
 - 2011—The report published following the Review of Federal Support to Research and Development (the “Jenkins report”) advised ways to improve federal support for business innovation.
 - 2012—The Economic Action Plan announced a new approach to support business innovation, including transforming the National Research Council of Canada, doubling funding to the Industrial Research Assistance Program and leveraging government procurement.
 - 2013—The Economic Action Plan further invested in the transformation of the National Research Council of Canada, provided new support to innovative firms and announced the new Venture Capital Action Plan.
 - 2014—The Economic Action Plan introduced new initiatives focused on global research excellence, including:
 - \$1.5 billion (over ten years) to create the Canada First Research Excellence Fund to help post-secondary institutions achieve global excellence
 - \$46 million per year to the granting councils and Research Support Fund
 - \$222 million (over five years) to TRIUMF, Canada’s national laboratory for particle physics
 - \$40 million for internships in high-demand fields and an additional \$8 million to Mitacs to support post-doctoral industrial R&D fellowships
 - \$15 million (over three years) to the Institute for Quantum Computing
 - \$10 million (over two years) for social innovation projects at colleges and polytechnics to address the research needs of community organizations
 - \$3 million (over three years) to the Canadian Digital Media Network for the creation of the Open Data Institute
 - \$500 million (over two years) to the Automotive Innovation Fund
 - \$90.4 million (over four years) to the Forest Industry Transformation Program
 - \$40 million (over four years) in additional funding to the Canada Accelerator and Incubator Program
 - 2014—*Seizing Canada’s Moment* outlines a vision for how Canada will maintain its leadership in science, technology and innovation.

SEIZING CANADA'S MOMENT

In the globally competitive race to advance science, technology and innovation, Canada is well positioned. It has:

- marketplace framework laws that protect innovation and reward innovators;
- immigration policies that welcome knowledge workers from around the world;
- a strong economy that has recovered quickly from the market turbulence of the past years;
- knowledge and research institutions that are recognized internationally;
- solid economic fundamentals through improved framework policies that foster business investment and growth;
- a strong balance sheet, a projected balanced budget and a commitment to continued debt reduction; and
- a federal government that has made science, technology and innovation a priority, with over \$11 billion in new resources spent across this full range of activities since 2006.

A LEGACY OF INNOVATION

Throughout our history as a nation, Canadians have been pioneers in scientific and technological achievement. We have turned research and ideas into products, jobs and a healthier, safer world. Here are some of Canada's successes:

- 1860s – steam automobile
- 1870s – telephone / standard time
- 1880s – rotary railroad snowplow
- 1890s – basketball
- 1900s – Robertson screw / Marquis wheat / AM radio
- 1910s – echo sounding / hydrofoil speed record
- 1920s – insulin treatment for diabetes / snowblower / electric variable pitch aircraft propeller
- 1930s – snowmobile / first electron microscope in North America / portable two-way radio
- 1940s – voltage-controlled electronic music synthesizer / first g-suit flown in combat / co-discovery of carbon-14
- 1950s – co-invention of alkaline dry battery / external heart pacemaker / cobalt bomb radiation therapy
- 1960s – Alouette scientific satellite / co-invention of charge-coupled device
- 1970s – IMAX motion picture system / Anik domestic communication satellites
- 1980s – Canadarm / automated synthesis of DNA sequences
- 1990s – BlackBerry
- 2000s – D-Wave One: world's first commercially available Quantum computer
- 2010s – ATLAS subatomic particle sensor (Higgs Boson) / monoclonal antibodies for Ebola treatment / detection of microbes in deep Precambrian rocks / high-pressure direct injection natural gas diesel engine

Having built on these achievements, Canada now stands at the threshold of a new era. We can leverage the many advantages that stem from a strong, stable and vibrant science, technology and innovation ecosystem. Together, we will seize this moment and build a brighter future for all Canadians.