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INNOVATION AND TECHNOLOGY: AN EXCHANGE OF IDEAS

Report of the Standing Committee on Industry, Science and Technology

**Dan Ruimy
Chair**

JUNE 2017

42nd PARLIAMENT, FIRST SESSION

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THE STANDING COMMITTEE ON INDUSTRY, SCIENCE AND TECHNOLOGY

has the honour to present its

SEVENTH REPORT

Pursuant to its mandate under Standing Order 108(2), the Committee travelled to Washington, D.C., United States of America from May 1 to 3, 2017, to discuss opportunities for cooperation between Canada and the United States in innovation and jobs creation, and has agreed to report the following:

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INNOVATION AND TECHNOLOGY: AN EXCHANGE OF IDEAS

CHAPTER ONE: INTRODUCTION

[On 7 February 2017](#), the House of Commons Standing Committee on Industry, Science and Technology (the Committee) agreed to travel to Washington, D.C., from May 1 to 3, 2017 inclusive.

The main purpose of the trip was to meet with American elected officials and representatives of businesses and associations who deal with the same issues as the Committee. In particular, the goal was to discuss best practices and opportunities for cooperation between Canada and the United States (U.S.) with regard to innovation. The second objective of the trip was to learn about policies, challenges and solutions in two areas the Committee intends to study: intellectual property and technology transfer, and broadband connectivity in rural and remote regions. The discussions regarding opportunities for cooperation on innovation were somewhat limited, as the Committee's future topics of study took up most of the meetings. Other issues, such as trade, were occasional subjects of conversation.

During its trip, the Committee's work included the following:¹

- attending a briefing on the political and economic situation in the U.S. given by Canada's Ambassador to the U.S., David MacNaughton, and his staff;
- holding four round table sessions of about 45 minutes each with American academic, technological, scientific and innovation associations, as well as businesses;
- meeting individually with eight members of the House of Representatives (six Democrats and three Republicans) for about 20 minutes to 30 minutes each;
- meeting with three Republican members of the House of Representatives who sit on the Subcommittee on Trade of the House Committee on Ways and Means, along with members of the U.S. Chamber of Commerce, for 30 minutes;
- meeting with 13 senators (6 Republicans and 7 Democrats) who sit on the Senate Committee on Commerce, Science and Transportation before

1 A complete list of witnesses is provided in the Appendix.

attending a hearing of that committee concerning the development of broadband connectivity in rural and remote regions;

- visiting the Consumer Technology Association's "Innovation House" and Google, Amazon and 1776 (a business incubator) facilities, and having discussions with their staff during one-hour meetings; and
- attending a lecture by the 2015 Nobel Laureate in Physics, Arthur Bruce McDonald, a Canadian.

This report is organized as follows: the second chapter summarizes the discussions on broadband connectivity in rural and remote regions; the third chapter does the same for intellectual property and technology transfer; and the fourth chapter briefly describes the other issues that arose.

The Committee would like to thank the staff at Canada's Embassy to the United States, which made most of the Committee's meetings possible, as well as all the witnesses and American elected officials who took the time to speak with the Committee members.

CHAPTER TWO: BROADBAND CONNECTIVITY IN RURAL AND REMOTE REGIONS

2.1 Definition of Broadband Connectivity

There is no common definition of broadband connectivity. In Canada, the Canadian Radio-television and Telecommunications Commission (CRTC), in its [universal service statement](#), refers to a download speed of at least 50 megabits per second (Mbps) and an upload speed of at least 10 Mbps. In the U.S., the Federal Communications Commission (FCC) [defines broadband connectivity](#) as download speeds of at least 25 Mbps and upload speeds of at least 3 Mbps. Some American stakeholders stated that download speeds of between 20 Mbps and 25 Mbps are enough to meet most user needs.

2.2 Importance of Broadband Connectivity for Rural and Remote Regions

Broadband connectivity provides major benefits to rural and remote regions. The discussions referenced various applications for which broadband connectivity is in demand in these regions, including distance education and telemedicine, precision seeding in agriculture and labour market information (under development by Google). However, there is often little or no business case for Internet service providers to offer broadband connectivity in remote, sparsely populated areas. American representatives expressed the view that some of the challenges faced by rural Canada pertaining to broadband Internet access were also present in rural U.S.

2.3 Technologies Used

The various stakeholders discussed the technologies available today:

- Cable is a communications technology that provides data transmission over coaxial cable.
- A digital subscriber line (DSL) is a data communications technology that provides data transmission over a copper local loop.
- Fibre is a technology that employs glass threads or plastic fibres to transmit data using pulses of light.
- Fixed wireless is a wireless network that uses either licensed or unlicensed spectrum to provide communications services (voice and data) where the service is intended to be used in a fixed location.
- Long-Term Evolution (LTE) mobile service is a protocol or standard used for communications between a mobile phone and cell towers in mobile

networks. It is also called 4G (fourth generation).² A fifth generation (5G) is being developed and expected to offer higher capacity than 4G, allowing more traffic, more devices, and a higher consumption of data.

- Some stakeholders also spoke about communication by geostationary satellite, that is, a satellite in high orbit over a fixed point on the equator, which means it serves the regions furthest from the equator less well. There are also low-Earth orbit satellites (LEOS) that are not necessarily over the equator.

The representative of one association, the Information Technology and Innovation Foundation, spoke about a [report the association published](#) in April 2017 on the best guidance for policymakers respecting rural broadband connectivity. Like the report, the other stakeholders unanimously concluded that governments should not favour one technology over the others, but instead focus on the most effective and economical technology for specific needs and circumstances. Fibre was often viewed as too expensive for very remote regions and should be reserved for community hubs, such as schools and hospitals. For extremely remote areas, new technologies such as LEOS can provide access. However, satellite technology was criticized for being heavily weather-dependent. LTE, or 4G, mobile technology was seen as robust and will not become obsolete for many years. The discussions also touched on the fact that the U.S. is ahead of Canada in developing 5G technology.

2.4 Implementation and Funding

A number of association representatives spoke about improving broadband connectivity gradually, starting with the most accessible regions. This point raised the issue of balancing accessibility and quality. Some stakeholders said that providing some access was “better than nothing,” while others argued that very slow speeds would not help businesses in rural and remote regions at all and would quickly become outmoded.

The FCC’s approach to funding the expansion of broadband connectivity to rural and remote regions was cited as a model. It consists of proposing that a provider extend its coverage to regions that do not have access to broadband Internet. The provider has the right to refuse to do so, in which case the proposal is put up for auction. The implemented policy of billing Internet subscribers \$1.50 per month to fund network maintenance and expansion was also discussed. One representative said the public sector should not be responsible for developing and operating telecommunications infrastructure, as it tends to neglect maintenance. She also noted that local co-operatives could manage network access.

Some stakeholders brought up regulations that limit the potential for further developing rural and remote regions, but little information was provided in this regard. For example, one witness appearing before the Senate Committee on Commerce,

2 The definitions of the technologies are drawn from Canadian Radio-television and Telecommunications Commission, “[Broadband Internet Service Coverage in Canada](#).”

Science and Transportation stated that the regulations for LEOS should be modernized. In addition, zoning and other local regulations may complicate the construction of new infrastructure.

Harmonizing Canadian and American standards in this area was also described as being of critical importance. For example, 700-Mhz spectrum auctions took place first in the U.S. and then in Canada, enabling the same transmission spectrum to be allocated in both countries.

CHAPTER THREE: INTELLECTUAL PROPERTY AND TECHNOLOGY TRANSFER

3.1 Rules Governing Intellectual Property Transfers

In both the U.S. and Canada, the rules for transferring intellectual property from colleges and universities to industry are inconsistent and vary by institution. In general, intellectual property developed by students who are not employed by the university or college belongs to the student, while inventions developed by professors and other college or university employees belong to the institution. However, universities and employee-inventors share the revenue from commercializing inventions, with an estimated 30% to 50% going to inventors.

The *Bayh–Dole Act* of 1980 was described as creating a strong incentive for innovation and transfers of intellectual property in the U.S. This legislation provides that universities can claim the rights to inventions that stem from research funded by the federal government, which encourages these institutions to commercialize them. However, it is difficult to establish a causal link between the enactment of this law and the increase in technology transfers, as the legislation was passed in the midst of a number of major technological advances. Another stakeholder noted that the *America Invents Act* of 2010 also encouraged technology transfer.

3.2 Technology Transfer Challenges and Solutions

The main challenge to the commercialization of intellectual property and technology transfer is the “valley of death,” the period between the creation of an invention and its commercialization. In the past, obtaining a patent was enough to attract attention and private-sector investment. Today, firms are reluctant to take on the risk of commercializing unproven inventions. Universities that hold patents therefore have to invest increasing amounts of effort and money to bring inventions to the commercialization stage. For example, they need to develop prototypes, prove the invention’s technical effectiveness and conduct market research. Some stakeholders said they offer new entrepreneurs training in this regard.

Many students want to use the inventions they develop in university to start their own businesses, but lack the skills and knowledge to do so. To help students make the leap into the private sector and commercialize inventions they develop at university, one stakeholder extolled the virtues of “entrepreneur centres.” An entrepreneur centre serves as a kind of pre-incubator, focusing on providing practical training to young entrepreneurs by facilitating mentoring and delivering seminars on selling their inventions.

A number of stakeholders also emphasized the importance of continuing to support basic research, which is a major source of innovations over the long term. Moreover, some universities are attracting high levels of private investment by effectively promoting their research activities, without necessarily engaging in technology transfer.

Similarly, some stakeholders stressed that student training and placement, staff and research activities are more important for successful technology transfer than the strength of intellectual property rights.

One witness explained that it is important for Canada to set up technology transfer offices in order to increase the number of these transfers and to ensure universities' existing patents are put to use.

CHAPTER FOUR: OTHER TOPICS OF DISCUSSION

4.1 International Trade

Since one of the objectives of the trip was to forge ties with American elected officials, the Committee members met with members of the House of Representatives and senators. The Committee reiterated the importance of the Canada–U.S. relationship and of American exports to Canada, which create jobs in the U.S. The upcoming changes to the North American Free Trade Agreement (NAFTA) were discussed in general terms. All the American elected officials, regardless of their party affiliation, agreed that their goal is to update some elements of NAFTA and that no major dispute would result. Some members of the Subcommittee on Trade mentioned the potential to strengthen and modernize the agreement in order to create a united front against foreign competition.

In addition, a representative of Google expressed support for modernizing NAFTA. An updated NAFTA could include measures set out in the Trans-Pacific Partnership, such as copyright, counterfeiting and data protection provisions.

4.2 Canada–United States Cooperation on Innovation

The issue of Canada–U.S. cooperation is a sensitive one, as both countries hope to stimulate strong economic growth and job creation domestically, particularly by boosting exports and sparking more innovation. Thus, competition between the two countries can deter collaboration efforts. However, some representatives seemed open to cooperation that would benefit both countries, namely, jointly funded projects in areas such as the space technology sector, which is already a sector where international collaboration is very strong.

CHAPTER FIVE: CONCLUSION

The Committee's trip to Washington, D.C., enabled it to establish connections with American elected officials and representatives of U.S. companies and associations who share the Committee's interest in innovation, intellectual property and broadband connectivity in rural and remote regions. Other subjects of discussion included challenges and opportunities for cooperation between Canadian and American institutions and Canada–U.S. trade relations.

The trip also enabled the Committee members to gain a more accurate sense of the issues surrounding the topics of two studies it plans to undertake and to meet potential witnesses who could provide them with information on those topics. One of the studies will concern broadband Internet access in rural and remote regions. The other will deal with intellectual property and technology transfer to industry.

Regarding broadband connectivity in rural and remote regions, most of the stakeholders the Committee heard from support two broad approaches: 1) access should be expanded gradually; and 2) governments should avoid favouring one technology over another. The various technologies may be complementary, and a number of implementation models exist, including auctions or more local approaches, such as those managed by co-operatives.

As for intellectual property and technology transfer, a legislative approach could facilitate these transfers, but governments in Canada and the U.S. do not hold the same jurisdiction over universities. The difficulties universities have in investing more in the pre-commercialization stages were also discussed. Lastly, the importance of training researchers in sales and commercialization was highlighted.

APPENDIX A: LIST OF MEETING PARTICIPANTS

Organizations and Individuals	Date
<p>Adtran Gary Bolton, Vice President of Marketing</p>	2017/05/01
<p>Association of American Universities Jessica Sebeok, Associate Vice President Toby Smith, Vice President for Policy</p>	
<p>Association of Public and Land-grant Universities Carina Marquez-Oberhoffner, Associate Director, Congressional and Governmental Affairs Jim Woodell, Vice President, Economic Development and Community Engagement</p>	
<p>Association of University Technology Managers Stephen Susalka, Chief Executive Officer</p>	
<p>Council on Governmental Relations Bob Hardy, Director, Contracts and Intellectual Property Management</p>	
<p>Echostar Communications Corporation Jodi Goldberg, Associate Corporate Counsel</p>	
<p>Embassy of Canada in Washington Ambassador David MacNaughton Adam Barratt, Minister-Counsellor, Congressional Colin Bird, Minister-Counsellor Trade Gilles Gauthier, Minister Economic James Greathouse, Policy Assistant Jordan Khan, Second Secretary Brad Wood, First Secretary Commercial</p>	
<p>Information Technology and Innovation Foundation Rob Atkinson, President Doug Brake, Telecommunications Policy Analyst</p>	
<p>Juniper Networks Sampak Garg, Director of Government Affaires and Senior Corporate Counsel</p>	
<p>Nokia Corporation Elizabeth Rojas Levi, Director of Public Affairs and Government Relations for the Americas Region</p>	

Organizations and Individuals	Date
<p>NTCA-The Rural Broadband Association</p> <p>Mike Romano, Senior Vice President of Policy Jill Canfield, Vice President of Legal and Industry, Assistant General Counsel</p> <p>Qualcomm Inc.</p> <p>Dean Brenner, Senior Vice President, Government Affairs</p> <p>Telecommunications Industry Association</p> <p>Cinnamon Rogers, Senior Vice-President Ashley Simmons, Director of Government and Public Affairs Dileep Srihari, Director, Legislative and Government Affairs K.C. Swanson, Director, Global Policy</p> <p>University of Michigan</p> <p>Michael Waring, Director of the Washington Office, Executive Director of Federal Relations</p>	2017/05/01
<p>Amazon</p> <p>Darren Achord, Senior Manager, Public Policy, Telecom Arrow Augerot, Senior Manager, Public Policy, Customs and Trade Steve de Eyre, Head of Public Policy Andrew Harris, Senior Manager, Public Policy, Western Hemisphere and Internet Governance Sarah Hudgins, Senior Management, Public Policy, IP Shannon Kellogg, Director of AWS Public Policy, Americas</p> <p>American Association for the Advancement of Science</p> <p>Charles Dunlap, Director, Research Competitiveness Program Kei Koizumi, Visiting Scholar</p> <p>Consumer Technology Association</p> <p>Jamie Boone, Senior Director, Government Affairs E. Sage Chandler, Vice President, International Trade Michael Patrick Hayes, Manager, Government Affairs Douglas K. Johnson, Vice President, Technology Policy Tiffany Moore, Vice President, Congressional Affairs Michael Petricone, Senior Vice President, Government Affairs Kathryn Shuffield, Senior Coordinator, Political Programs Tyler Suiers, Vice President, Communications</p>	2017/05/02

Organizations and Individuals	Date
United States House of Representatives	2017/05/02
Hon. Marsha Blackburn	
Hon. Dwight Evans	
Hon. Sheila Jackson Lee	
Hon. Eddie Bernice Johnson	
Hon. Benda Lawrence	
1776 Innovation Incubator	2017/05/03
Brandon Pollak, Head of Global Affairs	
Altrius Group, LLC	
William J. Morley, President & CEO	
Google	
Colin McKay, Head, Public Policy and Government Relations	
United States Chamber of Commerce	
Kelly Anderson, Senior Manager, International Intellectual Property	
Patrick Kilbride, Executive Director of Intellectual Property	
United States House of Representatives	
Hon. Donald Beyer	
Hon. Mike Bost	
Hon. Chris Collins	
Hon. George Holding	
Hon. Patrick Meehan	
Hon. Dave Reichert	
Hon. Tim Ryan	
United States Senate	
U.S. Senate Committee on Commerce, Science and Transportation	

MINUTES OF PROCEEDINGS

A copy of the relevant *Minutes of Proceedings* ([Meetings Nos. 64](#)) is tabled.

Respectfully submitted,

Dan Ruimy
Chair

