

## TECHNOLOGY TRANSFER - THE CANADIAN EXPERIENCE

### Communication from the Government of Canada

*Work of the Working Group under the auspices of the General Council pursuant  
to paragraph 37 of the Doha Ministerial Declaration*

## I. INTRODUCTION

1. The Government of Canada welcomes this opportunity to share with the Working Group an overview of its experience related to technology transfer and draw out key implications that can inform the examination of the relationship between trade and technology transfer, as well as any possible recommendations on steps that might be taken within the mandate of the WTO to increase flows of technology to developing countries.

2. Canada considers the Doha Ministerial Declaration's direction to examine the relationship between trade and transfer of technology to be important in itself and within the broader context of sustainable development and actions to eradicate poverty. The work of this group complements a range of other international initiatives in which all Members share an interest, including the reaffirmation of the Development Goals this past March in Monterrey, Mexico, and the historic agreement on an Africa Action Plan to support the goals of the New Partnership for Africa's Development made this past June at the G8 Summit in Kananaskis, Alberta, Canada. A common theme running through each of these forums is the importance of sharing knowledge in a spirit of partnership to achieve common objectives.

3. Canada supports the view offered by a number of developed and developing Members of this Working Group that, at this stage, we should not foreclose from consideration the broad array of domestic and international constraints and opportunities for facilitating the flow of technology to developing countries. Our particular efforts, however, must also be focussed and realistic. By the time of the 5<sup>th</sup> Ministerial Conference we should be able to identify whether there are areas, within a WTO context, where WTO Members can make a contribution to increasing flows of technology to developing countries. Sharing our mutual experiences with technology transfer will help us achieve this goal.

4. Against this background, this submission first situates technology transfer within the context of Canada's new innovation strategy. It then reviews the Canadian experience with technology transfer from three different perspectives: domestic Canadian policies and technology transfer; Canada as a recipient of technology from the world; and Canada as a provider of technology to the world.

## II. TECHNOLOGY TRANSFER WITHIN THE CONTEXT OF CANADA'S INNOVATION STRATEGY

5. Canada views innovation as the process through which new economic and social value is extracted from knowledge. Through innovation, knowledge is applied to the development and

commercialization of new products and services or to new ways of designing and producing an existing product or service. In January of 2002, the Government of Canada set out its innovation strategy through two policy papers: *Knowledge Matters: Skills and Learning for Canadians*; and *Achieving Excellence: Investing in People, Knowledge and Opportunity*.<sup>1</sup> Canada is a significant net importer of knowledge and technology. Therefore, it is not surprising to find that technology transfer is a key element within its innovation strategy. The Government of Canada recognizes that continuous refinement of both general framework policies and specific policies and measures are essential to improve the flow of technology both internally and externally in order to reach our ambitious innovation goals and targets.

### III. DOMESTIC POLICIES AND TECHNOLOGY TRANSFER

6. Much of the analysis underlying Canada's innovation strategy has underlined the critical contribution that getting Canada's domestic business environment right makes to building a more innovative economy. The Canadian experience has been that domestic policy actions to this end improve conditions for the generation, transfer, and diffusion of technology (in the broadest sense of the word) internally. But that is not the entire story. Many of the domestic policy measures and actions Canada has taken in the past to improve the internal environment for innovation and technology transfer are now reflected in its international commitments which, in themselves, have played a positive and reinforcing role.

7. A review of Canada's domestic innovation system, and the entire array of Canada's policies and programs to strengthen that system, will not be undertaken here. Instead, selected examples of domestic policies with a strong linkage to improving conditions for technology transfer are highlighted. The examples fall within two general categories. First, to encourage the creation, transfer and diffusion of technology and knowledge, the Government of Canada has put in place, and is continuing to develop, domestic framework policies that provide for a fair, efficient and competitive marketplace - the essential prerequisite for technology transfer. Second, changes to Canada's framework policies that have encouraged technology transfer have been complemented by many specific initiatives and programs for improving Canada's innovation capacity, including with respect to technology transfer.

#### Domestic Framework Policies

##### *Regulatory framework*

8. The regulatory regime of any country has an enormous impact on its global competitiveness. OECD research indicates that effective regulatory reform efforts can result in GDP growth in the range of 3 to 6 per cent (for Canada, that means potential economic growth of over C\$50 billion). Although difficult to establish empirically, a major portion of this growth would result from increasing the rate of innovation, and implicitly the strengthening of technology transfer performance.

9. The Canadian experience has reflected the so-called small country disadvantage - trying to provide world-class regulatory programs with relatively fewer resources than are available to regulators in larger economies. There are many examples where Canada has used opportunities within regional and international trade agreements to overcome this disadvantage through better integrated or even harmonized regulatory regimes with its trading partners.

---

<sup>1</sup> The Government of Canada is pleased to make available to Working Group Members copies of its Innovation Strategy papers that provide an overview of current circumstances within Canada.

10. Canada is not alone among WTO member countries in facing difficult regulatory challenges in integrating domestic social and economic objectives in a context of increased technical complexity. This is particularly true in areas of health and environmental protection but also in terms of getting domestic policy frameworks right for new business areas like e-commerce and biotechnology, and establishing public confidence that these areas are beneficial and well-managed. In this context, technology transfer gives rise to contentious and complex issues domestically and, of course, internationally.

11. The Canadian approach to standards is an example of how Canada has moved forward domestically and looked to international agreements as an essential and complementary element of its domestic regulatory framework. In Canada, more than 60 per cent of the national standards approved in recent years have been based on international standards. This reflects the reality of Canadian trade patterns: some 60 per cent of Canadian manufactured goods are now exported to other countries as opposed to 25 per cent in 1980. Canada's traditional standardization approach addressed narrowly defined technological concerns in a purely domestic context. Canada's new standards strategy takes a different direction, including benchmarking domestic standards against such criteria as the extent to which they help build Canadian competitive advantage through technology and information transfer.

#### *Intellectual Property (IP)*

12. One objective of the Canadian IP policy framework is to encourage innovation and technology transfer through providing incentives for research and development (R&D) leading to new products and production processes, and facilitating the diffusion of new technology and creative works. Over the past fifteen years, the Canadian IP policy framework has undergone enormous change to achieve this objective while, at the same time, ensuring that an appropriate balance is struck between the interests of creators and users of IP.

13. Finding the right balance between creators and users of IP, as the pace of technological change in Canadian and global marketplaces accelerates, has proven to be a continuing process of domestic consultation and legislative revision. Canada has utilised the flexibility provided for in the TRIPS Agreement to create an exception whereby a patent can be worked by anyone seeking regulatory approval for the product. This "early working" can only be in relation to that regulatory approval. Canada's successful defence of the "early working" or regulatory exception at the WTO Dispute Settlement Body validates a fundamental element of our patent regime. In the pharmaceutical industry, it has been demonstrated that this exception accelerates the market access of generic drugs by a period of 3 to 6.5 years (the average time required to prepare for and complete the regulatory approval process for a generic drug).

14. Canada's IP policies aimed at spurring innovation and ensuring maximum access to new creations at home and from abroad are reflected in, and consistent with, the scope and content of the international IP commitments Canada has made to date. Canada's experience is that domestic policy objectives can be met while deriving the benefits, including enhanced flows of technology, resulting from international agreements on IP.

*Competition Policy*

15. The Canadian experience is that competition policy has contributed substantially to achieving efficiencies in the Canadian economy, including in the flow of technologies between firms and to the dynamism of firms. As with the case of IP framework policies, Canadian competition policies are continually evolving to take account of structural changes in the marketplace and to reflect changing business strategies employed by firms in response to global competitive pressures. One example is found in the Canadian competition policy response to the increasing use by Canadian firms of strategic alliances.

16. Strategic alliances can act as an important mechanism for transferring the skills and knowledge among employees within participating firms. These resources may be hard to acquire through normal market transactions. Many alliances involve something new, innovative and forward-looking: a new research and development program, new products, technologies and processes, or a new marketing strategy to be conducted jointly by the parties. The adjective "strategic" has a definite meaning here. It implies a concern with the longer-term, with investment rather than day-to-day operations, and with developing new markets rather than servicing existing ones.

17. It is Canada's experience that strategic alliances generally do not raise competition policy issues under our existing Competition Act. However, alliances can take a variety of forms with varying impact in the marketplace and where they are likely to lead to anti-competitive effects, intended or otherwise, parties must be able to determine whether the Act is contravened. In response, the Canadian Competition Bureau has issued specific and transparent guidance on how strategic alliances will be reviewed, and if necessary, how the Act will be applied to the few alliances which potentially lead to anti-competitive effects.<sup>2</sup>

18. The modernization of Canada's competition policy framework to meet domestic objectives is increasingly being reflected in Canada's international competition activities. In particular the growing international dimension to competition law enforcement, has placed competition policy in a prominent position on the international policy agenda. In this regard, Canada supports the negotiation of a multilateral agreement on competition policy within the WTO, to reinforce support for addressing anticompetitive practices by all Members.

*Government Procurement*

19. In the past Canada used government procurement as a tool for an array of domestic policy objectives, with technology transfer often being far down the list. Over recent years, however, the importance of government procurement policies as a means to transfer and diffuse technology throughout the economy has received much greater recognition. The effectiveness of government procurement policies subject to our trade agreements in relation to enhancing flows of technology both domestically and internationally is strongly linked to the degree of openness, transparency, and non-discrimination found in tendering processes.

20. Canada, along with 26 other WTO Members, are Parties to the plurilateral WTO Agreement on Government Procurement, which works towards greater openness, transparency, and non-discrimination. In addition, Canada has been working with its regional trading partners to achieve these same ends. In the 1988 Canada-US Free Trade Agreement, Canada agreed to establish a Procurement Review Board (PRB) to hear complaints filed by potential suppliers concerning alleged breaches by the Government of Canada of prescribed procedural requirements applicable to any

---

<sup>2</sup> "Strategic Alliances under the Competition Act," Director of Investigation and Research, Bureau of Competition Policy, November 1995.

aspects of the procurement process for covered contracts. In January of 1994, the coming into force of the North American Free Trade Agreement (NAFTA) brought with it not only an expanded scope of coverage but also a transfer of authority to hear procurement complaints to the Canadian International Trade Tribunal (the CITT).

21. The CITT currently hears complaints arising under the North American Free Trade Agreement (NAFTA), the Canadian domestic Agreement on Internal Trade, the WTO Agreement on Government Procurement, and the Canada-Korea Agreement on the Procurement of Telecommunications Equipment. Members may be interested to learn that the majority of complaints heard by the CITT and the PRB before it have not been from potential foreign suppliers, but from Canadian firms challenging their own federal government's procurement decisions.

#### Specific Initiatives and Programs for Technology Transfer

22. The modernization of Canada's framework policies are accompanied by an array of initiatives and programs to strengthen Canada's innovation capacity, the majority of which also strengthen Canada's technology transfer performance. Selected examples include:

- (a) The creation of the Canada Foundation for Innovation (CFI) in 1997. The CFI shares the cost of Infrastructure required to conduct new research in Canada and abroad. The CFI's international program element (C\$100 million) encourages Canadian research institutions to join with international partners and take advantage of research opportunities with leading facilities in other countries.
- (b) The establishment of the Canada Research Chairs (CRC) program. Under CRC, 2,000 academic positions at universities across the country will be funded by 2005. The program's objective is to enable Canadian universities, together with their affiliated research institutes and hospitals, to become world-class research centres through attracting and retaining the best researchers in the world to Canadian Universities and research hospitals.
- (c) Since 1997 the Government has invested heavily in making Canada one of the most internet "connected" countries in the world. The Government has been delivering on this commitment by connecting Canadians to each other and the world through programs that are tailored to address the various needs of Canadians. These activities are building on previous steps taken to deregulate the telecommunications industry in Canada, which has increased competition and encouraged Canadian firms to quickly develop innovative products and services. Canada has also participated in the G-8 Digital Opportunities Task Force to share its experience and find ways to overcome the "digital divide" between developed and many developing countries.
- (d) The Networks of Centres of Excellence (NCE) program has been operating successfully for twelve years and now has an annual budget \$77.4 million per year. Networks of Centres of Excellence are partnerships among researchers in universities, industry, government and non-governmental organizations aimed at turning Canadian research and entrepreneurial talent into economic and social benefits for all Canadians. An integral part of the federal government's Innovation Strategy, these nation-wide, multidisciplinary and multi-sectoral research partnerships connect excellent research with industrial know-how and strategic investment. Many of the networks have an international reach.

23. Members of this group will undoubtedly note that the specific initiatives cited above, while extremely important to encouraging and facilitating technology transfer in Canada, may be beyond the financial or institutional reach of many developing countries. This does not obviate the relevance of

Canada's experience in this area. Sound framework policies, many of which derive from, or in turn support, commitments in this organization are a necessary element to a successful technology transfer environment. Augmented by supportive specific initiatives technology transfer systems can flourish.

24. One of the key issues for this group is while there are undoubtedly important areas for international cooperative action in the area of designing, funding and implementing supportive initiatives, the extent to which the WTO can provide solutions in this area are limited. From the Canadian perspective the WTO can play a direct and substantial role in encouraging the adoption of effective framework policies within all member countries that will strengthen the international flow of technology between all member countries, but especially to developing countries.

#### **IV. CANADA AS A RECIPIENT OF TECHNOLOGY FROM THE WORLD**

25. There exists a large body of literature on the extent and nature of the contribution Foreign Direct Investment (FDI) can make to economic growth in general and technological transfer and development in particular. These findings will not be reviewed again here. Instead, the focus is on three specific points. First, it is Canada's experience that it must have access to knowledge and technologies from around the world in order to ensure our own economic growth and sustainable development. Second, FDI has been a key means for Canada to achieve this objective. Third, Canada's evolving FDI policies, and its international investment commitments in regional and multilateral trade and investment agreements, reflect these facts of economic life, but in a manner that also allows Canada to advance other essential national interests.

26. FDI has been, and continues to be, a key contributor to economic development and innovation in Canada. The level of FDI has grown rapidly in recent years, with the stock of FDI in Canada reaching \$291 billion in 2001. Many Canadian studies have provided empirical evidence that FDI leads to substantial intra corporate technology transfer between foreign parents and foreign-controlled Canadian subsidiaries. Possibly more significantly, however, is the finding that foreign-controlled firms in Canada are generally more productive than Canadian-controlled firms.<sup>3</sup> This suggests that foreign-controlled firms are altering the structure of production in Canada such that Canadian firms have to adjust to the new productivity benchmarks, including through lowering production costs and adopting new product and process technologies.

27. The Canadian international investment policy framework for FDI has been liberalized over the past two decades, in no small part due to a broader understanding that it is a key transmission mechanism for technology from abroad. Members may recall Canada established the Foreign Investment Review Agency (FIRA) in 1974 to screen new foreign investment and to review foreign acquisitions of existing assets. Approvals given by FIRA were in some cases contingent on the investor providing undertakings, including in relation to domestic purchasing, employment, and technology transfer.

28. In 1985, and prior to the negotiation of the Canada-US Free Trade Agreement which provided limited disciplines of performance requirements attached investments, the Government of Canada abolished FIRA and replaced it with a new agency, Investment Canada. The policy rationales for FIRA's abolition included that FIRA had been demonstrated to discourage foreign investment and that the undertakings it extracted from potential investors were of dubious value given the pace of economic and technological change in the Canadian and world economies.

29. The recognition of the economic and technological benefits from FDI are reflected in the 1985 Investment Canada Act which states that: "Recognizing that increased capital and technology

---

<sup>3</sup> Jianmin Tang and Someshwar Rao, "R&D Propensity and Productivity Performance of Foreign-Controlled Firms in Canada". Industry Canada Working Paper No. 33, March 2001.

would benefit Canada, the purpose of this Act is to encourage investment in Canada by Canadians and non-Canadians that contributes to economic growth and employment opportunities and to provide for the review of significant investments in Canada by non-Canadians in order to ensure such benefit to Canada."<sup>4</sup> Under this legislation, Canada continues to review significant investments in Canada by non-Canadians (over a threshold level in 2002 of \$218 million for WTO member investors). This right of review is preserved in all international investment agreements Canada has signed. In these agreements, Canada has also preserved its rights to adopt and maintain measures in a number of important policy areas including health, public education, social services, regional development and aboriginal affairs.

30. FDI is a critical channel for technology transfer to Canada but it is not the only one. It will be recalled that all industries, including those not necessarily traditionally viewed as highly technologically intensive, embody advanced technology in products and processes. The mining industry and indeed government services are two examples of sectors that have been transformed recently through enhanced technological intensity in the performance of their work. With respect to goods production (including basic commodities), Canadian producers need to obtain technologically sophisticated production inputs and machinery and equipment at competitive prices. In many cases, they need to source these inputs from abroad.

31. Over the past decade, Canada has unilaterally changed its import policies to ensure Canadian producers can more efficiently obtain technology from abroad as embodied in production inputs. A prime example is Canada's tariff program for imported production machinery. Under this program, duties on a broad range of machinery were remitted to importers only if reasonably equivalent machinery was not available from Canadian production. The program covered a broad range of machinery from all sources. It also imposed administrative costs on industry which were a significant barrier to the importation of leading edge production technologies. In January of 1998 the Canadian government terminated the Machinery Program. Virtually all machinery production parts and most spare parts under the former Machinery Program now enter Canada duty free. The Government of Canada also took the opportunity afforded by the abolition of the Machinery Program to introduce several new duty-free items covering new technology equipment.

32. Technology transfer is also embodied in the tacit knowledge carried by people. Many people have said that successful technology transfer embodies a number of complimentary policies in this respect. For example, policies that encourage, or that at least do not impede, the recruiting of professionals from abroad; the ability to use consulting firms, especially consulting engineering firms regardless of nationality, the importance of international cooperation with respect to laboratory use and the education and training of scientists, engineers and technologists are indicative of supportive policies that have served Canada well. Canada's international commitments in trade in services reflect the priority it places on ensuring that Canada has international access to knowledge embodied in services. At the same time, the Canadian experience has been that Canada's international commitments in trade in services do not restrict its ability to achieve diverse domestic policy objectives, including cultural policy objectives.

## **V. CANADA AS AN EXPORTER OF TECHNOLOGY TO THE WORLD**

33. Canada has long recognized the benefits that flow to Canada and to recipient countries from exporting Canadian know-how around the world. These benefits are often defined in commercial terms. But they are also defined, in some cases, against benchmarks of international cooperation and development across a wide array of global economic, social and environmental issue areas.

---

<sup>4</sup> Investment Canada Act, R.S., 1985, c. 28 (1st Supp.)

34. Canada has a strong interest as an exporter of commercial technologies to markets in developed and developing countries, including as these are transmitted through Canadian direct investment abroad. Canadian direct investment abroad (CDIA) stock increased from \$79.8 billion in 1988 to \$301 billion in 2000. While most of CDIA is located in developed countries, over recent years the stock of CDIA in developing countries has grown rapidly.

35. The Government of Canada and its research partners, such as the National Research Council of Canada and the Natural Sciences and Engineering Research Council, have a variety of programs in place to encourage the commercial export of Canadian technology abroad (including technology embodied in goods and services and in Canadian direct investments abroad). Two specific examples are the Canadian International Development Agency's (CIDA) Industrial Cooperation Program and Canada's contribution to the International Model Forest Network.

36. CIDA's Industrial Cooperation Program provides financial support to Canadian businesses planning sustainable business activities in developing countries in a variety of sectors. It reduces the risks to Canadian firms by sharing the costs unique to doing business in developing countries and those associated with providing training, the participation of women, and a clean environment. Recently, support was provided through the Industrial Cooperation Program to a Canadian firm producing components of an air emission filtering system for sale in China. With support from CIDA, the company entered into a joint-venture agreement with a Chinese company. It received program assistance to help train Chinese employees to ensure high-quality production that would meet ISO 9000 certification standards. Of the total training activity cost of C\$320,000, CIDA contributed C\$250,000. The Canadian and Chinese partners each invested C\$1.5 million in leading-edge production equipment. The joint venture is now self-sufficient, and is supplying markets in China, Japan, and Eastern Europe. It employs 60 people in China, and maintains five jobs in Canada.

37. Canada's Model Forest Program was established in 1992 to address the challenge of balancing the extensive range of demands that are placed on Canada's forests. Successes of the program include the development of local-level indicators of sustainability; innovative land-tenure models; best management practices including sustainability codes of conduct for woodlot managers and contractors; and the development and application of geographic information systems technologies for forest management and resources scenario planning. The technologies and knowledge generated through the program are now being exported to the world, including through the International Model Forest Network (IMFN) housed at the International Development Research Centre (IDRC) in Ottawa. Today, the network includes model forests in Canada, Mexico, Chile, Russia, Japan, and the United States. A number of other countries such as Indonesia, Thailand, Philippines, China, Myanmar, and Argentina are preparing to join the network.

## **VI. CONCLUSION**

38. The Canadian experience with technology transfer shows that measures taken to strengthen our domestic innovation capacity have also strengthened our ability to transfer technology internally, attract technology from abroad (whether tacit, codified, and as embodied in people, goods and services), and be an exporter of technology to the world. Canadian domestic policies to establish the internal conditions for a strong innovation capacity (and, by implication, a strong technology transfer capacity) have been complemented and reinforced by the commitments it has undertaken in the WTO and regional trade agreements in a variety of areas, including: investment; intellectual property; standards; market access for trade in goods and services; and government procurement.



## ANNEX 1

### Appendix: Canadian Web-Based Resources Related to Technology Transfer

**Strategis** - Comprehensive online information for Canadian businesses on: markets, trade and investment; industrial perspectives; technology and innovation; micro-economic research and analysis; managing business; and marketplace services. It is also a gateway to other relevant technology transfer sites; <http://strategis.ic.gc.ca>

**National Technology Index (NTI)** - A listing of more than 1,200 licensable technologies from the public sector; [http://strategis.ic.gc.ca/sc\\_innov/nti/engdoc/search/html](http://strategis.ic.gc.ca/sc_innov/nti/engdoc/search/html)

**Opportunity Match** - A companion service will alert you when new technologies that match your profile are entered in the NTI; <http://strategis.ic.gc.ca/SSG/tf00181e.html>

**Trans-Forum** - An online communications and information service which links the industry liaison offices of a growing number of universities, affiliated research institutes, colleges, technical institutes and Centres of Excellence across Canada. Its purpose is to enhance technology and expertise transfer from higher education institutions to Canadian business, especially small and medium-sized enterprises. It makes key services and information accessible to industry liaison officials to assist them in their marketing efforts; <http://strategis.gc.ca/SSG/tf00184e.htm>

**Canadian Technology Network** - A network of industry associations, research organizations, governments, universities and colleges established to provide business people with quick, easy access to data, intelligence and services on technology and related business services; <http://ctn.nrc.ca>

**Department of Foreign Affairs and International Trade - Science and Technology Program** - Working on behalf of Canada's science and technology (S&T) community, the S&T program of DFAIT facilitates the development of international research and development (R&D) collaboration between Canada and other countries, and assists in the collection of intelligence for S&T policy development; [http://www.infoexport.gc.ca/science/home\\_e.html](http://www.infoexport.gc.ca/science/home_e.html)

**National Research Council (NRC)** – Canada's premier R&D capabilities which actively promotes technology transfer in Canada and abroad; <http://www.nrc.ca>

**NRC's Industrial Research Assistance Program (IRAP)** - An extensive network of the National Research Council's Industrial Technology Advisors who provide professional advice and technological know-how to small- and medium-sized companies and put them in touch with people and financial resources to help them undertake research, development and technology adaptation projects; <http://www.nrc.ca/irap/home.html>

**NRC's Canada Institute for Scientific and Technical Information** - One of the world's major sources for information in all areas of science, technology, engineering and medicine; [http://www.nrc.ca/cisti/cisti\\_e.shtml](http://www.nrc.ca/cisti/cisti_e.shtml)

**Statistics Canada** - Provides working papers on S&T; <http://www.statscan.ca>

**Canadian International Development Agency (CIDA)** – Canada's major aid agency which has technology transfer programs; <http://www.acdi-cida.gc.ca/index.htm>

**International Development Research Centre (IDRC)** - A Canadian funded agency that assists developing countries to solve their problems by building science and technology capabilities; <http://www.idrc.ca>

**Canadian Advanced Technology Alliance (CATA)** - An industry association that gets involved in technology transfer through its Technogate brokerage service; <http://www.cata.ca>

**Canadian Manufacturers and Exporters** - An industry association which promotes international trade and development including technology transfers;  
<http://www.cme-mce.ca>

**Research Infosource** - An information and data source on Canadian R&D;  
<http://www.researchinfosource.com>

**Canadian International Trade Tribunal (CITT)** - Canada's procurement complaint review authority; <http://www.citt-tcce.gc.ca>

---