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Diplomacy at the Leading Edge: Advanced Technology and Canadian Trade Policy

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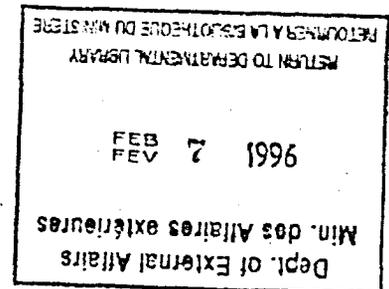
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Executive Summary

Defining Canada's national economic interests has become a much more important exercise with the end of the Cold War and increased economic competition among allies and between regions. Canada's interests are being transformed by technological innovation both at home and abroad. The extent to which enterprises adopt and adapt to new technologies will determine whether or not Canadians maintain or enhance their relative standard of living, economic security and competitive position.

The goal of this Paper is not only to broaden the standard debate beyond traditional questions of government support for commercial research and development and the gathering of technology information abroad, but also to provide relevant recommendations for Canadian trade policy linked to advanced technology. In doing so, the Paper provides an overview of the interaction between legal, economic and trade issues affecting advanced technology markets, with particular reference to the North American Free Trade Agreement (NAFTA) and the WTO and demonstrates how the U.S. and EU have managed to develop and integrate their non-trade policy frameworks to their commercial advantage.

Over 85 percent of Canada's advanced technology exports are to the United States and European Union. As a result, the primary objective of the Paper is to review, through a technology lens, the policies and practices in several key policy domains in both the United States and European Union that have an impact on advanced technology development. In doing so, the Paper proposes to address three fundamental questions:

1. What is the interplay between policies targetted at advanced technology sectors in the United States and the European Union and trade policy?
2. Based on these crossovers and recent technological and policy developments, what are some of the potential sources of dispute?
3. What are Canadian "interests" in this debate?

While a dynamic domestic economy is a prerequisite if Canada is to remain technologically competitive, a discussion on domestic policies for growth and innovation are beyond the scope of this Paper.

Many of the issues discussed in the Paper will not be entirely new to the specialist. Moreover, not all relevant trade policy dimensions are covered, including

technical product standards and import tariffs on many information technology products in big emerging markets. Restraints of space and time have been real considerations in this regard. In addition, the author does not propose a definitive agenda, but rather hopes that the Paper will encourage debate between and among trade and technology policy practitioners and specialists responsible for what are often treated, somewhat erroneously, as disconnected dimensions of economic policy. In the case of advanced technology and trade policy, the whole is clearly greater than its constituent parts.

The Paper first provides an overview of Canadian performance in technology intensive industries. It then looks at the links between technology and five major policy areas: (1) R&D and subsidies; (2) technology-related investment issues, (3) government procurement (4) intellectual property rights (IPRs); and (5) the potential of competition policy to influence high technology trade and investment. The recommendations that follow from the report (see Appendix I) form an inventory of potential Canadian trade policy objectives that can be broadly summarized as follows:

- foreign government promotion of exclusionary technology consortia, which can act to restrain the flow of technology, should be curtailed; consequently, there should be no discrimination against Canadian-owned, U.S.-based affiliates from participating in U.S.-sponsored consortia;
- at least within the NAFTA area, consideration should be given to prohibiting, on a reciprocal basis, subsidy programmes made conditional on R&D being carried out solely within the territory of the granting government;
- the use of locational subsidies or government procurement contracts reserved for domestic industry should be further limited and disciplined in order to lessen the distortions caused by incentives for private sector high-technology firms to locate in a particular jurisdiction;
- Canada should encourage continued reform of intellectual property law in the United States and follow-up amendments to U.S. legislation which discriminate against Canadian companies. Restrictive technology licensing and the excessive use of IPRs that hurt technology diffusion should also be better controlled;
- Canadians need to develop a precise and acceptable definition of patentable living matter. Canada should, therefore, consider hosting an international enquiry on the broader issues of patenting genetic material and other life forms;

- the Government of Canada should monitor closely the evolving U.S. and EU strategy on IPRs to ensure that it does not discourage the amount of R&D undertaken in and the transfer of technology to Canada;
- Canada should continue to review its internal intellectual property policies to ensure the widest possible transfer of technology from government research to the private sector for commercial exploitation;
- the scope of competition policy, particularly within North America, should be modified to capture more clearly the anti-competitive nature of locational subsidies, as well as cross-border predatory pricing practices of the private sector (i.e., as a replacement for anti-dumping law); and
- Canada should be vigilant against harmonization of its competition law to include certain negative features of the current U.S. approach to anti-trust (i.e., greater proclivity to *per se* illegality, citizens suits, treble damages and anti-trust actions by sub-national governments).

Résumé

La définition des intérêts économiques nationaux du Canada a pris beaucoup plus d'importance avec la fin de la guerre froide et l'intensification de la concurrence économique entre alliés et entre régions. Les intérêts du Canada sont transformés par l'innovation technologique au pays et à l'étranger. La mesure dans laquelle les entreprises adoptent les nouvelles technologies et s'y adaptent déterminera si les Canadiens peuvent espérer maintenir ou améliorer leur niveau de vie relatif, leur sécurité économique et leur position concurrentielle.

En plus d'élargir le débat habituel au-delà des questions traditionnelles concernant l'appui gouvernemental à la recherche-développement commerciale et à la collecte d'information technologique à l'étranger, ce document vise à fournir des recommandations pertinentes pour la politique commerciale canadienne en rapport avec la technologie de pointe. À cette fin, il dresse un survol de l'interaction qui existe entre les questions juridiques, économiques et commerciales affectant les marchés de la technologie de pointe, surtout en ce qui concerne de l'Accord de libre-échange nord-américain (ALENA) et l'Accord sur l'OMC. Il montre aussi comment les États-Unis et l'Union européenne ont réussi à développer et à intégrer leurs cadres de politique non-commerciale et ce, à leur avantage mutuel.

Plus de 85 % des exportations canadiennes de haute technologie sont destinées aux États-Unis et à l'Union européenne. C'est pourquoi ce document a pour objectif

premier d'examiner, sous l'angle de la technologie et dans plusieurs domaines clés, les politiques et pratiques des États-Unis et de l'Union européenne qui influent sur le développement de la haute technologie. À cette fin, son auteur propose de traiter des trois questions fondamentales suivantes :

1. Quelle est l'interaction entre, d'une part, les politiques ciblant les secteurs de haute technicité aux États-Unis et dans l'Union européenne et, d'autre part, la politique commerciale?
2. Sur la base de ces interactions et compte tenu des récents développements aux niveaux de la technologie et des politiques, quelles sont les sources potentielles de ces différends?
3. Quels sont les « intérêts » canadiens dans ce débat?

Il est vrai que le Canada doit maintenir une économie intérieure dynamique s'il veut rester technologiquement concurrentiel. Mais l'examen des politiques intérieures favorisant la croissance et l'innovation déborde du cadre de la présente étude.

Plusieurs questions traitées dans ce document ne seront pas entièrement nouvelles pour le spécialiste. De plus, les dimensions pertinentes de la politique commerciale ne sont pas toutes examinées; c'est par exemple le cas des normes techniques applicables aux produits et des droits imposés à l'importation de nombreux produits de la technologie de l'information sur les gros marchés naissants. L'espace et le temps nous ont réellement limités à cet égard. L'auteur ne propose pas non plus de programme d'action; il espère plutôt que son document encouragera un débat entre les praticiens des politiques commerciale et technologique et les spécialistes responsables de ce que l'on traite souvent, plutôt erronément, comme des dimensions disjointes de la politique économique. Dans le cas de la politique touchant la technologie de pointe et le commerce, l'ensemble est nettement plus grand que la somme de ses parties constituantes.

Le document fait d'abord le survol de la performance canadienne dans les industries à forte intensité technologique. Il examine ensuite les liens qui existent entre la technologie et les cinq grands domaines de politique, à savoir: 1) la R-D et les subventions, 2) les questions d'investissement liées à la technologie, 3) les marchés publics, 4) les droits de propriété intellectuelle (DPI), et 5) l'effet potentiel de la politique de concurrence sur le commerce et l'investissement liés à la haute technologie. Les recommandations qui découlent du rapport (voir l'Appendice I) composent un ensemble d'objectifs potentiels pour la politique commerciale canadienne; elles peuvent être résumées en gros comme suit:

- il faudrait tenter d'amener les gouvernements étrangers à avantager moins les consortia technologiques exclusifs, qui peuvent contribuer à entraver les flux technologiques; par conséquent, les filiales canadiennes basées aux États-Unis devraient pouvoir participer librement à des consortia parrainés par les États-Unis;
- il faudrait envisager d'interdire, du moins dans la zone ALENA et sur une base de réciprocité, les programmes de subventions prescrivant que la R-D soit menée exclusivement sur le territoire du gouvernement qui accorde la subvention;
- le recours aux subventions de relocalisation ou aux marchés publics réservés à l'industrie nationale devrait être davantage limité et réglementé afin de réduire les distorsions causées par les incitations offertes pour amener les firmes privées de haute technicité à s'établir sur un territoire particulier;
- le Canada devrait encourager les États-Unis à poursuivre leur réforme du droit de la propriété intellectuelle, et réagir aux amendements à la législation américaine qui exercent une discrimination contre les sociétés canadiennes. L'octroi de licences technologiques restrictives et l'utilisation excessive de DPI entravant la diffusion de la technologie devraient aussi être mieux contrôlés;
- les Canadiens doivent se donner une définition précise et acceptable de la matière vivante brevetable. Le Canada devrait donc songer à lancer une enquête internationale sur les grandes questions liées au brevetage du matériel génétique et des autres formes de vie;
- le gouvernement du Canada devrait surveiller de près l'évolution de la stratégie des États-Unis et de l'UE sur les DPI pour s'assurer qu'elle ne décourage pas la conduite de R-D ou le transfert de technologie au Canada;
- le Canada devrait continuer à revoir ses politiques nationales sur la propriété intellectuelle pour garantir le plus large transfert possible de technologie des établissements publics au secteur privé à des fins d'exploitation commerciale;
- la portée de la politique de concurrence, surtout en Amérique du Nord, devrait être modifiée de façon à refléter plus clairement la nature anticoncurrentielle des subventions de relocalisation ainsi que des prix transfrontières abusivement bas pratiqués par le secteur privé (c.-à-d. comme moyen de remplacer la législation antidumping);

- le Canada devrait veiller à ce que toute harmonisation de son droit de la concurrence exclue certains éléments négatifs de l'approche américaine actuelle des questions antitrust (qui privilégie l'argument de l'illégalité *per se*, les actions intentées par des citoyens, les poursuites en triples dommages-intérêts, et les procédures antitrust engagées par les gouvernements infranationaux).

ALPHABETICAL GLOSSARY OF ACRONYMS

ABC	Advanced Battery Consortium
AMTP	Advanced Manufacturing Technology Program
ARPA	Advanced Research Programs Agency
ATP	Advanced Technology Program
ATPs	Advanced Technology Products
ATPA	Advanced Technology Preeminence Act
CIPO	Canadian Intellectual Property Office
CRADA	Cooperative Research and Development Agreement
DOC	Department of Commerce
DoD	Department of Defence
DOE	Department of Energy
DOJ	Department of Justice
DOT	Department of Transportation
EPA	Environmental Protection Agency
FTC	Fair Trade Commission
FTTA	Federal Technology Transfer Act
GPA	Government Procurement Agreement
IP	Intellectual Property
IPRs	Intellectual Property Rights
MEP	Manufacturing Extension Program
MAI	Multilateral Agreement on Investment
MTN	Multilateral Trade Negotiations
NAFTA	North American Free Trade Agreement
NCRA	National Cooperative Research Act
NCRPA	National Cooperative Research and Production Act
NCTTA	National Cooperative Technology Transfer Act
NIST	National Institute of Standards and Technology
NSF	National Science Foundation
OSTP	Office of Science and Technology Policy
OTCA	Omnibus Trade and Competitiveness Act
PNGV	Partnership for New Generation of Vehicles
SCM	Subsidies and Countervailing Measure (Agreement)
Sematech	Consortium of Semiconductor Manufacturing Equipment Makers
TRIMs	Trade Related Investment Measures
TRIPS	Trade Related Intellectual Property Rights
TRP	Technology Reinvestment Program
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

1. Introduction

● Background and Definitions

Production of advanced technology products (ATPs) is generally perceived as a positive indicator of a nation's competitiveness and technological development.¹ As a result, trade in advanced technology based goods, particularly semi-conductors, computers and aerospace products, has yet to be broadly liberalized for strategic, military and economic reasons.

There are several widely accepted definitions of advanced technology products. These include sectors with: a high content of "new" technology and significant "imbedded" R&D components relative to sales; steep learning curves and high risks due to short product life-cycles; low ratios of transportation cost to value; and rapid growth which often requires access to foreign markets. Increasingly, technology-intensive industries may also include "traditional" sectors of the economy such as the automobile industry.² Moreover, a high mobility of production for advanced technology products often leads to a physical separation of R&D facilities from production sites. ATPs by definition are products, and therefore do not necessarily reflect advances in processing technologies, unless the processing machinery itself is an ATP. Canadian trade in ATPs, for example, does not reflect important process-related innovation gains in Canada's resource sectors.

Most industrialized countries and a number of emerging economies provide incentives and other subsidies to nurture innovation. Reform of these practices as they relate to R&D can be politically sensitive because it is often assumed that government assistance will be welfare increasing for the economy as a whole. Indeed, Japan, Europe and increasingly the U.S. have moved subsidies from basic research to "precompetitive" or generic research, while R&D tax credits in Canada include product-oriented R&D. However, while gains from high technology trade are useful indicators of a nation's competitiveness and level of development, they are often difficult to quantify. The costly irony of this growing pattern of incentives is

¹ As there is no international agreement to define advanced technology products (ATPs), Industry Canada estimates of ATPs are based on a list developed by the U.S. Bureau of Census. To be considered an ATP, a product must contain a high value content of "leading-edge technologies from an advanced technology field." The value of the high-technology element must constitute a significant proportion of the total value of the selected classification code. Currently, ten fields are used to classify advanced technology products: biotechnology, life sciences, optoelectronics, information and communications, electronics, flexible manufacturing, advanced materials, aerospace, weapons and nuclear technology.

² This paper uses the terms technology intensive industries, advanced technology and high technology interchangeably.

that many of the direct economic returns once thought to derive from support for advanced technology industries may have been considerably reduced due to fierce international competition. Assistance to industry in Canada can be and often is outbid elsewhere.

When dealing with advanced technology, not only employment is at stake but competitiveness and national prestige. Due to the perceived economic benefits of advanced technology industries (i.e., more productive and higher paying jobs, enhanced exports and local infrastructure and other "externalities" or spill-over benefits such as learning curve economies), these industries also receive protectionist treatment in many countries.

Thus, one important topic in the current economic debate pertaining to advanced technology trade is the connection between "innovation" and "growth". The usually observed growth benefits derived from direct financial support for R&D activity are currently being reviewed by the Micro-economic Policy Analysis Branch of Industry Canada and by the OECD among others.³ The current consensus also emphasizes the importance of intellectual property rights such as copyright for encouraging innovations, although some recent work puts the focus more clearly on the importance of encouraging innovation diffusion.⁴ In addition, structural impediments to market entry ("systems friction") and the nature of business-government relations often involve instruments of domestic technology policy and are a growing topic of discussion.⁵ While this Paper does not propose to resolve these hotly contested issues, their existence underlines the centrality of advanced technology to the evolving international trade policy agenda.

● The Canadian Context

Canadians have always been required to focus on international markets and linkages for technology, much as we have always needed access to foreign capital

³ For example, see Pierre Fortin and Elhanan Helpman, *Endogenous Innovation and Growth: Implications for Canada*, Industry Canada Occasional Paper Number 10 (August 1995), pp.27-30. For a qualifying statement that suggests that, in certain circumstances, the growth impact of incremental R&D might be less than previously posited in the economics literature, see Alwyn Young, *Growth Without Scale Effects*, National Bureau of Economic Research, Working Paper No.5211 (August 1995).

⁴ For example, see P.A. Geroski, *Innovation and Competitive Advantage*, OECD, Economics Department Working Papers No. 159 (Paris 1995) and I. Prakash Sharma, *Optimal Patent Term and Trade: Some Considerations on the Road Ahead*, Policy Staff Paper No.93/12 (October 1992).

⁵ For example, see Sylvia Ostry and Richard R. Nelson, *Techno-nationalism and Techno-globalism: Conflict and Cooperation*, Washington, DC: Brookings Institution (1995). See also, David Mowery *The Challenges of International Trade to U.S. Technology Policy*, in *Linking Trade and Technology Policies*, (1992), pp. 121-38.

and overseas markets for our goods and services. These trends are intensifying, not only for Canada, but for many industrialized countries including the United States. While Canada has been graced with a comparative advantage in natural resources, continued access to foreign technology is imperative for the current and future competitiveness of many Canadian industries.

New technology often comes from smaller Canadian firms without the capacity to exploit fully their own innovations. A growing number of firms, however, are turning to international cooperation as a way to get more results from R&D funding. Strategic alliances have accelerated technology transfer and internationalized component sourcing and have placed new challenges on the trade policy agenda. Innovation seems to call for larger firms, as they are best equipped to take advantage of the resulting economies of scale. Nonetheless, in some sectors like telecommunications, new technologies have permitted smaller Canadian firms to supply a new range of services without incurring high costs.

The structure of Canadian technology policy results from a multitude of loosely coordinated federal and provincial players, with a certain penchant in the past for "scientific research for the sake of science" - an overstatement, perhaps, but one that does usefully highlight the lack of adequate linkages between much research traditionally done in this country, the private sector and market trends. Until recently, there was, proportionally, minimal government assistance for industrial technology adoption. Increasingly, however, government investment in R&D will be more closely measured for its economic impact as the Government moves to capture more broadly the returns of publicly funded research for the Canadian economy.

- **The International Context**

Early in 1981, William Brock, the then U.S. Trade Representative, proposed that the next round of GATT negotiations target trade in high technology industries as a priority area. However, when the Uruguay Round was launched in September 1986, the U.S. had changed tack and dropped its proposal to identify trade in high technology as a "specific negotiating objective." At the same time, changes in U.S. policy resulted in attempts to restrict the transfer of and access to publicly funded research through controls on foreign access to research consortia. Much of this Paper focuses on the United States as most of our advanced technology exports are destined for the U.S. and that country is by far the major source of technology transfer into Canada. Moreover, U.S. technology policy tends to dominate multilateral agenda setting in this area.

Most trade law, including much of the GATT/WTO, predates "high technology" as a central trade issue. While the World Trade Organization (WTO) framework will reduce traditional barriers on many advanced technology products and facilitate the international transfer of applied new technologies, much remains to be done to shape and implement trade disciplines in this area. Clearly, domestic technology policies in a number of countries have important implications for Canadian foreign policy-makers. The Department of Foreign Affairs and International Trade plays a number of roles with potentially important consequences for high technology policy - from "scientific diplomacy" to more direct commercial support, to developing new and better rules that reduce or eliminate imbalances that negatively affect Canada in the field of technology. Canada has special needs and must ensure progress on some of these issues in the NAFTA context, and in a forward-looking WTO work programme that will hopefully emerge from the 1996 Ministerial meeting in Singapore.

- **Rationale and Goals**

The ultimate goal of the Sections that follow is to provide an overview of the interplay that Canadian trade policy has and should continue to have on Canadian industrial and technology policy in the future. The discussion is on both financial and non-financial "incentives" which include: (1) organizational and financial support for R&D, while denying international investors national treatment in various technology consortia; (2) locational subsidies for foreign direct investment; (3) public procurement practices; (4) the aggressive use of intellectual property rights to slow the rate of technology diffusion; and (5) lax antitrust enforcement. In addressing these issues, the Paper addresses three fundamental questions:

1. What is the interplay between trade policy and policies targetted at advanced technology in the United States and the European Union?
2. Based on these crossovers, and recent technological and policy developments, what are some of the potential sources of dispute?
3. What are Canadian "interests" in this debate?

More generally, the development of a comprehensive economic strategy linked to federal science and technology policy has become a priority as decision-makers scramble to build cohesion from varied constituencies. These challenges are compounded in Canada by the fact that the trade and technology policy communities still find it very difficult to interact on these issues, while various trade policy specialists (e.g., investment, intellectual property, trade remedies, competition policy, etc.) do not meet frequently to compare and contrast systematically the objectives of

their substantive files, much less to review their objectives through a comprehensive advanced technology prism.

This Paper is not, because of space and time constraints, as comprehensive as a full re-evaluation of the trade policy and advanced technology connection might be. For example, we do not explore technology issues related to technical standards, or import tariffs that still impede trade in information and communication goods. Nonetheless, perhaps the most important lesson to derive from the Paper is that we must strengthen further our understanding of the interplay between issues and players. Each policy recommendation made below is of at least some importance. However, it is the whole that clearly tells a much more interesting story of the challenges facing Canada rather than any specific policy recommendation.

Recommendations are included in each of Sections three through five. All of the recommendations are gathered together in the Appendix at the end of the Paper. First, by way of further background, we assess Canada's recent trade performance in technology intensive industries.

2. Canada's Advanced Technology Trade in a Global Context

This Section reviews available Industry Canada and OECD data on Canada's trade performance in advanced technology sectors to understand better the context of various policy issues reviewed later in the text.⁶

2.1 The Global Context

The United States had a commanding technological lead in the 1950s and 1960s. However, the U.S. share of global high-technology exports, which stabilized at 24-25 percent during the period 1976-1985, declined to 21-22 per cent during 1985-89. In Japan, the level of high technology imports has remained relatively unchanged over the last two decades, with domestic suppliers accounting for about 95 percent of the Japanese market for high technology products.⁷

The decline of the U.S. and European "science-based" sectors relative to Japan between 1970 and 1990, due mainly to declines in the electronics sector, has been a cause of great angst and sparked a number of changes in U.S. technology policy. The rapidity with which the U.S. domestic economy "internationalized" during this period is considered central to understanding the U.S. debate in the 1990s over technology and trade policies.⁸ The U.S.'s responses to this internationalization has had, and will have, significant implications for Canada.

In 1993, over 80 percent of the world's R&D expenditure and approximately 70 percent of the world's R&D personnel were located in 5 industrial countries (the U.S., Japan, France, the United Kingdom and West Germany).⁹ With the addition of five smaller European countries, the shares rise to over 90 percent and 80 percent respectively.

⁶ For example, see Industry, Science and Technology Canada, *Trade in Advanced Technology Products, S&T Economic Analysis Division, ISTC, Ottawa, 1992*. About 500 of the 22,000 commodity classification codes used in reporting U.S. merchandise trade were identified as "advanced technology." In this report, the 500 ATPs in the U.S. list were aggregated to the six-digit level in order to make a successful cross-over to the HS tariff system, which reduced the number of commodities to 222.

⁷ Japan is the only country to have doubled in 15 years its export market shares in high technology sectors, without increasing the overall rate of manufacturing import penetration. *Ibid.*, p. 197.

⁸ For example, see *Technology and Trade Performance*, in *Science and Technology Policy: Review and Outlook 1994* (OECD 1994), pp. 195-223.

⁹ R&D is defined as creative work undertaken on a systematic basis to increase the stock of scientific and technical knowledge in new applications. Expenditures on R&D are an important indicator of the effort devoted to creative activity in science and technology.

According to the most recent OECD S&T Policy Outlook (1994), an analysis of world trade of manufactured goods reveals a deepening process of specialization. Trade balances in high technology sectors show an increasing surplus by Japan vis-à-vis the United States and Europe and by the United States vis-à-vis Europe. Current reductions in R&D funding risk weakening the position of Canada and Europe and increasing the gap between the largest economies and others.¹⁰

2.2 Canada's Advanced Technology-Based Economy¹¹

In 1994, advanced technology products constituted 10 percent of total Canadian merchandise trade (imports plus exports) or 8.5 percent of total Canadian exports. Table 1 presents Canadian trade in advanced technology industries for 1990-1994. During this period, advanced technology trade grew by 76 percent, compared with a 49 percent increase for merchandise trade as a whole.

Table 1 - Canada's Imports and Exports by ATP Category, 1990-94					
	Imports	Exports	Balance	Total	Total share of merchandise trade
	(millions of dollars)				(%)
1990	11 804	12 412	609	24 216	8.6
1991	15 224	13 429	-1 795	28 653	10.4
1992	17 043	12 336	-4 707	29 379	9.7
1993	19 122	15 276	-3 846	34 398	9.8
1994	24 216	18 368	-5 848	42 584	10.1
Change from 1990-1994 (%)	105	48	--	76	

Source: Industry Canada estimates.

¹⁰ See Science and Technology Policy: Review and Outlook 1994 (OECD)1994.

¹¹ This section is indebted to Industry Canada's chapter *Trade in Advanced Technology Products* in *The Resource Book for Science and Technology Consultations* (Vol. II), Secretariat for Science and Technology Review, Industry Canada (August 1994). To ensure equitable comparisons of the data, all Canadian import data were converted to 1986 constant dollars using the Bank of Canada import implicit price index. This report has since been updated and revised in a study undertaken for Industry Canada by Denzel J. Doyle and Paul Timmins, *Canada's Trade Performance in Advanced Technology Products* (September 1995). The analysis, which is incorporated in this Section, is based at the full 10-digit HS (Harmonized System) level for 10 ATP categories that are used by the U.S. Department of Commerce. This classification is based on the classification of products as opposed to industry sectors and refers only to products and not to services.

Canadian exports of high technology products grew 48 percent from \$12.4 billion in 1990 to \$18.4 billion in 1994. The principal deficit sectors were information and communications equipment and advanced electronics (see Table 2). The primary two industries with a surplus during this period were aerospace and advanced materials. Two categories, information and communications, and aerospace, accounted for about 80% of Canada exports in 1994.

Imports grew an even faster 105 percent during this period. As a result, Canada went from a small advanced technology trade surplus in 1990 to a deficit of \$5.8 billion in 1994. It should be noted that, given Canada's much higher than OECD average reliance on off-shore inputs, our value-added deficit is even higher. In fact, it is suggested that advanced technology industries, while paying higher than average wages, operate in relative isolation from the domestic economy, since their output is largely exported and their intermediate inputs are often imported.¹²

Table 2 - Balance of Trade by ATP Category, 1990-94					
	1990	1991	1992	1993	1994
(millions of dollars)					
Biotechnology	-93	-107	-138	-176	-213
Life sciences	-388	-504	-472	-515	-701
Opto-electronics	4	-3	-61	-61	-81
Information and Communications	-2 118	-1 634	-2 334	-2 726	-2 556
Electronics	1 218	-207	-1 637	-2 128	-3 854
Flexible Manufacturing	-563	-462	-408	-414	-680
Advanced Materials	83	-823	3	27	42
Aerospace	2 639	2 059	491	2 293	2 554
Weapons	-73	-68	-44	-114	-196
Nuclear technology	-100	-47	-108	-32	-163
Total	609	-1 795	-4 707	-3 846	-5 848
Source: Industry Canada estimates.					

¹² A recent study indicates that approximately 16% of the value of Canadian exports result from imported inputs. Imported inputs, however, remain central to the competitive survival of several advanced technology export industries. See James McCormack, *The Impact of Exports: An Input-Output Analysis of Canadian Trade*, Policy Planning Staff Paper No. 94/12, Department of Foreign Affairs and International Trade, December 1994.

A deficit position for most technologies occurred across most geographic regions (see Table 3). One exception is trade with nations included as "Other," where Canada had a trade surplus in five industries in 1994. Canada also had a small overall surplus with the United States of \$151 million (see Table 4) after running two years of deficits. Canada's overall trade deficit with "Other", primarily Asian nations, however, increased 511 percent during 1990-1994 to \$3.2 billion representing 54 percent of Canada's advanced technology trade deficit. Canada's 1994 trade deficit with Japan was \$2.2 billion or 38 percent, while it was \$625 million with the European Union or almost 11 percent of the total deficit (see Table 4).

Table 3 - Balance of Trade by Selected Regions, 1994				
	U.S.	Japan	European Community	Other
(millions of dollars)				
Biotechnology	-180	-3	-22	-9
Life sciences	-593	-35	-105	32
Opto-electronics	-66	-36	12	9
Information and Communications	123	-1 189	-21	-1 469
Electronics	-160	-831	-524	-2 339
Flexible Manufacturing	-534	-128	-87	68
Advanced Materials	-70	-8	60	52
Aerospace	1 833	28	93	600
Weapons	-151	-5	-28	-12
Nuclear technology	-51	-4	-4	-107
Source: Industry Canada estimates				

Table 4 - Balance of Trade by Selected Economic Area, 1990-94					
	World	U.S.	Japan	European Community	Other
(millions of dollars)					
1990	609	909	-1 260	189	772
1991	-1 795	796	-1 366	-248	-976
1992	-4 707	-1 143	-1 327	-634	-1 603
1993	-3 846	-173	-1 707	234	-2 200
1994	-5 848	151	-2 201	-625	-3 174

Source: Industry Canada estimates

Table 5 presents Canada's bilateral trade by region for 1994. The relative importance of the U.S. for exports and imports combined remains significant and increased slightly, to 68 percent from 67 percent in 1990, while the percentage of Canada's advanced technology trade with the European Community (8 percent) also remained stable. However, Canada's trade deficit with Japan has been growing rapidly, with imports almost doubling while exports remained static.

Table 5 - High-Technology Trade, by Region, 1994							
	Total value	(%)	Exports	(%)	Imports	(%)	Balance
(millions of dollars)							
United States	29 019	68	14 585	79	14 434	59	151
Japan	2 525	6	162	1	2 363	10	-2 201
European Community	3 234	8	1 305	7	1 929	8	-625
Other	7 806	18	2 316	13	5 490	23	-3 174

Source: Industry Canada estimates

2.3 R&D Expenditures and Technology Balance of Payments

The structure of Canada's postwar technology policy has been characterized by heavy reliance on federal R&D funding as a percentage of national R&D expenditure. Canada's planned R&D expenditures in 1995 was at 1.56% of GDP.¹³ As a percentage of GDP, Canadian R&D expenditure has remained relatively constant throughout the 1990s. According to Statistics Canada, the business sector intended to perform 59% of the total R&D, higher education 24% and the federal government 13% for a total of \$11.8 billion.

In 1995, Canadian universities, as in the U.S., account for a large share of national R&D, especially for basic research. The importance of small firms and service industries in technology commercialization is also increasingly recognized. In 1987, a quarter of industrial R&D was performed in service industries, a share which has risen steadily to 30 percent in 1994.¹⁴

Canada has one of the highest proportions of R&D financed directly from foreign sources among OECD countries. In 1991, 72.3 percent of Canada's business sector R&D expenditure was funded by industry; 9.6 percent by government; and 18.1 percent from foreign sources.¹⁵ (It is unclear from the data whether foreign firms are relocating their R&D to Canada or simply acquiring existing R&D facilities). Moreover, about 40 percent of all R&D funded by industry in Canada is performed by subsidiaries of foreign companies.¹⁶

For its part, the Technology Balance of Payments (TBP) does not measure R&D proper, but rather concerns the purchase and sale of technology. The TBP covers international transactions relating to trade in patents and licenses based on patents and other associated elements of industrial property and includes payments for services with scientific or technological content.¹⁷ Virtually all OECD countries pay as

¹³ Also known as the GERD, or "gross domestic expenditure on research and development", total R&D expenditures represent all R&D performed in a country's national territory during a given year. The GERD includes R&D performed within a country and funded from abroad but excludes payments sent abroad for R&D performed in other countries.

¹⁴ See Antoine Rose, *Strategic R&D Alliances*, Analytical Paper Series No. 4 Services, Science and Technology Division, Statistics Canada (1995).

¹⁵ OECD, *Science and Technology Policy: Review and Outlook*, (1994), p. 160.

¹⁶ *Ibid.*, p.148.

¹⁷ When reviewing TBP, it should be remembered that it covers both the current acquisition of technology and outflows for past contracts. See *Ibid.*, Table II.35, p. 185.

much or more for technology than they earn. Some have outflows two times greater than receipts and occasionally even higher. The main exception is the U.S., which is in a very strong surplus position with receipts about five times higher than payments in 1990. Canada's payments in 1990 (US \$775 million) were moderately higher than receipts (US \$721 million). As a result, Canada's TBP ratio (payments/receipts) was 1.07 in 1990, or similar to that of Japan (1.10) and the United Kingdom (1.04).¹⁸

2.4 Summary

Canada's recent trade balance performance in high-technology industries is largely negative. The sector is characterized by the rapid growth of imports and exports. The trade statistics demonstrate that, while the United States and European Union continue to be our largest market for technology exports (86% of advanced technology exports in 1994), trade with the Pacific Rim countries is quickly growing in importance. But is a deficit in advanced technology trade the entire story or even the most important factor?

While Canada may be lagging in infrastructure (i.e., the information highway), R&D expenditures and capital markets, in most areas Canadians clearly are getting the technology they need, embedded in goods, through licensing and through foreign direct investment. Although losing some learning and other externalities in some sectors, Canadians have tended to develop indigenous technology to improve competitiveness in sectors where they already have a comparative advantage (i.e., natural resources and agriculture) and in advanced technology industries that fit the country's physical and geographic needs (i.e., telecommunications, aspects of aerospace and biotechnology). Coe and Helpman suggest that Canada clearly benefits from "spillovers", primarily from the U.S., which help to offset its overall trade deficit in advanced technology.¹⁹

Recognizing that a small, open economy can really only expect to develop a handful of technology leaders, the rest of this Paper identifies issues that need to be addressed if we are to maintain unimpeded access to our traditional sources of technology abroad in those areas important to our economic security and to nurture future technology leaders.

¹⁸ Ibid.

¹⁹ David T. Coe and Elhanan Helpman, *International R&D Spillovers*, National Bureau of Economic Research Working Paper Series No.4444 (August 1993).

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3. Non-Tariff Barriers to Advanced Technology Trade and Investment

3.1 Introduction

Sustaining long-term economic growth in advanced economies continues to depend on technological innovation.²⁰ As a result, there are increased efforts by industrialized countries to strengthen their technological competitiveness through incentives and related performance requirements. This has resulted in a variety of discriminatory non-tariff measures with significant trade-distorting effects, a situation calling for new policy and rule-making responses.

Recognizing that subsidies along with government procurement are significant factors in U.S. and European "strategic" trade policy, this section briefly outlines several Canadian policy concerns. In this regard, particular reference is paid to the NAFTA and the WTO Agreements on Subsidies and Countervailing Measures (SCM Agreement)²¹ and Government Procurement. Recommendations, found throughout the text, call for: 1) further limits on the use of subsidies, especially investment subsidies and locational incentives; 2) national treatment for Canadian companies that wish to participate in joint research projects - especially within the NAFTA free trade area; and 3) discipline on the use of public procurement contracts, reserved for domestic industry, that provide incentives for private sector R&D or other high technology investment in a particular jurisdiction. The specific recommendations are also listed in the Paper's Appendix.

The questions addressed in this section, analyzed in light of the above objectives, can be summarized under three broad headings:

Unilateralism: How do asymmetries of market access and the "conditional" application of national treatment entrenched by some of Canada's trading partners affect Canada's technology base and the industrial sectors which depend on it?

²⁰ For example, see Paul R. Krugman, *Technology and International Competition: a Historical Perspective*, in Martha Caldwell Harris and Gordon E. Moore, eds., *Linking Trade and Technology Policies* (1992), pp. 13-29.

²¹ *Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiation*, 15 April 1994, Agreement on Subsidies and Countervailing Measures, referred to here as the SCM Agreement.

Balancing Canadian Interests: How has the nature of Canadian interests related to subsidies and countervailing duties changed? Should Canadians be concerned over recent developments in U.S. government-funded R&D and locational incentives?²²

Technological Protectionism: Is technological protectionism through government procurement and other legislation drawing some Canadian firms south of the border or abroad as they attempt to get behind non-tariff barriers through direct investment and joint ventures?

We begin the discussion with a brief examination of the nexus between trade in technology and subsidies. We then review how subsidies and government procurement practices may not only increase barriers to free trade but affect inward and outward Canadian investment.

3.2 The Policy Context: A Brief Overview

3.2.1 The Trade and Investment Implications of R&D

Conventional wisdom and the theoretical predictions of models of endogenous innovation suggest that increased research effort should lead to more rapid growth. Certain recent economics research, however, has begun to question whether this relationship is always as strong as usually posited. In certain circumstances, incremental R&D may not increase an economy's growth rate.²³ Nonetheless, the standard view, drawing on a number of empirical studies, remains that R&D is a good investment with a positive rate of return at the firm level and significant spill-overs across firms and industries.²⁴

Moreover, many nation states are no longer willing to promote and support large-scale R&D subsidies without ensuring that the results clearly and directly benefit "national" firms and that the exploitation of that research stays in the country where

²² It has been pointed out that there is no evidence of significant demand by Canadian firms for access to foreign technology consortia. See Rhoda Caldwell, *Technology Consortia: A Prisoner's Dilemma?*, Policy Staff Paper No. 93/10, Department of Foreign Affairs and International Trade (July 1993).

²³ See Young, *Growth Without Scale Effects* and several articles by Charles Jones, including *Empirical Evidence on R&D Based Models of Economic Growth*, Manuscript, Department of Economics, Stanford University, 1994.

²⁴ Fortin and Helpman, *Endogenous Innovation and Growth*, p.28 report that the social rate of return on R&D is higher than the private rate by a factor that ranges from two to five.

the investment originates.²⁵ As a result, there is growing concern over the increasing lack of transparency in the development and implementation of national R&D strategies which can lead to the distortion of investment behaviour with adverse effects on trade flows.²⁶

The economic importance of R&D is evident by the fact that the greatest growth in international trade during the last decade was in the sectors of the highest R&D intensity.²⁷ The importance of this linkage is compounded in Canada by the country's dependence on investment by foreign-owned manufacturing affiliates, rather than mostly on domestically-controlled industries, for R&D, technology transfer and exports.²⁸ Belgium and Canada aside, most developed countries depend on home-based firms for the bulk of their R&D/technological activities.²⁹

Historically, R&D has tended to be both centrally controlled and centrally located. The increasing separation of R&D from production, however, makes it easier for a firm to avoid the intent of trade and industrial policy. In some sectors, technology "production" is disappearing (e.g., software and telecommunications) as most of the cost of producing products is in R&D. In other sectors, R&D is being decentralized as "virtual" corporations contract research (e.g., in pharmaceuticals and biotechnology) or purchase subsidiaries to work with at arm's length (e.g., Microsoft's purchase of Softimage).

It is no longer certain that R&D will be located within the home country nor that attracting FDI will bring R&D with it. Nor is it certain that, in attracting R&D, host countries will attract production. A complicating factor when analyzing technological aspects of foreign investment is that it tends to be industry specific. These issues are further confused by questions of "national security". Clearly, some sectors are more important than others, since failure to invest in certain "strategic" technologies with

²⁵ In the private sector, measures to protect technology are most evident in the push for broader and deeper intellectual property rights.

²⁶ Inducement bidding wars over R&D incentives and locational subsidies offered by countries and sub-regional governments are often negated by their cost. See *Multinationals and the National Interest: Playing by Different Rules*, Office of Technology Assessment of the U.S. Congress, September 1993, p. 67.

²⁷ In the first half of the 1980s, these sectors accounted for about 20 per cent of OECD industrial exports (and more than 30 per cent for the United States) against less than 14 percent in 1975.

²⁸ MNEs outspend domestic companies in R&D. Bertin and Wyatt found this to be the case in the U.S.. Work done by Statistics Canada has found a similar tendency in Canada.

²⁹ The bulk of FDI in Canada has taken place within industries of medium R&D expenditures (which have more mature technological inputs). In contrast, services have been one of the major growth areas of FDI and are a major user of advanced technologies.

high growth potential and broad infrastructure applications may jeopardize future competitive success and result in increased costs later.³⁰

Among the top 100 foreign firms doing R&D in Canada in 1993, 68 percent was conducted by U.S. firms, down from 76 percent in 1986.³¹ Perhaps more surprising, however, is the fact that Canadian firms now invest in R&D in the United States almost half the value of what they do in Canada, and this amount is growing.³² A number of Canadian firms have invested heavily in R&D operations in the U.S to cultivate good economic relations with U.S. scientific and political elites. American political elites, however, are becoming increasingly demanding and protectionist. Clearly, even when formal market access commitments have been made, investors are often frustrated by informal barriers.³³

3.2.2 Technology Consortia and Countervail

Technology consortia for R&D purposes exist in virtually every industry. However, they tend to be concentrated in the knowledge-intensive product and service sectors: motor vehicles, telecommunications and electronics. The benefits of such R&D cooperation are well documented. They include: product development, new networks of contacts, the potential for enhanced international marketing and joint venture opportunities, and increased export sales.³⁴ European and U.S. rules of participation in government-supported R&D consortia limit access to foreigners through intellectual property restrictions and discriminatory rules on participation (see section 3.3.1 below).

³⁰ "Strategic technologies" include biotechnology, new materials, microelectronic technologies and telecommunications.

³¹ See Stephen Wilson, *Changing Partners: Trends and Prospects in Canada's Regional Economic Relations*, Policy Planning Staff paper No. 95/02, Department of Foreign Affairs and International Trade, February 1995. The relative decline of expenditures by U.S. affiliates is apparently due, in part, to the growth of R&D spending by European affiliates, primarily in the pharmaceutical sector.

³² Canadian companies spent almost US\$2 billion on R&D in the United States in 1990 or almost half the value of Canadian firms' R&D spending in Canada. See Statistics Canada, Service Bulletin, Science Statistics Vol. 17, No. 5 (August 1993), p.4.

³³ See Industry Canada, *Formal and Informal Investment Barriers in the G-7 countries*, Occasional Paper No.1 Vols. I and II, Ottawa: Government of Canada (1994).

³⁴ For a study on the role for R & D consortia in Canadian technology development, see Vinod Kumar and Sunder Magun, *The Role of R & D Consortia in Technology Development*, Occasional Paper No. 3, Industry Canada, (February 1995).

R&D consortia often have diffuse goals due to the pre-competitive nature of their research and, unlike most joint ventures, include direct competitors. The growing integration of government and university laboratories with private sector research in the form of technology consortia has had a profound effect on the nature of subsidized collaboration.³⁵

For its part, countervailing duty law establishes that generally available subsidies are not "actionable", including for research purposes. In addition, the U.S. Department of Commerce practice has been to countervail an R&D subsidy if it is specific unless the results are made generally available.³⁶ Moreover, the threat that large economies will use countervailing duties against imports, like the use of investment subsidies in those same economies, can influence corporate decisions in favour of investing in larger countries to the detriment of smaller jurisdictions.

The Uruguay Round developed internationally agreed-upon rules for defining and categorizing subsidies.³⁷ Government subsidies are "actionable" or "non-actionable" depending on the nature, objective and amount of the subsidy. Some other subsidies are simply "prohibited" notwithstanding the amount of subsidy (e.g., export subsidies for non-agricultural goods). As noted above, certain R&D subsidies are not actionable.³⁸ Prohibited and actionable subsidies may be subject alternatively to WTO dispute settlement procedures or countervailing duties applied by the importing country in accordance with Part V of the SCM Agreement, with the caveat that only one form of relief (countervail or WTO dispute settlement) shall be available to the

³⁵ Due to their potentially collusive behaviour, technology consortia are sometimes considered anti-competitive.

³⁶ Countervailing duties are trade measures that may be applied at the border where subsidized imported goods are found by the domestic investigating authority to distort the market (i.e., cause material injury or threat of material injury to a domestic industry, or material retardation to the establishment of such an industry). For an investigation to proceed, the domestic authority must demonstrate: a) the existence of a subsidy, b) injury, and c) a causal link between the subsidized imports and injury.

³⁷ For overviews of the SCM Agreement, see: Patrick J. McDonough, *Subsidies and Countervailing Measures*, in Terence Stewart (ed.), *The GATT Uruguay Round: A Negotiating History (1986-92)*, Volume 1, Kluwer Law and Taxation Publishers, Cambridge Massachusetts (1993); Gilbert Gagné, *North American Free Trade, Subsidies and Countervailing Duties: Issues and Options*, Policy Staff Paper No. 94/13, Department of Foreign Affairs and International Trade (July 1994); George Kleinfield and David Kaye, *Red Light, Green Light? The 1994 Agreement on Subsidies and Countervailing Measures, Research and Development Assistance, and U.S. Policy*, *Journal of World Trade*(November 1994).

³⁸ Governments are prohibited from granting subsidies contingent either on export performance or the use of domestic products (SCM Agreement Article 3.1). Governments must use caution to avoid "actionable" subsidies, i.e., those causing "adverse effects to the interests of other members" of the WTO (SCM Agreement Article 5.1). Governments may provide non-actionable subsidies, i.e., those which are generally available or not specific within the meaning of the Agreement (including regional development assistance that is generally available within designated disadvantaged regions), or those which are specific but which meet certain prescribed criteria (for R&D and environmental reconversion).

importing country with regard to the effects of a particular subsidy in the importer's domestic market.

3.2.3 Investment Locational Subsidies

The Uruguay Round's Subsidy and Countervailing Measures Agreement (SCM) provides for an exhaustive definition of subsidy that is based on the concept of a financial contribution that confers a benefit (i.e., the SCM requires that for a subsidy to exist there must be a financial contribution by a government which is further defined through a list of practices that constitute financial contributions, including any form of income or price support under GATT Article XVI). For a subsidy to be subject to trade action (i.e., via the countervail or serious prejudice provisions), it must also be found to be "specific" within the meaning of the Agreement.

The SCM Agreement does not prohibit investment subsidies, including locational incentives. Nonetheless, the SCM's new provisions dealing with "serious prejudice" (as yet untested) may provide some recourse against locational subsidies that, *inter alia*, also result in import displacement. Specifically, Article 6 refines the original GATT Article XVI:1 concept of serious prejudice. This provision represents a useful step toward further discipline, although it should also be noted that the serious prejudice provision is by no means air-tight. For example, where the recipient firm is a "start-up" company, an overall rate of government subsidization not exceeding 15% of the total funds invested is permitted.³⁹

3.2.4 Government Funding of Defence R&D and Procurement of Advanced Technology

Government procurement of technology is not an insignificant issue, as Government expenditures account for one-quarter to one half of gross national product in most countries. Due to the magnitude of the spending involved, public procurement is considered one of the most important trade-related issues for high technology industries and an important source of demand for products and services such as in aerospace, electronics, information technology and biotechnology.

³⁹ See SCM Agreement, Annex IV, paragraph 4.

● **Government Funding of Defence R&D**

During the Cold War, technology policies in the EU and North America were often motivated by military security concerns rather than economic strategy. As a result, government funding of "applied" R&D was often confined largely to purely defence-related areas. Defence economic cooperation between Canada and the United States, for example, is an important part of the bilateral relationship and perhaps unique in the world.⁴⁰ The comprehensive network of existing arrangements on defence trade and production originated during World War II, when the two governments decided to pool industrial resources to increase the effectiveness of the allied war effort. Successive governments have recognized that the cooperative use of research, development and production resources is in our mutual military and economic interest.⁴¹

The effect of government expenditures on private industrial R&D is generally believed to have a significant spillover and give a considerable boost to domestic private R&D spending.⁴² Moreover, procurement can have a marked effect on investment location decision-making. Recently, the Clinton Administration has promoted military-civilian technology links under "dual-use" technology programmes which has stretched the notion of "national security", and confused legitimate government expenditure on basic R&D with subsidized research used for commercial purposes. Such targeted government procurement, like subsidies, can be used as a policy instrument to reinforce government support for high-tech industries with spinoffs from the technology developed transferred to other commercial applications.

⁴⁰ The Permanent Joint Board on Defense (PJBD) was established in 1940 to "develop a coordinated program of requirements, production and procurement...." The goal was to remove as far as possible barriers which would impede the flow between Canada and the U.S. of goods essential for the common defence. Since that time, Canada and the U.S. have concluded over 200 defence-related agreements. Collectively, these agreements have become known as the Defence Production Sharing Agreement (DPSA).

⁴¹ For example: Defence Development Sharing Agreement (DDSA). DDSA products cannot be set-aside for Small/Disadvantaged Businesses (DFARS 219.502-1); Defence Production Sharing Arrangement (DPSA) which provides access not afforded under the NAFTA (Annex 1001b-2).

⁴² See R. Preston McAfee and John McMillan, *Government Procurement and International Trade*, *Journal of International Economics*, (26) 1989, 291-308; F. Lichtenburg, *The Effect of Government Funding on Private Industrial Research and Development: A Reassessment*, *Journal of Industrial Economics*, (36) 1987, 97-104; D. Levy and N. Terleckyj, *The Effects of Government R&D on Private R&D Productivity: A Macro-economic Analysis*, *Bell Journal of Economics*, (14) 1983, 551-61.

- **Procurement of Advanced Technology**

Most governments discriminate in favour of national producers when purchasing goods and services, often through unwritten rules that protect "national champions". The justifications for protectionism include: attempts to assure supply of critical national services (i.e., national security), or simply to protect local producers and employment from foreign competition. Administrative practices include: selective and single sourcing, contracts not open to public tender, stringent technical and financial requirements tailored to local suppliers, non-price criteria, and tacit understandings between government and industry. In some cases, awarding government procurement contracts has been conditional on a supplier licensing technology to local firms and/or on the basis of offsets.

A new Government Procurement Agreement (GPA), negotiated during the Uruguay Round, will enter into force 1 January 1996.⁴³ The GPA is an attempt to open non-discriminatory access to public tenders for the supply of goods and services. The Agreement calls for international competitive bidding and expands the list of public agencies subject to multilateral rules. The NAFTA, while providing substantial commitments, does not yet cover procurement by sub-national governments. Such jurisdictions will be covered to a certain degree if the GPA negotiations successfully conclude.

3.3 Non-Tariff Barriers to Advanced Technology Trade

3.3.1 Technology Consortia and National Treatment

The early 1990s saw direct U.S. government funding of commercial R&D begin in the areas of advanced computing and bio-technology. With the 1992 election of Bill Clinton, the U.S. government's partnership with industry to develop "strategic technologies" became a major element of U.S. economic policy. As a result, the U.S. Congress, through a variety of technology-related legislation, has given enhanced roles to the Departments of Commerce, Energy and Defense to assist U.S. companies to develop and commercialize technology in key industry sectors.⁴⁴ The ultimate goal of U.S. legislation is to ensure that taxpayer-funded R&D provides real benefits to the U.S. economy as measured by job creation and retention, economic growth and

⁴³ The GPA supersedes the GATT Procurement Code of 1981 which was the first multilateral attempt to discipline government procurement.

⁴⁴ For example, the Commerce Department's proposed R&D budget for 1996 under the National Science and Technology Council Initiatives will increase 26%. A Citizen's Guide to the Federal Budget (1995).

international competitiveness. In this regard, it should be noted that neither the NAFTA nor the Uruguay Round SCM Agreement restricts a government's right to offer a subsidy contingent on R&D being carried out domestically.

U.S. investment policy remains controversial in its attempts to leverage advantages by increasingly demanding reciprocity from the home country of investors, rather than by encouraging investment on a non-discriminatory basis under the principle of national treatment. A number of pieces of U.S. technology legislation, for example, limit foreign-owned companies located in the U.S. from participating in U.S. government-funded technology consortia and include specific reciprocity provisions. This runs counter to attempts to eliminate cross-border restrictions in favour of national treatment under the NAFTA. With a protectionist Republican Congress, such calls for reciprocity in the U.S. are likely to increase.⁴⁵ The following statutes are areas where Canada will want to pursue market-opening initiatives within the NAFTA, if Canadian companies are to be freed from undue restrictions on access to publicly funded R&D programs.

- **The National Cooperative Research Production Act**

Legislation such as the National Cooperative Research and Production Act (NCRPA) of 1993 continues to erode access to U.S. R&D initiatives. The Act, which amends the 1984 National Cooperative Research Act (NCRA), is designed to promote innovation, to facilitate trade and to strengthen U.S. competitiveness in world markets. The Act also requires commitments by U.S. recipients of Government

⁴⁵ Proposed/Approved Legislation in the 103rd Congress containing reciprocity provisions included:

National Cooperative Production Amendments Act of 1993, H.R. 1313/S. 574, accords limited antitrust immunity to joint production ventures. Signed into law on 10 June 1993.

Environmental Technologies Act of 1994, H.R. 3870/S. 978, promotes environmental technologies in the U.S. by coordinating federal R&D efforts and encouraging government/industry partnerships. Passed in the House and Senate.

Department of Energy National Competitiveness Technology Partnership Act of 1993, S. 473, restructures Department of Energy laboratories to promote partnerships with the private sector. Passed in Senate without the discriminatory provision.

The National Competitiveness Act of 1994 (HR820) did not become law. The Manton Amendment, that would have prevented foreign owned firms in the U.S. from participating in research programs that H.R. 820 funded unless the foreign companies country of origin provided comparable opportunities for U.S. firms, was defeated.

Source: United States Congress; SRI International.

subsidies to promote the post-research manufacture, within the United States, of products resulting from technologies developed with government assistance.⁴⁶

One primary issue for Canada is the fact that the NCRPA discriminates against the operations of Canadian companies located in the U.S.. Moreover, the manufacturing obligations resulting from this legislation also limit the potential benefits to Canada of participation in U.S. government-funded or contract R&D. An additional difference between the NCRPA and its predecessor is that the U.S. now applies the principle of reciprocity rather than the principle of national treatment. In addition, the legislation seeks to protect U.S. firms further from punitive treble damages in a private anti-trust suit, thereby discriminating further against Canadian companies in terms of U.S. anti-trust law (this issue is discussed in greater detail in Section 5).

- **The U.S. Technology Transfer Act and CRADAs**

Technology transfer requirements are one of the most frequently reported trade-related investment measures practised. The U.S. National Competitiveness Technology Transfer Act, for example, gives U.S. Federal laboratories the right to enter into cooperative agreements with firms and consortia of firms for R&D, but with preference given to American firms when establishing such agreements.⁴⁷ As a result, subsidies can be provided to national firms and not to foreign-controlled affiliates based in the U.S..

One relevant programme resulting from the U.S. Federal Technology Transfer Act are Cooperative Research and Development Agreements (CRADAs), which are

⁴⁶ *National Cooperative Production Amendments of 1993* P.L. 103-42 H.R. 1313/S. 574 15 U.S.C.s 4306. See also, *American Technology Preeminence Act* P.L. 102-245, including the *Technology Administration Authorization Act of 1991* H.R. 1989/S. 1034; 42 U.S.C. s 13525.

⁴⁷ CRADAs were first authorized by the Stevenson-Wydler Technology Innovation Act of 1980, P.L.96-480, 94 Stat. 2311, updated by the National Competitiveness Technology Transfer Act of 1989, P.L. 101-189, 103 Stat. 1674 at Section 3133.

Article XXIII of the Department of Energy's Master Cooperative Research and Development Agreement which applies to PNGV projects involving DOE's National Labs requires, *inter alia*, that :

- Participants' (USCAR's) member companies are domestic companies which have their research and development, design, administration and production facilities for motor vehicles, located predominately in the United States and Canada.
- A Participant agrees that its share of joint research projects under the CRADA will be conducted predominately in U.S.-based facilities during the term of the CRADA and, if the Participant continues the work, for a period of two years after the completion of the CRADA.
- The Participants and the Contractor direct the joint research projects in such a manner that, when viewed across the entire multi-year programme, they promote early and first utilization and/or commercialization of the products, processes, or services utilizing intellectual property arising from the programme in U.S.-based facilities of the Participant's member companies and their suppliers. See 15 U.S.C. Section 3710 a(c)(4) (emphasis added).

government-industry agreements with U.S. Federal laboratories to develop new technology. By statute, CRADAs must give preference to business units located in the United States which agree that products embodying inventions made under the cooperative research and development agreement or produced through the use of such inventions "will be manufactured substantially in the United States."⁴⁸

One notable CRADA of importance to Canada is the U.S. Department of Energy's work with Chrysler, Ford and General Motors ("the Big Three") automobile makers to develop batteries for advanced electric cars via the Advanced Battery Consortium (ABC).⁴⁹ Under the ten-year project, U.S. government agencies and laboratories will work on the development of a vehicle that will be up to three times more fuel efficient but that costs no more to own or operate. To coordinate cooperative automotive R&D ventures, the Big Three have also cemented a "members only" Council for Automotive Research (USCAR) that is closed to all other auto makers. The worrying effect for Canada is the underlying orientation of these partnerships toward U.S.-based facilities, aimed to ensure that U.S job opportunities are enhanced.

- **ATP and the Partnership for New Generation of Vehicles (PNGV)**

The Advanced Technology Program (ATP) supports the development of civilian technologies and has similar eligibility requirements as the CRADAs.⁵⁰ The ATP provides matching grants through the National Institute of Standards and Technology (NIST), an agency within the U.S. Department of Commerce, to companies and consortia developing pre-commercial, high risk, "enabling" technologies with potentially high economic returns.⁵¹ Increased ATP funding (over 100% over five

⁴⁸ Canada has most successfully participated in defence-related CRADAs linked to the U.S. Air Force and Navy.

⁴⁹ The number of CRADA partnerships will go from 6,093 in 1995 to an estimated 6,816 in 1996, an increase of over 12 percent with a public-private value in cash and non-cash contributions of nearly \$6 billion. The National Science and Technology Council proposes to invest \$1.8 billion in technology transfer activities in 1996, an increase of \$157 million or 10% over 1995. A Citizen's Guide to the Federal Budget (1995).

⁵⁰ The Advanced Technology Program (ATP) went from a budget of \$68 million in 1993 to an estimated \$431 in 1995. A proposed budget of \$491 million in 1996 would represent an increase of 14%.

⁵¹ Other programs include the High Performance Computing and Communications Program, an inter-agency coordinating mechanism for computer R&D, established in 1991 with the backing of then Senator Albert Gore, and the Flat Panel Display Initiative, a Defense Department project to develop flat panel displays.

years), has allowed the number of projects to grow from 29 in 1993 to a projected 300 in 1996.⁵²

One ATP project, the Partnership for a New Generation of Vehicles (PNGV), was announced in late 1993. The PNGV or "Clean Car" initiative was created as part of a package of technology policies geared to respond to a number of commercial/technological challenges. The goals of the PNGV are: 1) to transfer U.S. military technology from the U.S. National Laboratory System to the Big Three to enhance their competitiveness and create automobiles of the future; 2) to "leap-frog" technology and foreign producers; and 3) to create a stronger U.S. auto industry by "re-taking" market shares.⁵³ U.S. government funding for PNGV was \$175 million in 1994 and \$246 million for 1995. The proposed budget for 1996 is \$333 million - a 35 percent increase from 1995.⁵⁴

The PNGV, the largest R&D consortium in the world, discriminates by giving preference to business units located in the U.S. that will manufacture substantially in the U.S.. Programmes such as the PNGV, while perhaps stretching the intent of the Subsidy and Countervailing Measures (SCM) Agreement, are not prohibited under that Agreement or the NAFTA. A strategic policy such as PNGV places any emerging advanced Canadian technology in this sector at risk of migration outside the country.

While the automotive industry is not currently considered "high technology", like other advanced technology industries, the auto industry's development cycles for new products and parts are decreasing, technology is changing rapidly and production is increasingly global.⁵⁵ While the U.S.-Canada Automotive Pact has helped to

⁵² Another core NIST activity is the Manufacturing Extension Partnership (MEP). MEP helps small and medium sized manufacturers on the use of the latest manufacturing and production technology. MEP's proposed budget for 1996 is \$147 million, up 62% over 1995.

⁵³ European and Asian carmakers are not standing still on automotive technology. Like the U.S. companies, they tend to work together on the technical issues they consider "pre-competitive".

⁵⁴ Eight agencies participate in this initiative: the Departments of Commerce, Defense, Energy, Interior and Transportation, as well as EPA, NASA and the NSF. See *Investing in S&T, A Citizen's Guide to the U.S. Federal Budget*.

⁵⁵ For a discussion of industry trends affecting Canadian auto suppliers, see: *Impact of the Partnership for a New Generation of Vehicles on the Canadian Automotive Industry*, Industry Canada (1995), pp. 75-8. Ernst and Young which prepared the report states: "There is little doubt that many major auto parts and assemblies sold today will be obsolete within the 15-year time-frame of this study [1995-2010]."

integrate the North American auto industry since 1965,⁵⁶ many Canadian auto parts manufacturers still perform little or no R&D. As technology evolves, however, Canadian producers that cannot provide technical resources or become involved in partnerships to provide such innovation will be left behind.⁵⁷ With \$57 billion in automotive-related exports in 1994, any loss of market share due to shifts in technology and production would have a significant impact on Canada.

Recommendation 1. **The provision of national treatment, particularly within the NAFTA area, for Canadian firms in U.S. technology programmes**

Discriminatory access to technology consortia strengthens the role of U.S.-owned, U.S.-based firms in conducting R&D and post research manufacture. As the distinction between foreign and domestic becomes increasingly blurred within North America, particularly in the field of advanced technology, the lack of full national treatment, especially for Canadian firms willing to commit their own money and expertise becomes increasingly unjustifiable. At the least, provisions that discriminate against Canadian-owned, U.S.-based firms should be avoided, as should territorial restrictions placed on post research manufacture. This approach would require non-discriminatory access to Canadian government-sponsored programmes for U.S.-controlled firms based in Canada.

⁵⁶ Canada's automotive parts industry alone generates over C\$15 billion (1992) in revenues, of which two-thirds is exported and provides direct employment for over 70,000 people. Indirect employment is estimated at 300,000 Canadian jobs. The automotive parts sector represents approximately 20% of Canadian end-product exports.

⁵⁷ These resources include product design and development engineers, process engineers and research scientists.

Recommendation 2. Increased disciplines on "conditional" government subsidies (i.e., those that promote exclusionary R&D consortia)

More ambitiously, Canada could seek the agreement of other countries to extend subsidy-based performance requirement prohibitions within the NAFTA and, pursuant to the current negotiations in the OECD, seek to establish a Multilateral Agreement on Investment (MAI) that limits even further undisciplined practices such as a government's ability to make subsidies conditional on R&D being carried out solely within the territory of the granting government. It will be difficult to convince any single government to agree to such a change, due to concerns about not benefitting from positive spill-overs generated by R&D occurring in its territory. But the combination of budgetary pressures and the possibility that other governments might concur could create the basis for a reciprocal arrangement for those countries prepared to accept this new approach.

● **Canada-EU S&T Agreement: A Model for S&T Cooperation?**

Like the U.S. and the Japanese, the European Union has done much to develop "strategic technologies." As in the U.S. and Japan, Canadian firms have also found it difficult to become members in EU-supported consortia, particularly those whose members include competitors.⁵⁸ Normally, participants from non-European nations, including those with affiliates in Europe, are permitted only if their country has a technology access treaty with the EU.

The European Commission delivers the European Union's R&D programs through a number of complementary R&D Framework Programmes (FPs). Established in 1984, these FPs seek through coordinated research "to combat the diminishing competitiveness in Europe's high-tech industries, the lack of investment in industrial research and the inability of firms to translate S&T excellence into commercial success."⁵⁹ One of the benefits of these programs has been to create a pan European

⁵⁸ Notwithstanding the existence of a bilateral science and technology cooperation agreement since 1986, and the availability of financial assistance from the Japan Science and Technology Fund, Canada's success rate in Japan is considered "abysmal". See Caldwell, *Technology Consortia*, p. 3.

⁵⁹ *National S&T Governance Profiles, Resource Book for Science and Technology Consultations, Volume II.* Secretariat for Science and Technology Review, Industry Canada (August 1994), p. 74.

industrial research community in a region that accounts for approximately one-third of global R&D.⁶⁰

Canada has worked hard in Europe to gain access to the research activities of nationally and regionally sponsored R&D programs and signed in June 1995 a Canada-EU S&T Agreement in order to take part in the Fourth Framework Program for Research and Technological Cooperation.⁶¹ This Agreement will allow Canadian-based firms to participate in Community-funded projects as full partners and, more importantly, with full rights to intellectual property. The Agreement is reciprocal, giving EU institutions and companies the opportunity to participate in complementary Canadian R&D projects. The two sides agreed to establish a Joint Science and Technology Cooperation Committee to oversee the operation of the Agreement. The Accord is seen as potentially important for Canadian high-technology companies "who aspire to develop or increase their presence in Europe".

The agreement with the EU gives Canadian companies, universities and research institutes the opportunity to join with European Partners in research and technological development (RTD) projects under the European Union's RTD Programmes. The contacts facilitated by the Agreement should increase access to European consortia with similar or related interests. In short, the Agreement establishes a framework that will facilitate economic and social benefits, as well as develop strategic alliances within Canada and internationally. With the Agreement, Canadian researchers now have full opportunity to participate in projects conducted under the EU's Framework Programme.

While this agreement represents a positive step, its impact should not be overestimated. A significant proportion of European subsidies for advanced technology occur outside of the R&D Framework Programmes, primarily at the Member State level. Indeed, spending under the Fourth Framework Programme represents only 13% of projected public R&D expenditure within the EU. Moreover, the Commission is also proposing new channels for Union-level R&D Cooperation separate from the existing Framework Programmes.⁶² Having said that, clear rules to help increase

⁶⁰ Europe's technology policy, however, has been criticized as an exercise in "how not to catch up", as the EU has tended to support funding for technologies already identified in the U.S. and Japan, thus funding technology being developed simultaneously elsewhere.

⁶¹ The Fourth Framework Program runs from 1994-1998 and has a budget of C\$17.5 billion to support collaborative R&D projects by researchers and business from EU-member countries.

⁶² The EU is still attempting to address internal problems with trade-distorting state aids, whether directed toward R&D or other purposes. Union-level subsidy laws are considered weak and hard to enforce. Some would argue that the lack of a "level playing field" at the Union level is not an encouraging sign for fair third-country access to such

access to European technology consortia are a useful first step and could perhaps prove a useful model for future R&D/S&T negotiations with the United States.

Recommendation 3. Negotiate a bilateral S&T Access Agreement with the United States

Canada could seek to negotiate explicit and enhanced access to publicly supported R&D programs such as the ATP through a separate bilateral Canada-U.S. S&T Access Agreement. Moreover, the Government of Canada should seek to eliminate or reduce the U.S.-based manufacturing requirement for Cooperative Research and Development Assistance (CRADA) projects. In the interim, there is a need to ensure resources dedicated to constituency building within both the U.S. and European R&D communities and private sectors, with a view to ensuring more liberal terms of access to our primary sources of advanced technology.

3.3.2 Locational and R&D Subsidies

- **The United States**

The lack of sufficient international discipline on foreign investment subsidies (including the locational dimension) is becoming a significant issue in the advanced technology sector. In the United States, competition to attract foreign investment has escalated into competitive bidding wars between states and local government, each pursuing beggar-thy-neighbour industrial policy through tax, loan and infrastructure incentives, in order to secure plant locations. More than two dozen states offer substantial grants and other equivalent measures to attract advanced technology investment.⁶³ Not only do these policies reduce the net benefit of such investments, they distort markets to the advantage of particular firms and jurisdictions.

Moreover, R&D expenditures undertaken by the U.S. after the demise of the Cold War are becoming increasingly blurred with civilian technology through dual-use

programmes.

⁶³ For example, the state of Ohio is reported to have paid \$16 million in direct incentives to Honda to secure a plant in 1982. By 1988, Kentucky is reported to have spent \$125 million in incentives to attract Toyota to locate a plant there. In 1993, Alabama concluded a \$300 million incentive package to attract Daimler-Benz. See *Multinationals and the U.S. Technology Base*, Office of Technology Assessment, United States Congress, pp. 120-1.

technology programmes.⁶⁴ Dual-use programmes include subsidies for projects that accelerate commercial progress in such areas as advanced materials, space systems, flat panel displays and information technology such as high density data storage devices. "When most successful, these advancements permit the production of commercial and defence components on the same assembly line."⁶⁵ Are R&D expenditures for so-called "dual-use" technology just one more example of technological protectionism?⁶⁶

The U.S. federal budget proposes \$73 billion for its R&D programmes in 1996, accounting for about 40 percent of all U.S. R&D expenditures.⁶⁷ While the U.S. budget promises to maintain overall R&D funding at roughly 1995 levels, it proposes about \$1 billion more for civilian R&D (Basic Research (+4%); Applied (+2.8%); and Development R&D (+4.7%)).

If U.S. estimates account for so-called "dual-use" defence R&D, the civilian share of U.S. R&D should exceed 51 percent in 1996, up from 44 percent in 1993.⁶⁸ The Technology Reinvestment Program (TRP) is one key component of the U.S. dual-use strategy. The TRP awards federal funds on a cost-shared basis to enable industry-led projects to create new dual-use technologies. The 1996 Budget request for the program is \$500 million or a 13 percent increase over 1995.

Despite its recent history of leading international efforts to broaden the scope of prohibited subsidies, it is interesting to note that the U.S. Uruguay Round negotiating team boldly changed their negotiating position in 1993 to broaden and deepen the types of R&D assistance that would remain non-actionable.⁶⁹ Their goal,

⁶⁴ The U.S. Semiconductor Manufacturing Technology Consortium, for example, received half of its budget, approximately US \$100 million, from the Advanced Research Programs Agency (ARPA), a division of the U.S. Department of Defense. See Caldwell, *supra*, footnote 20 at 23.

⁶⁵ *Maintaining A Quality Military Force, A Citizen's Guide to the Budget.*

⁶⁶ For example, see President Clinton's reports *Technology for America's Economic Growth: A New Direction to Build Economic Strength* (February 1993) or *Science and the National Interest* (August 1993).

⁶⁷ Industry provides most of the balance, while the combined share of state governments, university and non-profit support has doubled from 3% to 6% between 1985 and 1993. See OECD, *Recent Trends in the Regional Situation and Policy: United States*, DT/REG/(95)3/07, p.2.

⁶⁸ The civilian share of U.S. government R&D expenditures would be 48% in 1996 if dual-use expenditures are not included.

⁶⁹ The non-actionable status of such assistance apparently remained unsettled until the final weeks of the Uruguay Round. It is interesting to note that the PINGV, cited previously, was introduced by the U.S. Department of Commerce the same month that the U.S. officially shifted its position on research subsidies. See *Lawmakers Call for Shift in U.S. Position on Research Subsidies in GATT Trade Talks*, International Trade Reporter (BNA) 24

as a result of a comprehensive policy review, was to ensure that the SCM Agreement would not affect the U.S. domestic R&D agenda of public-sector/private-sector technology partnerships by subjecting them to countervail action. While the focus of the Reagan and Bush Administrations was on the need to limit what competitors could do in this area, the Clinton Administration, with bipartisan support, moved to increase the caps in the SCM Agreement on R&D spending from 50 to 75 percent on "industrial research", and from 25 to 50 percent on "precompetitive" development activities.⁷⁰ Moreover, it is worth recalling that the U.S. specifically lobbied, albeit unsuccessfully, against including compulsory notification of R&D subsidies under the SCM Agreement.

- **European Union**

In the EU, Governments often make up to 60 percent of the cost of an investment in select advanced technology sectors.⁷¹ The main types of incentives include: research and development incentives (as noted, billions of ECUs are available under the Fourth Framework Programme), tax incentives to "enterprise zones," and select regional incentives. Manufacturing firms, for example, often have their corporate tax rate reduced to 10 percent, instead of the statutory rate of 50 percent, once projects are up and running.

The EU has also permitted the creation of the European Development Area (EDA) which encompasses the common border areas of France, Belgium and Luxembourg. All three governments offer special export allowances and up to 37.5 percent direct financing of industrial investments in the EDA. French regions suffering structural difficulties may also be exempted from corporate tax for up to five years and are eligible to lease assets such as land at subsidized rates. Depending on the area, such measures may cover 50 to 100 percent of the total plant cost. Moreover,

(November 1993) p. 157.

⁷⁰ Industrial research involves a critical investigation that attempts to discover new knowledge that may help in the development of new or improved "products, processes or services or in bringing about a significant improvement to existing products, processes or services." (SCM Agreement Article 8(2)(a), footnote 25). Pre-competitive research converts industrial research into a "plan, blueprint or design for new, modified or improved products, processes or services ..." (SCM Agreement Article 8.2 (a), footnote 26), including the production of a first non-commercial prototype. Routine or periodic alterations of existing products are excluded (SCM, Footnote 29) and would, in theory, be actionable if a demonstration of adverse effect/"material injury" could be demonstrated. It should also be noted that there is a 100% carve-out for "fundamental" research activities (see SCM Agreement, Article 8, footnote 24).

⁷¹ For example, see *The Impact of Trade Related Investment Measures on Trade Development: Theory, Evidence and Implications*, United Nations, (1991), pp. 69-77.

in France, sizeable worker grants and training subsidies can account for up to 80 percent of the cost of training new workers.

France and the United Kingdom also offer financial incentives to promote research and development activity and assist companies find partners in the Europe-wide "Eureka" programme which offers grants of up to 50 percent of project costs. A high technology content is helpful in obtaining maximum incentive levels in the EU and investments known to be "footloose" or internationally mobile are likely to draw on additional forms of "discretionary" incentives. (Northern Ireland, in particular, used to offer one of the best incentive package in Western Europe and was considered particularly generous in offering up-front grants for world-scale sized operations).⁷²

According to a recent survey on investing, licensing and trading conditions in the U.K, while UK authorities cannot insist on a minimum level of British components as a condition of assistance, "they generally suggest that a majority of the content be sourced from the EU, unless overriding advantages of employment or technology transfer dictate otherwise."⁷³

* * * * *

Canada, under current fiscal constraints, no longer has the economic means to pursue vigorously the subsidy option as actively as governments might otherwise desire or as we have in the past. As a result, Canada is particularly vulnerable to subsidy competition with the United States and other major players with regard to both R&D and investment locational subsidies more broadly. Further international discipline on the use of subsidies has consequently become as important an objective for Canada as constraining the application of countervailing duties.

Locational subsidies merit greater attention in international rule-making, particularly when fiscal benefits are conditional on the size of the operation (i.e., number of jobs created) while the small domestic market in cases such as Northern Ireland ensure that most if not all of the output will be exported,⁷⁴ or when significant import displacement is the likely result. The SCM's provisions on countervailing duties

⁷² Investment grants offered in Northern Ireland in 1993/94 totalled £127million divided approximately evenly between British and foreign firms.

⁷³ For example, at the Nissan car manufacturing plant in north-east England, EU content for cars was initially 60 percent and has now risen to over 80 percent. See The Economist Intelligence Unit, *Investing, Licensing and Trading Conditions Abroad: Britain* (October 1994), p.17.

⁷⁴ See Eric Bond and Stephen Guisinger, *Investment Incentives as Tariffs Substitutes: A Comprehensive Measure of Protection*, in *Review of Economics and Statistics*, 67 (Feb.1985), pp. 91-7.

and serious prejudice respectively help to address these issues, but neither can be sufficiently effective even if tightened further. The disciplining impact of countervailing duties is *ex post facto* and is tilted, in practice, in favour of the lesser trade-dependence of the larger economies. The serious prejudice provision is new and untested, may be difficult to marshal in many cases (the existence of "import displacement" could for example, be influenced by many factors), and is also *ex post facto* in nature (i.e., the "damage" is already done, embodied in a production facility attracted by an incentive programme that in many cases is tailored to facilitate "start-up", not on-going production).

Recommendation 4. Transparency and Quantitative Limits on Investment Locational Incentives

Questions about the transparency of investment subsidies offered by national and sub-national governments remain problematic. What should be disciplined? Investment measures having anticipated adverse effects on trade or the effects themselves (i.e., what is described as *ex ante* and *ex post* approaches)? I would argue for an *ex ante* approach, including prompt and full disclosure, particularly for subsidies that could have a distorting effect on industries that invest heavily in R&D and thus influence investment behaviour. Canada could also work for expenditure caps on locational subsidies within North America and more generally. In practice, the U.S. is unlikely to engage unless the other global players participate as well (i.e., unilateral North American disarmament on the use of locational incentives is improbable). Nor should Canada legally bind itself in this area more than its trading partners. These considerations argue for working on this subsidy issue during the current OECD-sponsored negotiations to establish a Multilateral Agreement on Investment (MAI) and eventually in the WTO context.

Recommendation 5. Possible Quantitative Limits on R&D Subsidies

One medium-term option could also be to seek quantitative limits on total national spending on direct R&D subsidies. Tightening subsidies targeted at promoting advanced technology sectors remains an issue for future negotiations and will require clearer definitions of pre-competitive and competitive R&D, as well as a careful re-evaluation of the economics of the spill-over benefits derived from R&D subsidies versus the potentially trade and investment distorting impact of the far greater resources that the U.S. and the EU can spend compared to Canada and other smaller economies.

Recommendation 6. Transparency with regard to R&D Subsidies

Canada should seek to ensure that its trading partners promptly and fully notify their R&D subsidies in the WTO context. See also Recommendation 5.

● **The Subsidy and Countervailing Measures (SCM) Agreement**

Canada, along with the Europeans, has often been a target of U.S. countervail law. Pursuant to the 1979 GATT Subsidies Code, the U.S. finally agreed to provide explicitly for a test of injury to domestic industry as part of its countervail investigation procedures. Nonetheless, the Code regulated subsidies at the multilateral level according to the degree of their negative impact on trade, rather than through strict definitions.⁷⁵ Countervailing actions were still used for protectionist purposes in a number of cases. Under the 1979 Code, Canadian exports benefitting from R&D subsidies were challenged with countervailing duties by Members who claimed that such subsidies, used to support the production of an exported good, had caused "injury" to the domestic industry in the importing country.⁷⁶

⁷⁵ Agreement on the Interpretation of an Application of Articles VI, XVI and XXIII of The General Agreement on Tariffs and Trade (Geneva 1979). Referred to as the 1979 Subsidies Code.

⁷⁶ In the past, the U.S. practice has been to countervail research and development if it is specific and provides a benefit, unless the results are made publicly available. For cases, see *New Steel Rail Except Light Rail from Canada*, 54 Fed. Reg. 31991-31997 (Dept of Comm 1989) (research grant not countervailable because the results of the study were made public); *Pure Magnesium and Alloy Magnesium from Canada*, 57 Fed Reg. at 30946, 30950 (Dept of Commerce 1992) (Research done by Institute of Magnesium Technology not countervailable because membership in the Institute is open to all parties, and all parties obtain results on equal terms); *Optic Liquid Level Sensing Systems from Canada*, 44 Fed. Reg. 1728 (1979).

NAFTA negotiators "deferred" to the existing GATT Subsidies Code and the Uruguay Round negotiations that were underway at the time. However, the growing use of countervailing and anti-dumping duties undercuts the positive effects of both the FTA and NAFTA.⁷⁷ Indeed, NAFTA does not address common methods of dealing with allegations of trade-distorting practices, specifically those concerned with dumping and subsidization of traded goods. Nonetheless, NAFTA does establish mechanisms for reform work in the area of trade remedies,⁷⁸ while in 1993 two working groups were established, at the insistence of the Canadian Government, with a mandate to seek reform in these areas.

Disputes on subsidies tend to focus on whether they are general or specific.⁷⁹ For a subsidy to be subject to trade action under the SCM Agreement, it must be shown to be specific within the meaning of the Agreement.⁸⁰ Subsidies that benefit all domestic industries, such as public investment in infrastructure, roads and electricity are considered non-specific and therefore outside the reach of the Agreement.⁸¹ On the other hand, Article 3 prohibits subsidies contingent, in law or in fact and whether solely or as one of several other conditions, upon export performance.⁸² This Article also prohibits any subsidy that is contingent on the use of domestic over imported inputs. The prohibition on any domestic content requirement is "absolute". These "uncompromising" results, said to be the creation of "anti-subsidy crusaders" during the Bush and Reagan Administrations, greatly broaden the definition of "prohibited" subsidies.

Moreover, the SCM Agreement clarifies the calculation of the amount of subsidy for the purpose of levying countervailing duties. Under Article 14, members

⁷⁷ See Thomas M. Boddez and Michael J. Trebilcock, *Unfinished Business: Reforming Trade Remedy Laws in North America*, Policy Study 17 (Toronto: C.D. Howe Institute, 1993); I.M. Destler, *American Trade Politics*, 2nd edition (Washington/New York: Institute for International Economics, 1992).

⁷⁸ NAFTA Article 1907(2). The Article states that the Parties "agree to consult on: a) the potential to develop more effective rules and disciplines concerning the use of government subsidies; and b) the potential for reliance on a substitute system of rules for dealing with unfair transborder pricing practices and government subsidization."

⁷⁹ Subsidies that are general can prove to be of greater benefit to certain kinds of companies and therefore may be deemed specific in practice. For instance, general subsidization of investment may favour industries with high capital ratios. See Gilbert Gagné, *North American Free Trade, Subsidies and Countervailing Duties: Issues and Options*, Policy Staff Paper No. 94/13, Department of Foreign Affairs and International Trade, July 1994, p. 9.

⁸⁰ SCM Agreement Article 2.1(a).

⁸¹ SCM Agreement Article 2.1(b).

⁸² SCM Agreement Article 3.1(a)-(b).

are also obliged to publish their countervailing duty regulations indicating the methodology employed to calculate the benefit conferred by a subsidy to the recipient company.

Less positively, the U.S. Department of Commerce appears willing to continue to accept at "face value" a petitioner's statement that it represents the "domestic industry".⁸³ Consistent with SCM Article 16, current U.S. legislation continues to provide the investigating authority with considerable leeway in determining whether a particular plant should be considered "domestic" for the purpose of defining the scope of "domestic industry" when, *inter alia*, determining standing and injury.

The harassment potential is considerable against competitors located in a smaller economy such as Canada that depends heavily on exports to the U.S.. Moreover, the SCM, unlike U.S. legislation, requires that there be a causal connection between subsidized import and alleged injury. (Other factors such as productivity or changes in demand and supply often explain the problems that domestic industry or specific companies are facing.) To date, the U.S. has done little to clarify these important concepts in law, although the "causal link" is made in practice.

The goal of the Canadian government continues to be to limit the scope of such investigations, as usually the impact of a U.S. countervailing duty on the exports of a Canadian-based company affects a high proportion of that company's overall production - which is primarily oriented to the U.S. market. In contrast, a Canadian countervail action usually affects a much smaller proportion of the production of a U.S.-based firm exporting to Canada. The 10:1 difference in the two economies means that the countervail instrument, while technically and legally similar in both countries, can do much more damage, in practice, to the smaller Canadian market. Moreover, severe fiscal restraint at home makes it more difficult than ever for Canadian governments to outbid their U.S. and EU counterparts in efforts to attract investors through the ample use of financial inducements (see the first part of section 3.3.2 above).

⁸³ See Pure Magnesium and Alloy Magnesium from Canada, 57 Fed. Reg. at 30947 (Dept. Comm. 1992). Apparently in this case the Magnesium Corporation of Salt Lake City, the American producer that originated the countervail and anti-dumping investigations against the Magnesium producer Norsk Hydro, represented only 22 percent of the U.S. market, since other producers of magnesium in the U.S. remained silent. See Gagné, footnote 68 at 22.

Recommendation 7. Tightening Countervailing Duty Provisions of the SCM Agreement

Canada will need to review continually amendments to U.S. legislation to ensure conformity with the SCM Agreement. The domestic implementation process in the U.S. has been used to provide a protectionist interpretation of its MTN obligations. In the context of future discussions in either the WTO or the NAFTA about the further tightening of disciplines applicable to countervail, Canada may wish to pursue the following negotiating objectives:

- **Actionable Subsidies**

a) The SCM Agreement allows countervailing measures against imported goods without determining whether and to what degree the domestic industry petitioned for countervailing duties is also subsidized. Although this "net subsidy" approach was discussed during the Uruguay Round negotiations, it was not possible to incorporate it in the SCM text, in part due to U.S. opposition. Future negotiations in either the WTO or the NAFTA may provide an opportunity to re-engage on this matter.

b) Moreover, Article 14 of the SCM Agreement requires that the national investigating authority provide a transparent investigative process when calculating actionable subsidies for countervail purposes, and that a methodology be provided through national legislation. The U.S. Department of Commerce published proposed countervailing duty regulations in 1989, but has apparently never finalized these regulations. This should be done.

- **Injury or Technological Protectionism?**

The SCM Agreement requires greater clarification on a causal link with purported sources of injury. The SCM, unlike U.S. legislation, requires that there be a causal connection between the subsidized import and alleged injury. (Other factors such as productivity or changes in demand and supply often explain the problems that domestic industry or specific companies are facing.) To date, the U.S. has done little to clarify these important concepts in its own law.

Recommendation 8. The Application of Foreign Trade Remedy Laws Should Not be at the Expense of Canadian Technology-Intensive Industries.

Countervail has become increasingly counterproductive, particularly with regard to NAFTA markets. One approach under discussion within the NAFTA calls for different sectors of the economy to be exempt from countervailing duty actions and anti-dumping duties. The application of this approach to advanced technology sectors within North America should be actively explored.

3.3.3 Government Procurement and National Security

Canadian companies have to compete against domestic preferences and sectoral import restrictions on government procurement in North America, Europe and Japan. In the case of the U.S., they also face increasing set-asides for small business, a broadly based interpretation of national security and, recently, attempts to bring "buy national" policies into the private sector. Together, these procurement policies distort the terms of trade in advanced technology products and services. Where these measures apply, it becomes irrelevant whether or not one has acceded to the NAFTA or the WTO/GPA. As a result, the following practices are additional areas where Canada will want to pursue further market opening initiatives.

- **EU "Buy National" Policies**

- i. **The EU Utilities Directive**

Government-owned entities in the EU which are not currently covered by the GPA often follow "buy national" or "buy EU" policies. In addition, procurement is often restricted by onerous testing and certification procedures. This is particularly noticeable, for the purposes of this Paper, in the areas of telecommunications switching, satellites and aerospace. In 1991, for example, the estimated value of the EU market for telecommunications equipment was US\$29 billion, of which approximately one-half was accounted for by EU government entities. (Total Canadian exports of telecommunications equipment to the EU in 1991 were \$197.6 million for a market share of 0.7 percent).

While the EU "Utilities Directive," which came into effect in January 1993, was an attempt to open up government procurement in a number of markets, it continues to discriminate against non-EU bids from countries without international or bilateral agreements on procurement. Under this directive, EU procuring entities may reject bids with less than 50 percent EU value outright, or impose a three percent penalty

on those same tenders. The U.S. has been active through high profile bilateral telecommunications talks to seek the removal of such "buy national" policies. Indeed, in 1993 the U.S. and EU came close to a major trade dispute over this issue. The EU and U.S., in April 1994, signed a bilateral agreement on government procurement on a reciprocal basis. The value of contracts opened in each market is \$103 billion, most of which will be made available to other parties through the GPA on a reciprocal basis.

- **U.S. Buy National Policies**

- i. The Buy America Act & Small And Minority Business Set-Asides**

U.S. Federal, State and local government expenditures represent between 17 to 20 percent of all U.S. consumption (or \$1.2 trillion out of consumption of \$6.9 trillion in 1994), with the U.S. Department of Defense accounting for approximately 75 percent of this total. In 1994, U.S. federal government procurement that would have been covered by the GPA, if it had been in effect at that time, was estimated at \$234 billion.⁸⁴

The U.S. maintains a number of discriminatory procurement practices at both the State and Federal levels. The Buy America Act (BAA), established in 1933, is perhaps the most obvious.⁸⁵ This legislation, with preferences of 6%-50% not uncommon, effectively precludes Canadian suppliers from the bulk of government procurement by U.S. federal entities not covered by the NAFTA or the WTO. The Buy America Act not only runs counter to the spirit of the NAFTA, it has been challenged by America's trading partners for over three decades.

The U.S. also has a series of programmes designed to assist small and minority businesses, including the small-business set-aside program, which are exempted from the NAFTA procurement chapter. In addition, higher value contracts may be set aside discretionally in the U.S. if a sufficient number of small businesses are capable of fulfilling the contract. By law, set-asides affect 20% of the total value of U.S. government prime contract awards.

⁸⁴ Defence procurement is subject to a 50 percent Balance of Payments Evaluation Factor which affords domestic suppliers with a 50 per cent price preference. Canada, however, is considered a qualifying country, so that Canadian suppliers, in principle, are regarded as "domestic" for this purpose.

⁸⁵ 41 U.S.C. The Act was seen at the time as retaliation against "Buy British" requirements in effect during 1920-1933 period.

The following are examples of recent attempts to expand the scope of Buy America legislation.

ii. The Federal Acquisition and Streamlining Act of 1994

Signed into law by President Clinton in October 1994, the Federal Acquisition and Streamlining Act of 1994, revised the U.S. federal acquisition laws with the aim of simplifying the procurement process. Included in the Act was the provision to increase the threshold for the small-business set-aside programme from U.S. \$25,000 for goods and US \$50,000 for services to US \$100,000 for both goods and services. The increase in the threshold, which is now in force, means that more contracts will be set aside. Canada is currently engaged in discussions with the U.S. and Mexican governments to arrive at a settlement to ensure that the coverage of procurement under the NAFTA remains balanced. It can be argued that the Act constitutes a unilateral reduction in the threshold agreed upon which, in accordance with the terms of Article 1022 (2)(c) of the NAFTA, requires compensatory adjustments by the United States for the purposes of maintaining a level comparable to that which existed prior to the entry into effect of the Act.

iii. The Federal Acquisition Reform Act of 1995 (FARA)

The proposed Federal Acquisition Reform Act of 1995 (FARA), is another example of U.S. protectionist measures on procurement.⁸⁶ Introduced in May 1995, the Act proposes to limit competition by replacing "full and open competition" under previous legislation with "maximum practicable competition". The goal is to permit the U.S. government to use simplified acquisition procedures on "commercial items" contracts of any value. The bill, which does not define "commercial items", is likely to restrict competition for new and smaller businesses on significant government contracts. Such restrictions could conflict with the United States' NAFTA obligations under Article 1016.

iv. The Anti-trust and Communications Reform Act of 1994

The Anti-trust and Communications Reform Act was passed by the Energy & Commerce and Judiciary Committees of the Senate, but was not passed by the House.⁸⁷ If enacted, the legislation would have enabled federally regulated phone companies in the U.S. to manufacture and sell telecommunications equipment.

⁸⁶ H.R. 1670 The Federal Acquisition Reform Act of 1995.

⁸⁷ 47 USC 201 et seq Amendment to the Communications Act of 1934.

However, while the Bill would mandate domestic manufacture, it also required that all component parts used in this manufacture be manufactured in the U.S.. Exceptions would only be made if a "good faith effort" to obtain parts in the U.S. had failed. Even then, no more than 40% of the value of finished products could be from components manufactured abroad. While this Bill died with the 103rd Congress, a new Communications Act of 1995 has been tabled which would also allow "Baby Bells" to engage in the manufacture of telecommunications equipment. While the 1995 Act has been amended to require that Bells and their affiliates make procurement decisions in a "fair and objective manner", one is left to assume that the logic behind the phrase is still "Buy America".⁸⁸

v. National Competitiveness Act of 1994⁸⁹

Like many pieces of protectionist legislation, the National Competitiveness Act (NCA) was tabled "to promote the industrial competitiveness and economic growth of the United States." The Act, which would provide close to \$2 billion in subsidies, grants and loans for industrial joint ventures between government and private industry, would also have legally required U.S. government agencies involved in procurement pursuant to the Act to comply with the Buy America Act to purchase only American-made equipment and products when spending grant money. The Act included amendments requiring any firm participating in the Department of Commerce's National Institute of Standards and Technology (NIST) research programmes "to promote the manufacture within the United States" of products resulting from joint R&D. The latter proposed amendment is in keeping with protectionist legislation previously discussed.⁹⁰

⁸⁸ Legislature Report 104th Congress.

⁸⁹ See H.R. 820.

⁹⁰ The National Competitiveness Act of 1994 (HR820) did not become law. The Manton amendment, that would have prevented foreign-owned firms in the U.S. from participating in research programs that H.R. 820 funded unless the foreign companies' country of origin provided comparable opportunities for U.S. firms, was defeated. Such reciprocity initiatives, however, are likely to continue.

Recommendation 9. Government Procurement

NAFTA Article 1024 calls for initiation of further procurement negotiations "no later than" December 1998. Canada should seek to advance the launch of these negotiations to put pressure on U.S. programmes that distort advanced technology development and ensure that these issues are also a central agenda item at the Singapore WTO Ministerial meeting in late 1996.

Canada should also seek access for Canadian industry to bid on:

- U.S. federal management and operations contracts for civilian departments and agencies, including the Department of Energy and power administrations
- U.S. federal research and development contracts for civilian applications, and
- U.S. federal research and development contracts for American small business.

- **Government Procurement and National Security**

- i. Management and Operating Contracts**

R&D facilities under NASA, DOE and the Department of Defense are often contracted to private companies and universities under "Management and Operating Contracts" (M&O Contracts). Because many of these facilities had their start in nuclear or other military weapons development, they are considered security establishments. While the primary field of technology addressed by these facilities is now being converted to commercial or "dual-use" technology, the U.S. continues to purchase goods and services using "security exceptions" rather than competitive bidding. The United States, indeed, excluded M&O Contracts from the list of covered services in the GPA. Therefore, M&O contracts do not follow the full and open competition procedures required under Federal Acquisition Regulations (FARs). Again, national security, broadly used, limits competition.

Article XXIII of the new GPA states that any Party may take such measures as warranted by national security concerns. As a result, the Article permits any Party to use national security as a reason to refuse a foreign tender. However, the Agreement does not define national security exceptions. The broadening of "national security" to include "national economic security", however, goes against the basic principle of non-discrimination in both NAFTA and the GPA.

Recommendation 10. National Security or Technological Protectionism ?

The blurring of "economic security" with the issue of national security is likely to become a growing irritant. Clearer, narrow definitions are required to determine legitimate security concerns of Canada's technology partners. While Canada's national technology policies should minimize the disruptive effects on trade and investment flows, they should do so only to the degree that others do likewise, particularly the U.S..

Canada has had a special relationship with the United States for defence-related R&D dating from the Second World War. In the past, these successful relationships, under MOUs, Agreements and exchanges of letters have provided special access to U.S. technology not enjoyed by other U.S. allies. These cooperative R&D and production successes should be built upon in areas of future economic/commercial interest.

- **Government Procurement and the Trade Act of 1988**

While, as noted above, the U.S. continues to maintain and develop significant hurdles on the procurement front, it has not hesitated to act under Title VII of the 1988 Trade Act to challenge formally foreign government procurement policies, notably in advanced technology sectors. (Title VII has a statutory requirement that the White House identify annually any country that, in broad terms, persistently discriminates against U.S. bidders.)

Title VII was used with Japan in 1994 under the Framework Agreement to win changes in the way the Japanese government buys telecommunications and medical equipment and services. In July 1995, the U.S. and Japan held the first review of their telecommunications accord. The U.S. intends to press Japan further to include the mobile phone subsidiary of the semi-government Nippon Telegraph and Telephone in future talks.⁹¹ Moreover, the U.S. also used Title VII in 1994 to retaliate against the EU for discriminatory treatment against U.S. suppliers of telecommunications equipment and services. The EU and U.S., in May 1995, concluded an Agreement on government procurement in the form of an exchange of letters.

⁹¹ The U.S. wants Japanese government procurement to increase in all areas of the telecommunications sector, including optical fibres, switching systems and services. The U.S. currently has approximately 3 percent of the Japanese market. The NTT-related telecommunications market amounts to about \$9 billion, compared with \$700 million without. See *US-Japan Hold First Review of Telecoms Accord*, Reuter News Service, 13 July 1995.

While not sanctioned formally, Australia was also cited in 1995 for unfair treatment in the area of information technology, along with Brazil for discriminatory practices in telecommunications and computer software and Japan for discrimination by government organizations in the acquisition of super computers.⁹²

Canada needs to be concerned about U.S. "Buy National" policies and recent U.S. bilateral accords on government procurement to ensure that they are not implemented in favour of U.S. or non-Canadian products. Clearly, there is a need for WTO monitoring of these accords and international pressure to encourage others not to act bilaterally.

Recommendation 11. WTO Monitoring of Bilateral Accords

Canada has a strong interest to ensure that foreign countries' discriminatory procurement practices are reduced. Moreover, Canada should insist that the WTO monitor all bilateral accords on government procurement to ensure that such accords, often negotiated under threat of unilateral sanctions, do not favour a particular country's products.

While not directly dealt with in this Paper, WTO monitoring should also be extended actively to review other government-induced, potentially discriminatory changes to private sector purchasing patterns - e.g., the U.S.-Japan bilateral agreement on semi-conductors of the late 1980s which was central to increased Japanese private sector purchases of U.S.-produced semi-conductors.

Conclusions

Trends in Canadian research expenditure make it clear that when the major players, both foreign and Canadian, are inhibited by non-tariff barriers, they do not hesitate to enter into collaborative agreements as a price of entrée into a particular market. Canadian firms have gained limited access to certain U.S. technology consortia. However, the process is less than transparent and often requires diplomatic lobbying to have firms made eligible. In order to improve access to U.S. consortia

⁹² See USA: Whitehouse OKs Foreign Government Procurement Policies, Japan Economic Institute of America. Report, May 26, 1995.

with the potential for downstream commercial opportunities, Canada may have to re-organize its R&D efforts to provide additional access to Canadian R&D projects.

If we can aim to restrict government activity influencing investment performance requirements, it is also clear from this study that we must also be prepared to deal with government practices that promote investment through incentives or locational subsidies. The incentive side of investment regimes is often neglected, for while prohibitive measures are falling into disuse, beggar-thy-neighbour subsidies, at the state and sub-state level, are growing concerns. This is a game Canada can no longer afford to play. The distinction between those non-tariff measures which merely affect trade and those that distort and restrict trade has yet to be made - a major problem of definitions. As a result, it will be important to define the mandate of the recently launched (May 1995) OECD-based negotiations on a future Multilateral Agreement on Investment (MAI) in a way that is acceptable to those who believe that discussions should focus only on the removal of measures that firms view as barriers (e.g., performance requirements) and those with broader economic concerns about trade and investment distortions such as Canada.

If it proved difficult to balance concessions on investment issues within a single bilateral accord during the negotiations of the FTA and NAFTA, it will prove even more difficult in a multilateral forum, particularly if technology issues remain mixed with other matters. Whatever steps it takes, Canada will have to ask hard questions about Government-funded involvement in technological cooperation agreements internationally to determine the net benefit to Canada. In this regard, the issue of reciprocity versus national treatment for Canadian firms established in the U.S. needs to be addressed.

Another major issue internationally is whether the disciplines should apply only to mandatory measures, such as the absolute requirement to purchase inputs locally; or also those measures "with which compliance is necessary to obtain an advantage" - such as a subsidy which is conditional on the use of local inputs. The WTO Trade-Related Investment Measures (TRIMs) agreement makes it explicit that prohibited measures include both those which are mandatory and those which have to be complied with in order to obtain some financial "advantage", and is thus potentially more encompassing than the SCM Agreement and much more akin to the NAFTA approach.⁹³

⁹³ Note: While the TRIMs Agreement does not define the term "advantage", it is understood to cover all forms of advantage (including those that are tax-related) and is thus considered more encompassing than the term "subsidies" found in the SCM Agreement. Pierre Sauvé, *A First Look at Investment in the Final Act of the Uruguay Round*, *Journal of World Trade*, Vol. 28, No. 5, p.5-15. Sauvé notes that there is considerable potential for overlap with the provisions on "prohibited" subsidies, particularly Article 3:1.

For its part, the SCM Agreement provides Canada with a number of new disciplines to defend its interests. These include: a clearer definition of a subsidy; allowable subsidies for regional development and R&D; a refinement of provisions governing countervailing duty investigations, which helps clarify such vague concepts of "domestic industry" and "injury"; and possible redress when U.S. subsidies cause displacement of Canadian exports. Furthermore, the Canadian Government has an undertaking from the U.S., under the NAFTA, to work toward trade remedy reform.

New U.S. legislation in the area of technology coincides with aggressive R&D subsidies targeted at commercial technologies but limited to domestic producers. Programs such as PNGV are not prohibited under the SCM Agreement or the NAFTA. While such programs might be "actionable", and thus potentially subject to countervailing duties, Canada has little leverage to discipline the U.S. in practice since the U.S. economy can only be minimally influenced by the application of countervailing actions by Canada due to its small market size. In practical terms, no country countervails U.S. exports very effectively (i.e., if effectiveness is defined as changing U.S. trade policy). As a result, U.S. subsidies and trade remedy laws will continue to provide challenges for Canadian trade and technology policies.

U.S. subsidies are less visible than Canadian ones and often take the form of civilian and defence procurement, low interest loans and loan guarantees and tax measures. Subsidies undertaken by the U.S. after the demise of the Cold War are becoming even less defence-related and more commercial. "Indirect" incentives, resulting from government procurement, should increase our concern even further. Clearly, there is a growing inconsistency between the spirit of the uncompromising prohibitions of Article 3 of the SCM Agreement, largely formulated under the Bush and Reagan Administrations, and the current U.S. agenda. Attempts to negotiate further limits on R&D expenditures by governments or to cap and then reduce investment locational subsidies will be difficult. In this regard, it is worth recalling that the U.S. specifically lobbied against including compulsory reporting on subsidies in the SCM Agreement.

In the U.S., the Buy America Act, enhanced small-business set asides and new related legislation are reserving increasing amounts of government procurement for domestic suppliers. The U.S. approach which is targeted to curtail "leakage" on the part of U.S. buyers also discourages Canadian and other foreign sellers. Canada should be concerned about the wide variety of "Buy America" and related procurement provisions which persist and to which are being added others for federally-funded technology infrastructure programs.

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4. Trade, Technology and Intellectual Property Rights: Implications for Canada

4.1 Introduction

The principal international agreements dealing with intellectual property (IP) include the Paris, Berne and other related conventions administered by the World Intellectual Property Organization (WIPO).⁹⁴ WIPO conventions, however, are difficult to enforce and standards of protection have fallen short of modern requirements. As a result, the United States and other developed economies lobbied for the inclusion of intellectual property rights (IPRs) in the Uruguay Round.

While in the past most attention was paid to patents, the generation and diffusion of new technology places greater attention on questions of copyright and new forms of protection, such as trade secrets. Moreover, many new information technologies can be replicated easily. As a result, the distinction between inventions, covered by patents, and authorship, covered by copyright, has become clouded as new information-based products no longer fit the old legal framework.⁹⁵

Broadly speaking, IP is information of commercial value that has taken on the status of property. A unique feature of intellectual property is that it is "inherently intangible", but can be incorporated as information or knowledge in tangible objects. Moreover, protection of intellectual property is limited in time, which varies from traditional legal concepts of property.⁹⁶ Arguably, IP is as important a factor of production as capital and labour, and closely linked to trade performance. As a result, IPRs were one of the most controversial topics during the Uruguay Round.

The United States is leading the push to redefine intellectual property and has influenced a number of national IP regimes, including those of Canada, Japan and France and developing countries such as Brazil, the Republic of Korea and China. These international developments result in part from changes in domestic practice and legislation in the United States and the use of various instruments in both bilateral and

⁹⁴ The Berne Convention for the Protection of Literary and Artistic Works (1971)(Berne Convention); The Paris Convention for the Protection of Industrial Property(1967)(Paris Convention); WIPO, a UN specialized agency, was established in 1967.

⁹⁵ See *Intellectual Property Rights in an Age of Electronics and Information*, Office of Technology Assessment, United States Congress, Washington D.C., 1985.

⁹⁶ Traditionally, patents were a privilege granted by a state, not a proprietary right. The right to exclusive use of a patent was balanced against a social obligation to disclose useful information. Moreover, "monopolies" granted to inventors when compared with today were of relatively short duration. See I. Prakash Sharma, *Optimal Patent Term and Trade: Some Considerations on the Road Ahead*, Policy Staff Paper No. 93/12, Foreign Affairs and International Trade Canada, December 1993.

multilateral negotiations.⁹⁷ The unilateral use of domestic legislation by the U.S. has become part of the trade negotiating process and a subject of media attention⁹⁸

In this section, we propose to review some of the more important issues related to trade and IPRs facing Canada. After a brief overview of the economic implications of IP on technology transfer, trade and investment, we assess the trade policy implications of the NAFTA, the WTO/TRIPS Agreement and selected U.S. domestic IP legislation. Recommendations are included within the text of this section and are also gathered together in the Paper's Appendix.

4.2 Canadian Intellectual Property Objectives

Canada's four IP objectives in the NAFTA and GATT negotiations could be summarized as follows: first, that discriminatory "border practices" encountered by Canada be curtailed; second, Canada hoped to achieve higher standards of both protection and enforcement on a regional and global basis; third, negotiators did not want to see new IP-related trade barriers created; and finally, Canada wanted to have a consultation and dispute settlement process within both the GATT and NAFTA to minimize unilateral actions.⁹⁹ The questions addressed in this section can be analyzed, in light of these objectives, under four broad headings:

Balancing Canadian Interests: How can Canada continue to ensure that international legal instruments balance the somewhat different needs of technology producers and consumers during a period of rapid technological change?

Unilateralism: Will the violation of intellectual property rules continue to be open to unilateral action and retaliation on merchandise exports?

⁹⁷ U.S. domestic initiatives include: 1980 amendment to 1975 Copyright Act (explicitly granting copyright protection to software); 1984 Semiconductor Chip Protection Act (Section 902 of which contains an all important reciprocity clause - in contrast to the principle of national treatment applied to other U.S. multilateral instruments); 1985 International Software Protection Act, which also includes a reciprocity clause. These measures, despite their technical particularities, contain the same "holistic approach" set out in the 1984 Trade and Tariff Act, the 1984 National Productivity and Innovation Act and the Omnibus Trade and Competitiveness Act of 1988 cited previously. The latter includes several significant provisions concerning IPRs and assigns to them a major role in bilateral and multilateral trade negotiations (i.e., the "special 301" provision of the Omnibus Act authorizes use of the IPR argument to threaten countries with retaliation if they do not conform to United States requirements on IPRs.)

⁹⁸ See Helen Cooper and Cathy Chen, *China Averts Trade War With U.S., Agrees to Combat Piracy of Various Items*, *The Wall Street Journal*, Feb.27, 1995.

⁹⁹ See David Watters, *The Canadian Perspective on the GATT TRIPS Negotiations*, in *Global Rivalry and Intellectual Property; Developing Canadian Strategies*, Murray G. Smith, ed., pp. 183-90.

Technological Protectionism: Is knowledge becoming more a private asset than a public good and, as a result, is IP becoming a "protectionist" device?

Competition Policy: Should competition policy guidelines related to intellectual property rights be revisited?

We begin with a brief examination of the economic implications of intellectual property which is indispensable for understanding the current debate.

4.3 Intellectual Property: An Overview

4.3.1 Economic Implications of Intellectual Property

IPRs are protected through patents, copyright, industrial designs, trademarks geographical indications, integrated circuits, trade secrets and plant breeder's rights. The two main types of IPRs are industrial property rights and copyrights¹⁰⁰. *Sui generis* or special forms of protection have been developed to protect emerging technologies as in the case of biotechnology, plant breeders rights and the protection of integrated circuits. Trade secret protection comprises laws to protect undisclosed information that gives a competitive advantage to its owner.

There are several legal tools to avoid the use or abuse of monopoly powers that IPRs provide. These include the sale and assignment of exclusive rights, licensing and know-how agreements, and compulsory licensing. Compulsory licensing is considered as a sanction on the owners of IP should they not fulfil their obligation to develop a protected invention. The U.S., for example, can impose compulsory licenses for government procurement/national security purposes. It is also used in the U.S. as an anti-trust defence in patent litigation cases. In short, the threat of compulsory licensing is intended to avoid the abuses of monopoly that could slow down or limit scientific and/or technical progress.

Economists, still, know little about the effect of various IPRs on basic outcomes such as the volume of R&D or economic growth rates. Nonetheless, economic theory

¹⁰⁰ The Paris Convention includes: industrial property rights, patents, industrial design, utility models, trademarks, service marks, trade names, indication of source or appellation of origin and measures for the repression of unfair competition. The concept of copyright can refer either to the exclusive privilege granted to make a copy of a literary or artistic creation (mainly in English-speaking common law countries) or to the authorship itself (as in most continental countries). Paolo Bifani, *The New Mercantilism and the International Appropriation of Technology*, in *Technology, Trade Policy and the Uruguay Round*, p. 146.

in the area of patents provides at least four main perspectives.¹⁰¹ Perhaps the most relevant to this discussion is "appropriability theory", which helps us to understand the role of investment by MNEs in intellectual property and technology transfer, or the importance of knowledge and proprietary technology as "firm assets".¹⁰²

4.3.2 Intellectual Property, R&D and Technology Transfer

MNEs are more important as innovators rather than inventors. They tend to combine in-house R&D with acquisition of IP produced by relatively small firms that do not have financing, market power and/or desire to commercialize new technological innovations successfully. This tendency is evident by the acquisition by MNEs of small and mid-size Canadian firms, primarily in the software and biotechnological sectors.¹⁰³ Access to and transfer of technology are closely linked to IPRs.¹⁰⁴ Patents are used to create proprietary assets from a company's R&D, or what are called "invisible assets." As a result, the generation and allocation of IP is an incentive shaping both R&D and a firm's capacity to monitor and absorb knowledge.

¹⁰¹ Other economic theory on IP includes: the interplay between the patent system and industrialization and the transfer of technology; patents as an indicator of scientific and technological development and its relationship to firm size and the quest for productivity; patents in the context of welfare economics and resource allocation theory; and the divergence between social and private costs. For a useful summary of these approaches, see Bifani, *New Mercantilism*, p. 156.

¹⁰² Geroski, *Innovation and Competitive Advantage*, suggests that the balance between preserving incentives (e.g., through patents) to innovate and encouraging maximum diffusion should tilt more toward the latter.

¹⁰³ Canada has a disproportionate number of patents filed by individuals and small firms.

¹⁰⁴ There are a number of ways technology can be acquired. Possible contractual relationships include: licensing, contract R&D, R&D joint-ventures, or bilateral collaborative arrangements.

Recommendation 1. Performance Requirements: R&D and Technology Transfer

Technological "leap frogging" or acquiring an established business by competitors in order to catch up in certain technological areas has been a considerable drain on Canada's limited R&D expenditures. It is important for Canada to retain the ability to impose technology-related performance requirements in carefully selected circumstances involving the direct merger with or acquisition of a Canadian company by a foreign firm, as was done in the NAFTA. Technology transfer restrictions may occasionally be warranted when, for example, there is a foreign takeover of a firm already engaged in R&D activities, to ensure that the firm is not gutted of its R&D capacity, which is often funded directly or indirectly by Canadian taxpayers. This tool should not be used to force technology transfer into Canada, but rather to prevent the indiscriminate outflow of Canadian R&D capacity through the back door of a merger or acquisition where predatory intent is suspected.

4.3.3 Intellectual Property and Trade

Traditionally, intellectual property was not considered a trade issue, as it is not a product *per se*. However, as trade in intangibles began to grow more rapidly than trade in tangibles in the 1970s and 1980s, IP became a trade policy issue in both the NAFTA¹⁰⁵ and the GATT. Although the two resulting codes are similar, Chapter 17 of NAFTA goes beyond the TRIPS Agreement, most particularly due to its links with the investment obligations of the former. Intellectual property rights under NAFTA protect and enforce IPRs by, at a minimum, requiring Member countries to undertake the obligations of a number of international agreements as the base level of IP protection.¹⁰⁶

Interest in IPRs in the GATT was a carry-over from the Tokyo Round which intermittently, and ultimately unsuccessfully, focussed on an Anti-counterfeiting Code to protect trademarks. In the early 1980s, the U.S. and the EC continued to push for a code with other developed countries. The new Uruguay Round TRIPS Agreement is much more comprehensive in its implications as it sets fairly detailed minimum

¹⁰⁵ Disagreement between the United States and Canada on the problem of exclusive rights in the food, chemical and pharmaceutical sector was not resolved during negotiations of the FTA which includes only a short reference on the need to "cooperate" in order to improve protection of IPRs.

¹⁰⁶ NAFTA Article 1701(2).

standards of protection combined with enforcement guidelines for Member countries.¹⁰⁷ The TRIPS Agreement will be reviewed four years after coming into force.¹⁰⁸

4.3.4 Intellectual Property and Investment

During the NAFTA negotiations, the U.S. proposed a comprehensive definition of investment which included intangible property.¹⁰⁹ As a result, all forms of IP, including new IPRs yet to be developed, have been brought under the umbrella of the investment chapter, including protection against expropriation, the largely unimpeded right to transfer earnings abroad and access to international mediation and arbitration through investor-state dispute settlement mechanisms.

For its part, the TRIPS Agreement greatly enhances IP protection, including that provided through coverage under the WTO dispute settlement system, afforded to firms globally that invest in, produce and trade research and intellectual property-intensive goods and services. Moreover, the TRIPS Agreement implicitly recognizes the fact that the strength or weakness of a country's system of IP protection will have a substantial effect on the kinds of technologies likely to be transferred by international firms, and hence be a potentially important determinant of the composition and extent of FDI.

¹⁰⁷ The TRIPS Agreement addresses five main issues:

- the applicability of GATT principles (e.g., national treatment and MFN treatment) and those of relevant international intellectual property agreements;
- the provisions of intellectual property rights for copyright and related rights, trademarks and service marks, geographical indications, industrial designs, patent layout designs for integrated circuits and undisclosed information (trade secrets);
- procedures and remedies under the domestic laws of Members to ensure that IPRs can be effectively enforced by foreign and national right holders;
- provisions for multilateral dispute settlement; and
- finally, new conceptions of the link between competition/anti-trust practices and IPRs, particularly with respect to licensing arrangements.

¹⁰⁸ TRIPS Article 27 (3)(b).

¹⁰⁹ NAFTA Article 1139(g) defines investment broadly to include: "real estate or other property, tangible or intangible, acquired in the expectations or used for the purpose of economic benefit or other business purposes."

4.4 Intellectual Property Issues

4.4.1 Balancing Canadian Interests

There is an inherent conflict between the producers of IP, who tend to emphasize competitiveness, and consumers, including Canada overall (clearly much more a consumer than a producer of IP), who depend on foreign technology for growth and development. Producers favour stringent IPRs, while consumers encourage technology diffusion. As a result, NAFTA member countries may implement more extensive IPRs than those required by the NAFTA,¹¹⁰ or they may limit such rights if they have an adverse effect on competition.¹¹¹

- Harmonization and Compulsory Licensing

The "monopolistic" nature of patent rights led many countries, including Canada, to require that the subject matter of a patent be available to be "worked" within the country.¹¹² *Inter alia*, compulsory licensing is a means to ensure that the patented product or process is exploited (i.e., made/used/sold) within the jurisdiction of the granting authority. The United States has no such working requirement *per se*.¹¹³ As a result, it has been in the forefront of countries pushing for the elimination of any kind of compulsory licensing. During the Uruguay Round positions differed: Japan, the European Union and many developing countries suggested following the Paris Convention which provides for compulsory licensing, while the U.S. proposed to allow compulsory licensing only in highly exceptional cases.

Partly due to pressure from the United States, and before NAFTA, Canada passed legislation to eliminate its distinctive compulsory licensing system for pharmaceuticals which was the only sector where this practice was a public issue.¹¹⁴

¹¹⁰ NAFTA Article 1702.

¹¹¹ NAFTA Article 1704.

¹¹² Compulsory, non-exclusive licensing has been used by Japan as a condition of approving foreign direct investment or for accepting the registration of foreign patents. Canada introduced compulsory licensing for pharmaceuticals so as to facilitate the domestic production of well-known drugs under generic names to keep prices of medicines low.

¹¹³ Although, as noted previously, the U.S. can impose compulsory licenses for government procurement/national security purposes.

¹¹⁴ Compulsory licensing of pharmaceuticals was legislated in Canada in 1969. In 1987, Ottawa passed legislation (Bill C-22) which increased the patent protection for pharmaceutical firms. In exchange for extended patent protection, the Canadian pharmaceutical industry undertook to double its ratio of R&D to sales by the end of 1996. Bill C-22 partially undid the 1969 compulsory licensing policy.

For its part, Canada expected the U.S to harmonize its practices with the norms being developed during the Uruguay Round in the TRIPS Agreement.¹¹⁵

Recommendation 2. Monitor Diversion of R&D from Canada

Although Canadian taxpayers pay for the majority of university research, private corporations, including MNEs, often end up owning the patents and discoveries. While the United States has taken steps to stop any transfer to foreign countries of IP that results from Federal funds, Canada should resist the temptation. Instead, Canada should push for national treatment as per the NAFTA. More research needs to be done to verify the extent to which the U.S.'s strategy on IPRs actually discourages the amount of R&D done in Canada.

● Section 104 First-to-Invent versus First-to-File

Most countries, except the United States and the Philippines, determine the priority of invention registration based on the party who filed first (regardless of where), rather than the party that "invented" first (i.e., interpreted to mean invented in a specific jurisdiction - the U.S. or the Philippines). This significant difference in the U.S. from international norms sometimes has extraterritorial effects. The U.S., for example, continues to violate the non-discrimination provisions of the Paris Convention under Section 104 of Title 35 of the U.S. Patent Act.¹¹⁶ The U.S. refused to address the problems in the Patent Cooperation Treaty where it reserved the right to continue to discriminate against foreign inventors.¹¹⁷ Section 104 indicates that evidence related to the conception of an invention is limited to activities in the United States (either constructing a working prototype or filing a patent application).¹¹⁸

¹¹⁵ NAFTA 1709 (7) allows for compulsory licensing but prohibits different compulsory licensing systems for different technology fields (e.g., pharmaceuticals), while 1709 (10) lays out the conditions for using compulsory licensing.

¹¹⁶ U.S. Patent Act, 35 U.S.C. Section 104 (1988).

¹¹⁷ Article 64(4) Patent Cooperation Treaty, June 19, 1970. The Cooperation Treaty provides for a centralized international filing system for patent applications. In the case of *In re Hilmer I*, the U.S. admitted discrimination against foreign applicants who relied on their home country patent application to establish a "patent defeating" date of invention.

¹¹⁸ 35 U.S.C.s 104 (1988) The Section states:

In proceedings in the Patent and Trademark Office and in the courts, an applicant for a patent or a patentee, may not establish a date of invention by reference to knowledge or use thereof, or other activity with respect thereto, in a foreign country, except as provided in sections 119 and 365 of this

NAFTA requires "even-handed" treatment of citizens of all three countries in determining the priority of inventorship.¹¹⁹ As a result, inventive activity in Canada must be accorded the same status as inventive activity in the U.S. for the purposes of establishing the date of invention. Moreover, the TRIPS Agreement forbids discrimination in patent law with respect to the "place of invention, the field of technology and whether products are imported or locally produced."¹²⁰

While Section 104 was amended to include only those countries "other than a NAFTA country", the amendment was qualified by additional text that continues to create some uncertainty for inventors and investors as to what extent inventive activity in Canada can be considered to be equal to inventive activities in the U.S..¹²¹ Moreover, U.S. implementing legislation of the WTO/TRIPS agreement contains similar reservations. As a result, the U.S. continues to provide scope for discrimination in favour of inventive activity taking place in the U.S. which could have the effect of diverting R&D to the U.S.. While U.S. scholars are beginning to accept the first-to-file concept, there is considerable resistance and the potential for abuse by aggressive litigation in this area remains significant.

In January 1994, U.S. Secretary of Commerce Brown announced that the U.S. would continue first-to-invent in the U.S. policy on patents.¹²² It is perhaps not a coincidence that U.S. persistence on "first-to-invent" coincides with increasing technological protectionism on the part of U.S. business and Congress, both to delay disclosure of inventions and to step up the use of trade secrets. If the U.S.'s first-to-invent system of patents is fully eliminated, there would be no particular advantage to being a U.S.-based inventor. As one legal practitioner correctly noted:

title (Sections 119 and 365 relate to priority accorded foreign filed applications). Emphasis added.

¹¹⁹ Article 1703(1). Article 1709(7) requires that patents be available and patent rights "enjoyable without discrimination as to the territory" of the Party where the invention is made.

¹²⁰ TRIPS, Article 27.

¹²¹ The amendment for NAFTA countries was qualified by the addition of the following negative provision:

"To the extent that any information in a NAFTA country concerning knowledge, use, or other activity relevant to proving or disproving a date of invention has not been made available for use in a proceeding in the Office, a court, or any other competent authority to the same extent as information in the United States, the Commissioner, court, or other authority shall draw appropriate inferences, or take other action permitted by statute, rule or regulation in favour of the party that requested the information in the proceeding." Emphasis added.

¹²² The U.S. has not precluded future adoption of a first-to-file system. See "U.S. Won't Seek Renewal of Talks on Global Harmonization of Patents", 8 *World Intellectual Property Reporter* (BNA 79, 79-80). Apparently the rationale for keeping "first-to-invent" procedures are constitutional requirements that a patent be awarded to the "first and true inventor" and principles of "equity".

"harmonization will harm only those whose livelihood depends on unnecessary complexity and litigation." ¹²³

Recommendation 3. Continued reform of IP law in the United States and increased transparency is needed to ensure that the U.S lives up to its trade obligations.

(a) Section 104 of the U.S. Patent Act: First-to-Invent versus First-to-File

Article 1709(7) of the NAFTA requires that patents be available and patent rights enjoyable without discrimination. Section 104 of the U.S. Patent Act continues to discriminate in favour of inventive activity in the United States and has the potential to divert research and development to the U.S.. Under provisions of NAFTA, Section 104 should be fully amended to permit the unambiguous inclusion of activities in Canada and Mexico. Those parts of section 104 that continue to permit the potential for discrimination should be deleted or made non-applicable to Canada.

● **Section 204: Patent Licensing and NAFTA**

Under U.S. Statute, 35 USC, Section 204, Canadians have found that even requests for access to U.S. patents or knowledge have been denied, due to exclusive access provisions in U.S. patent law and operating agreements between U.S. government agencies and lab operators.¹²⁴ Section 204 restricts the exclusive right to use or sell an invention discovered in the U.S. through a production licensing agreement with U.S. government agencies and laboratories (i.e., with some U.S. government funding), to those persons who "agree that any product embodying the subject invention, or produced through the use of the subject invention, will be manufactured in the United States."

This statute raises interesting trade law questions about the interplay between NAFTA's protection of a patent owner's right to withhold consent to prevent others

¹²³ Kate H. Murasgige, *Harmonization of Patent Laws*, *Houston Journal of International Law*, Vol. 16, No. 4 (Spring 1994), p. 614.

¹²⁴ Certain agreements also exist between Canadian funding mechanisms such as IRAP and the private sector to ensure that Canadian Government funds benefit Canadian companies. However, these mechanisms do not take the form of patent laws.

from making, using or selling the subject matter of the patent¹²⁵ and its compatibility with the broad intent of the national treatment provisions of the Agreement.¹²⁶ As previously noted, NAFTA makes patent rights enjoyable "without discrimination as to the field of technology, the territory of the Party where the invention was made and whether products are imported or locally produced."¹²⁷ Moreover, the investment chapter provides that:

Each party shall accord investors of another Party treatment no less favourable than it accords, in like circumstances, to its own investors with respect to the establishment, acquisition, expansion, management, conduct, operation, and sale or other disposition of investments.¹²⁸

Interestingly, the U.S. maintains an export control law which requires that inventors get a license before filing applications in foreign countries which should be considered a barrier to filing patents in Canada.

Recommendation 3.

(b) Section 204 of the U.S. Patent Act

Intellectual property law in the United States must ensure that Canadian private investors have equal access to inventions in the United States as American investors have to Canadian inventions. U.S. Statute, 35 USC s204 restricts the exclusive right to use or sell an invention (created through a production licensing agreement between a firm and a government agency or laboratory) to those persons who "agree(s) that any products embodying the subject invention or produced through the use of the subject invention will be manufactured in the United States." It should be the goal of Canada to develop a separate, non-discriminatory accord with the United States in this area.

¹²⁵ NAFTA Article 1709(9) provides: "Each party shall permit patent owners to assign and transfer by succession their patents, and to conclude licensing agreements."

¹²⁶ NAFTA Article 1703 (1) states: "Each Party shall accord to nationals of another Party treatment no less favourable than that it accords to its own nationals with regard to the protection and enforcement of all intellectual property rights...."

¹²⁷ NAFTA Article 1709 (7).

¹²⁸ NAFTA Article 1102 (1). However, NAFTA Chapter 1106(4) includes exemption from national treatment for the subsidization of R&D and production location.

4.4.2 Unilateralism

Like the evolution of the TRIMs agreement, a dispute between Canada and the United States before a GATT dispute settlement panel helped define the intellectual property debate in the early 1980s.¹²⁹ Canada's concern at the time, as it is today, is that violations of intellectual property rules should not be open to unilateral retaliation on Canadian merchandise exports. The apparent reluctance to change certain aspects of U.S. domestic law, due to private sector lobbying, makes it clear that unilateral use of patent protection will remain an important instrument of U.S. trade policy.

- **Section 337 U.S. Tariff Act**

Section 337 of the Tariff Act of 1930¹³⁰ permits owners of intellectual property rights to block infringing imports by obtaining temporary or permanent exclusion orders from the U.S. International Trade Commission (ITC). Omnibus trade legislation enacted in 1988 made it easier for IP owners to make their case before the ITC and provided a variety of procedures for expedited relief.

Section 337 has been a point of contention with Canada and other U.S. trading partners for some time. In 1987, the European Commission initiated complaint procedures under the GATT, alleging that Section 337 discriminates against foreign countries. A GATT panel agreed, ruling in November 1988 that in most cases Section 337 was not compatible with the national treatment obligation (Article III) of the GATT.¹³¹ In November 1989, the United States allowed adoption of the GATT panel

¹²⁹ At Canada's request, a GATT panel was established in 1981 to examine the application of the U.S. Tariff Act of 1930, Section 337, against a Canadian supplier of automotive spring assemblies which were barred from entering the U.S. on the grounds that they infringed U.S. patent rights. A GATT panel ruling in 1983 rejected Canada's complaint, finding that the U.S. action was consistent with the language of GATT Article XX(d) (i.e., the trade restriction was considered "necessary" for the enforcement of U.S. patent law). Article XX(d) allows for the adoption of non-discriminatory measures to assure the compliance with GATT consistent laws and regulations not bound by GATT disciplines (GATT 1986). See Carlos Primo Braga, *Trade Related Intellectual Property Issues: The Uruguay Round Agreement and its Economic Implications*, paper presented at the Uruguay Round and Developing Economies/World Bank Conference, January 1995, p. 4.

¹³⁰ U.S. Tariff Act of 1930, 19 USC 1337.

¹³¹ The panel reasoned that Section 337 actions before the ITC against foreign companies are discriminatory because: (1) U.S. patent holders can choose either the ITC or the district courts as the venue in which they challenge imported products, whereas district courts are the sole forum for litigating against domestic products; (2) Section 337 imposed fixed time limits, whereas the district courts do not; (3) counterclaims cannot be raised under Section 337, while they can be raised before district courts; (4) exclusion orders are available to U.S. patent owners under Section 337, whereas no comparable remedy is available against infringing products of U.S. origin; (5) the Customs Service automatically enforces the ITC exclusion order; and (6) producers and importers may have to defend their products before both the ITC and district courts.

report and assumed an obligation to reform section 337 to conform with Article III.¹³² Moreover, changes to Section 337 were to have been one of the main gains for Canada in the IP chapter of NAFTA and to have been part of the U.S.'s NAFTA implementing legislation.¹³³ In 1990, 1992, 1993 and 1994, the U.S. attempted to "fix" Section 337 legislatively.

It remains the goal of the Canadian Government that U.S. procedures are brought into full conformity with the international obligations of the United States (Chapter 17 of the NAFTA, the GATT Panel Report and TRIPs). Canada recently responded to the latest, still insufficient U.S. attempt¹³⁴ to amend Section 337 by reminding the U.S. of the importance Canada places on WTO Member States bringing their IPR enforcement legislation into conformity with Articles 49 and 50(8) of the TRIPs Agreement.¹³⁵ Outstanding issues, while not exhaustive, include: 1) dual proceedings or the possibility that foreign goods and right holders will continue to be exposed to proceedings before both the ITC and in Federal District Court;¹³⁶ and 2) the fact that counterclaims cannot be raised under section 337 at the ITC, while they can be before a District Court in domestic cases. This imposes an unequal burden on the non-US defendant in an ITC proceeding, as compared with that faced by U.S. defendants in District Court proceedings.

¹³² The U.S. apparently agreed to the adoption of the GATT Panel ruling on the understanding that implementation by the U.S. would depend on the successful conclusion of the GATT TRIPs Agreement.

¹³³ Various aspects of the NAFTA IP chapter touch on Section 337. For example, see the national treatment provisions of Article 1703, and the enforcement provisions of Articles 1715(8) and 1716(8).

¹³⁴ See U.S. International Trade Commission 19 CFR Part 210, "Procedures for Investigations and Related Proceedings Concerning Unfair Practices in Import Trade". These interim rules of practice and procedures to implement amendments to Section 337, were enacted by the U.S. Congress as part of the Uruguay Round Agreements Act. Federal Register December 30, 1995.

¹³⁵ Articles 49 and 50(8) require that any administrative procedure for the enforcement of intellectual property "shall conform to principles equivalent in substance" to the obligations regarding the judicial procedures outlined in these articles. These TRIPs obligations are identical to that contained in Articles 1715 (8) and 1716 (8) of the NAFTA.

¹³⁶ The GATT panel dealing with 337 specifically found that the possibility that producers or importers of products of foreign origin might have to defend their products both before the ITC and in Federal District Court was one of the factors that amounted to a denial of national treatment for imported products in contravention of Article III:4 of the GATT. Section 337 is also considered a violation under Article 65(5) of TRIPs.

Recommendation 3.

(c) Section 337 of the U.S. Tariff Act

Section 337, although recently amended, continues to discriminate against foreign companies. Canada will want to continue to push for modifications that bring Section 337 into conformity with the international obligations of the United States (Articles 48, 49 and 50(8) of the TRIPS Agreement) and Chapter 17 of the NAFTA (Articles 1715(8) and 1716 (8)).

4.4.3 Technological Protectionism

- Trade Secrets

A legal trade secret occurs where confidential information is not made public. Historically, trade secrets have not been protected because of their nature of secrecy. In the case of a dispute, a trade secret owner must demonstrate some measure of actual secrecy (i.e., "reasonable" efforts to maintain secrecy) and the accused's misconduct in obtaining, using or disclosing the trade secret. Small businesses especially often find the time and dollar costs associated with the patent process to be too onerous. Hence they make use of secrecy instead. Secrecy is also used when rapid obsolescence is expected or in dealing with non-patentable subject matter. Trade secrets, in partial contrast to other statutory IP law, discourage the publication of information to protect the owner and to give him a competitive advantage.¹³⁷ Trade secrecy in Canada falls under common law. In the U.S., some states have codified common law practices into statutory trade secret protection.

The U.S. sought to include trade secrets in the NAFTA and TRIPS Agreement as a legally recognized form of IP protection:¹³⁸

¹³⁷ Generally the subject matter must be unavailable to the public and not readily determined by independent investigations. If an end product is easily reverse engineered, trade secrets are not useful. Trade secrets have traditionally been used for formulae and production processes. See Steven McDaniel, *Protecting Biotechnology Trade Secrets in University and Industrial Research*, *Houston Journal of International Law*, Vol. 16, No. 4 (Spring 1994), pp. 565-590.

¹³⁸ NAFTA Article 1711 requires signatories to protect: (1) relative rather than absolute secrets; (2) known material, which in combination is generally unknown, even if certain aspects are publicly available; and (3) information that is actually or potentially valuable by virtue of being generally unknown.

No party may discourage or impede the voluntary licensing of trade secrets by imposing excessive or discriminatory conditions on such licenses or conditions that dilute the value of the trade secrets.¹³⁹

NAFTA, however, goes beyond its parallel TRIPs article on trade secrets in several respects.¹⁴⁰ It requires, for example, Parties to the NAFTA to provide the legal means to prevent trade secrets from being acquired if "the information has actual or commercial value because it is secret."¹⁴¹ While this article might be construed primarily to concern suppressing dishonest commercial practices, its effect has been to confer a monopoly right on specified information. Moreover, there are no specific exceptions to a trade secret. It is likely, therefore, that trade secrets will complicate Governments' attempts to foster cooperative measures between industry, university research and government laboratories for R & D activities.¹⁴² One potentially new manifestation of trade secrets is that such things as sharing test results on pharmaceuticals could now be systematically delayed.

In summary, while it is recognized that legal protection for confidentiality is essential to the development of advanced technology industries,¹⁴³ trade secrets can also be a "back-door" mechanism to protect items such as life-forms which in many cases are not allowed under conventional patents. Moreover, trade secrets, unlike patents, can protect information well beyond the terms available through patenting. Despite this, trade secrets remain difficult to define. The interplay between trade secrets and unfair competition - a subject which is addressed in the next section - will be central to any future debate on trade-related intellectual property rights.

- Joint Research

In computer science, biotechnology and pharmaceuticals, most inventions are the products of teams, not individual inventors. Increasingly, however, "(t)he open community of science finds that it must integrate more closely with companies which

¹³⁹ NAFTA Article 1711 (4) (Trade Secrets).

¹⁴⁰ TRIPs Article 39 (Protection of Undisclosed Information).

¹⁴¹ NAFTA Article 1711 (1) (b).

¹⁴² The possibility of using trade secrets was evident in the U.S. Superconductivity Competitiveness Act which provides for with-holding "commercially valuable" scientific information developed in U.S. Government laboratories from release under the U.S. Freedom of Information Act.

¹⁴³ See Scott J. Fields, *Intellectual Property, Nafta would extend Protection of Rights; /Historic Changes Expected if Pact is Ratified*, Legal Intelligence, Sept. 29, 1993, p. 9.

are dependent upon establishing proprietary rights if they are to exploit knowledge in more open trading regimes to their competitive advantage."¹⁴⁴ An emerging IP issue for Canada is the proprietary right to intellectual property resulting from joint research.

The issue of joint ownership of research is likely to grow in importance in Canada due to cut-backs in government funding for basic research and is complicated when knowledge crosses borders.

...(w)ithout international patent protection for their preliminary discoveries, academic researchers enter blindly into the nebulous arena of international trade secrecy, which lacks established protocols and legal procedures.¹⁴⁵

These complications help to explain why international collaborative arrangements/technology consortia are increasingly difficult to penetrate for both the Canadian private and public sectors, particularly once research has begun. Canadian universities and public research laboratories active internationally, that once provided knowledge in a relatively open and unstructured fashion, will likewise tend to adapt to these new competitive realities.

- **Biotechnology and Protection of Higher Life Forms**

Most industrialized countries permit patenting of "non-naturally occurring" micro-organisms. However, only a few, excluding Canada, allow patents for larger non-natural organisms (multi-cellular or genetically engineered animals). Identifying patentable subject matter is a growing problem in the agricultural, pharmaceutical and medical fields as technology evolves into areas unknown at the time that classifications were developed.¹⁴⁶ However, it is biotechnology that is quickly overwhelming the global patent system.

¹⁴⁴ Luke Georghiou and J.S. Metcalfe, *Public Science, Intellectual Property Rights and Research Administration*, in *Science and Technology and Free Trade*. p. 54.

¹⁴⁵ C. Steven McDaniel, *Protecting Biotechnology Trade Secrets in University and Industrial Research*, *Houston Journal of International Law*, Vol. 16, No.3 (Spring 1994), p. 566.

¹⁴⁶ The European Parliament, for example, approved an amendment to EC patent law in October 1992 which provides patent protection for biotech inventions. The amendments include specifics on what cannot be patented. *Biotechnology Regulation in the European Community*, 10 *Biotechnology Law Reporter* 8 (1991). Patents are not available for inventions of human body parts or that involve unnatural processes for the production and modification of animals. Council Directive 93/41/EEC on National Measures Relating to the Placing on the Market of High Technology Medicinal Products, Particularly those Derived from Biotechnology, 1993 O.J. (L214) 40 was defeated by the European Parliament in March 1995. Most countries exclude from patents scientific principles/laws of nature, mathematical models and abstract ideas.

While both the TRIPS and NAFTA cover life-form patenting, each agreement provides "may exclude" clauses. NAFTA is considered lacking by the U.S., as it provides mandatory protection only for plant varieties and excludes: "plants and animals other than micro-organisms; and essentially biological processes for the production of plant or animals, other than non-biological and microbiological processes for such production."¹⁴⁷ NAFTA, however, does leave Parties free to "implement in [their] domestic law more extensive protection of intellectual property rights" than the minimum demanded by the Agreement.¹⁴⁸

Under the TRIPS Agreement, countries are required to provide protection for micro-organisms, microbiological processes and plant varieties.¹⁴⁹ However, "exemptions" from patentability are admitted for diagnostic, therapeutic and surgical methods,¹⁵⁰ which is consistent with the patent laws of most countries. Other exclusions allowed from patentability include: to protect public order or morality, to prevent serious prejudice to the environment or to protect human or plant life. These exceptions, however, are constrained by the *caveat* that nonpatentable inventions must be excluded from commercial exploitation in the Member country.

Like the NAFTA, the TRIPS Agreement is considered conservative by the U.S. for allowing non-patentability of plants and animals in contrast to the U.S. biotechnology lobby that favours broad patent coverage.¹⁵¹ While the Canadian Intellectual Property Office (CIPO) has determined that each patent application for higher life forms will be examined individually, biotechnology is an area where pressure for harmonization is likely to be forthcoming as companies use U.S. legal precedents to press for recognition of their biological patents in Canada. Canadian concerns range from access to U.S. technology and the economic benefits of such biological inventions to the unknown environmental risks from the release of unwanted genes.

¹⁴⁷ NAFTA Article 1709 (3) (b) and (c). See also Seth D. Greenstein, *Examination of Intellectual Property Provisions of the North American Free Trade Agreement*, World Intellectual Property Reporter (BNA) 344, 345 (1992).

¹⁴⁸ NAFTA Article 1702.

¹⁴⁹ TRIPS Article 27 (3) (b): This includes both "frontier" innovation (i.e., cell and gene manipulation) and conventional fermentation processes, but may exclude from patentability traditional breeding methods and higher life organisms. With respect to plant varieties, however, Members are required to provide protection "either by patents or by an effective *sui generis* system or by any combination thereof".

¹⁵⁰ TRIPS Article 27 (3) (a).

¹⁵¹ Investors in the biotechnology field in Canada lobbied jointly with their U.S. counterparts, arguing that enhanced patent protection is essential for the survival of this industry.

Recommendation 4. Canada Should Take a Lead on Defining Future IP Issues

- **Patenting of Life Forms**

Currently, there is confusion within the Canadian legal community concerning a precise and acceptable definition of patentable living matter. The patenting of biological life forms needs to be addressed at the international level along with issues such as the loss of genetic diversity, trade and the environment, and medical treatment for humans and animals. Canada should prepare for future international trade negotiations on biotechnology by developing negotiating positions in this specialized area. Canada could, for example, host discussions on the broader issues of patenting genetic material and lead an international enquiry concerning the patenting of life forms.

- **Exclusive Importation Rights (Gray Market Trade) and Border Measures**

"Exclusive import rights" are an attempt to give trademark and copyright owners the ability to stop the "parallel importation" into a particular jurisdiction of all kinds of items produced elsewhere legally - from computer programs to compact discs. This type of arrangement, favoured by the U.S. and European Union, particularly for sound recordings, would allow right-holders to prevent the purchase of a good legally produced abroad at the most economical price and subsequently imported through what has become known as "grey market" trade. U.S. policy is against parallel imports in order to segment national markets and price discriminate. Canada has opposed proposals for such exclusive import rights at the World Intellectual Property Organization.

In addition to exclusive importation rights, U.S. industry continues to push for an expanded role for customs authorities to undertake border measures that would enforce all intellectual property rights, not just counterfeit trademark goods or pirated copyright goods, as contained in the NAFTA or WTO/TRIPS.¹⁵² Canada has opposed extending border requirements as being costly and not appropriate for intellectual property. Currently, for example, there are no Canadian border measures for patent rights, rights of layout designs of semiconductor integrated circuits, trade secret rights, plant breeder's rights, rights for geographical indications and industrial design rights. Enforcement of Canada's obligations in these areas, as enshrined in domestic law, remains the responsibility of domestic police forces.

¹⁵² NAFTA, Article 1718(1)

- **Dispute over Extending Patent Terms**

The Uruguay Round requires WTO Members to provide 20 year patents from the time of application for a patent. However, the law has been interpreted by some U.S. drug companies as giving them an additional three years of patent protection on existing patents before other companies are allowed to apply to make low-cost generic alternatives.¹⁵³ The extra three years (on average) relate to preventing generic drug companies wanting to use a patented drug from filing regulatory approval applications during the last three years of the patent term. If the generic drug companies have to wait until the 20th year before seeking regulatory approval, they will need an additional three years to get approval. In this regard, it is worth noting that Canadian generic drug companies have the "fastest time to market" after patent expiry in the world.

The U.S. drug companies have pressed their interpretation on the Food and Drug Administration, which last May acknowledged these companies' position. The generic industry and consumer groups in both Canada and the U.S. are opposed. Mickey Kantor, the United States Trade Representative, has written a letter to the Senate indicating that the negotiations during the Uruguay Round did not mean to incur this consequence.¹⁵⁴ As a result, the Senate Finance Committee, while facing stiff lobbying, is currently attempting to restore the 17 year limit on a drug company's patent of a new medicine through an amendment to the budget bill.

Recommendation 5. Canada Should Take a Lead on Defining Future IP Issues

- **Other Proposals to Extend IPRs**

Canada should remain skeptical about new U.S. proposals (e.g., the further extension of patent terms; a prohibition of "grey market" imports) that extend IPRs further without careful evaluation of the broader social benefits of such changes, including their demonstrated impact on encouraging innovation in practice.

¹⁵³ The three years is speciously calculated by comparing the TRIPS 20 years from date-of-filing term to the 17 years from date-of-grant term previously in force in several jurisdictions. NAFTA allows either approach.

¹⁵⁴ The Senate Finance Committee has put forward an amendment that would close this unintentional loophole that extends the life of patents on prescription drugs. A number of large drug companies continue to lobby to protect the provision. See Neil A. Lewis, *Drug Firms at Odds over Patent Extensions*, *New York Times*, September 28, 1995.

4.4.4 Competition Policy/Anti-Trust

Enhanced IPRs can lead to the concentration of innovation as firms use their rights to prevent or delay the transfer of technology. Protectionist tactics to minimize the loss of economic rents through imitation, copying and rapid worldwide diffusion include: increasing the complexity of technology, the use of restrictive business practices associated with the transfer of technology, the tying and packaging of new technology to managerial expertise or the further selling of other products, or active use of monopolistic power.¹⁵⁵

The NAFTA broke new ground by including provisions to deal with competition policy. Under NAFTA, for example, a patented invention can only be used as the basis for a second patent (dependent patent) in cases where there has been "an adjudicated violation of domestic laws regarding anticompetitive practices."¹⁵⁶ Moreover, the TRIPS Agreement also provides new conceptions of the link between competition\anti-trust practices and IPRs, particularly with respect to licensing arrangements. The U.S. in particular will have to reduce significantly areas of conflict between IPRs and anti-trust. Whether or not the application of these concepts will make it more difficult to foster cooperation among firms has yet to be determined. The following chapter addresses some of these issues in greater detail and questions whether specific competition policy guidelines should be developed for advanced technology in general and intellectual property in particular.

Recommendation 6. Canada Should Take a Lead on Defining Future IP Issues

- **IP and Competition Policy**

Canada should pursue further work, including through seminars/conferences involving the private sector, which explores the future balance between the protection of IP (i.e., a monopoly conferred to promote a public good) and competition policy constraints.

¹⁵⁵ For example, if a new innovation has a low price elasticity of demand, the innovator, protected by his monopoly, can set the market price.

¹⁵⁶ NAFTA Article 1709 (10) (I). See also 1709(10)(K) and 1704.

4.5 Conclusions

The balance between the wide dissemination of technological advances and the granting of temporary IP monopolies to inventors has, until recently, been legislated in a Canadian context taking into account certain international conventions. Since NAFTA and the TRIPS Agreement, IP protection has been more fully "internationalized" and made more binding and enforceable. While it is recognized that legal protection is essential to the development of advanced technology, Canadians should be concerned about technological protectionism and the monopolization of information.

Traditionally, science had no borders. Despite liberalization in the EU and NAFTA, restrictions on the cross-border transfer of scientific knowledge are emerging.¹⁵⁷ At stake is the way technology is disseminated. If the Canadian economy is to move toward higher value-added goods, with growing numbers of skilled workers in well paying jobs, the way we manage intellectual property will have to play a role. At stake is the future of high value-added production in Canada at a time when the role of government in actively promoting high technology industries is being reshaped by NAFTA, the Final Act of the Uruguay Round and budgetary deficits.

Recommendation 7. Diffusion of Intellectual Property in Canada

The Canadian government should review its intellectual property policy to ensure the widest possible transfer of technology to the Canadian private sector for commercial exploitation.

Technological protectionism is not only a dispute between producers and consumers of knowledge but between producers in an attempt to control global markets. A growing intolerance of "free-riders" will likely increase the use of IPRs as commercial weapons. Just as nations once profited from an American "nuclear umbrella", the United States, in the creation of a strong IPR umbrella, will likely continue to encourage advanced technology development in the U.S. to the detriment of countries such as Canada. Moreover, the current IP system is likely to remain

¹⁵⁷ One of the most cited examples was the exclusion of non-U.S. nationals from early meetings regarding high temperature superconductivity. Likewise, in the EU, foreign-owned multinationals are not allowed to participate in various government-sponsored programmes.

cumbersome for small firms outside the U.S., as the difficulty of determining if one is in violation of someone else's legally protected patent or copyright remains. As long as the U.S. maintains its first-to-invent system of patents, Canadian companies remain vulnerable to legal challenges.

Canada's IP trade policy must continue to balance between protecting the right of producers while attempting to maximize the wider benefit that results from broad access to technology. While Canadian IPRs do not appear to discourage the amount of R&D done in Canada, evidence suggests that a stricter IP regime in the U.S. which gives more emphasis on the right to protect than the requirement to disclose and which retains several discriminatory features, will reinforce monopolistic and oligopolistic features of world trade.

Enhanced IPRs can lead to the concentration of innovation as firms exercise their monopoly rights to prevent or delay the transfer of technology. Concerns over the shift in rights with increasing obligations on the part of governments to uphold those rights may have altered the historical balance between economic cost versus social interest. As a result, Canada will more than ever need to push for transparent, non-discriminatory and consistent rules for trade in technology. As this section indicates, certain U.S. domestic legislation impedes the free flow of information, thus reducing Canadian access to new technologies. While the Canadian Government implemented a number of new IP obligations leading up to the NAFTA, the U.S. has begun only recently to implement more fully its obligations in U.S. law. In practice, however, the U.S. appears set to continue to discriminate in favour of U.S. firms and to expand the reach of existing IPRs.

Recommendation 8. Diffusion of Intellectual Property Information in Canada

Increasingly, companies will need to insure through searching existing patent literature that their R&D does not violate existing intellectual property. The Canadian Intellectual Property Office (CIPO) has information on domestic and foreign patented technology on file and is responsible for disseminating patent information to the private sector. Foreign Service Officers should be made increasingly aware of CIPO and the role of patents, copyrights, trademarks and industrial designs as a trade policy and trade development tool.

5. Competition Policy: Anticompetitive Practices Affecting International Trade in Technology

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5. Competition Policy: Anticompetitive Practices Affecting International Trade in Technology

Of all the structural differences among nations, differences in competition policy may have the greatest influence on the terms of global competition in high technology industries. Yet such differences are likely to be the most difficult to harmonize or to regulate by multilateral rules.¹⁵⁸

Lawyers and economists know very little about innovation, and as they begin to understand it, there is a tendency to despair because taking it into account impairs - if not destroys - the validity of a simple model that many use to deal with anti-trust policies.¹⁵⁹

5.1 Introduction

As trade barriers at international borders have fallen to historically low levels, the impact of domestic policies, like competition (known in the U.S. as anti-trust), have taken on increasing importance. The globalization of commerce and the limited international range of competition policy have meant that private anti-competitive behaviour which extends beyond a domestic jurisdiction can continue largely unconstrained. The lack of international obligations in competition policy can also give rise to public anti-competitive behaviour, in which governments back "national champions" or directly support private anti-competitive behaviour through uneven enforcement.

Competition laws are substantially about economic efficiency, as well as consumer welfare. While there are many similarities to the various national competition statutes, differences exist. Different procedural and substantive rules between countries to regulate corporate behaviour and government efforts to influence corporate decisions reflect different economic and legal structures and traditions. The existence of differences is entirely natural and does not necessarily

¹⁵⁸ Laura Tyson, *Managing Trade Conflict in High Technology Industries*, in *Linking Trade and Technology Policies* (1992), p. 84.

¹⁵⁹ See T. Jorde and D. Teece, *Rule of Reason Analysis of Horizontal Arrangements: Agreements Designed to Advance Innovation and Commercialized Technology*, *Antitrust Law Journal*, Vol. 61 (1993), p. 581, where the authors state their belief that much of the accepted analytical apparatus for anti-trust should be modified to reflect a conceptual framework that explicitly takes innovation and its organizational requirements into account more fully.

imply a policy "problem".¹⁶⁰ Nonetheless, the potential for disputes over competition policy does also exist. As international trade rules broaden, it is increasingly clear that the fuller convergence (not necessarily the harmonization) of rules concerning competition may well be required where differences can have negative trade or investment implications or impede competition.

The interplay between trade, competition policy and advanced technology is evident in a number of areas such as: national policies on anti-dumping; exclusionary R&D consortia subsidized by government; investment measures such as locational incentives; and intellectual property rights. R&D and its diffusion can create special challenges for competition law, since the nature of high technology business can lead to global oligopolies. For example, R&D creates distinct problems associated with inter-firm cooperation and alliances.

The traditional focus of antitrust/competition policy was on price competition.¹⁶¹ Competitive effects (dynamic efficiency concerns), however, cannot always be analyzed by looking at conventional product markets. Increasingly, innovation is recognized for the crucial role it plays in delivering economic growth and by enhancing competitiveness through efficient production and distribution.¹⁶² As a result, there have been moves, particularly in the U.S., to define "innovation markets". These include: markets for existing innovative products; R&D spending to create new products, processes or goods that are close proxies for innovation efforts; and intellectual property.¹⁶³

Some observers argue that innovation is currently retarded by anti-trust laws, particularly in instances where innovation can only be achieved by cooperation among competitors. Indeed, proposals have been made to revise competition law in various jurisdictions (including the U.S.) so that it coincides more "clearly" with innovation-led industrial policy. This will facilitate inter-corporate exchanges of information if they are "pro-competitive" and increase economic efficiency. The opposite case is also being made as anti-trust specialists continue to be concerned about the growing

¹⁶⁰ For an innovative study on the somewhat different philosophical underpinnings of U.S., EU, Japanese and Canadian competition law, see I. Prakash Sharma and Philip Marsden, *National Competition Policy Philosophies in the Quad: Considerations for Trade Policy*, Policy Staff Paper No.95/14, Department of Foreign Affairs and International Trade (December 1995).

¹⁶¹ In the U.S. "competition policy" is called anti-trust.

¹⁶² Innovation we define here as the quest for and discovery, development, improvement and adoption of new processes, new products and new organizational structures and procedure.

¹⁶³ See Richard J. Gilbert and Steven C. Sunshine, *Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets*, *Antitrust Law Journal*, Vol. 63 (1995).

potential of a monopolist to retard the pace of research and development. As a result, competition remedies such as a requirement to license technology may be used more often in the future. Clearly, competition policy is not a closed end in itself.¹⁶⁴

5.2 Canadian Competition Policy Objectives

In the author's view and in light of the previous two sections, competition policy objectives for Canada in any future trade negotiations could be summarized as follows: first, that foreign government promotion of exclusionary R&D joint-venture exemptions be limited under any new international competition system; second, that R&D and locational subsidies and the application of trade remedy laws designed to promote technology intensive "national champions" in certain jurisdictions not be done at the expense of Canadian companies; and three, that restrictive technology licensing and the excessive use of IPRs which hurt technology diffusion be avoided. However, while Canada has been strongly committed to the use of competition policy to promote corporate competitiveness and eliminate barriers to trade, a number of questions remain:

Balancing Canadian Interests: What are the basic policy differences of various competition regimes as they relate to advanced technology? How should the linkage between trade and competition policy be explored? Where are the two policies supportive and where are they not?

Unilateralism: What is the likelihood of developing a common, innovation-promoting framework governing competition policy while avoiding extraterritorial effects? And how can Canada avoid an overly confrontational, litigious and bureaucratic anti-trust regime replacing traditional trade remedies?

Technological Protectionism: What is the interplay between intellectual property and competition policy and what is the proper balance between industrial "producers" and "consumers" of technology? Moreover, do the competitive interests of Canadian high technology firms always coincide with the overall national interest?

¹⁶⁴ For example, see Oxford Analytica, *U.S. Anti-trust Policies Face Review*, *The Wall Street Journal*, November 20, 1995.

5.3 Competition Policy: An Overview

Competition policy at the international level, as it pertains to advanced technology and trade policy, should deal with four broad issues: (a) anti-competitive trade practices such as subsidies; (b) predatory pricing and anti-dumping; (c) investment/joint-ventures and merger control; and (d) intellectual property.

5.3.1 Trade Implications of Competition Policy

Domestic regulation of competition does not necessarily enhance economic competitiveness. (If it did, we would perhaps not have as many disputes in this area.) Indeed, several well-documented cases in the U.S., Japan and Europe suggest that lack of anti-trust enforcement can play a significant role in enhancing economic competitiveness of "national champions". Clearly, national competition authorities do not necessarily always have a trade liberalizing agenda in mind when they take action. As a result, competition policy, or at least the application of competition laws, is often linked with political points of views as much as economic or trade theory. "Anti-competitive" business practices in the home market, an accusation often levelled at the Japanese, can, for example, provide the profits necessary to fund expansion in foreign markets. As a result, some countries argue that their anti-trust authorities should be able to take action in cases of anti-competitive behaviour in the home market of foreign competitors.

In addition, it should be noted that overly or arbitrarily restrictive competition standards may also impede certain pro-competitive opportunities. For example, competition law standards could be written or applied so as to impede opportunities for corporate restructuring, trans-national joint ventures, international strategic alliances, etc..

5.3.2 Competition Policy, R&D/Subsidies and Antidumping Laws

- R&D/Subsidies

Joint R&D projects are allowable under most countries' competition law. Indeed, most countries resisted liberalizing R&D services during the MTN services negotiations, in order to shelter R&D joint-ventures and other policies such as direct and indirect subsidies aimed at promoting "national champions". While the U.S. government once viewed direct subsidies as a distortion in the competitive marketplace, the U.S. position, as noted previously, has evolved. As Horlich and Meyer note:

The competition policy community in the United States seems to have paid little attention to the role that government subsidies can play in distorting competition within the United States. The European Community, by contrast, has a very active dossier of attempts to control subsidization within the communities to prevent such distortions. The difference between the two approaches may be explained by the untenable assumption that there are no subsidies in the United States, or by the unproven assumption that the level of subsidization is sufficiently similar across the United States so as to cancel itself out.¹⁶⁵

The irony is that while the European Community is noted for defending its subsidies in international trade negotiations, it is the only major jurisdiction that has successfully implemented an administrative system to attempt to discipline subsidies through competition policy.¹⁶⁶

- **Anti-dumping**

Domestic anti-trust laws generally increase competition and lower prices. In contrast, while the initial objective of anti-dumping laws was to address cross-border predatory pricing, or other forms of clearly anti-competitive behaviour, they have become a convenient tool for powerful lobbies and often reduce competition and raise prices.¹⁶⁷ For high technology products, the measurement of production costs, and consequently the determination of the dumping margin, is especially hazardous. Industries in these sectors reasonably tend to set prices that reflect significant economies of scale and learning. That is, current prices are set in terms of anticipated future costs (which will be considerably lower). For products such as aircraft and semi-conductors, such "forward" or "life-cycle" pricing is widely practised, economically rational and non-predatory in intent - and yet, such pricing can and does

¹⁶⁵ Gary N. Horlick and Michael A. Meyer, *The International Convergence of Competition Policy*, *The International Lawyer*, Vol. 29, No. 1 (Spring 1995), pp. 65-76. Emphasis added. See also, *Community Framework for State Aid for Research and Development*, 1986 O.G. (C 83) 2; *Commission Communication on the Method for the Application of Article 92(3)(a) and (c) to Regional Aid*, 1988 O.G. (C 212) 2.

¹⁶⁶ *Ibid.*, p. 68.

¹⁶⁷ For further background, see Keith H. Christie, *Damned If We Don't: Some Reflections on Antidumping and Competition Policy*, Policy Staff Paper No. 94/15, Department of Foreign Affairs and International Trade, July 1994.

run afoul of national anti-dumping law (which, in addition, fails to capture the production of domestic competitors).¹⁶⁸

As a result, both national and multilateral (GATT) anti-dumping laws have been criticized for deterring competitive behaviour that is neither unfair nor predatory. The debate has helped push competition issues to the top of the trade policy agenda.¹⁶⁹ The United States, for example, has used the threat of anti-dumping to encourage Japan to accept a voluntary export restraint (VER) as a means to stabilize import prices of semi-conductors, while the European Union has used such measures to force the Japanese to produce advanced components in Europe.¹⁷⁰ Recent analysis of U.S., EU, Australian and Canadian practices clearly demonstrates that very few anti-dumping cases have, in fact, been limited to correcting predatory pricing by foreigners selling in the import market. This practice creates an anti-competitive chill in the marketplace that distorts trade and investment, including in advanced technology sectors.¹⁷¹

¹⁶⁸ Tyson argues that, rather than fall back on the false precision of constructed cost and fair market value, the application of anti-dumping rules should be based, whenever possible, on actual prices or average variable cost of production. Laura D'Andrea Tyson, *Who's Bashing Whom: Trade Conflict in High Technology Industries*, Institute for International Economics Washington, 1992, p.80.

¹⁶⁹ The argument is that competition laws would target only predatory pricing as opposed to anti-dumping law which targets the injurious effects on domestic industry of a broad range of perfectly competitive activity (but carried out by foreigners). The former must have the intent of lessening competition. See T.M. Boddez and M.J. Tebelcock, *Unfinished Business: Reforming Trade Remedy Laws in North America*, Winnipeg Kromar Printing (1993).

¹⁷⁰ Korean semiconductor makers are establishing facilities in the U.S. to avoid possible trade barriers and gain access to advanced chip technology. Hyundai, for example, recently announced that it will invest US\$1.3 billion in a semi-conductor plant and would conduct research at its new U.S. facility. John Burton, *Hyundai builds global role with \$1.3bn US Chip Plant*, Financial Times, May 24, 1995, p. 4.

¹⁷¹ See Christie, *Damned If We Don't*, pp.8-13.

Recommendation 1. Transparent Antidumping Laws

The goal for Canada is to develop more transparent, tighter anti-dumping procedures and to require others to do likewise. The convergence of procedures used by the NAFTA partners in the administration of their anti-dumping laws, particularly the methods used to calculate dumping would be a useful first step. (In high technology products, the measurement of production costs is especially hazardous because of the global character of the firms involved and because any estimate of cost is extremely sensitive to the scale of production and learning over time.) The application of anti-dumping should be based on average variable costs whenever the constructed value method is used. Over time, filters to gauge predatory intent and to screen out non-predatory commercial behaviour should be introduced.

5.3.3 Investment and Merger Control

Whereas a decade ago, the guiding force behind mergers was primarily corporate profit, today mergers are increasingly driven by technological change. Competition-related investment issues linked to advanced technology include: attempts by governments to influence corporate decisions to merge, acquire another company or establish a strategic alliance; overly lax competition policy designed to attract investment; and attempts to provide "national champions" with strategic advantages in international markets.

Technology is evolving so quickly that traditional ways of viewing mergers are quickly becoming obsolete. Various lobbies suggest that high-tech mergers demand new thinking in anti-trust and some suggest that there should be anti-trust exemptions for high-technology industries. It is, therefore, not surprising that moves for greater coordination of competition policy are beginning to come from multinational technology leaders themselves.¹⁷² Clearly, competition-related issues are much tougher to assess today, particularly for technologies that are just developing and markets that do not yet exist. Most competition authorities, however, maintain that advanced technology industries should not be off-limits to anti-trust.

¹⁷² For example, during its recent antitrust settlement negotiations with the U.S. Justice Department, Microsoft requested that EU officials participate in the talks so that a similar investigation in the European Union could be resolved simultaneously.

5.3.4 Competition Policy and Intellectual Property Rights

The underlying philosophy of competition policy tends to encourage wider diffusion of technology which in turn promotes innovation in new products and processes, although this premise can create a certain tension with intellectual property rights. Here we refer to patents, trademarks, copyright and the "know-how" necessary to ensure against under-investment in new technology. It is argued that weak intellectual property rules hinder the transfer of technology, and that stronger rules are required to deal with commercial counterfeiting and the misappropriation of technology. While the relationship between IPRs and competition enforcement is not new, according to many commentators it too is moving to the top of the trade policy agenda. Indeed, the U.S. Department of Justice has recently circulated new anti-trust guidelines for the licensing and acquisition of intellectual property.¹⁷³

IPRs can provide an exclusive legal right to title-holders that are first into a particular market. Owners may exploit their rights themselves or transfer their rights, usually through licence, to others in exchange for a fee. Intellectual property licensing arrangements have implications for competition policy since they can be used to underpin cartel-like behaviour to fix prices, limit output, divide markets and deter new entrants. Competition policy reviews such agreements to ensure that restrictions are not unduly anti-competitive.¹⁷⁴ Ironically, what was once viewed as anti-competitive behaviour is now being re-invented somewhat due to a new understanding that competing firms may also enter agreements to share complementary IPRs for the purpose of developing new technology that can have pro-competitive effects.

¹⁷³ See *Antitrust Guidelines for the Licensing of Intellectual Property*, April 6, 1995 issued by the Department of Justice and the Federal Trade Commission.

¹⁷⁴ Typical examples of such agreements are: tied purchase agreements where the licensee is forced to buy inputs not covered by the IPR from the licensor or his nominees; tie-out arrangements where the licensee is forced to use only the licensor's technology; restriction of use of the technology once the licence has expired; grant-back provisions requiring the licensee to assign all improvements and innovations without charge; and market sharing requirements. This list is not exhaustive.

5.4 Competition Policy Forums

5.4.1 Canada, the United States and the NAFTA

NAFTA, unlike the FTA, gives competition policy a degree of importance by establishing the premise of cooperation with regard to competition law enforcement.¹⁷⁵ However, the "best endeavour" nature of this obligation means that it cannot be the basis for dispute settlement under the NAFTA.¹⁷⁶ During the NAFTA negotiations, Canada faced U.S. reluctance to include substantive provisions on competition policy at all. Ultimately, competition policy within NAFTA is left to each of the Parties. While the focus remains on anti-competitive behaviour within each national jurisdiction, the Parties have also agreed to undertake work on the relationship between competition laws and policies, and trade within the free trade area.¹⁷⁷ In this regard, a Working Group on Trade and Competition is required to report to the NAFTA Free Trade Commission by January 1999.

NAFTA, while not abolishing monopolies and state enterprises, or preventing the creation of new ones, attempts to oversee and review the effects on pricing and distribution activities of these entities in both domestic and cross-border trade.¹⁷⁸ Of interest to the advanced technology sector is the greater coverage of service monopolies.¹⁷⁹ Monopolies are prohibited from using their "dominant position" to engage in anti-competitive practices in a non-monopolized market through the discretionary provision of the monopoly product (i.e., selling telecom services at two different prices), cross-subsidisation of R&D or predatory conduct. Issues related to monopolies and state enterprises can be considered under the dispute settlement

¹⁷⁵ NAFTA Article 1501. This Article obliges the NAFTA Partners to "cooperate on issues of competition law enforcement policy, including mutual legal assistance, notification, consultation and exchange of information relating to the enforcement of competition laws and policies in the free trade area."

¹⁷⁶ NAFTA Article 1501(3).

¹⁷⁷ See NAFTA Article 1504. Currently, these issues are dealt with through the NAFTA consultation mechanisms and national legislative and judicial frameworks. Canada and the U.S. also recently updated and replaced a 1984 Memorandum of Understanding (MOU) to notify, cooperate and consult on competition issues and deceptive marketing practices. See also, Prakash Sharma and Prue Thomson with Keith Christie, *Delivering the Goods: Manufacturer-Retailer Relations and the Implications for Competition and Trade Policies*, Policy Staff Paper No. 94/11, Department of Foreign Affairs and International Trade, December 1994.

¹⁷⁸ NAFTA Articles 1502 and 1503.

¹⁷⁹ When purchasing or selling the monopoly goods or services which they provide, NAFTA requires monopolies to exercise or act in a manner consistent with governments' NAFTA non-discrimination obligations.

provisions of Chapter 20. However, these obligations do not apply to government procurement.¹⁸⁰

- **Canada**

The absence of a common North American dispute settlement mechanism with regard to competition law means that Canadian concerns about the impact of U.S. competition law on corporate activity in Canada must rely upon the "best endeavours" feature of the recent Canada-U.S. Agreement, as well as the consultative features of the NAFTA. While the NAFTA continues to allow for anti-dumping and countervailing duties, the ultimate goal of Canada is to develop better disciplines or a competition policy replacement for these instruments.

The Canadian Competition Act deals with intellectual property and technology licensing agreements that apply to tied selling, exclusive dealing and territorial market restrictions, if these practices can be shown to lessen competition substantially.¹⁸¹ However, it appears that competition remedies are not readily available from a practical point of view. Canadian authorities have initiated very few prosecutions under the Competition Act, as the Canadian system is much less confrontational than its U.S. counterpart. Moreover, the Canadian system has avoided the most adversarial features of the U.S. system, including its somewhat greater use of *per se* findings of illegality, the much broader right of private actions under anti-trust law with the prospect of punitive (treble) damages, and actions taken by State Attorneys-General in addition to those taken by federal authorities. All in all, the Canadian competition system is less likely to discourage innovative inter-firm collaboration.

- **The United States**

U.S. anti-trust procedures require extensive judicial review by the Federal Trade Commission (FTC) and by the Department of Justice (DOJ). While U.S. anti-trust law is enforced by two federal agencies as well as the anti-trust authorities in each of the states that may be affected by a collaborative arrangement, it is considered flexible in some areas such as in accommodating collaborative R&D through special treatment for technology consortia. The U.S. has also been criticized, however, for its attempts to impose U.S. anti-trust policy on foreign companies for conduct outside the U.S..

¹⁸⁰ NAFTA Article 1502 (4).

¹⁸¹ Howard Wetston, *The Interface between Competition Policy and Intellectual Property Rights in The Canadian Economy*, in *Global Rivalry and Intellectual Property*, Murray G. Smith, ed., pp. 137-44.

The Clinton Administration's approach to competition and anti-trust differs from his Republican predecessors. The shift has been along the continuum from free markets to greater faith in technology as the central economic force driving the U.S. economy. However, views differ between the Department of Justice and the Commerce Department and the White House. Commerce Secretary Ron Brown and the Defense Department are being pressured to seek anti-trust exemptions for high-technology industries, while others such as Ann Bingaman, Assistant Attorney General for Anti-Trust, argue that tough enforcement is considered necessary to "ensure competition and advanced technological change."¹⁸² As noted in section three, President Clinton and Vice-President Gore have embraced efforts by the Big Three auto-makers - "the very symbol of an American oligopoly" - to create a technology consortia to "leap frog" Japanese automotive technology. Moreover, as the telecommunications and information technology sectors converge, "few people close to the Administration believe the Clinton team will do much to slow a concentration of corporate power."¹⁸³

This year, for the first time, the development of goods "that do not yet exist" will be taken into account in U.S. anti-trust actions. The FTC will consider R&D and the merger of firms with specialized assets or other characteristics which could lessen competition by retarding the pace of R&D. As a result, the FTC is increasingly likely to challenge mergers in "innovation markets" when options for R&D are diminished or dominant suppliers acquire competing firms with exclusive licenses or licenses for the future fruits of R&D.¹⁸⁴ Ironically, in certain aspects of anti-trust enforcement, the U.S. has moved toward greater policy restrictions with respect to R&D consortia by instituting greater vigilance on possible abuse of dominant position.

¹⁸² Bob Davis and Joe Davidson, *Competing Creeds: Clinton Team is Split about Anti-trust Policy as Big Mergers Wait*, *The Wall Street Journal*, October 28, 1993, p. 1.

¹⁸³ The Wall Street Journal reports that, privately, White House economic advisers support big mergers in the telecommunication field to advance the U.S. lead to create a high speed computer network for the information superhighway. *Ibid.*

¹⁸⁴ The U.S. guidelines also state that a *per se* offence will not be deemed to have occurred if at least four other independently controlled entities possess comparable capabilities and incentives to undertake R&D of the relevant products or other products that would be a close substitute.

i. **U.S. Anti-Trust, Extraterritoriality and the NCRPA**

The National Cooperative Research and Production Act (NCRPA) of 1993,¹⁸⁵ which amends the 1984 National Cooperative Research Act (NCRA) reduces anti-trust penalties against U.S. consortia that engage in the production of a product, process or service. The amended Act broadens the application of the U.S. anti-trust immunity in a way that is limited to U.S. firms. For example, in order to receive these antitrust benefits, the joint venture's principal facilities must be located in the United States.¹⁸⁶

The stated purpose of the NCRPA is to promote innovation, facilitate trade and strengthen the competitiveness of the United States in world markets by clarifying the "applicability of the rule of reason standard."¹⁸⁷ The NCRPA establishes a procedure under which the business community may notify the Department of Justice and Federal Trade Commission of their cooperative ventures and thereby qualify for a single-damage limitation on civil anti-trust liability. An additional difference between the NCRPA and its predecessor is that the U.S. is applying the principle of reciprocity rather than the principle of national treatment to non-U.S. firms.

The primary issue for Canada is the fact that the NCRPA discriminates in favour of joint venture production facilities located in the U.S.. Moreover, every person who controls any party to the joint venture must be a U.S. citizen or a foreign person from a country whose domestic laws accord at least the same level of anti-trust treatment to U.S.-controlled firms based in the foreign jurisdiction. Key elements of the Act are clearly contrary to the spirit of the NAFTA and GATT national treatment principle.

¹⁸⁵ The original bill dealt with research and development and did not address production. The NCRA was originally passed to "head off" Japanese success in this area.

¹⁸⁶ If located in the United States, and an anti-trust action is filed, then the facility would be liable only for single damages. However, if principal facilities were located in Canada, and anti-trust litigation occurred in which a U.S. and a Canadian firm are involved, then the joint-venture could be hit with treble damages.

¹⁸⁷ The 1994 Rule of Reason Standards (Section 3) is to be amended to read as follows: "In any action under anti-trust laws, or any State law similar to the anti-trust law, the conduct of any person in making or performing a contract to carry out a joint venture shall not be deemed illegal *per se*; such conduct shall be judged on the basis of its reasonableness, taking into account all relevant factors affecting competition, including, but not limited to, effects on competition in properly defined, relevant research, development, product, process, and service. For the purpose of determining market, worldwide capacity shall be considered to the extent that it is appropriate in the circumstances".

Recommendation 2. Competition Policy and U.S. Anti-trust

Any modification of existing competition policy should be non-discriminatory with respect to ownership of investments (i.e., provide national treatment). One Canadian objective is to modify U.S. anti-trust policy which encourages technology consortia that discriminate in favour of joint venture production facilities located in the U.S.. Moreover, U.S. legislation reducing potential anti-trust penalties with regards to certain consortia, but which requires every person who controls any part of such a joint-venture to be a U.S. citizen or a foreign person from a country whose domestic laws accord at least the same level of anti-trust treatment, should be repealed.

5.4.2 The European Union and the Treaty of Rome

The Treaty of Rome attempts to control competition in the European Union by disciplining anti-competitive trade practices. In effect, competition law within the EU has replaced anti-dumping law and is also used to discipline state subsidies as well as anti-competitive corporate behaviour.¹⁸⁸ The Treaty of Rome is concerned with eliminating and preventing barriers, direct and indirect, to trade within the EU and, through the European Commission, controls the regulation of foreign trade. However, the Treaty also makes reference to developing "national champions"¹⁸⁹ and encourages activities that "contribute to the improvement of the production or distribution of goods or to the promotion of technical or economic progress."¹⁹⁰ In practice, the principal goal of the Treaty is to enhance the integration of European economies, rather than the promotion of competition *per se*.¹⁹¹

European competition law is considered somewhat lax in its approach to horizontal cross-border mergers, which are seen as market integrating forces, and

¹⁸⁸ Moreover, in its recent negotiations with EFTA and East European nations, the EU has insisted that member states adopt a legal regime compatible with EU laws.

¹⁸⁹ Treaty of Rome, Article 85.

¹⁹⁰ Treaty of Rome, Article 85 (3).

¹⁹¹ The creation of European Economic Area in 1994 and the Maastricht Accords (ratified in October 1993) are an extension of the goals of the Treaty of Rome.

stricter in its approach to "vertical restraints" that tend to divide markets.¹⁹² As a result, mergers or other activity that involve distribution or partitioning agreements are considered the most serious of all EU competition policy breaches.¹⁹³ In contrast, EU competition cases have rarely been brought against advanced-technology industries. Although the EU system functions mainly on directives from the Commission based in Brussels, litigation on various competition issues and decisions does occur in EU Member State courts and the European Court.

In rapidly changing advanced technology sectors, very litigious approaches to anti-trust are increasingly untenable. U.S. competition law tends to be enforced somewhat more by the courts than by administrative review, as is the case under European and Canadian competition policy in practice. As international and regional efforts proceed toward greater competition policy cooperation and convergence, Canada must be vigilant against certain features of the current U.S. approach (i.e., a greater proclivity to *per se* illegality, broader scope for citizens suits, treble damages and anti-trust actions by sub-national governments (to name a few)).

Recommendation 3. Administrative Approach vs Active Judicial Challenge

Canadian competition law should continue to give priority to efficiency enhancing inter-firm collaboration and stability in the application of the regulatory framework. We support the broadly administrative approach followed in Canada, particularly for the NAFTA area, to prevent restrictive business practices and enhance market integration. A better understanding of the European model would also be useful should NAFTA-EU talks on liberalized trade eventually come to fruition.

5.4.3 GATT and the OECD

Certain existing rules of the GATT/WTO, specifically intellectual property and services, are related to competition policy. However, the GATT Anti-Dumping Code and its WTO successor is the only agreement dealing directly with restrictive business

¹⁹² Treaty establishing the European Economic Community, March 25, 1957, 298 U.N.T.S. 3 (hereinafter Treaty of Rome) Articles 85-86. Competition issues are subject to two levels of litigation in the European courts: the Court of First Instance and the European Court. This is not the case for all EU laws, most of which are not considered in the Court of First Instance at all.

¹⁹³ See Sharma and Marsden, *National Competition Policy Philosophies*.

practices through the control of anti-competitive trade actions of the private sector.¹⁹⁴ The "non-violation" dispute settlement approach constitutes another possible avenue to address competition policy-related issues, although rather a long-shot on the basis of current GATT/WTO jurisprudence.¹⁹⁵ One could argue, for example, that competition policy enforcement or non-enforcement is a *de facto* "subsidy" to a domestic industry.¹⁹⁶ Such exemptions or non-enforcement constitute what has been called a "regulatory subsidy." Of course, under current international trade law, the non-enforcement of competition policy or any other law is not considered a subsidy. (The SCM Agreement, for example, clearly defines a subsidy as a financial contribution by a government, not the on-enforcement of a law or policy.) Nonetheless, non-enforcement could, in theory, be subject to a general nullification and impairment claim if enforcement practice were to deteriorate significantly and, once identified, could perhaps be subject to a rectification recommendation of a WTO panel.¹⁹⁷

While the Uruguay Round Agreements offer scope for competition law challenges, the reach of the WTO remains very limited in this regard. Differences of opinion remain on the speed and proper forum for future multilateral approaches to competition policy. Will the WTO be able to develop international competition rules to take some of the pressure off trade law/anti-dumping rules? The current U.S. view is that attempts to create a global anti-trust law are not a good idea.¹⁹⁸

¹⁹⁴ The WTO recognizes the need for the consistent resolution of disputes arising from anti-dumping and countervailing duty measures. See *Declaration on Dispute Settlement Pursuant to the Agreement on Implementation of Article VI of the General Agreement on Tariffs and Trade 1994*, Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations, 15 April 1994.

¹⁹⁵ A non-violation claim can be made when a measure or action does not violate any explicit GATT/WTO rule, but nonetheless impairs a contractual concession entered into in the GATT/WTO and the measure/action could not have been reasonably anticipated when the concession was given.

¹⁹⁶ See Bernard M. Hoekman and Petros C. Mavroidis, "Competition Policy and the GATT", in *The World Economy*, Vol. 17, March 1994, p. 144.

¹⁹⁷ This includes passive support for non enforcement of anti-trust law or, in some cases, active support through anti-trust exemptions or subsidies. As long as support is identified, recourse to the WTO may be possible.

¹⁹⁸ It has not gone unnoticed that it was the United States which vetoed early attempts to control private anti-competitive business practices during post-War negotiations to create an International Trade Organization. Chapter V of the Havana Charter was an attempt to prevent in an international forum "business practices affecting international trade which restrain competition, limit access to market, or foster monopoly to control."

The EU's Sir Leon Brittan has proposed the development of minimum competition rules enforced by domestic authorities. Brittan has also pushed for intensified efforts to establish international competition rules within the OECD.¹⁹⁹ Several countries, including Canada, support exploring internationally the possible scope and shape of rules on competition policy, with the focus on the WTO as a proper forum. From a Canadian perspective and in addition to the work underway in the NAFTA, the author believes that the WTO is a logical place for the development of an international competition policy due to its consensual decision-making process and effective dispute settlement system.

5.5 Conclusions and Policy Implications

Governments are having difficulties making informed regulatory decisions on technologies whose impact may not be understood until well into the future. Increasingly, they will need to advise companies what they can do to take advantage of trade liberalization and technological change, rather than regulate to tell them what they cannot do. As recent Canadian and U.S. competition legislation suggests, business must be in a position to make decisions on the basis of an accurate understanding of the rules.

Are trade policy authorities placing too much hope on competition policy? Sylvia Ostry has argued that national differences cannot and probably should not be harmonized as an act of policy "for its own sake". Instead, differences should converge over time due to competition among producers through trade and cross-border investment. I tend to agree with Ostry: the main goal is to rectify only those differences that impede international trade and investment. Increasingly, it is perhaps more important to ask: what kind of market best provides innovation?

In the absence of political will to relinquish trade remedies and address some of the other technology-related barriers to trade outlined in this section, the scope for harmonized competition policy remains elusive. The only places where this has been successful are regions where deeper economic integration has occurred (i.e., the EU and Australia/New Zealand) than that which is envisioned between Canada and the United States. In light of the findings of previous sections, it would perhaps be more productive to continue to push for further liberalisation of market access, particularly policies related to subsidies, foreign direct investment and intellectual property and,

¹⁹⁹ An independent "International Anti-Trust Code Working Group" released a controversial draft anti-trust codes in July 1993. Designed to be a GATT Agreement, the Anti-Trust Code was developed in an attempt to bring coherence to the process of convergence that is already taking place.

where possible, continue work toward the further disciplining of anti-dumping and countervailing duties.

Is Canada being pulled by the U.S. confrontational model? The U.S. Department of Justice continues to use anti-trust law to open foreign markets to more competition by American exporters. However, while the U.S. invokes such laws, it does not appear to be in a great hurry to develop a global competition policy. Like other aspects of trade law, application and intent vary considerably between Canada and the U.S.. U.S. antitrust law provides for many more specific exemptions to the application of U.S. laws. Furthermore, certain sectoral exemptions may constitute a violation of the principle of national treatment and give rise to investment distortion effects. The practical impact of these types of exemptions is that exporters to the U.S. may be subject to antitrust liability for anti-competitive practices, while their U.S.-based competitor will not.²⁰⁰

As this section outlines, there are a number of anti-competitive practices relevant to the advanced technology sector that are supported by governments through competition policy exemptions on technology consortia and with regard to investment locational subsidies. Regrettably, under current rules, many of these activities appear WTO consistent. As pointed out previously, Canada is limited in its capacity to "retaliate" through the adoption of similar practices in Canada, as the costs to the smaller, more trade dependent economy frequently outweigh the cost to the United States. The balance between theory and practice when countering protectionist trade measures leaves the smaller players with much less scope to manoeuvre, unless rule-making expands further to restrict additional discriminatory practices.

²⁰⁰ (Canadian) Register of United States Barriers to Trade, Department of Foreign Affairs and International Trade (Ottawa, 1995).

6. Outlook and Implications for Canada

Most trade law, including much of the GATT/WTO, predates the emergence of "high technology" as a central trade issue. While the WTO framework will reduce traditional barriers on many high technology products and facilitate the international transfer of new applied technologies, much remains to be done to shape and implement trade disciplines on investment-distorting, government financial incentives and performance requirements, public procurement practices, the misuse of national security concerns to deny national treatment, and other instruments in the arsenal of "national technology policies."

The primary goal of the Paper is to provide an overview of the interaction between trade, investment and technology policies in order to provide recommendations for Canadian trade policy leading to the year 2000. At stake is the future of advanced technology R&D and high value-added production in Canada at a time when the role of government in actively promoting advanced technology industries is adapting to the rights and obligations that bind NAFTA and WTO members, the inadequacy of international rules to discipline certain discriminatory practices, and budgetary deficits.

Canada has special needs and must ensure progress on some of these issues in the NAFTA context, and in a forward-looking WTO work programme that will hopefully emerge from the December 1996 Ministerial meeting in Singapore. Detailed recommendations, also listed together in Appendix I, call for: 1) further limits on the use of subsidies; 2) national treatment for Canadian companies that wish to participate in joint research projects - especially within the NAFTA free trade area; 3) discipline on the use of discriminatory public procurement contracts that provide incentives for private sector R&D or other high tech investment in a particular jurisdiction; 4) the clear elimination of discriminatory practices related to intellectual property rights in the U.S., and careful analysis of the expanding U.S.-EU IPR agenda; and e) several proposals that cut across the advanced technology/competition policy domains.

The challenges outlined in the Paper are compounded by the lack of adequate linkages between the private sector, market trends and much public R&D traditionally done in this country, along with the fact that the trade and technology policy communities still find it difficult to interact on these issues.

The Department of Foreign Affairs and International Trade plays a number of roles with potentially important consequences for advanced technology policy - from "scientific diplomacy" to more direct commercial support, to developing new and

better rules that reduce or eliminate imbalances that negatively affect Canada in the field of technology. While "technology" issues and initiatives clearly have important implications for Canadian foreign policy, recognition of DFAIT efforts in this area has been slow in coming. The linkages between trade and technology policies appear to be more clearly understood in the U.S. where the Department of State has a formal career path for foreign service officers who make S&T their speciality.

Since Canada's high technology exports are largely destined for the U.S., much of this Paper has been devoted to our neighbour to the south. The impact of the Clinton Administration's partnership with industry to develop "strategic technologies" has yet to be fully felt in Canada. The U.S. Administration has, for example, promoted military-civilian technology links under "dual-use" technology programmes which have stretched the notion of national security and confused legitimate government support for basic R&D with subsidized research for commercial purposes. The Republican sweep of 1994 aside, the enhanced commercial partnership between the U.S. government and industry is a force to be reckoned with and a challenge to the full realization of NAFTA's potential. For example, Republicans and Democrats alike seem wedded to pushing further the frontier of intellectual property rights in all available fora in response to pressure from the U.S. business community.

U.S. policies outlined in the Paper include a package of programmes and legislative changes targeted at strengthening the competitive position of U.S. business at the expense of its major trading partners. Examples of shifts in policy and the importance attributed to these new programmes include:

- a wide range of technology-related legislation that gives enhanced roles to the Departments of Commerce, Energy and Defense;
- a range of programs funded by the Commerce Department and managed by the National Institute of Standards and Technology which include Government-industry technology consortia that target industries that are also of particular importance to Canada (i.e., autos, aerospace and telecommunications);
- changes to federal R&D expenditures to redirect and expand U.S. R&D programs away from defence and space to develop and commercialize competitive new industrial technologies;
- a number of performance requirements for investment (i.e., downstream manufacturing commitments) for participation in publicly funded technology projects;

- more than doubling budgets for the Advanced Technology Program and the Manufacturing Technology Centres programme for FY 1995;
- greater diffusion to the private sector of the intellectual property created by U.S. national laboratories;
- reform of competition law to "favour" further innovation and advanced technology; and
- attempts to reform the WTO and NAFTA to further protect U.S. technology interests.

Technology Consortia

It is generally accepted that government expenditures on private industrial R&D have significant spill-over effects and give a considerable boost to domestic private R&D spending. The growing integration of government and university laboratories with private sector research in the form of technology consortia has also had a profound effect. European and U.S. rules of participation in government-supported R&D consortia reveal a number of restrictions and, in the latter case, the application of relatively arbitrary rules on access.

Canada has worked hard in Europe to gain access to the research activities of nationally and regionally sponsored R&D programs and signed in June 1995 a Canada-EU S&T Agreement. This Agreement will allow Canadian-based firms to participate in Community-funded projects as full partners and, more importantly, with full rights to intellectual property. The Agreement is reciprocal, giving EU institutions and companies the opportunity to participate in complementary Canadian R&D projects. In order to improve access to U.S. consortia with the potential for downstream commercial opportunities, Canada may have to organize its R&D efforts to provide additional access to Canadian R&D projects.

R&D Subsidies

U.S. subsidies are less visible than Canadian ones and often take the form of civilian and defence procurement, low interest loans and loan guarantees and tax measures. New U.S. legislation in the area of technology coincides with aggressive R&D subsidies targeted at commercial technologies but limited to domestic producers. Moreover, U.S. subsidies undertaken after the demise of the Cold War are becoming

less defence-related and more commercial, while increasingly moving from basic research to "precompetitive" or generic research. These issues revolve around the right of national governments to set R&D policy and questions of "vital" national interests which are often clouded by questions of "national security", real or perceived. The need for further international disciplines on the level and nature of R&D subsidization should be carefully analyzed in light of budgetary pressures and some recent economic work that qualifies the usual link made between incremental R&D expenditures and growth in certain circumstances.

Investment Incentives

The complementary relationship between trade, in both goods and services, foreign direct investment (FDI) and technology is increasingly evident. In contrast to the early 1960s and 1970s, when small teams of innovators and small amounts of venture capital went a long way in fields such as biotechnology and microelectronics, size, financial weight, vertical integration and market share are increasingly as important as R&D for commercial success.

If trade policy can aim to restrict government activity influencing investment performance requirements, it is clear from this study that we must also be prepared to deal with government practices that promote investment through incentives or subsidies. The incentive side of investment regimes is often neglected at a time when beggar-thy-neighbour domestic subsidies and massive investment incentives represent a game that Canada can no longer afford to play.

Government Procurement

Due to the magnitude of the spending involved, public procurement is one of the most important trade-related issues for high technology industries and an important source of demand for products and services such as aerospace, electronics, information technology and biotechnology. Multibillion dollar U.S. federal technology contracts offer enormous leverage into both public and private sector business developments. After successful performance on such teams, Canadian firms would improve their odds of obtaining future contracts with the prime contractor and others on public or private sector and international government bids.

Targeted government procurement, like subsidies, is used as a policy instrument to reinforce government support for advanced technology industries with spinoffs from technology development transferred to other commercial applications. Moreover,

procurement can have a marked effect on investment location. While the NAFTA and WTO/Government Procurement Agreement provided increased access to some areas of U.S. government procurement, there remains much work ahead. Canadians should be concerned about the wide variety of "Buy America" provisions that persist and to which are being added others for federally-funded technology infrastructure programs. Enhanced small-business set asides, and bilateral accords on government procurement are increasingly protectionist in tone and implemented in favour of U.S. products. The U.S. approach, which is targeted to curtail "leakage" on the part of U.S. buyers, also appears set to discourage Canadian and other foreign sellers.

Intellectual Property

Traditionally, trade in intellectual property was not considered a trade issue, as IP is not a product *per se*. Moreover, while in the past most attention was paid to patents, information technology, which can be easily replicated, has placed greater attention on questions of copyright and new forms of protection, such as trade secrets.

The U.S. and the EU are leading the push to redefine intellectual property. Indeed, the unilateral use of U.S. domestic legislation by Washington has become part of the trade negotiating process. Canadians, on balance consumers rather than producers of IP, should be concerned about technological protectionism and the monopolization of information that may have an adverse effect on competition. Enhanced IPRs can lead to the concentration of innovation as firms exercise their monopoly rights to prevent or delay the transfer of technology. While Canadian IPRs do not appear to discourage the amount of R&D done in Canada, evidence suggests that a stricter IP regime in the U.S. which gives more emphasis to the right to protect than the requirement to disclose, and which retains several discriminatory features, will reinforce monopolistic and oligopolistic tendencies in world trade. As a result, Canada will need more than ever to push for transparent, non-discriminatory and economically sound rules for trade in intellectual property.

Anti-trust/Competition Policy

The relationship between IPRs and competition enforcement is not new. However, according to many commentators, it too is moving to the top of the trade policy agenda. There are also a number of anti-competitive practices relevant to the advanced technology sector supported by governments "passively" through existing competition policy exemptions on technology consortia, investment locational

subsidies, and active use of anti-dumping law to pursue competitive, non-predatory cross-border trade in goods. Regrettably, under current rules, many of these activities appear WTO consistent. While the traditional focus of competition policy was on price competition, competitive effects cannot always be analyzed by looking at conventional product markets. Indeed, the U.S. Department of Justice has recently accepted new anti-trust guidelines for the licensing and acquisition of IP. As a result, innovation is increasingly recognized for the crucial role it plays in delivering economic growth and enhancing competitiveness through efficient production and distribution. However, while the U.S. Department of Justice continues to use anti-trust law to open foreign markets to more competition by American exporters, the U.S. approach to anti-trust remains similar to its use of other legislation discussed in this Paper, providing for flexible interpretation and domestic protection while attempting to open the markets of others.

Appendix I

Recommendations Chapter 3

Recommendation 1. The provision of national treatment, particularly within the NAFTA area, for Canadian firms in U.S. technology programmes

Discriminatory access to technology consortia strengthens the role of U.S.-owned, U.S.-based firms in conducting R&D and post research manufacture. As the distinction between foreign and domestic becomes increasingly blurred within North America, particularly in the field of advanced technology, the lack of full national treatment, especially for Canadian firms willing to commit their own money and expertise becomes increasingly unjustifiable. At the least, provisions that discriminate against Canadian-owned, U.S.-based firms should be avoided, as should territorial restrictions placed on post research manufacture. This approach would require non-discriminatory access to Canadian government-sponsored programmes for U.S.-controlled firms based in Canada.

Recommendation 2. Increased disciplines on "conditional" government subsidies (i.e., those that promote exclusionary R&D consortia)

More ambitiously, Canada could seek the agreement of other countries to extend subsidy-based performance requirement prohibitions within the NAFTA, and pursuant to the current negotiations in the OECD, to establish a Multilateral Agreement on Investment (MAI) that limit even further undisciplined practices such as a government's ability to make subsidies conditional on R&D being carried out solely within the territory of the granting government. It will be difficult to convince any single government to agree to such a change, due to concerns about not benefitting from positive spill-overs generated by R&D occurring in its territory. But the combination of budgetary pressures and the possibility that other governments might concur could create the basis for a reciprocal arrangement for those countries prepared to accept this new approach.

Recommendation 3. Negotiate a bilateral S&T Access Agreement with the United States

Canada could seek to negotiate explicit and enhanced access to publicly supported R&D programs such as the ATP through a separate bilateral Canada-U.S. S&T Access Agreement. Moreover, the Government of Canada should seek to eliminate or reduce the U.S.-based manufacturing requirement for Cooperative Research and Development Assistance (CRADA) projects. In the interim, there is a

need to ensure resources dedicated to constituency building within both the U.S. and European R&D communities and private sectors, with a view to ensuring more liberal terms of access to our primary sources of advanced technology.

Recommendation 4. Transparency and Quantitative Limits on Investment Locational Incentives

Questions about the transparency of investment subsidies offered by national and sub-national governments remain problematic. What should be disciplined? Investment measures having anticipated adverse effects on trade or the effects themselves (i.e., what is described as *ex ante* and *ex post* approaches)? I would argue for an *ex ante* approach, including prompt and full disclosure, particularly for subsidies that could have a distorting effect on industries that invest heavily in R&D and thus influence investment behaviour. Canada could also work for expenditure caps on locational subsidies within North America and more generally. In practice, the U.S. is unlikely to engage unless the other global players participate as well (i.e., unilateral North American disarmament on the use of locational incentives is improbable). Nor should Canada legally bind itself in this area more than its trading partners. These considerations argue for working on this subsidy issue during the current OECD-sponsored negotiations to establish a Multilateral Agreement on Investment (MAI) and eventually in the WTO context.

Recommendation 5. Possible Quantitative Limits on R&D Subsidies

One medium-term option could also be to seek quantitative limits on total national spending on direct R&D subsidies. Tightening subsidies targeted at promoting advanced technology sectors remains an issue for future negotiations and will require clearer definitions of pre-competitive and competitive R&D, as well as a careful re-evaluation of the economics of the spill-over benefits derived from R&D subsidies versus the potentially trade and investment distorting impact of the far greater resources that the U.S. and the EU can spend compared to Canada and other smaller economies.

Recommendation 6. Transparency with regard to R&D Subsidies

Canada should seek to ensure that its trading partners promptly and fully notify their R&D subsidies in the WTO context. See also Recommendation 5.

Recommendation 7. Tightening Countervailing Duty Provisions of the SCM Agreement

Canada will need to review continually amendments to U.S. legislation to ensure conformity with the SCM Agreement. The domestic implementation process in the U.S. has been used to provide a protectionist interpretation of its MTN obligations. In the context of future discussions in either the WTO or the NAFTA about the further tightening of disciplines applicable to countervail, Canada may wish to pursue the following negotiating objectives:

- **Actionable Subsidies**

a) The SCM Agreement allows countervailing measures against imported goods without determining whether and to what degree the domestic industry petitioned for countervailing duties is also subsidized. Although this "net subsidy" approach was discussed during the Uruguay Round negotiations, it was not possible to incorporate it in the SCM text, in part due to U.S. opposition. Future negotiations in either the WTO or the NAFTA may provide an opportunity to re-engage on this matter.

b) Moreover, Article 14 of the SCM Agreement requires that the national investigating authority provide a transparent investigative process when calculating actionable subsidies for countervail purposes, or that a methodology be provided through national legislation. The U.S. Department of Commerce published proposed countervailing duty regulations in 1989, but has apparently never finalized these regulations. This should be done.

- **Injury or Technological Protectionism?**

The SCM Agreement requires greater clarification on a causal link with purported sources of injury. The SCM, unlike U.S. legislation, requires that there be a causal connection between the subsidized import and alleged injury. (Other factors such as productivity or changes in demand and supply often explain the problems that domestic industry or specific companies are facing.) To date, the U.S. has done little to clarify these important concepts in its own law.

Recommendation 8. The Application of Foreign Trade Remedy Laws Should Not be at the Expense of Canadian Technology-Intensive Industries.

Countervail has become increasingly counterproductive, particularly with regard to NAFTA markets. One approach under discussion within the NAFTA calls for different sectors of the economy to be exempt from countervailing duty actions and

anti-dumping duties. The application of this approach to advanced technology sectors within North America should be actively explored.

Recommendation 9. Government Procurement

NAFTA Article 1024 calls for initiation of further procurement negotiations "no later than" December 1998. Canada should seek to advance the launch of these negotiations to put pressure on U.S. programmes that distort advanced technology development and ensure that these issues are also a central agenda item at the Singapore WTO Ministerial meeting in late 1996.

Canada should also seek access for Canadian industry to bid on:

- U.S. federal management and operations contracts for civilian departments and agencies, including the Department of Energy and power administrations
- U.S. federal research and development contracts for civilian applications, and
- U.S. federal research and development contracts for American small business.

Recommendation 10. National Security or Technological Protectionism ?

The blurring of "economic security" with the issue of national security is likely to become a growing irritant. Clearer, narrow definitions are required to determine legitimate security concerns of Canada's technology partners. While Canada's national technology policies should minimize the disruptive effects on trade and investment flows, they should do so only to the degree that others do likewise, particularly the U.S..

Canada has had a special relationship with the United States for defence-related R&D dating from the Second World War. In the past, these successful relationships, under MOUs, Agreements and exchanges of letters have provided special access to U.S. technology not enjoyed by other U.S. allies. These cooperative R&D and production successes should be built upon in areas of future economic/commercial interest.

Recommendation 11. WTO Monitoring of Bilateral Accords

Canada has a strong interest to ensure that foreign countries' discriminatory procurement practices are reduced. Moreover, Canada should insist that the WTO monitor all bilateral accords on government procurement to ensure that such accords,

often negotiated under threat of unilateral sanctions, do not favour a particular country's products.

While not directly dealt with in this Paper, WTO monitoring should also be extended actively to review other government-induced, potentially discriminatory changes to private sector purchasing patterns - e.g., the U.S.-Japan bilateral agreement on semi-conductors of the late 1980s which was central to increased Japanese private sector purchases of U.S.-produced semi-conductors.

Recommendations Chapter 4

Recommendation 1. Performance Requirements: R&D and Technology Transfer

Technological "leap frogging" or acquiring an established business by competitors in order to catch up in certain technological areas has been a considerable drain on Canada's limited R&D expenditures. It is important for Canada to retain the ability to impose technology-related performance requirements in carefully selected circumstances involving the direct merger with or acquisition of a Canadian company by a foreign firm, as was done in the NAFTA. Technology transfer restrictions may occasionally be warranted when, for example, there is a foreign takeover of a firm already engaged in R&D activities, to ensure that the firm is not gutted of its R&D capacity, which is often funded directly or indirectly by Canadian taxpayers. This tool should not be used to force technology transfer into Canada, but rather to prevent the indiscriminate outflow of Canadian R&D capacity through the back door of a merger or acquisition where predatory intent is suspected.

Recommendation 2. Monitor Diversion of R&D from Canada

Although Canadian taxpayers pay for the majority of university research, private corporations, including MNEs, often end up owning the patents and discoveries. While the United States has taken steps to stop any transfer to foreign countries of IP that results from Federal funds, Canada should resist the temptation. Instead, Canada should push for national treatment as per the NAFTA. More research needs to be done to verify the extent to which the U.S.'s strategy on IPRs actually discourages the amount of R&D done in Canada.

Recommendation 3. Continued reform of IP law in the United States and increased transparency is needed to ensure that the U.S lives up to its trade obligations.

(a) Section 104 of the U.S. Patent Act: First-to-Invent versus First-to-File

Article 1709(7) of the NAFTA requires that patents be available and patent rights enjoyable without discrimination. Section 104 of the U.S. Patent Act continues to discriminate in favour of inventive activity in the United States and has the potential to divert research and development to the U.S.. Under provisions of NAFTA, Section 104 should be fully amended to permit the unambiguous inclusion of activities in Canada and Mexico. Those parts of section 104 that continue to permit the potential for discrimination should be deleted or made non-applicable to Canada.

(b) Section 204 of the U.S. Patent Act

Intellectual property law in the United States must ensure that Canadian private investors have equal access to inventions in the United States as American investors have to Canadian inventions. U.S. Statute, 35 USC §204 restricts the exclusive right to use or sell an invention (created through a production licensing agreement between a firm and a government agency or laboratory) to those persons who "agree(s) that any products embodying the subject invention or produced through the use of the subject invention will be manufactured in the United States." It should be the goal of Canada to develop a separate, non-discriminatory accord with the United States in this area.

(c) Section 337 of the U.S. Tariff Act

Section 337, although recently amended, continues to discriminate against foreign companies. Canada will want to continue to push for modifications that bring Section 337 into conformity with the international obligations of the United States (Articles 48, 49 and 50(8) of the TRIPS Agreement) and Chapter 17 of the NAFTA (Articles 1715(8) and 1716 (8)).

Recommendation 4. Canada Should Take a Lead on Defining Future IP Issues

● **Patenting of Life Forms**

Currently, there is confusion within the Canadian legal community concerning a precise and acceptable definition of patentable living matter. The patenting of biological life forms needs to be addressed at the international level along with issues

such as the loss of genetic diversity, trade and the environment, and medical treatment for humans and animals. Canada should prepare for future international trade negotiations on biotechnology by developing negotiating positions in this specialized area. Canada could, for example, host discussions on the broader issues of patenting genetic material and lead an international enquiry concerning the patenting of life forms.

Recommendation 5. Canada Should Take a Lead on Defining Future IP Issues

- **Other Proposals to Extend IPRs**

Canada should remain skeptical about new U.S. proposals (e.g., the further extension of patent terms; a prohibition of "grey market" imports) that extend IPRs further without careful evaluation of the broader social benefits of such changes, including their demonstrated impact on encouraging innovation in practice.

Recommendation 6. Canada Should Take a Lead on Defining Future IP Issues

- **IP and Competition Policy**

Canada should pursue further work, including through seminars/conferences involving the private sector, which explores the future balance between the protection of IP (i.e., a monopoly conferred to promote a public good) and competition policy constraints.

Recommendation 7. Diffusion of Intellectual Property in Canada

The Canadian government should review its intellectual property policy to ensure the widest possible transfer of technology to the Canadian private sector for commercial exploitation.

Recommendation 8. Diffusion of Intellectual Property Information in Canada

Increasingly, companies will need to insure through searching existing patent literature that their R&D does not violate existing intellectual property. The Canadian Intellectual Property Office (CIPO) has information on domestic and foreign patented technology on file and is responsible for disseminating patent information to the private sector. Foreign Service Officers should be made increasingly aware of CIPO and the role of patents, copyrights, trademarks and industrial designs as a trade policy and trade development tool.

Recommendations Chapter 5

Recommendation 1. Transparent Antidumping Laws

The goal for Canada is to develop more transparent, tighter anti-dumping procedures and to require others to do likewise. The convergence of procedures used by the NAFTA partners in the administration of their anti-dumping laws, particularly the methods used to calculate dumping would be a useful first step. (In high technology products, the measurement of production costs is especially hazardous because of the global character of the firms involved and because any estimate of cost is extremely sensitive to the scale of production and learning over time.) The application of anti-dumping should be based on average variable costs whenever the constructed value method is used. Over time, filters to gauge predatory intent and to screen out non-predatory commercial behaviour should be introduced.

Recommendation 2. Competition Policy and U.S. Anti-trust

Any modification of existing competition policy should be non-discriminatory with respect to ownership of investments (i.e., provide national treatment). One Canadian objective is to modify U.S. anti-trust policy which encourages technology consortia that discriminate in favour of joint venture production facilities located in the U.S.. Moreover, U.S. legislation reducing potential anti-trust penalties with regards to certain consortia, but which requires every person who controls any part of such a joint-venture to be a U.S. citizen or a foreign person from a country whose domestic laws accord at least the same level of anti-trust treatment, should be repealed.

Recommendation 3. Administrative Approach vs Active Judicial Challenge

Canadian competition law should continue to give priority to efficiency enhancing inter-firm collaboration and stability in the application of the regulatory framework. We support the broadly administrative approach followed in Canada, particularly for the NAFTA area, to prevent restrictive business practices and enhance market integration. A better understanding of the European model would also be useful should NAFTA-EU talks on liberalized trade eventually come to fruition.

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