
Centre for International
Governance Innovation

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Prosperity & Security: *Canada's IP Imperative*

March 11, 2021

Jim Balsillie

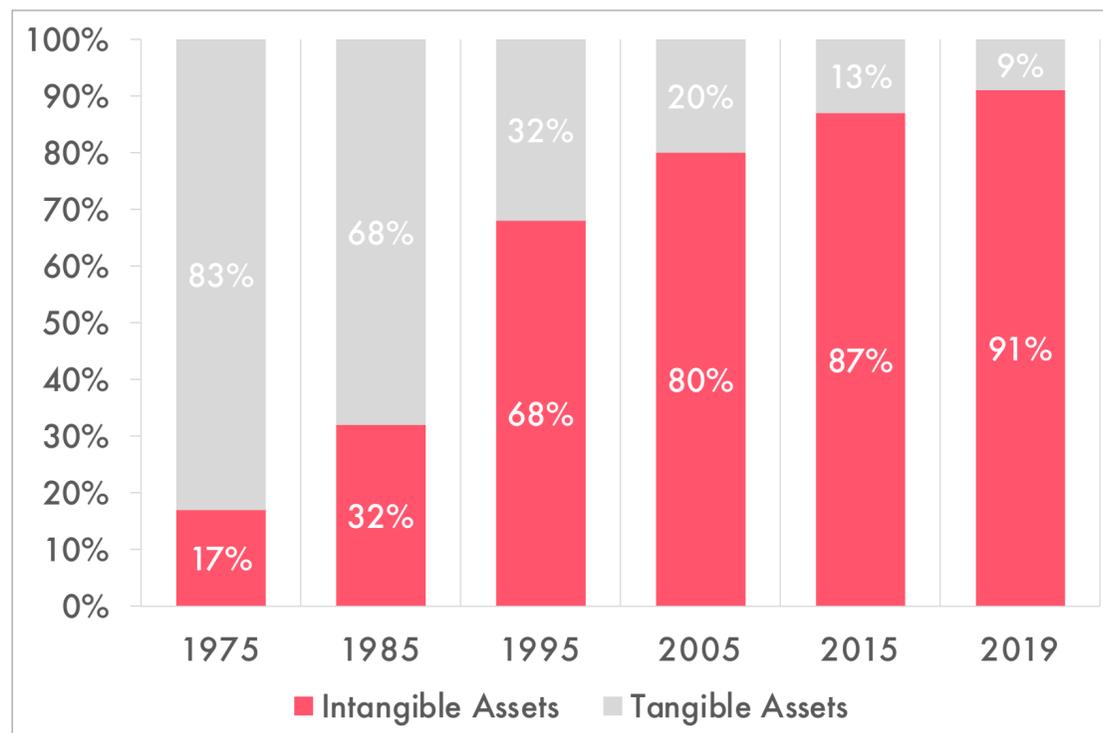
Chair, Centre for International Governance Innovation

Chair, Council of Canadian Innovators

Shift from Tangibles to Intangibles

Figure 1: Shift from Tangibles to Intangibles

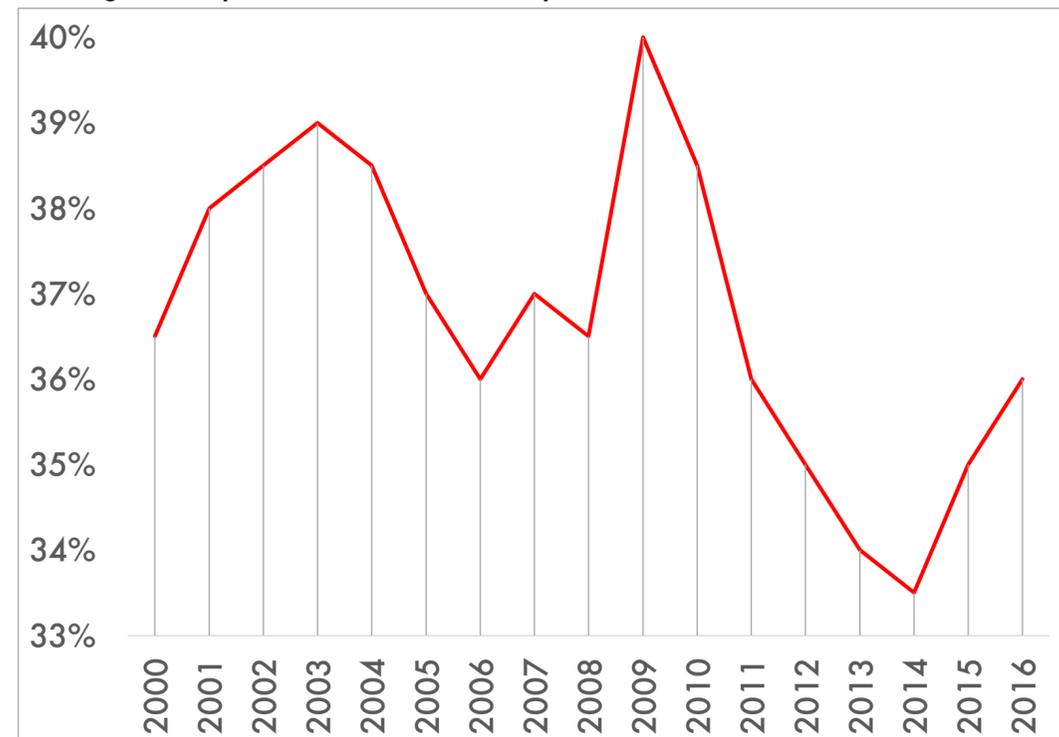
Components of S&P Market Value



Source: Ocean Tomo

Figure 2: The Decline of Canada's Intangible Capital

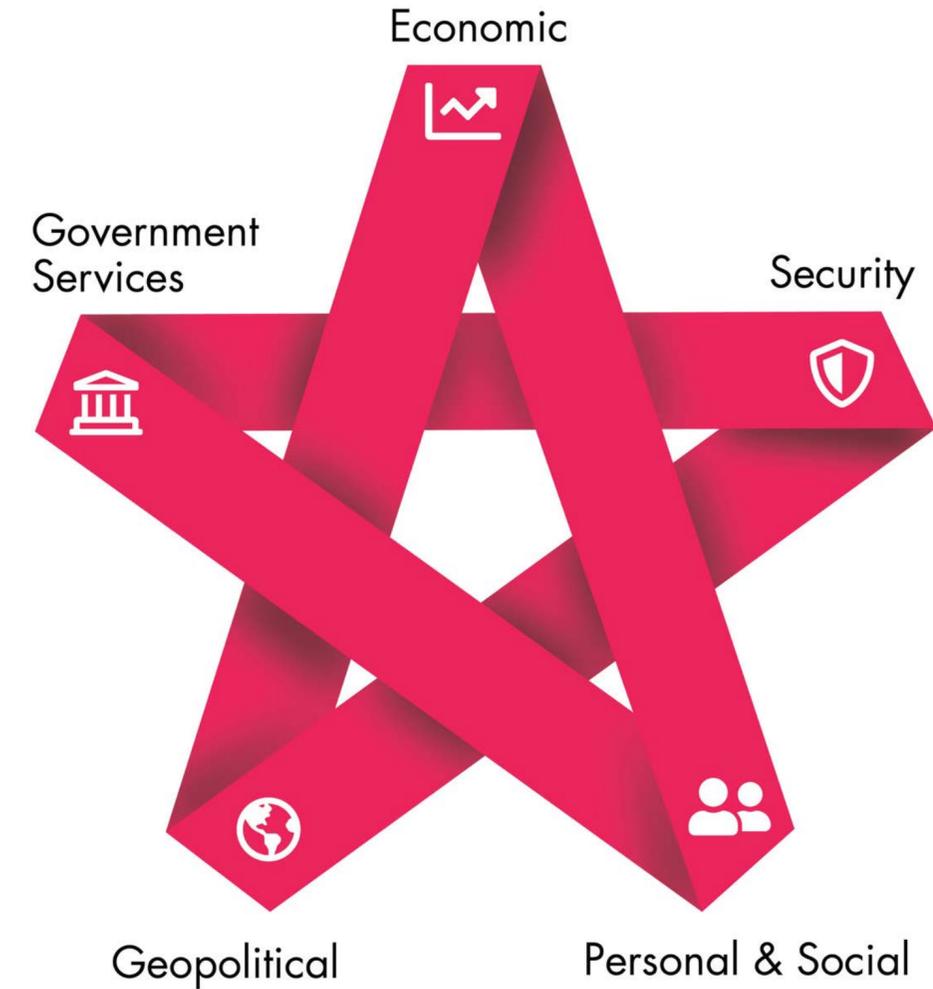
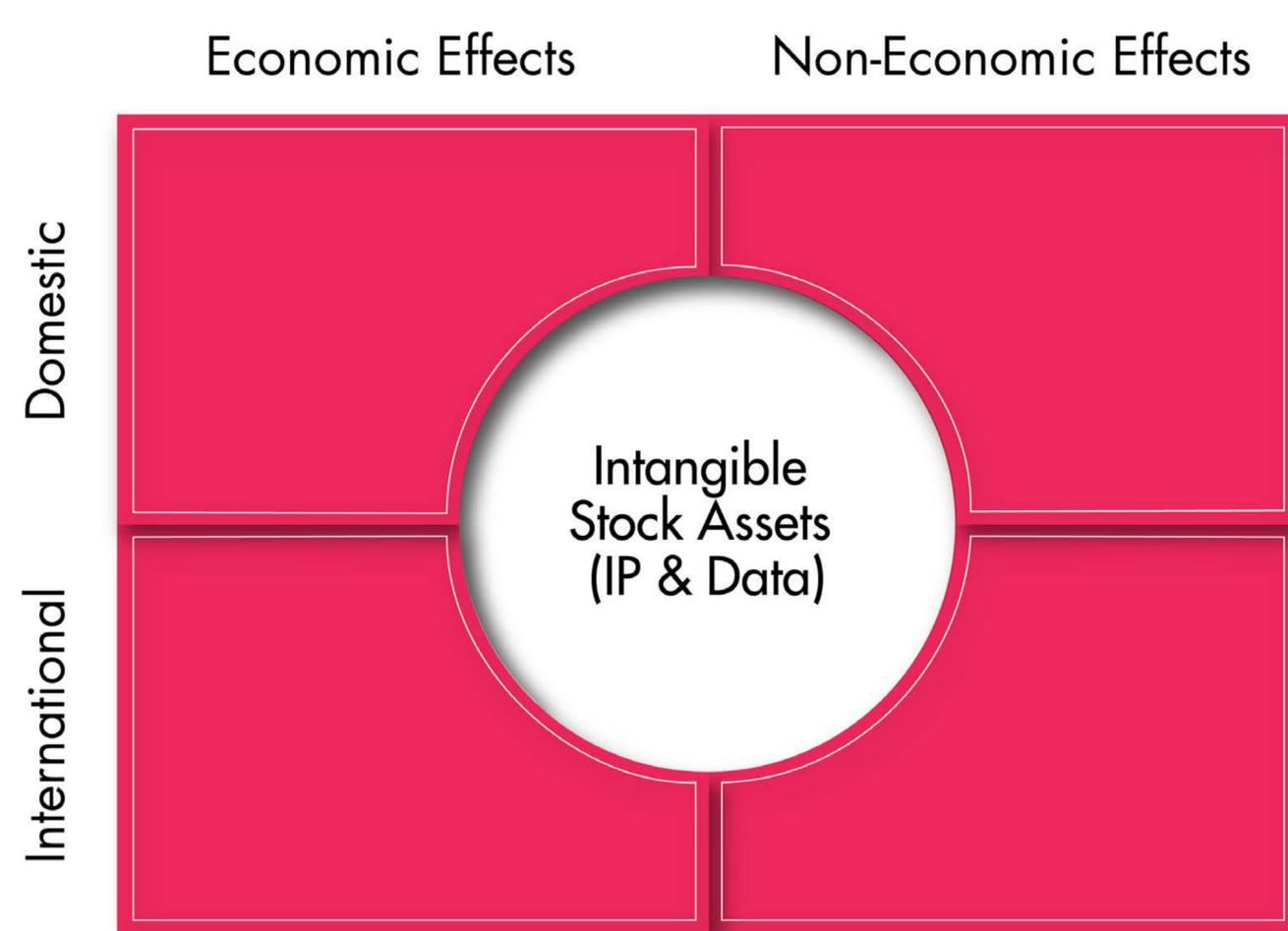
Intangible Capital Share of Total Capital Stock



Source: Statistics Canada

- Apple, Amazon, Alphabet, Facebook, Microsoft total value is ~\$7.6 trillion, with total tangible book value ~4%
- Alibaba and Tencent in China are valued at ~\$1.3 trillion, with total tangible book value ~3%

The Dual-Use Nature of Intangible Assets



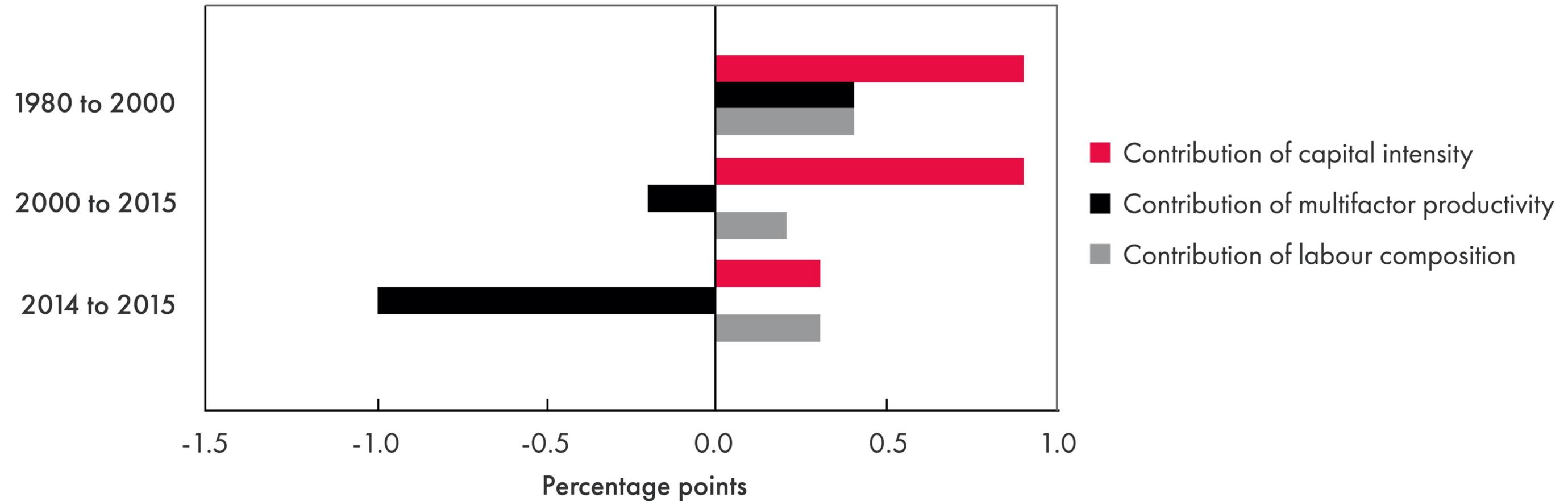
Economy of Traditional, Tangible Goods



Economy of Ideas, Intangible Goods

Ownership of physical property is a positive right	Owning ("generating") intellectual property (IP) is a negative right
Production and sale of physical property to generate revenue	Amassing IP and restricting use to collect "rents"
The objective in industrial/services economy is to move inventory	The objective in the innovation economy is to acquire IP
Traditional goods can only be owned by one person at a time ("rivalrous")	IP is globally and simultaneously accessible by unlimited number of people ("non-rivalrous")
Traditional infrastructure needed to move goods across borders to individual customers	It is impossible to determine where IP originates and how it moves across borders
Supply chains feature multiple vendors competing with each other based on cost competitiveness	Value chains are based on winner-take-all economics
Competition rules prevent traditional production monopolies	IP is a government-created temporary monopoly
Trade liberalization increases competition and reduces prices	Stronger IP protections decrease competition and increase prices
Traditional trade agreements reduce the value of vested interests	"Asset enhancement agreements" raise the value of vested IP-based interests

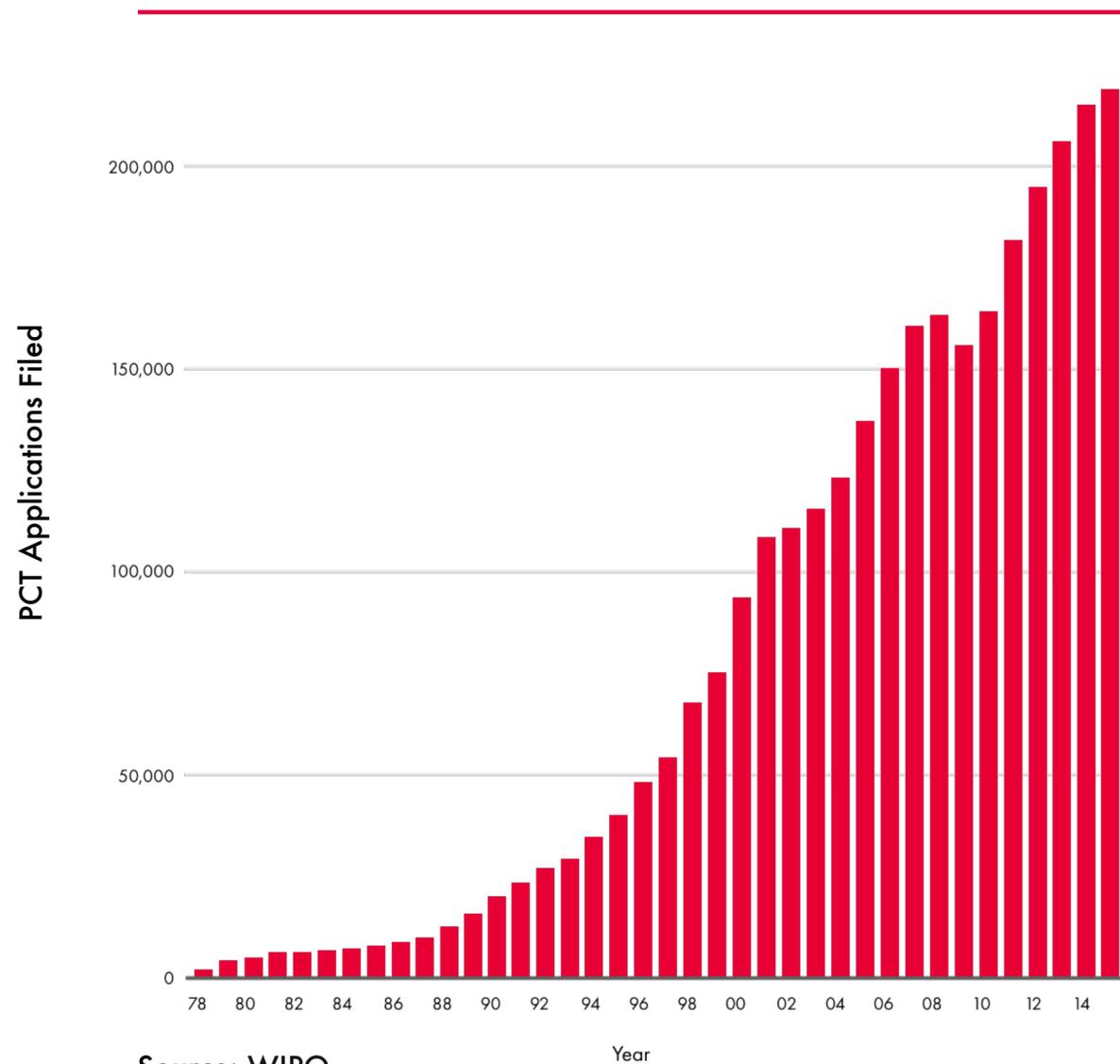
Canada's Shrinking Innovation Outputs



“Patents are the most concrete and comparable measure of innovative output over countries and time.”

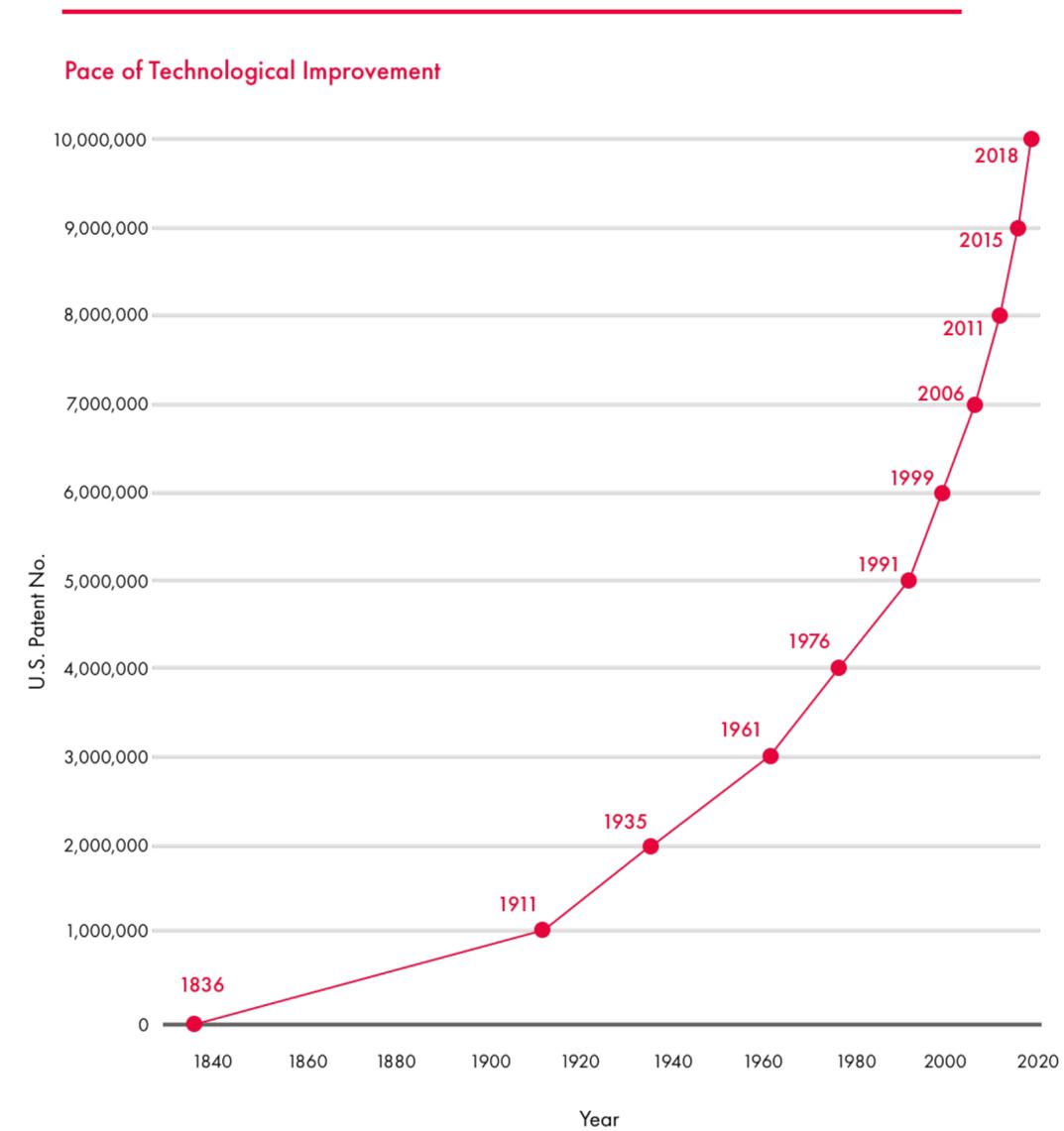
The IT Revolution and the Globalization of R&D

Figure 3: Patent Cooperation Treaty – Patent Filings



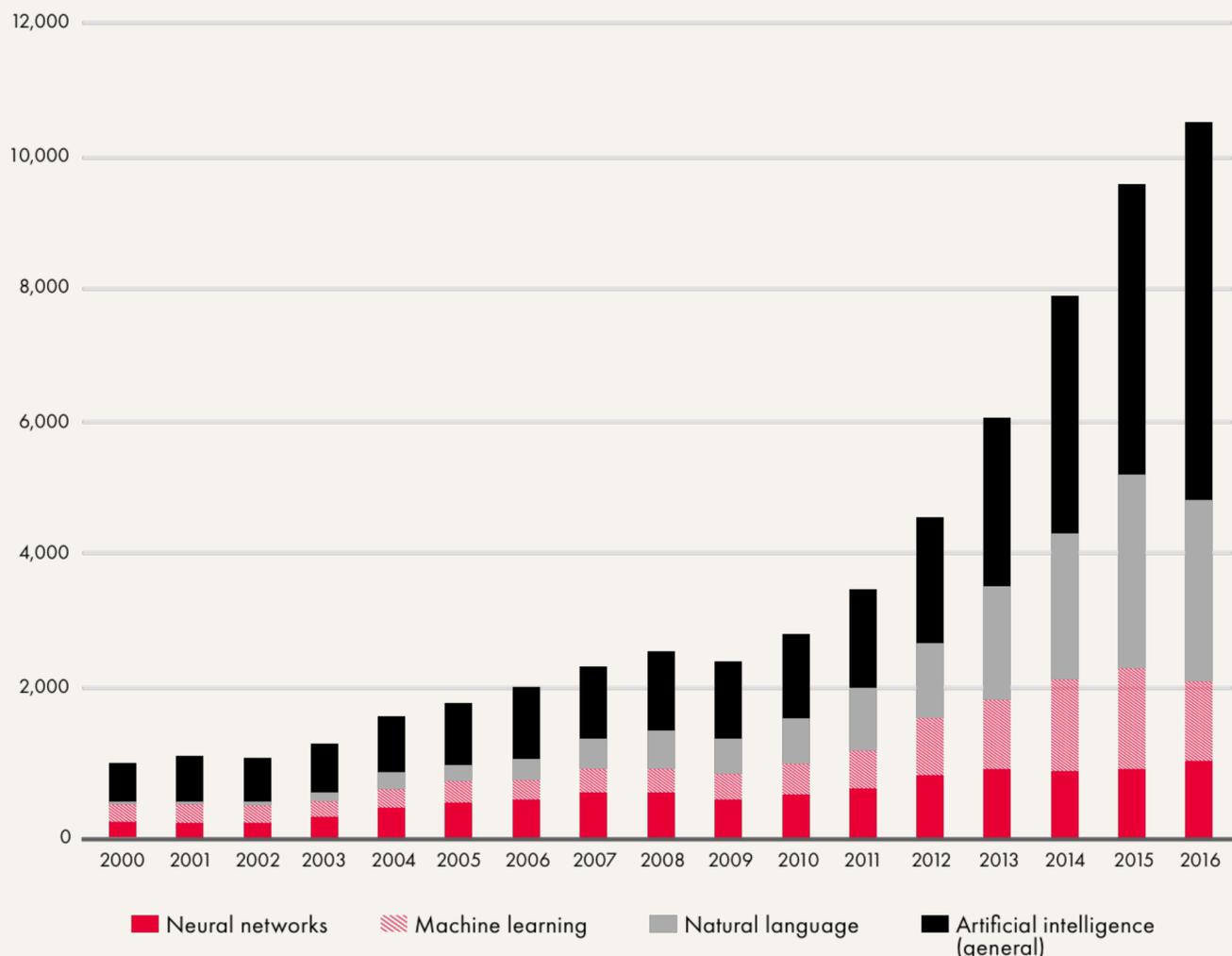
Source: [WIPO](#)

Figure 4: USPTO – Patent Filings



Strategic Technologies & AI Nationalism

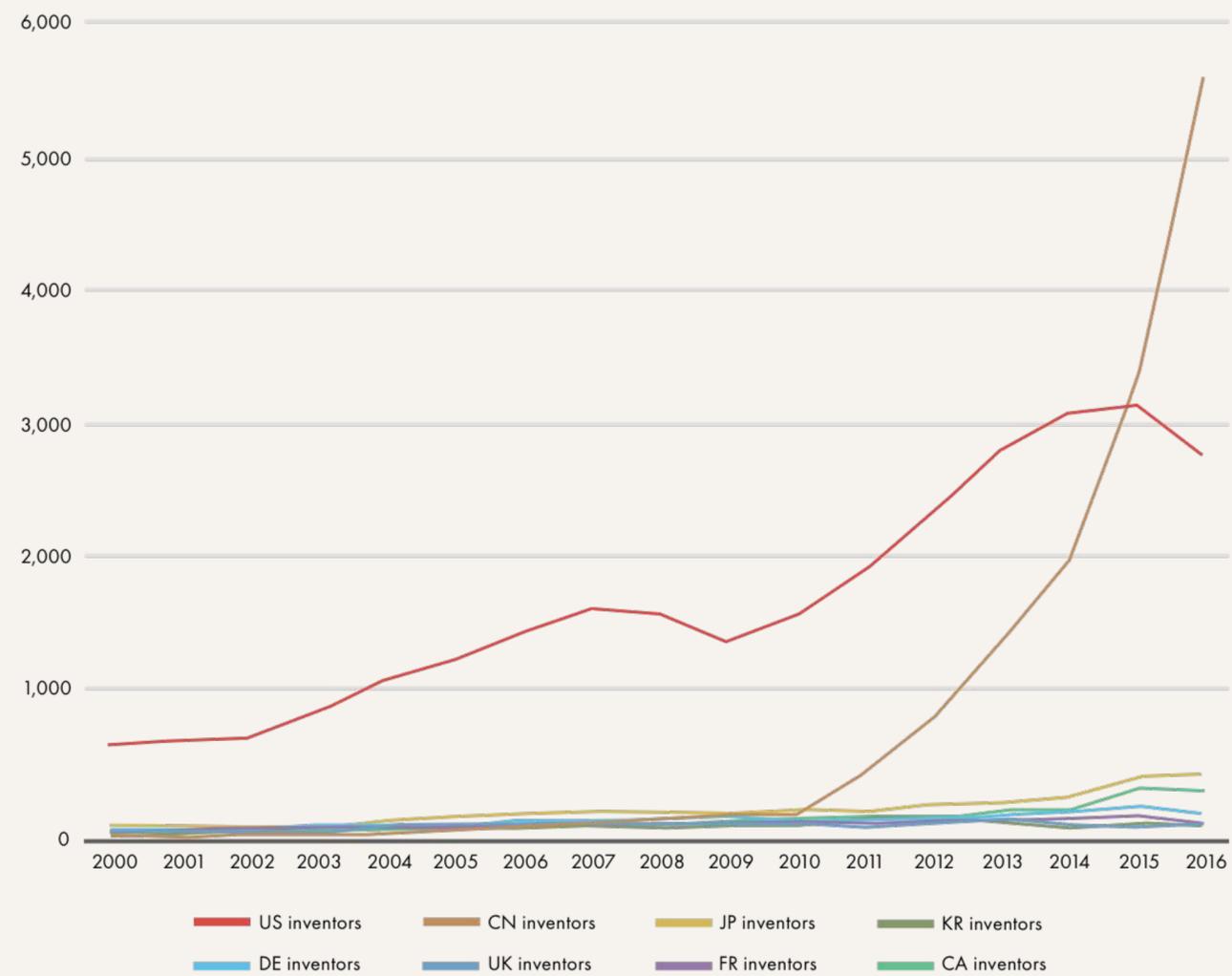
Figure 5: Patent filings by taxonomy



Source: Northworks IP

According to a recent WIPO report, Canada was the only jurisdiction 'to see a decrease' in the number of AI patents applied for between 2016 and 2018.

Figure 6: AI-related patent volume by inventor nationality



According to the China AI Development Report for 2018, China filed more than 30,000 public AI patents, an impressive tenfold jump in five years and about 2.5 times more than the United States, which it surpassed for the lead.

Change in Number of PCT Filings, 2014-2019

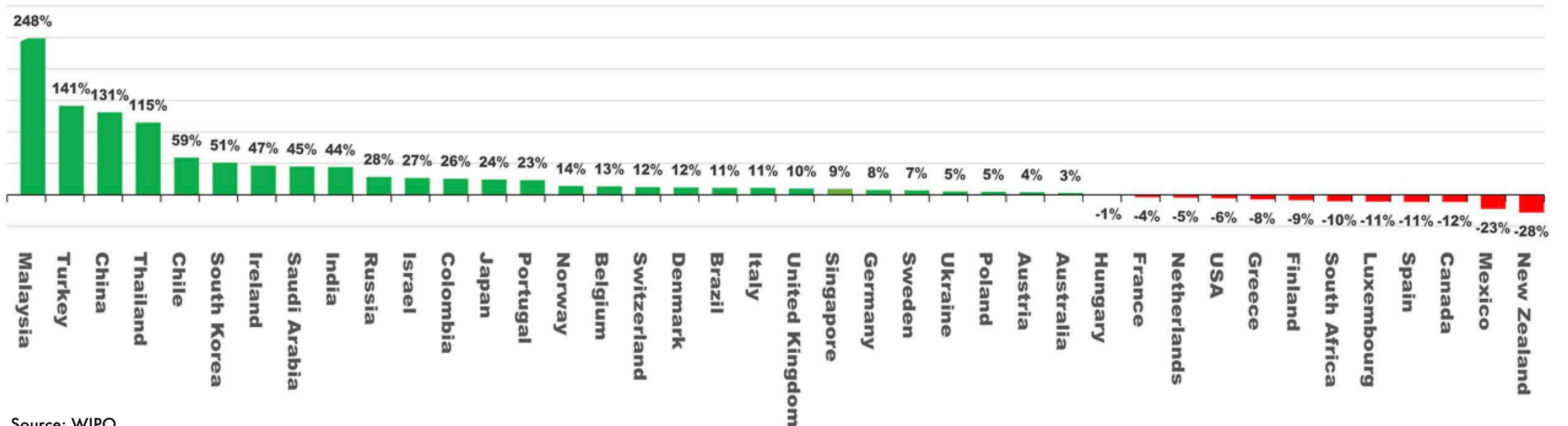
Top 5 Countries (Increase in # of PCT Filings)

- China +33,442
- Turkey +1,205
- Thailand +484
- Malaysia +144
- Chile +83

Bottom 5 Countries (Decrease in # of PCT Filings)

- Canada -358
- Spain -193
- New Zealand -93
- Mexico -64
- Luxembourg -42

Figure 7:



Different Types of IP Rights

1 Contracts	8 Tradenames
2 Patents	9 Trade Secrets
3 Copyrights	10 Utility models
4 Domain Names	11 Personality Rights
5 Geographical Indications	12 Plant Breeders Rights
6 Industrial Designs or Design Patents	13 ICT (Integrated Circuit Topography)
7 Trademarks	

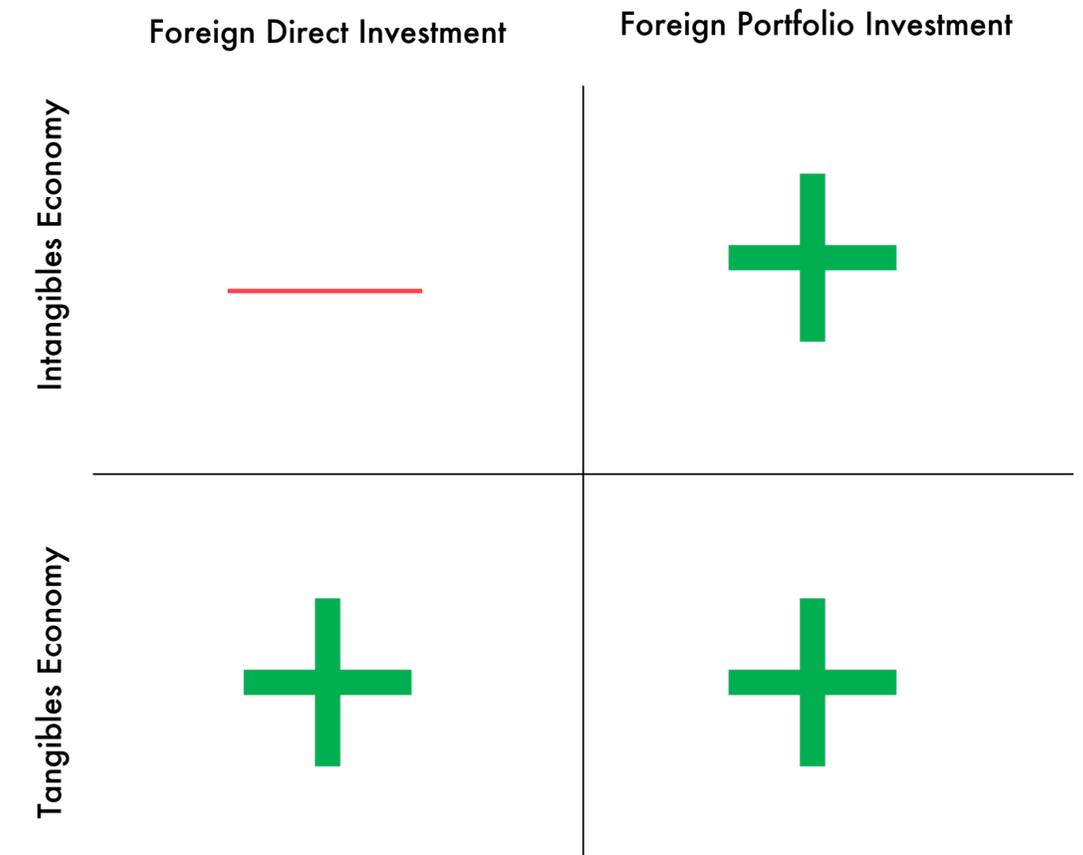
Foreign Investment Spillovers

Economic Prosperity

1. Jobs Created (key skills such as computer engineering and data science have negative unemployment)
2. Wealth Effects (future benefits go to foreign owners)
3. Management Development
 1. Remote Direction/Supervision vs. Autonomous Branch Operation
 2. Expansiveness of Employee Non-Disclosure Agreements
 3. Comprehensiveness of Non-Competition Agreements
4. Top Talent Exfiltration
5. Data Exfiltration
6. Ecosystem Dynamism Effects
7. Erosion of Tax Base
8. Value Chain Effects (particularly for high-potential emerging firms)

National Security

1. Cybersecurity Impacts
2. Critical Infrastructure Impacts
3. Public Health Impacts
4. Military/Defence Impacts
5. Social Good Impacts (democracy, values, cohesion, autonomy)
6. Geopolitical Considerations



Canada's Most Recent IP "Philanthropy"

EV Battery Technology

Canadian researchers help Tesla build new 'million-mile' battery
The work contributed by these Dalhousie University experts could push the cost of EVs below that of gas cars

Tesla extends partnership with Dalhousie battery researchers

Tesla acquires Canadian battery specialist, Hibar Systems

"We have the ability to publish our work—that's highly important for graduate students so they can get jobs afterwards—and in exchange for that, Tesla gets the IP. That's the deal that we made. It may not be the best deal, but it works for us."

Paul Dahn, Battery Scientist,
Dalhousie University

"We have a very compelling value proposition, we feel that Canada can and will be a global leader when it comes to producing batteries."

Navdeep Bains, former ISED Minister

Artificial Intelligence

Alphabet chair praises Canada's AI innovations at Google's Go North

Google-parent Alphabet announces partnership with Waterfront Toronto

Alphabet subsidiary Sidewalk Labs is set to invest an initial \$50 million USD into project

"Schmidt also commented on the Canadian work done to advance artificial intelligence research. "...Montreal invented the basis for machine learning and AI, which is the basis of Google today," said Schmidt. "So thank you very much Canada."

Sameer Chhabra for Mobilesyrup
(October 17, 2017)

"Alphabet Inc. chairman Eric Schmidt said during an onstage chat with Justin Trudeau in Toronto that his company is 'enormously thankful to Canadians' for the country's artificial intelligence innovations. 'We now use it throughout our entire business and it's a major driver of our corporate success.'"

Armina Ligaya for *The Canadian Press*
(November 2, 2017)

Vaccines

National Research Council strikes deal with China to develop COVID-19 vaccine in Canada

Days after announcing deal, Ottawa learned China blocked CanSino's vaccine shipment

Canada seeking reassurance as Europe mulls export controls on COVID-19 vaccines

"Intellectual property 'for the vaccine is CanSino's, and where they supply the vaccine would be their decision,' he said. But the NRC's involvement in manufacturing 'vaccine in Canada would facilitate guaranteeing supply to Canada.'"

"The NRC signed a non-exclusive licence for CanSino to use the cell line in 2014. As a result, the council 'does not anticipate any revenue' from CanSino's use of the Canadian technology to make Ad5-nCoV."

Nathan Vanderklippe for *The Globe and Mail*
(May 12, 2020)

THE GLOBE AND MAIL

Balsillie calls on Ottawa to reform intellectual property rules

STEVEN CHASE > TECHNOLOGY REPORTER
SEAN SILCOFF > TECHNOLOGY REPORTER
ROBERT FIFE > OTTAWA BUREAU CHIEF
OTTAWA
PUBLISHED MAY 28, 2018
UPDATED OCTOBER 2, 2019

NATIONAL POST

Unclear intellectual property rules put Canada at risk amid higher threat of foreign takeovers: experts

Jim Balsillie said Ottawa has for years scrutinized foreign takeovers, while allowing foreign governments access to critical research and intellectual property

Jesse Snyder
Jun 15, 2020 • June 17, 2020

THE GLOBE AND MAIL

Canadian universities continuing with Huawei R&D funding partnerships

SEAN SILCOFF > TECHNOLOGY REPORTER
PUBLISHED JANUARY 18, 2019



NEWS

Politics

Experts call on Canadian universities to close off China's access to sensitive research

Former CSIS director says China views Canada as an 'easier target'



Evan Dyer · CBC News · Posted: Sep 15, 2020 4:00 AM ET | Last Updated: September 16

THE GLOBE AND MAIL

Ottawa partners with Huawei to fund university research despite security concerns

ROBERT FIFE > OTTAWA BUREAU CHIEF
STEVEN CHASE > SENIOR PARLIAMENTARY REPORTER
OTTAWA
PUBLISHED FEBRUARY 15, 2021

THE GLOBE AND MAIL

How Canadian money and research are helping China become a global telecom superpower

SEAN SILCOFF > TECHNOLOGY REPORTER
ROBERT FIFE > OTTAWA BUREAU CHIEF
STEVEN CHASE > SENIOR PARLIAMENTARY REPORTER
CHRISTINE DOBBY > CORPORATE LAW REPORTER
PUBLISHED MAY 26, 2018
UPDATED JUNE 19, 2018

THE GLOBE AND MAIL

Spy agency warns foreign states trying to steal COVID-19 research in Canada

ROBERT FIFE > OTTAWA BUREAU CHIEF
STEVEN CHASE > SENIOR PARLIAMENTARY REPORTER
OTTAWA
PUBLISHED MAY 22, 2020

The Logic

IN-DEPTH REPORTING ON THE INNOVATION ECONOMY

Canada's spy agency cautions universities about research ties with Huawei

By Catherine McIntyre Dec 10, 2018

- In January 2021, following the appointment of Minister François-Philippe Champagne to ISED, Prime Minister Justin Trudeau issued a supplementary mandate letter that included direction to “Work with the Minister of Public Safety and Emergency Preparedness, and in close collaboration with Canadian industry and post-secondary institutions, to safeguard Canada’s world-leading research ecosystem, as well as our intellectual property (IP) intensive businesses.”
- After nearly three years and multiple calls by experts and reporters, there are still no guidelines for Canadian post-secondary institutions to manage strategic technologies.
- This mandate must also include updates to our outdated Investment Canada Act as a critical component of Canada’s digital policy infrastructure.

Research & Security: Our Five Eyes Allies Respond



Australia's New Foreign Relations Act

The legislation requires public universities, local councils and state governments to notify the Australian government of any arrangements with foreign entities: governments, departments, agencies, authorities and some universities.

The legislation defines "arrangements" as anything in writing, whether or not legally binding. Arrangements will be recorded in an online public register.

The minister for foreign affairs can invalidate an arrangement if it's considered likely to adversely affect Australia's foreign relations or be inconsistent with Australia's foreign policy. The minister has the power to vary or invalidate international arrangements, including retrospectively, and there's no process for appeal or review.



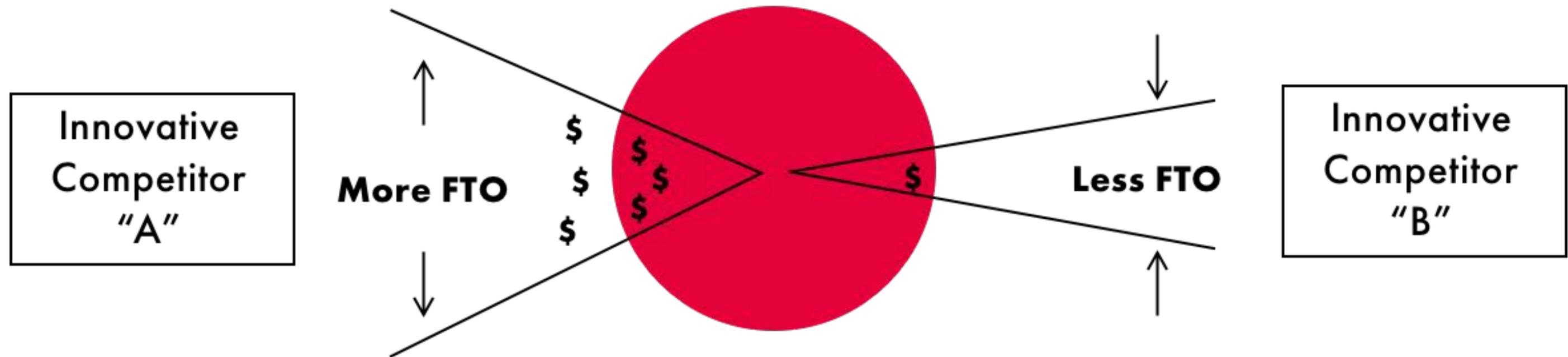
Memorandum on United States Government-Supported Research and Development National Security Policy

"R&D, including both basic and applied research, is a key contributor to American science and technology (S&T) innovation and is essential to United States economic and national security."

"Unfortunately, some foreign governments...seek to exploit open United States and international research environments to circumvent the costs and risks of conducting research, thereby increasing their economic and military competitiveness at the expense of the United States, its allies, and its partners."

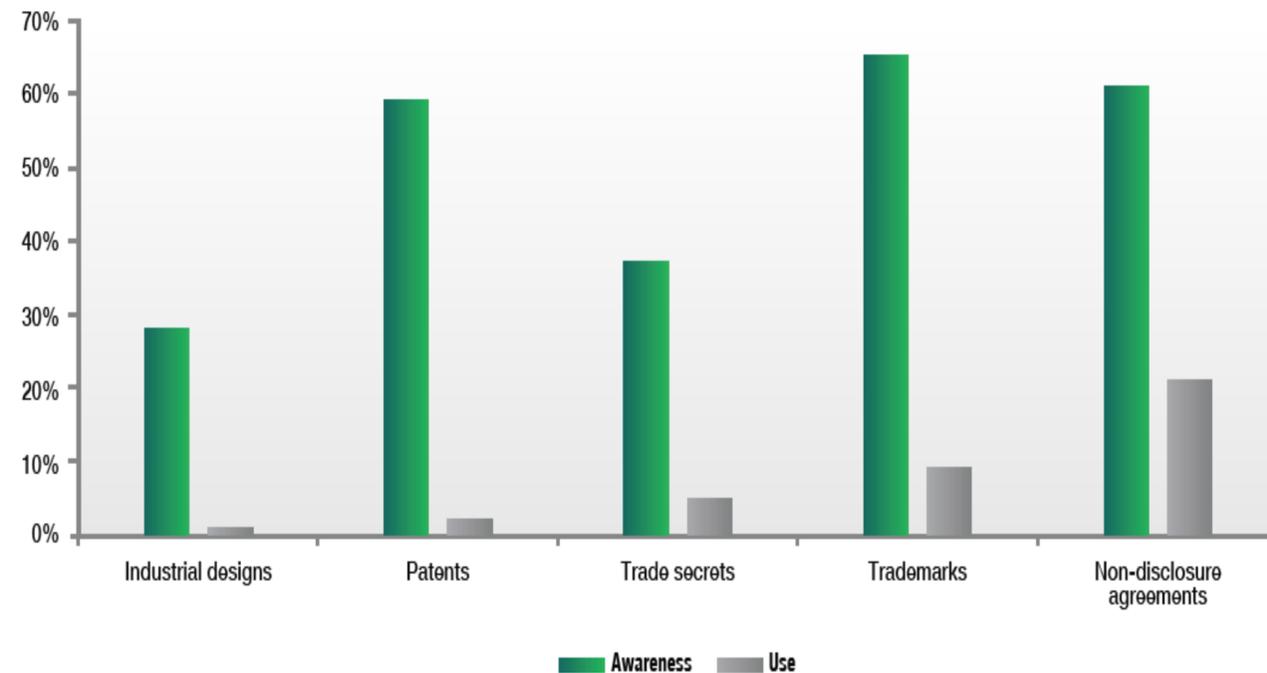
"While maintaining an open environment to foster research discoveries and innovation that benefit our Nation and the world, the United States will also take steps to protect intellectual capital, discourage research misappropriation, and ensure responsible management of United States taxpayer dollars. This includes steps to ensure that participants with significant influence on the United States R&D enterprise fully disclose information that can reveal potential conflicts of interest and conflicts of commitment."

Policy Infrastructure for the 21st Century Economy: *Freedom-to-Operate (FTO)*



Intellectual Property & Canadian SMEs

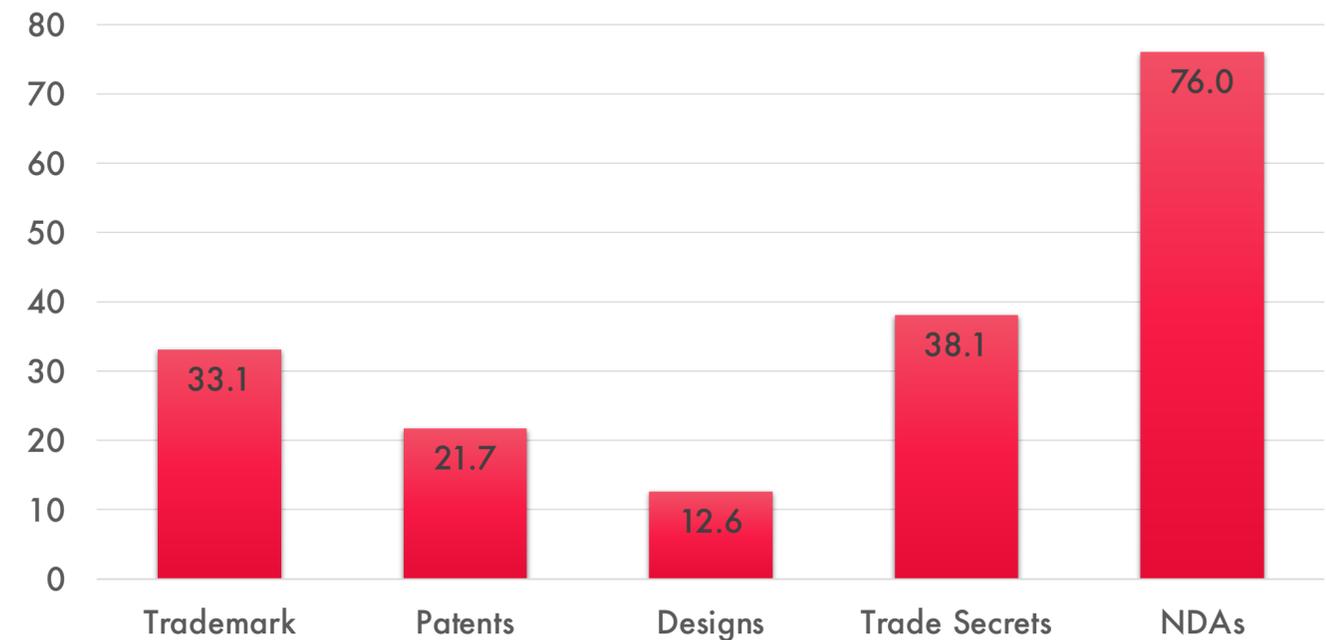
Figure 8: IP Awareness and Use among SMEs



Source: IP Canada Report 2019, CIPO

- 59% of SMEs are at least slightly aware of patents; however, only 2% of SMEs hold at least one

Figure 9: Intellectual Property Held by SMEs



Source: Survey on Financing and Growth of SMEs 2017, Statistics Canada

- Canadian SMEs holding formal IP are 3.0 times more likely to have expanded domestically and 4.3 times more likely to have expanded internationally

Canada's Low & Declining Rate of Business Investment (BERD)

Figure 10: BERD and GERD Average Annual Growth Rates

	Canada	OECD Average ²
GERD	-1.4%	2.1%
BERD – Total	-2.6%	1.8%
BERD – Manufacturing ¹	-5.6%	6.5%
BERD – Services ¹	-0.1%	-1.9%

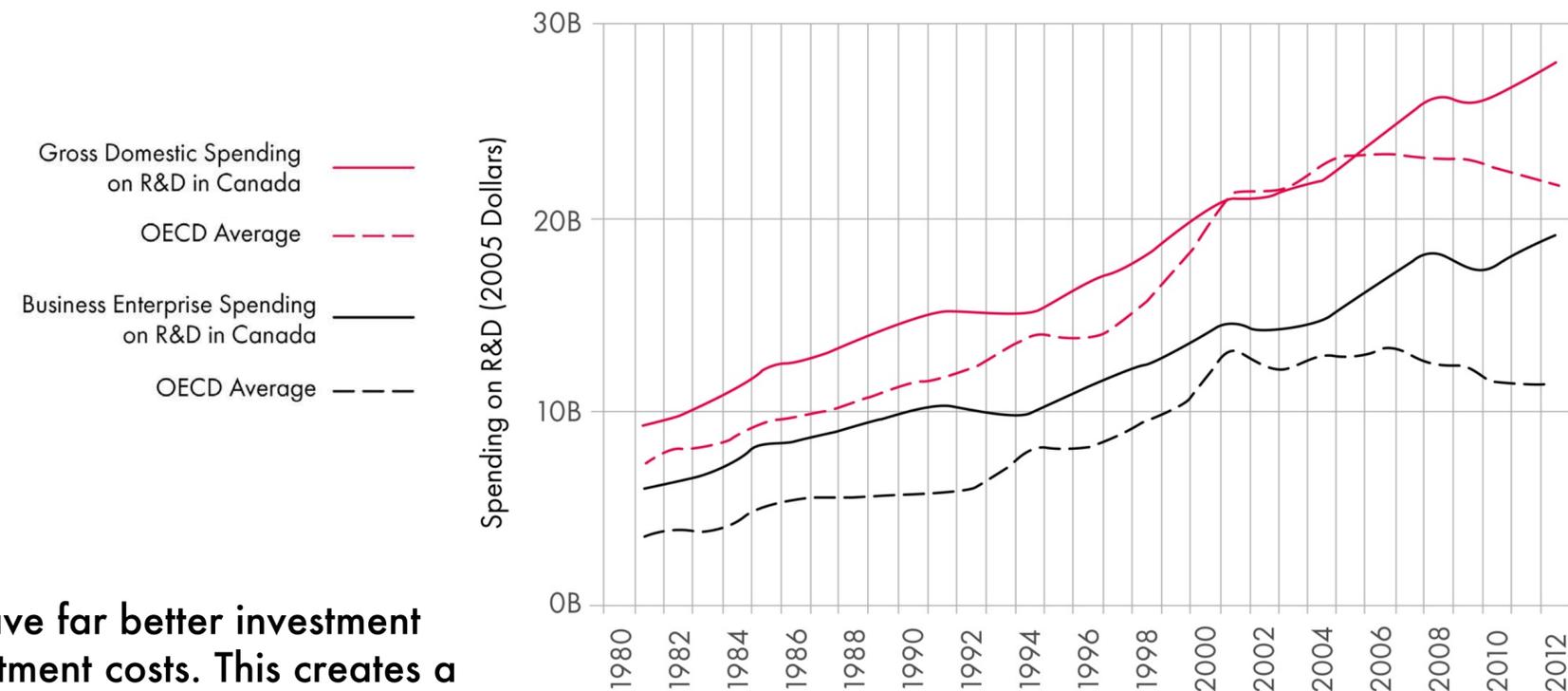
¹ Based on 2007-2011 period.

² For sectorial BERD only, the OECD average is based on an incomplete sample of OECD member countries due to limited data availability. For years where data was not available, it was estimated using the most recent year data point available for the corresponding country and industry.

Research shows that countries with large IP ownership have far better investment opportunities because high IP regimes create lower investment costs. This creates a virtuous cycle of innovation success, while countries with low IP ownership manifest a constrained and expensive business investment environment.

Ugo Pagano & Maria Alessandra Rossi: "The crash of the knowledge economy," *Cambridge Journal of Economics*

Figure 11: Changes in Gross and Business Spending on R&D for Canada and an Average OECD Country



Canada's IP Education Imperative

"Sophisticated IP knowledge is a fundamental requirement for both innovators and support intermediaries. Strong IP literacy skills are essential to ensuring that the ecosystem is adept at capitalizing on the economic potential of generating and commercializing valuable IP."

Expert Panel on Intellectual Property Report

Examples of confusion when non-experts at taxpayer funded intermediaries appoint themselves as educators:



"In Canada today, talent is the new IP. If we keep attracting and retaining talent at our current pace, good things will follow."

"It's become almost an article of faith to say that high-quality jobs and tax revenue vanish with lost IP. That has been true in the past, but while we would certainly rather see Canadian companies retain control of all the IP they can, our inability to outbid the world is hardly constrained to one asset class."

Source: Toronto Star (February 15, 2020)

"Firms, universities, and the government must come to an understanding that IP 1.0 died with the transition from the industrial economy to the innovation economy and, if Canada is to succeed in this economy from the commercialization of intellectual property, we have to balance technical IP with market and process IP within a new IP framework — IP 2.0."

"You have develop a really comprehensive market IP which is hiring people who have experience in that market. If your market is in Europe then hire Europeans. If it's in the US hire Americans who might understand the market better...your market IP is your customer."

"Data exists at the bottom layer, as underpinning all of these functions of technical IP, market IP, process IP."

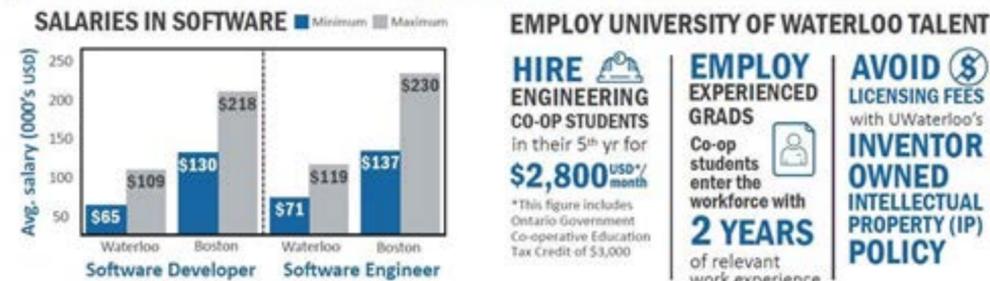
Source: Toronto Star (January 9, 2021), Communitech AMA (January 27, 2021)

US vs. Canada University IP Commercialization Record

COMPARING WATERLOO'S COSTS TO BOSTON

Waterloo and Boston are both centres of innovation, but **Waterloo has a huge cost advantage.**

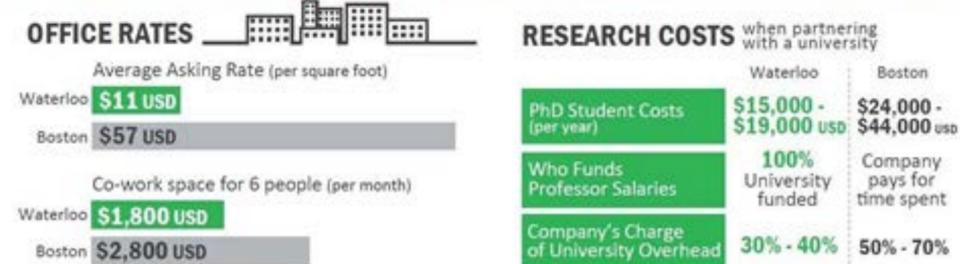
MORE EXPERIENCED TALENT... FOR LESS



WATERLOO CAN SAVE YOU MONEY



REDUCED OVERHEAD COSTS



Waterloo Economic Development Corporation flyer recently used to market at AI World in Boston

US Institutions:

Since inception, Stanford's Office of Technology Licensing generated \$1.8 billion in royalties 2012 to 2015, University of Utah generated \$211.8 million in licensing income or **\$136,000 per million** invested in research.

"America's greatest asset is IP... We're going to aggressively protect our intellectual property. IP is the cornerstone of innovation. It is essential to our prosperity and it will only become more so in this century... We just want to make sure that it's licensed and that American businesses are getting paid appropriately." (President Obama, 2010 speech to export conference)

Canadian Institutions:

In 2017, the University of Waterloo generated \$55,327 in licensing income on \$206 million of research expenditure or **\$269 per million** in research expenditure.

"We've done it because we focus on what works. We believe it's a model worth emulating." (University of Waterloo president, August 2018, The Globe and Mail op-ed)

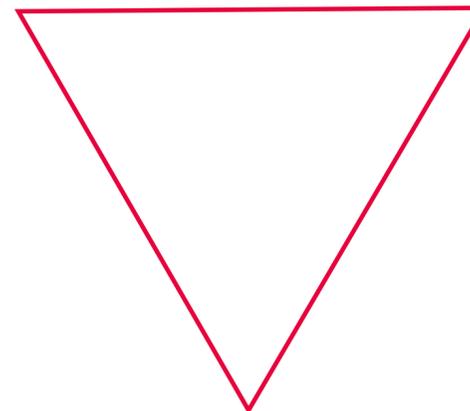
Source: AUTM

US Government “Iron Triangle”

Coordinated and Integrated Policy Development and Implementation for the Intangibles Economy

US PTO (Department of Commerce)

- Advise all aspects of government
- IP policy domestic and international
- Provides training, education and company-building programs for IP
- Multiple Private Sector Advisory Committees



Bureau of Economic and Business Affairs (State Department)

- Pursues economic diplomacy for America
- Advocates for strong enforcement (“higher protections”) IP policies internationally
- Promotes digital policy internationally
- Multiple Private Sector Advisory Committees

USTR (Executive Office of the President)

- US trade policy agreements, market access, imports
- WTO and TRIPS
- Special 301 Report (US companies provide external comments)
- Since 1974, US Congress mandated 27 Private Sector Advisory Committees to support US policy makers

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“Today’s international trade regime was not designed for a world of data, software, and artificial intelligence. Already under severe pressure from China’s rise and the backlash against hyper-globalization, it is utterly inadequate to face the three main challenges these new technologies pose.”

“First, there is geopolitics and national security....Second, there are concerns about individual privacy....Third, there is economics.”

Project Syndicate | THE WORLD'S
OPINION PAGE



The Coming Global Technology Fracture

Sep 8, 2020 | DANI RODRIK

Source: [Project Syndicate](#)

How to Build a Prosperous Country – Then and Now

Era of Traditional Infrastructure

National

- Transportation (railways, canals, seaways, highways, airline)
- Energy (hydro dams and transmission, pipelines, nuclear reactors)
- Communications (Bell TransCanada Microwave, Telesat Canada Satellites)
- Culture (CBC, Canadian content rules)
- Global institutions (UN, Bretton Woods, NAFTA)

Cooperatives

- Agricultural (feed supply, processing, equipment, butteries, processing, marketing)
- Financial (credit unions)
- Insurance (mutual companies)
- Energy technologies (AOSTRA SAGD, CANDU Reactor)

Social

- Universal education
- Labour regulations
- Environmental regulations
- Social welfare programs
- Socialized healthcare
- Canada Pension Plan

Era of Intangibles (Digital, IP, Data)

National

- Updated foreign direct investment (FDI) strategies
- Updated trade strategies
- Updated research funding strategies
- Updated Competition Bureau regulations
- Domestic media/content strategies
- National data strategy (updated PIPEDA, security framework)
- National cyber strategy
- National IP strategy
- Strategic procurement
- Digital Stability Board (DSB) for international digital governance
- Digital trust infrastructure

Cooperatives

- Data trusts (energy, mining, forestry, agriculture, cities, health care, etc.)
- Patent cooperatives (key vertical sectors, key horizontal technologies)
- Digital standards

Social

- Data governance regulations to protect private sphere and personal autonomy
- Data governance regulations to protect elections/democracy
- Utilize tax code to address externalities from digital realms
- Future of Work (social programs, education)

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Thank you.

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