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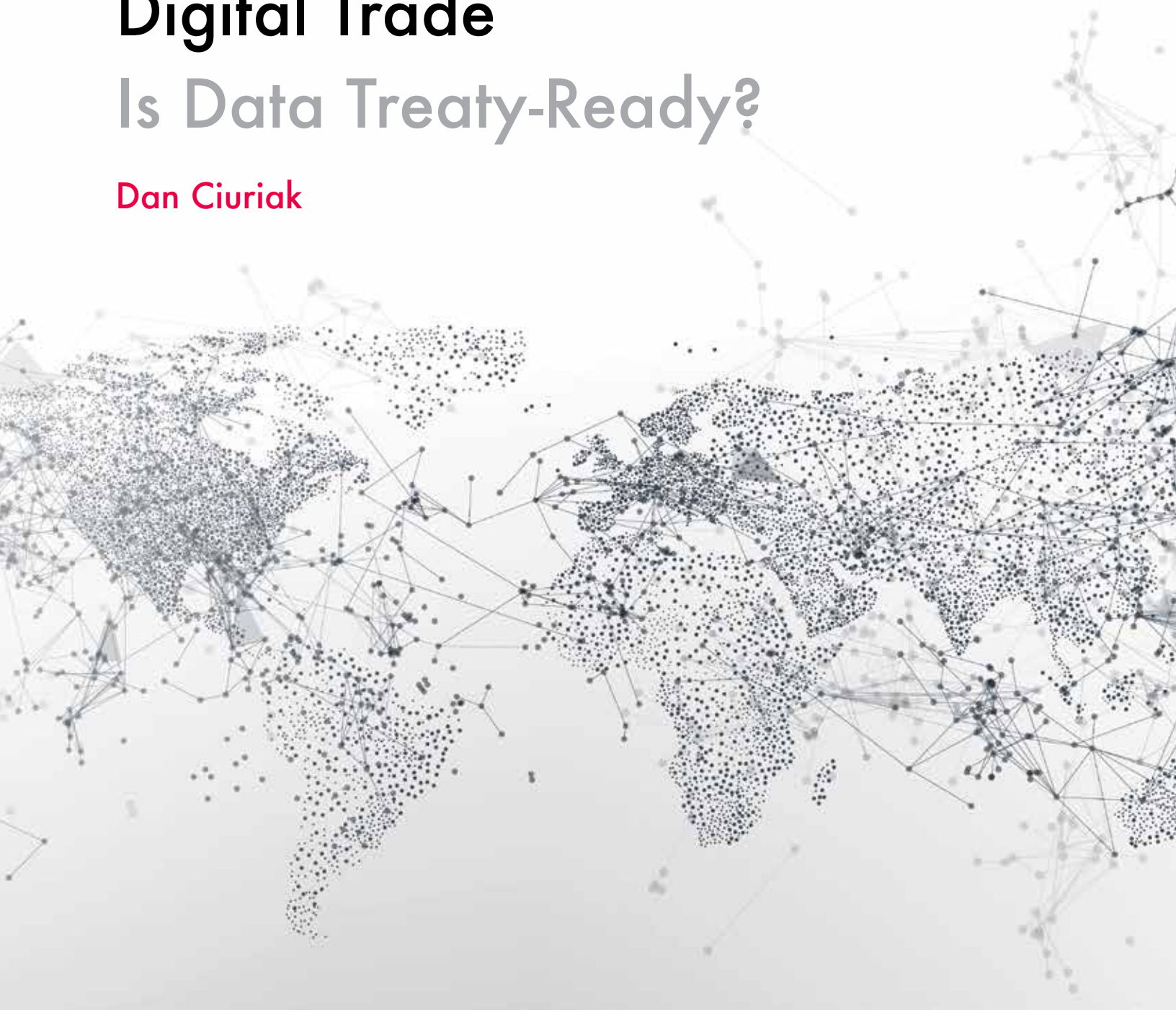
Digital Trade

Is Data Treaty-Ready?

Dan Ciuriak



Centre for International
Governance Innovation

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Is Data Treaty-Ready?

Dan Ciuriak

CIGI Masthead

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About the Author

Senior Fellow Dan Ciuriak joined CIGI's Global Economy Program in April 2016, focusing on the innovation and trade research theme.

At CIGI, Dan is exploring the interface between Canada's domestic innovation and international trade and investment, including the development of better metrics to assess the impact of Canada's trade agreements on innovation outcomes.

Based in Ottawa, Dan is the director and principal of Ciuriak Consulting Inc. He is also a fellow in residence with the C.D. Howe Institute and an associate with BKP Development Research and Consulting GmbH of Munich, Germany.

Previously, he was deputy chief economist at Canada's Department of Foreign Affairs and International Trade (DFAIT) (now Global Affairs Canada), with responsibility for economic analysis in support of trade negotiations and trade litigation, and served as contributing editor of DFAIT's Trade Policy Research series (2001–2007 and 2010 editions). He has also held several other positions at DFAIT, including as deputy to the chair of the Asia-Pacific Economic Cooperation Economic Committee and as finance counsellor at Canada's embassy in Germany.

About the Global Economy Program

Addressing limitations in the ways nations tackle shared economic challenges, the Global Economy Program at CIGI strives to inform and guide policy debates through world-leading research and sustained stakeholder engagement.

With experts from academia, national agencies, international institutions and the private sector, the Global Economy Program supports research in the following areas: management of severe sovereign debt crises; central banking and international financial regulation; China's role in the global economy; governance and policies of the Bretton Woods institutions; the Group of Twenty; global, plurilateral and regional trade agreements; and financing sustainable development. Each year, the Global Economy Program hosts, co-hosts and participates in many events worldwide, working with trusted international partners, which allows the program to disseminate policy recommendations to an international audience of policy makers.

Through its research, collaboration and publications, the Global Economy Program informs decision makers, fosters dialogue and debate on policy-relevant ideas and strengthens multilateral responses to the most pressing international governance issues.

Executive Summary

The knowledge-based and data-driven economy represents a new stage in the evolution of the economy, with transformative impacts on how goods and services are developed, produced, traded across borders, distributed and consumed. Data is the essential capital of this new economic age, as it enables the development of artificial intelligence (AI), which drives the transformation of *how* technology transforms. The powerful network externalities and steep economies of scale and scope that characterize this new economic age raise economic governance concerns in terms of income distribution, corporate concentration and the ability of countries to participate and capture benefits. Meanwhile, the power implicit in access to and control of data raises a plethora of concerns over personal privacy, social manipulation, influence over elections and security. Since cross-border data flows are integral to international trade, trade agreements are entering into the regulation of data. However, as the world is only at the dawn of this new era, a legitimate question is whether the regulation of data is treaty-ready and what sorts of flexibilities need to be retained to enable appropriate policy responses as necessary. This paper argues that data is not treaty-ready and draws the conclusion that Canada, which has much at stake in claiming a role in the data-driven economy, should be cautious about entering into international commitments, the implications of which are as yet unclear.

Introduction: Emergence of the Data-driven Economy

The data-driven economy represents a new stage in economic evolution. Big data, machine learning, AI and the ubiquity of sensors, monitors and robots are the characteristic elements of the data-driven economy. Even at the dawn of this new age, transformative impacts on how goods and services are developed, produced, traded across borders, distributed and consumed are being witnessed. The sense of profound change ushered in by the development of these new technological capabilities is captured in the coining of terms such as the "fourth industrial revolution" (Schwab 2016). While the innovations that combine to make this new age possible have been developed over many decades, the present decade is arguably the first of the data-driven-economy era.[1]

Data is the essential capital of this new economic age — the new "black gold" (*The Economist* 2016). There are a number of ways in which "data is different."

First, while data flows have long been part of the institutional framework of commerce[2] and public policy concerning access to and the use of data has been part of the information society dialogue since the 1980s,[3] what is new in the data-driven economy is the rapid spread of commercial applications of AI, built on algorithms that were trained with big data. Privileged access to data provides a competitive advantage in capturing market share in consumer goods and services sectors and promises to change the competitive landscape across a wide swath of industries through process optimization and, potentially, other advantages based on data obtained through the Internet of Things, coupled with machine-learning technologies.

Second, even though data is, for the most part, acquired without a paper trail of payments and receipts, the intangible capital that data generates underpins the vast market capitalization of data-driven firms. The implicit exchange of "free services" by internet platform providers for the data generated by the users thus represents a form of barter exchange — the value of which is only fully revealed through the market valuation of the platform companies. When these barter transactions take place across

1 The Organisation for Economic Co-operation and Development (OECD) analysis on the role of data in promoting innovation, growth and well-being in what it labelled the "data-driven economy" started in 2011; see OECD (n.d.).

2 The first commercial electronic data interchange messages were sent in 1965 by the Holland-America shipping company. See, for example, DocProcess (2013).

3 Susan Crawford (1983) provides a history of the development of the concept of the information society from its origins in economics to its subsequent diffusion to the field of information science. William Drake (1996) provides a discussion of the divergence in approach to information society regulation in the United States versus Canada and Europe. See also, for example, Christopher T. Marsden (2000) and, in particular, the chapter by Pamela Samuelson (2000) for an extensive treatment of the regulation of the information society and additional sources.

borders, they represent a new mode of trade — mode 5 digital trade, in the taxonomy proposed by Dan Ciuriak and Maria Ptashkina (2018).

Third, data, assembled at the scale now technically possible, enables a new acceleration in the pace of innovation by industrializing the act of learning itself. In this sense, the data-driven economy builds on the progressive acceleration of change in the knowledge-based economy that flourished in the advanced economies in the latter part of the twentieth century, in the industrial era that preceded the knowledge-based economy, and during the long period of gradual knowledge accumulation and technological development that sparked the industrial revolution in the first place. Across these eras, the amount of life experience and experimentation available to inform sound policy formulation shrank commensurately.

The powerful network externalities and steep economies of scale and scope that characterize this new economic age raise economic governance concerns in terms of income distribution, corporate concentration and the ability of countries to participate in and capture benefits from this new economy. Meanwhile, the power implicit in access to and control of data raises a plethora of concerns over personal privacy, social manipulation, influence over elections and security.

Since cross-border data flows are integral to international trade, there has been a move to internationalize policy regimes for e-commerce and data flows, including through the European Union's Digital Single Market initiative; dedicated chapters in trade agreements, such as the Trans-Pacific Partnership[4] (TPP) (the US model) and the Comprehensive Economic and Trade Agreement (the EU model); and initiatives for a stepped-up work program at the World Trade Organization (WTO), following the ministerial conference in Buenos Aires in December 2017.

However, this is only the dawn of the new era, in which the genie of AI has been released for deployment in commercial applications in a context in which the precautionary principle is observed only in exploration of the risks through science fiction. How the data-driven economy should be regulated, and what flexibilities need to be retained to enable appropriate policy responses by nations as issues arise, is not clear. This raises the question addressed in this paper: is data really ready for international conventions?

The discussion is organized as follows. The second section of the paper provides a historical perspective on the emergence of the data-driven economy by linking the accelerating pace of innovation historically to the rise of distinct economic eras. The third section discusses the main governance challenges that have emerged so far in the data-driven economy. The fourth section discusses the intervention of trade agreements into the (nascent) regulation of data in the data-driven economy. The fifth section discusses and concludes.

Historical Perspective: Transforming Transformation

To set up this discussion, it is useful to step back and consider not only the acceleration of the technological transformation of economies, but also the transformation of how technology is developed — that is, to consider the transformation of how technology transforms — and what this means for governance. This is essential to answering the question of whether "this time is different" when it comes to technological change, creative destruction and societal adaptation.

Sporadic Innovation and the Creation of Wealth

Technological change has been causing creative destruction since at least the introduction in the mid-1400s of the Gutenberg printing press, the ur-machine of today's knowledge-based economy. Although the pace and depth of transformation have greatly increased over the centuries and now, seemingly from year to year, raise ever greater adjustment pressures, even the venerable printing press threatened ways of life and prompted the defence of established ways. Thus, in the historical record, we hear the Abbot Johannes Trithemius (1483–1505) arguing strongly that monks should not stop copying because of the invention of printing. Echoing thoroughly modern sentiments, he observes that the word

4 See www.international.gc.ca/trade-agreements-accords-commerciaux/agr-acc/tpp-ptp/text-texte/toc-tdm.aspx?lang=eng.

written on parchment would last a thousand years, whereas paper could not be expected to survive more than a few hundred; printed books were full of errors, unlike diligently copied texts, and copying texts was intrinsic to the monk's way of life: "Of all manual labor nothing is more in accord with the state of monks than the zealous copying of sacred writings" (quoted in Daught 2013). Well, we know what happened there.

The recognition that innovation could raise the level of the wealth of nations led to governance innovation to promote such activity. This development can be dated back to at least the very first patent law, introduced in Venice in 1474, which starts with the preamble: "We have among us men of great genius, apt to invent and discover ingenious devices."[5] The aim of this law was to attract more such men of genius to Venice and to incentivize the invention of more ingenious devices. Geared to an age when innovation was the province of the individual and invention was sporadic, the idea of temporary monopoly over innovative products for the prospective life of the inventor made eminent sense and quickly (by Renaissance Age standards) led to the British Copyright Act 1710 (also known as the Statute of Anne), the first statute to provide copyright protection. The latter statute is notable also in the present context for its express purpose of encouraging authorship (Gomez-Arostegui 2010). Thomas Jefferson brought this understanding to the young United States when he became not only secretary of state but also the first commissioner of patents of the US Patent Office. That these instruments were well suited to promote innovative activity in their age is little disputed and the spread of their use took into account the observation of experience with their impacts.

Innovation and Growth

The recognition that technological change accelerates economic growth is more recent, dating back to the early 1800s (Mokyr 2008). What distinguished the Industrial Revolution from the preceding era of sporadic invention was the self-sustaining dynamic of innovation triggering more innovation. Importantly, this industrial dynamic was not diffuse, but localized. Alfred Marshall (1879), describing England's industrial districts, attributed their success to the concentration of a large number of small firms in one locale, which generated "external economies," the origin of the modern economic concept of knowledge externalities. The most prominent modern version of a Marshallian industrial district is Silicon Valley. Modern cluster policy represents an attempt to capture the positive externalities that such districts generate and that appear to be essential to dynamic growth. At the same time, this localization feature is an important factor in today's uneven distribution of benefits from globalization (*The Economist* 2017).

As industrializing economies globalized, the set of treaties addressing innovation grew slowly, starting with the Paris (1883) and Berne (1886) conventions for protection of industrial property and copyrights, respectively, but accelerating over the course of the twentieth century. The era of industrialization featured largely cafeteria-style internationalization of rules governing innovation: countries chose what to sign on to — again, based on experience and observation of what worked.

The Industrialization of Innovation

The dynamic feedback that drove the Industrial Revolution intensified with the industrialization of research and development (R&D) in the post-World War II era. Within decades, this gave rise to the perception of the knowledge-based economy. This term came into general use only in the mid-1990s, but the recognition at the policy level of the essential role of intellectual property (IP) as the foundation for growth may be dated back to December 12, 1980, when US President Jimmy Carter signed into law the Patent and Trademark Law Amendments Act, otherwise known as the Bayh-Dole Act. This marked a strategic departure by the United States, the leading goose in the globalization gaggle, to build its economy on the basis of IP. The benefits of first-mover advantage were great (*The Economist* 2002), but others, including, more recently, China, noticed and followed suit, triggering what amounted to a strategic arms race to assemble IP stocks (Ciuriak 2017a). The resources devoted to industrial R&D grew explosively in the race to enclose the knowledge commons by accumulating IP assets, enabled by an ever-growing cadre of freshly minted Ph.D.s and technicians and the exponential growth of computational power.

The proliferation of IP, in turn, raised new-found concerns about the governance of innovation. There is now a considerable body of opinion that

5 See www.copyrighthistory.org/cam/tools/request/showRecord.php?id=record_i_1474.

IP protection has been overdone and is actually hindering innovation (see, for example, Jaffe and Lerner 2004; Ciuriak and Curtis 2015; Geist 2017; Blit 2017). However, this issue remains actively debated and the possible role of IP protection in the puzzling slowdown in productivity growth in the knowledge-based economy era has neither been established nor dismissed.

Starting with the introduction of mandatory IP protection in the 1989 Canada–US Free Trade Agreement (CUSFTA) and the 1995 WTO Agreement on Trade-Related Aspects of Intellectual Property Rights, trade agreements became a tool for the economies with large IP portfolios to capture international IP rents and market share by excluding rival products. The expansion of WTO membership and the proliferation of trade agreements with IP chapters in the knowledge-based economy era helped spread the adoption of IP-protection laws and membership in the various IP conventions. Thus, in contrast to the industrial era, the knowledge-based economy era witnessed rapid internationalization of innovation-related policies. Moreover, the adoption of the stronger IP protection was often characterized by reluctant acquiescence, rather than enthusiastic embrace, as shown by the protracted negotiation of the IP chapter of the TPP and the heated debate over its merits and value to various parties.

The Industrialization of Learning

The shift of innovation into the digital realm (the digital transformation) created the conditions for a new acceleration of innovation with the industrialization of learning. While AI and robotics have long been in development and, indeed, in commercial application, the digital transformation is widely sensed as having led to a sea change in the implications for the economy and society, more generally. First, the digital transformation is now generating palpable change: "After waves of hype followed by disappointment, computers have now defeated chess, Jeopardy, Go, and poker champions. Policymakers and the public are impressed by driverless cars that have already traveled several million miles" (Etzioni and Etzioni 2017). Second, the spread of penetration across the economy is being enabled by the technical infrastructure underpinning the digital transformation.

The accelerated speed at which this new era is taking shape is outstripping the development of experience-based policy and experimentation with alternative regulatory models — one can contrast Estonia's approach to e-government (the e-Estonia model) with its tight controls on use and storage of personal data with the cloud model promoted by the US internet giants (Heller 2017). Indeed, this very lack of experience has led to arguments against the regulation of AI precisely because not enough is known yet to regulate effectively (Stone et al. 2016). The hesitation in application for reflection on consequences that was observed in a rather similar situation with recombinant DNA at the Asilomar conference in 1975 (Berg et al. 1975) — which gave rise to the formulation of the precautionary principle — seems nowhere in sight.

Yet, as discussed below, the internationalization of regimes for the regulation of the data-driven economy is already under way with the imminent implementation of the renamed Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), and the renegotiation of the North American Free Trade Agreement (NAFTA) with likely still stronger constraints on regulatory intervention on the table at the behest of the United States, and with barely a nod to the governance challenges of the data-driven economy.

The Governance Challenges of the Data-driven Economy

The data-driven economy is emerging at a point of inflection and possible disruption in the progress of globalization (Rodrik 2017). This disruption is signalled by the apparently growing backlash finding expression in the advance of populist parties in many countries. Some of this backlash has to do with the distributional effects of the model of globalization as we know it; some of it is a reaction to the visible presence of immigrants in economies facing distributional pressures. The finger of blame in this backlash is being put on things foreign — foreign goods, foreign workers and foreign countries.

As discussed below, the data-driven economy is not an obvious antidote to these pressures and symptoms, as it raises the possibility of a future with scarce and insecure work, rising corporate

concentration and income skewing. This is due to the empowerment of "superstar" firms and highly asymmetric capabilities across economies to participate in the industrial development of this era — and this is but a subset of the governance issues that pervade the social and political domains and at times conflict with commercial exploitation of the data-driven economy's possibilities.

Societal Issues

Many national and international governance challenges are to be faced in coping with the interaction between economic issues and those arising in the social and political domains. These challenges are complex, the risks vary across domains and the expertise to develop suitable regimes in many areas is still limited by inexperience. Some challenges may prove insuperable due to the insidious connection between power and corruption — and the greatest corruption induced by power is the belief in the legitimacy and efficacy of its exercise. Some examples of controversial practices that have surfaced include the following:

- → System vulnerability: Estonia has backed up its entire economy in servers based in Luxembourg (Heller 2017). That hints at the issues of vulnerabilities that societies will have to deal with as the digital transformation deepens and spreads.
- → Privacy: Privacy-related issues raised by the breadth of information that can now be assembled on an individual are legion. Some that have already been encountered and have generated unresolved controversy include denial of credit (on the basis of algorithmic predictions about credit risk), denial of parole (on the basis of algorithmic predictions about likelihood of recidivism) (Stone et al. 2016) and exploitation of emotional vulnerability of minors for marketing purposes.[6] Of particular importance for international trade agreements is the issue of the disclosure of algorithms used for these purposes — to wit, how can an individual defend their interests against the reasoning of an algorithm unless they have access to the programs and data used to teach it?
- → Legal liability and agency: Who is responsible for the harm done when machines act on their own initiative, primed by instructions geared to the data they encounter? Emergent behaviour raises challenges for legal concepts such as foreseeability (in tort law) and *mens rea* (in criminal law), not to mention control of autonomous or semi-autonomous AI-enabled agents. Under what conditions can software enter into binding contracts on behalf of persons or corporations (Stone et al. 2016)?
- → Safety standards and professional certification: The advent of driverless cars and the use of drones for commercial deliveries raise questions of what is safe enough for implementation, while the development of machines capable of tasks currently reserved for certified professionals raises new issues of when a machine can be certified (Calo 2016). Moreover, in the cases of AI used for medical procedures or legal advice, questions would arise as to who would have to pass the medical boards or legal bar, not to mention where they would be required to do so (Stone et al. 2016).
- → Weaponization: A Pandora's box of ethical questions are raised by the prospect of the use of AI-enabled robots for military purposes, not least by its reducing the political cost of military interventions.
- → Politics: The use of social media to not only mobilize political participation, but also disseminate disinformation and to target individuals for suppression, raises equally deep issues for democratic processes. Data-mining firms have used social media data to target messages to influence political preferences, sidestepping controls on the financing of election campaigns and foreign interference in national domestic processes, with alleged impacts on the Brexit vote, the 2016 US election and the recent Kenyan election.[7]

6 See Nitasha Tiku (2017) for a discussion of the privacy implications of the leaked memo from Facebook that pitched companies on the ability to target advertising at emotionally vulnerable minors. The original story was broken by *The Australian* and provoked a sharp reaction from Australian authorities and immediate backwatering by Facebook.

7 On the links between data-mining firms and electoral processes and the concerns these raise, see Carole Cadwalladr (2017) on the role of Cambridge Analytica in the Brexit vote, Jane Mayer (2017) on the role of the same firm in the Donald Trump election win and Salem Solomon and Thomas Griesbach (2017) on the role of this ubiquitous firm in the Kenyan election campaign.

This list is daunting enough, even without consideration of the open-ended implications of the realization of an AI that can pass the Turing test — the point where machines can pass for human — or the development of an AI that surpasses human intelligence (the "singularity") that is predicted to be achieved within decades (Kurzweil 2005). In the taxonomy of ages suggested here, these developments would represent yet another acceleration in innovation due to the industrialization of the creation of intelligence itself. But there are more immediate and mundane governance issues in the realm of economics to be addressed first.

Income Distribution and Social Pressures

The rising political tension within economies can, in a sense, be mapped onto growing income inequality, which not only — and perhaps not even most importantly — erodes economic welfare throughout most of the income spectrum, but also goes hand in hand with growing insecurity and the loss of relative socio-economic status for the lower income groups, which, in turn, catalyzes the populist rage at the elites.

Skill-biased technological change has been an important factor in the increase in rising wage inequality, as evidenced by the correlation of firm-level wage effects and skill effects (Song et al. 2016). However, many of the causes of the rising income disparities are also fundamental to the current model of globalization. In particular, the age of mobile capital and flexible labour markets has eroded the relative bargaining power of labour, resulting in either flat-lining/declining real wages or persistent unemployment, depending on labour market policy models (see, for example, Alexandra Spitz-Oener [2017] on the German experience in the post-1990 period, which involved trading off lower real wages for employment gains).

The data-driven economy did not create this model of globalization, but it threatens to intensify the pressures that have built up under it. To put a figure on the scale of the looming pressures, Carl Benedikt Frey and Michael A. Osborne (2017, 265) estimate that 47 percent of US jobs, predominantly lower-skilled and lower-waged, are at high risk of computerization in the first wave of AI adoption: "In the first wave, we find that most workers in transportation and logistics occupations, together with the bulk of office and administrative support workers, and labour in production occupations, are likely to be substituted by computer capital." Other estimates find a lower percentage of jobs at risk (for example, Melanie Arntz, Terry Gregory and Ulrich Zierahn [2016] estimate that on average just nine percent of jobs are at a high risk of being automated, namely those for which at least 70 percent of the tasks are automatable).

How powerful the disruption will be to economies is a wide-open question at the moment. For one thing, it would vary in intensity across economies, with advanced technological societies, such as the United States, feeling the effects more strongly and others less so. Given the Frey and Osborne (2017) figures, one could compare an AI shock of this magnitude to the labour-supply shock of a second China integrating into the global trading system, but without the commensurate positive demand shock that came with it. Second, while the impact will be gradual, given the history of progress in computing power, it is likely that AI will rapidly expand its skill set and become an increasingly good substitute for humans (DeCanio 2016, 289), intensifying the displacement effect over time.

The problem, though, is not necessarily unemployment: part of the economic response would be the substitution of leisure for labour. Indeed, given the demographic projections of an aging population, AI would ease the pressure to open up immigration to replace retiring workers in countries with aging populations. Moreover, the general experience with technological change is that, although the immediate displacement effect is painful, the long-run transformation of the economy creates demands for new jobs — in the end, this time might not be different (Lund and Manyika 2017). Rather, according to Stephen J. DeCanio (2016, 289), the problem appears to be income distribution: "This [scenario of increasingly good substitution of AI for humans] will increase measured inequality unless the returns to robotic assets are broadly spread across the population." However, as he goes on to add, "It is not clear how this spreading of the returns might come about" (ibid.).

To summarize, the income-distribution pressures that emerged during the knowledge-based-economy era are likely to intensify during the data-driven-economy era. This will likely require more fundamental reforms than the responses that have emerged today, such as instituting progressive trade agendas to make the model of globalization

more inclusive (the Canadian approach; see Ciuriak 2017b), repatriating economic sovereignty (the UK approach), waging trade wars (the threatened Trump administration approach) and strengthening social safety nets, including by instituting minimum universal incomes (which seems to be gathering support in the European Union).

Corporate Concentration and Access to Data

The knowledge-based-economy era featured a trend toward increased concentration, in part due to the rise of so-called "superstar firms." For example, in the United States, between 1997 and 2012, the weighted-average share of the top four firms' revenues across 893 industries rose from 26 percent to 32 percent of the total (*The Economist* 2016). John Van Reenen and Christina Patterson (2017) provide evidence that much of the increase in concentration came from the increase in the share of the economy accounted for by superstar companies and that the industries that featured the greatest shift toward superstar firms were those in which the labour share of income fell the most.

Some of the commonly cited factors behind these trends are the following:

- powerful network externalities, which tend to create natural monopolies or near monopolies (for example, search engines) — sometimes referred to as "winner-take-most" economics (for example, Autor et al. 2017);
- steep economies of scale in knowledge products, which result in zero or near-zero marginal production costs for digital products (for example, Rifkin 2014);
- near-frictionless commerce enabled by the internet and globalization, which allows the more efficient firms to capture greater market share (Van Reenen and Patterson 2017); and
- the key role of IP in the knowledge-based economy era, which protects established positions and creates stumbling blocks for potential competitors (for example, Wagner 2015).

The data-driven economy will likely see these trends intensify as well. The critical factor for AI is access to the data that trains the algorithms. While firms can work their way around patents, there is no way to work around lack of access to data. This points to extreme network externalities in the data-driven economy, where firms that secure access to data will gain powerful competitive advantages in terms of having smarter AI (in other words, the superstar firm advantage [Autor et al. 2017]).

This remains a hypothesis at the moment, but it is consistent with the level of attention that business is paying to the digital transformation, in general, and to capturing data, in particular. Advice to businesses seeking to benefit from the digital transformation emphasizes "extreme needs for data and computing power as well as for new algorithms or the refinement of existing algorithms" (Gualtieri, Lo Giudice and Purcell 2017).

A good example of the industry jockeying for position is in self-driving cars. The segment of the industry that captures the data will be positioned to become the next superstar firm of the "mobility services" industry that is projected to emerge from today's set of automotive players. Thus, the Chinese firm Baidu, which develops AI software for self-driving cars, has offered to give away its software in exchange for the data it generates, so it can compete with firms such as Uber and Lyfft, which obtain proprietary data from their business models. Meanwhile, firms that operate rental fleets are lobbying governments to ensure that they, rather than the manufacturers of the cars, have access to the data generated in their rental vehicles — and vice versa.

The contest to win in the data-driven economy is happening right now, within and across industries, as the lines between traditional industries blur. The Internet of Things — smart houses, cities, refrigerators, tractors and so forth — is the next battleground. The stakes are high, not only for firms, but also for economies and the organization of societies. Consider, for example, the role of technology firms in traditional public policy areas, such as urban planning, as it is now unfolding with the role of Sidewalk Labs, an Alphabet subsidiary, in redeveloping Toronto's Quayside district (Rider 2017). "Power and control over autonomous-vehicle technology is already concentrated in the hands of a small few: if a company like Uber or Alphabet controls the dominant transportation infrastructure, you need not live in an intentional community like Quayside to feel as though your city is becoming a company town" (Wiener 2017).

The potential for overt abuse of dominance is also a factor, as suggested by cases brought in Europe

by the European Commission's competition authorities against Google (for favouring its related suppliers in search results) and by the German Cartel Office against Facebook (for using its network dominance to, in effect, extort privacy waivers from users [White and Matussek 2017]).

Internationalization of the Governance Regime

As noted, the internationalization of the governance regime for the digital economy and for data, in particular, in the data-driven economy is being attempted at a very early stage of its development.

To date, much of the activity in developing rules and protocols has involved the technical infrastructure that facilitates internet transactions for all parties in institutions that include the following:

- the International Telecommunication Union addresses international standards for the Information Society;
- the Internet Corporation for Assigned Names and Numbers administers procedures for domain names on the internet;
- the United Nations Commission on International Trade Law deals with legal issues related to identity management, trust services and contractual aspects of cloud computing; and
- the Hague Conference on Private International Law addresses private international law norms (including conflict of laws, procedure and judicial cooperation) related to e-commerce and internet transactions.

Policy discussions and the development of norm-setting guidelines have been taking place in various intergovernmental fora, including the OECD, the Group of Seven, the Group of Twenty, the Asia-Pacific Economic Cooperation and the World Bank.

This activity amounts to the provision of public goods that underpin the data-driven economy and are accessible by all. For consumers, these activities enable access to the welfare gains generated by internet access, including the "free" content consumers obtain in an implicit barter exchange for the data they make available to internet service providers. From an industrial policy perspective, these activities do not impinge on domestic policies aimed at developing the capacity to participate in the data-driven economy.

However, trade agreements are starting to intervene, with dedicated chapters on e-commerce and data flows. While, for the most part, the e-commerce chapters of technically sophisticated agreements, such as the CPTPP, simply echo established good practices from this broad-based international cooperation, two sections of the TPP, in particular, have potential implications for a country's future ability to capture market share in the data-driven economy and to generate regulatory "chill."

The TPP provisions regarding the free flow of information across borders and restricting data localization requirements are article 14.11.2, which states, "Each Party shall allow the cross-border transfer of information by electronic means, including personal information, when this activity is for the conduct of the business of a covered person," and article 14.13.2, which states, "No Party shall require a covered person to use or locate computing facilities in that Party's territory as a condition for conducting business in that territory."[8]

In article 14.11.3, the TPP recognizes that each party may have its own regulatory regime and provides for parties introducing regulations for a legitimate public policy objective, but invokes the standard requirements regarding non-discrimination and minimal impact on trade: "Nothing in this Article shall prevent a Party from adopting or maintaining measures inconsistent with paragraph 2 to achieve a legitimate public policy objective, provided that the measure: (a) is not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on trade; and (b) does not impose restrictions on the use or location of computing facilities greater than are required to achieve the objective."[9]

If one assumes that the regulatory carve-out provisions provide sufficient latitude to allow

8 See http://international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/tpp-ptp/text-texte/14.aspx?lang=eng.

9 Ibid.

countries to deal with the plethora of societal concerns identified above (privacy, security and so on) and that the force of these measures goes purely to facilitate commerce on a non-discriminatory basis, the free flow of data across borders becomes the "fifth freedom," alongside the freedom of goods, services, capital and labour to move across borders in a globalized economy. There is, however, no consensus on whether the TPP language enabling regulation for "legitimate" public policies, subject to non-discrimination and trade-impact minimization, actually provides for sufficient regulatory space. Similar language has long been claimed to generate regulatory chill in such areas as environmental regulation (see, for example, the discussion in Dan Ciuriak and Natassia Ciuriak [2015] of the TPP environmental provisions), particularly when the area is subject to investor-state dispute settlement provisions.

Moreover, when data flows are understood as intangible capital assets and not simply as technical facilitation of commerce, the requirement to allow data to flow freely across borders amounts to relinquishing claim — without compensation — on the most valuable assets of the data-driven economy. This can be best appreciated by considering the financial implications of China's "Great Firewall," which restricts the flow of data across borders. The two most valuable companies in Asia at the end of 2017 were China's Tencent, whose WeChat social media platform has nearly one billion users, and e-commerce giant Alibaba; both touched the US$500 billion mark in market capitalization in 2017 (He 2018). As Yusho Cho (2018) notes, "Both companies have enjoyed meteoric growth, thanks partly to the government largely closing off the internet sector to foreign participation."

The national interest in this area turns on the ability to capture market share in the data-driven economy — which depends on the ability to capture data — and on the ability to implement regulations for various public purposes, ranging from competition policy, social issues, political interference, personal privacy and national security, among others.

At this early stage, how such disciplines will shape the data-driven economy is unknown, which in turn raises the question of whether parties signing onto trade agreements that introduce measures on data understand the value of the concessions they are making in this respect.

Discussion and Conclusion

Is data treaty ready? This paper argues that it is not and draws the conclusion that Canada, which has much at stake in claiming a role in the data-driven economy, should be cautious about entering into international commitments, the implications of which are as yet unclear.

Canada successfully navigated the industrial era and participated fully in the technology wave of the first decades of the knowledge-based economy era. However, post-2000, innovation performance slipped and eventually crashed: as prima facie evidence, the technology sector's share of the Toronto Stock Exchange fell from about 40 percent at its peak during the technology bubble of the late 1990s to only about 1.5 percent at the end of the financial crisis of 2008-2009.

During the knowledge-based economy period, in which IP was the essential capital, Canada signed onto progressively stronger IP-protection regimes in response to demands in trade negotiations. Initially, in the CUSFTA negotiations, this was done reluctantly, reflecting the intuition of Canada's policy community that stronger IP protection was not in Canada's interest. By the time the TPP negotiations rolled around, Canadian government policy appeared to have acquiesced in alignment with the international standards shaped by the main *demandeurs* — the United States and the European Union — notwithstanding persistent criticism from many in Canada's technology and academic communities.[10]

The data-driven economy represents a new stage in the evolution of the economy, because it transforms the *way* technology transforms. Data is the essential capital of the data-driven economy, and this gives primacy in economic policy to data access. Moreover, the extreme needs for data and computing power imply that network externalities, economies of scale and scope and global reach will favour the large established superstar firms, which, in turn, implies highly asymmetric benefits across countries in terms of

10 Notably, the Australian Productivity Commission (2016) has also made a number of similar criticisms that are of relevance for Canada, as another small, open economy, concerning the risks posed by the proliferation of low-value patents, excessive terms of copyright, the need to examine IP transactions from a competition law perspective and the constraints placed on domestic IP-policy flexibility by trade agreements.

industrial participation, alongside the generally proportionally shared consumer benefits provided by the digital economy and digital trade.

As Canada's innovation sector rebuilds and positions itself to gain a foothold in the emerging data-driven economy, innovation policy is being reformed and AI is a prominent element in the strategy. Canada has a strong foundation in AI research, is recognized as such internationally (see, for example, Bushey 2017) and has made significant commitments to building on this foundation (for example, the founding of the Vector Institute to promote AI research in Canada). Thus, Canada has much at stake.

At the same time, Canada is engaged in major trade negotiations that will include proposals to make commitments on cross-border data flows. What sorts of flexibilities may be needed to address regulatory challenges that emerge in the data-driven economy are not yet known; nor is it clear how recourse to such flexibilities might be constrained by regulatory chill from trade agreements. Stanford University's One Hundred Year Study on Artificial Intelligence, which released its inaugural report only in 2016, observes that "as a transformative technology, AI has the potential to challenge any number of legal assumptions in the short, medium, and long term. Precisely how law and policy will adapt to advances in AI — and how AI will adapt to values reflected in law and policy — depends on a variety of social, cultural, economic, and other factors, and is likely to vary by jurisdiction" (Stone et al. 2016).

In the economic sphere, the digital transformation and the advent of AI promise pervasive disruption (Schwab 2016). Two decades ago, the "bricks and clicks" business model was mostly hype; today, as Sears closes down all of its Canadian operations as part of the 2017 "retail apocalypse" (Thompson 2017), cutting 12,000 jobs, and Canadian cities scramble to mobilize subsidies to capture Amazon's new headquarters, the reality is upon us.

From an economic policy perspective, access to data and the AI it trains promises to affect the conditions of competition within and between nations, the structure of industries and the distribution of income. Accordingly, at the dawn of the data-driven economy era, a legitimate question seems to be whether data is ready for binding language in international treaties.

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