

Economic Doctrine Is in Flux: What are the Implications for Engagement?

Dan Ciuriak

15 November 2021

Abstract: The current opportunities for reengagement with the United States present themselves at a moment of profound changes in economic thinking in the United States and beyond. There are many factors behind the renewed interest in industrial policy, including the experience of the COVID-19 pandemic, the geopolitical competition with China, the return of shortages and inflationary pressures, the concerns about anti-competitive behaviour of platform firms, and the distributional dynamics of the data-driven economy. These have broad implications for trade policy and for the strategic approach for small, open economies like Canada. In an innovation-intensive world of superstar firms and geostrategic competition, the focus for Canada should be on innovation and firms. The measure of success: Canada's number of unicorns would be rising steeply, as would be Canada's R&D share of GDP, and private

1 Introduction

The incumbent global trade policy framework based on the World Trade Organization (WTO)

For its part, the business sector is scrambling to reposition itself for the new operating environment and is seeing a rapid evolution of the ecosystem of innovative firms: 2021 has seen a record number of start-ups reaching the status of unicorn, with a \$1 billion valuation for a private start-up

Meanwhile the rising share of economic rent in the system triggered a contest to capture them. The competition for rents is settled by bargaining power and other forms of market power under conditions of strategic behaviour, and the result (at the margin) is not win-win, but rather a transfer of wealth. And it is not a contest that nations will readily cede to independent tribunals, at least not when the stakes are large. The subsidy and trade protection wars over dynamic random access memory (DRAM) chips and civilian aircraft (Boeing vs. Airbus; later Bombardier vs. Embraer) were a taste of what was to come. What did we see in this era? The active use of instruments such as Super 301 to leverage concessions from trading partners (e.g., the Structural Impediments Initiative commitments made by Japan; Matsushita, 1990). The Uruguay Round was in good part about trying to put the use of these instruments back under wraps.

If we date the KBE/GVC world to 1980, the world for which the WTO was created in 1995 was one whose life was already half over. Indeed, by 1995, foreshadowing what was to come, the World-Wide Web was already five years old although not yet commercially a force; and in 1996,

It is more than eye-opening in light of this to consider a story told by Kevin Kelly, the former editor of Wired, of a conversation some years earlier with Larry Page, the co-founder and future

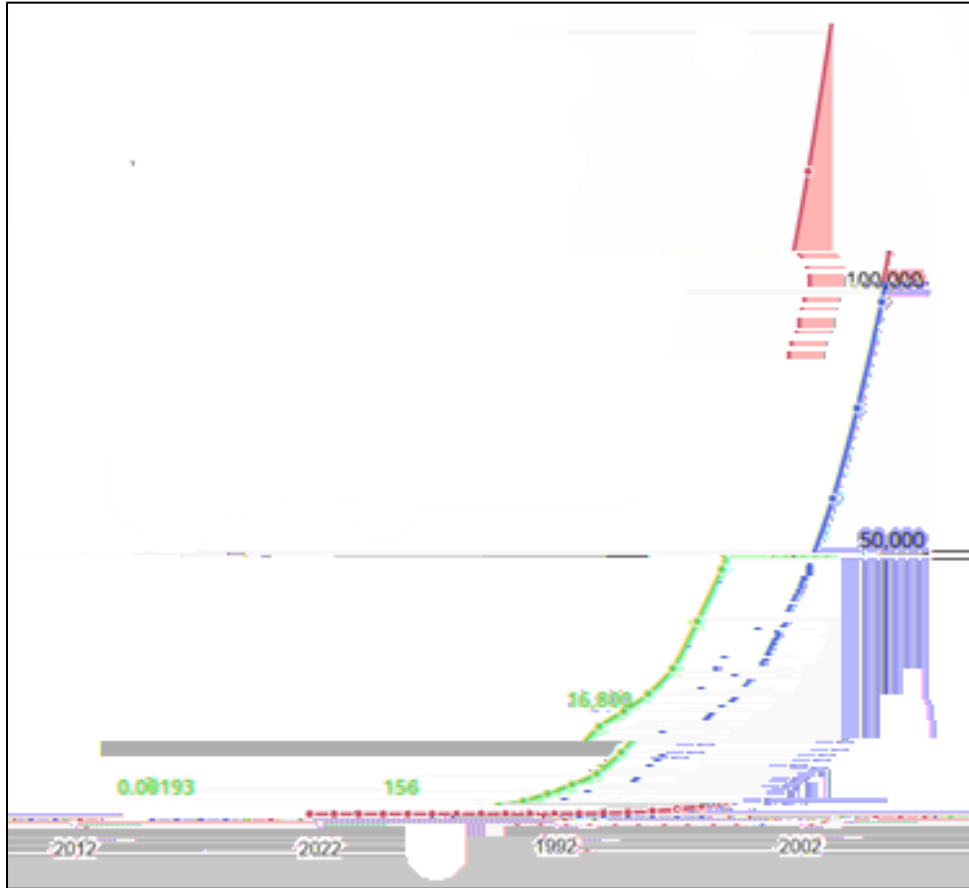
Around 2002 I attended a small party for Google before its IPO, when it only focused on

stuck with me:

The world for which Google was built had arrived. It was the world of big data, machine learning and artificial intelligence the data-driven economy (DDE).

As can be seen from Figure 2, the major part in the growth of the volume of Internet traffic and hence the scale of datafication came after the world emerged from the GFC.

Figure 2: Growth in Internet Traffic, 1992-2022 (projected), Gigabytes per second



Source: World Bank (2021). World Development Report 2021 and Cisco Visual Networking Index: Forecast and Trends, 2017-2022; <https://wdr2021.worldbank.org/stories/crossing-borders/>

It seems reasonable to date this second phase change to circa 2010. -driven starts to show up in the economic literature as early as 2011 in an OECD work program (see note 1 in Ciuriak, 2017a) but, with few exceptions, the main body of literature on this subject

is in the second half of the 2000-
2019 Davos speech emphasizes the role of data as *driving* the economy:

1967; Baumol et al., 1985). This refers to a stylized fact of economic growth that the transition into a services-intensive economy historically was associated with a marked growth slowdown (hence the oft-voiced concerns in developing countries about de-industrialization).

In a nutshell, post-industrial economies feature a rising share of services in GDP and at the same time experience a rise in relative costs of services. One reason for this effect is that services are much harder to scale than manufacturing.

Datafication changes everything for services-intensive economies because it introduces a highly scalable by-product of services that functions as a key factor input into the production of massively scalable AI (which has effectively a zero marginal cost of production). Human knowledge capital is not scalable; machine knowledge capital is (Ciuriak, 2018). Game changer.

Scalability introduces rents. Strategic behaviour is then inevitably induced since exercise of power determines market shares and the distribution of returns in the presence of rents. It has been oft

14). The gilding is worth fighting over.

Enter geoeconomics and geopolitics.

3.4 Data in the trading system

Data occupies a curious position in the trading system. On the one hand, insofar as it constitutes a digital product, it is subject to WTO rules, which are in principle technology neutral (see, e.g., Janow and Mavroidis 2019, s2). Moreover, insofar as data flows across borders are intrinsic to enabling a transaction subject to WTO commitments to take place, they are similarly subject to WTO commitments. In this sense, the term *digital product*, which includes both data as the substance of the digital product and other data associated with transactions which accompany digital products and are intrinsic to the transaction if not the product itself, have always been fully subject to WTO rules.

At the same time, data is directly traded in a barter exchange that takes place outside the WTO system of rules. This takes the form of free Internet services in exchange for the data generated by the use of that service, which then can be monetized separately in the other side of a two-sided market⁵. Such data *data* now it is very valuable, constituting a large share of intangible assets.

In 1976, intangibles accounted for 16% of the value of the assets of companies that comprise St

4 Strategic Behaviour in the DDE

The DDE is an economy primed for strategic behaviour by countries and firms. Strategic behaviour is generally not analytically tractable, which makes this economy uncommonly hard to predict.

Superstar firms often have resources at their disposal that exceed most countries yet are run by individuals who might be inclined to send a sports car with a mannequin in the (Gunter, 2018).

Competition issues are pervasive with strategic behaviour; again unpredictability reigns since conditions of competition are shaped by agreements not markets. By the same token, competition becomes the new market access given the implications for market concentration and risk of anti-competitive behaviour (i.e. will tend to depend on the conditions it agrees to regarding competition concerns).

Innovation issues add to the uncertainties as the industrialization of learning through machine learning accelerates innovation and

ross-border data f

Figure 7: Cross-border Data Flows by Economy, 2001-2019
(millions of megabits per second)

Source: Adapted from Tsunashima (2020), based on data from the International Telecommunications Union.

Figure 8: Facebook-backed 2Africa Cable and China's Digital Silk Road Africa Connections

Source: 2Africa cable chart from

5 Discussion

Industrial policy is front and centre today in public policy discussions for a range of reasons.

First and foremost, the nature of the DDE puts in play what appear to be massive economic rents that countries are maneuvering to capture. Strategic trade and economic policy is back in vogue.

Second, the major societal challenges today are in public goods space (climate change, pandemic, digital transformation). there is in that sense no

. The rationales for public sector engagement in the economy as regulator or in supporting production (including as a producer through state-owned enterprises) remain as they were, based on externalities and market failures (for a review, see Ciuriak, 2013). However, the nature of the major challenges means the optimal share of public goods in production has risen.

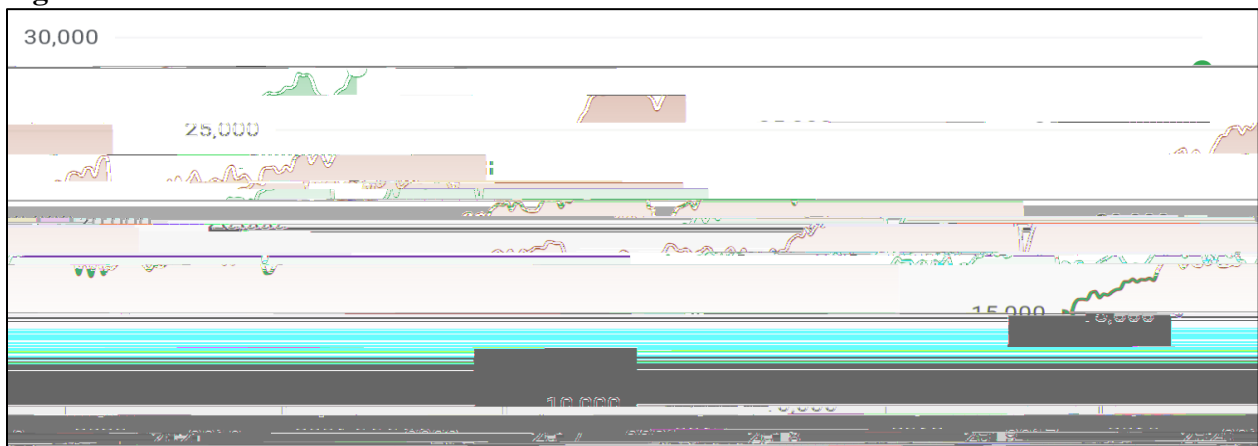
Third, the pandemic

China from the International Space Station (Kluger, 2015), China built its own (Kharpal, 2021) and for good measure recently executed a Mars lander on its first try (Webb and Allen, 2021) and brought back the first lunar samples in 44 year 5 mission in 2020 (Crane, 2020). Quantum computing is on the list of technologies subject to US export controls: Scientific American reported this year that China is now leading in this area (Garisto, 2021) after having launched the first quantum experimental satellite in 2016 (Gibney, 2016), and conducted the first successful quantum entanglement experiment at that distance in 2017 (Billings, 2017).

The US restrictions on computer chips and computer chip manufacturing technology likely face the same fate. There is much industry commentary to the effect that China has already gained full capability for mature 28 nanometer production technology as of 2021 and will have mass production capability of 14 nanometer chips which constitute the backbone of chip applications by end-2022 (see, e.g., Verdict, 2021; Barton 2021).

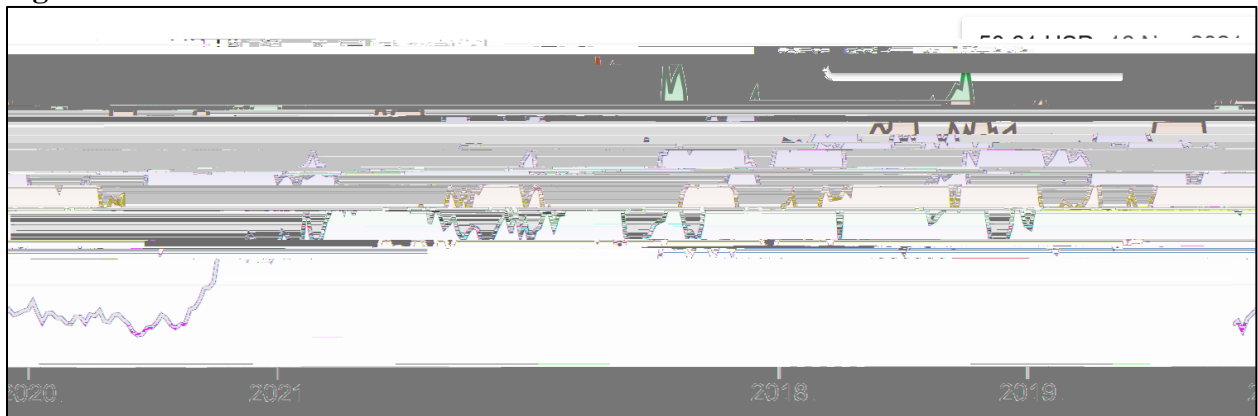
While it is impossible to know the state of play in tech due to the rapid pace of development, the market which was targeted by US sanctions, compared to Intel which is a beneficiary of these restrictions, provides a real-time guide (Figures 9 and 10) as to what the market, however misguided it might be, thinks.

Figure 9: Market Performance of SMIC



Source: Google Finance, accessed 16 November 2021

Figure 10: Market Performance of INTEL



Source: Google Finance, accessed 16 November 2021

Whether or not markets are truly efficient (in the sense of incorporating all known information and acting rationally on that information), they do reflect assimilation of a vast amount of public and private information. As well, FDI is flooding into China (up 17.8% in the first 10 months of 2021 after China led the world in 2020).

China is not going away. And the United States is hardly likely to throw in the towel. The post-pandemic DDE will thus be shaped by sustained high-stakes industrial policy competition.

Bottom line: changing technological and economic conditions mean that the rules-based system developed for the mature industrial economy and emerging KBE is not set up to govern the DDE. This would be the case even absent the major societal challenges and the growing geopolitical/geoeconomic divide. When the latter considerations are taken into account, the need for a wholesale review of the system becomes crystal clear.

Whither Canada? As a small open economy that depends on its relations with a global trading system in an innovation-intensive economy, the answer is hardly novel.

On the trade front, the escalating resort to national security rationales for trade restrictions this justification to the extent possible and to restore multilateral disciplines to ensure that they are available when such measures are invoked. Otherwise, Canada should pursue its traditional policy of economic diplomacy in the United States to combat protectionism in our main market and to seek trade diversification opportunities where they present themselves.

As regards innovation, Canada starts from a weak position with R&D spending as a share of GDP well below the OECD average, a relatively small number of unicorns in an age of unicorns, and a problematic structure of international trade specialization – a trade surplus in R&D services and a deficit in the IP that results from R&D, with a large net negative.

In an innovation-intensive world of superstar firms and geostrategic competition, the focus should be on innovation and firms. The measure of success: Canada's count of unicorns would be rising steeply, as would be Canada's R&D share of GDP, and private and public venture capital support for Canadian technology-intensive companies would be breaking records.

Canada's economic history is punctuated by the establishment of Crown Corporations to fill gaps. The maturation of the industrial era economy may have given the impression that this was history. Today, it's not a question of necessar

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