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FROM GATEKEEPER TO GAMEPLAYER

RECLAIMING EUROPE'S STRATEGIC RELEVANCE IN THE DATA-DRIVEN AGE

POLICY PAPER #3

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AUTHOR:
Dan Ciuriak

01. INTRODUCTION

The technological advances that enabled the emergence of the data-driven economy have had profound geopolitical consequences. As data is the medium through which all cyber activity takes place, control of data has redefined the conduct of international relations across all domains, including economic, social, political, and military. The introduction of a major new productive asset – big data – has induced intense rivalry to dominate the new general-purpose technologies it enabled and to capture the economic rents these technologies generated. At the same time, the dual use characteristics of the new general-purpose technologies enabled by big data has had major ramifications for national security. And new vulnerabilities for societal cohesion and democratic processes in open societies have been introduced by big data in its role as a force multiplier for information warfare.

Thinking of data as a productive capital asset positions it in the historical evolution of forms of capital. Dominance of new forms of productive assets has historically underpinned global power shifts enabling first movers in the new technologies to project global power. Leading the industrial revolution, which was powered by introduction of machinery of mass production, allowed the United Kingdom to build an empire on which the sun did not set. Leading the development of the knowledge-based economy, which was powered by the computer-aided industrialization of R&D and computer-aided manufacturing, elevated the United States to its unipolar moment. China's entry into the data-driven economy contemporaneously with the United States but with a scale advantage over the United States in generating data set up the escalating trade and technology war, as the latter sought to maintain its lead in the new technologies by preventing China's rise. In this sense, new forms of capital are inherently "revisionist" in international relations. Data and its derivative product, artificial intelligence (AI), have confirmed the pattern.

> As a new form of productive asset, data disrupts commerce. This creates new defensive – i.e., protectionist – interests; and new offensive interests – in particular the capture of the economic rents enabled by its deployment.

Internally, the character of society changes as wealth and power are re-distributed. Historically, the new forms of capital have in short order shifted power from the landed gentry to the industrial urban centers, to the clusters surrounding university towns, and then to the technology campuses. The identity of the "elites" changes and with those changes the persona of the country is altered – the phase change in the United States from its Wilsonian persona to a Jeffersonian/Jacksonian persona under Donald Trump is just the latest such shift in that country. The transitions here recall the concept of strange attractors from complexity theory – a relatively small shift in the political demography in the United States flips it into a different state. Europe faces similar consequences, given the rise of national chauvinism. To gainsay the famous dictum of Lord Palmerston, it turns out that a country has neither a permanent persona, nor permanent friends, nor permanent interests. All of these are endogenous to the technological and economic conditions of an age.

The dual-use nature of data and its derivative product, AI, overlays national security considerations on the economic rivalry issues. Its ability to act as a force multiplier in information warfare, to compromise privacy, and to shape public opinion gives it the characteristics of both weapon and infrastructure, which has a disruptive effect on the geopolitical equilibrium.

Until recently, the impact of this on the trading system was limited but that has now changed. In particular, the United States has made a fundamental break with its cross-border data policy. It championed free cross-border data flow and opposed data localization when it had the strong suit in the data-driven economy. But that changed with the rise of China's capabilities in this sphere. The United States pulled out of the WTO e-commerce negotiations and withdrew its support for free flow and no data localization. It has also convened the first multinational meeting to address connected vehicle risks, including its "Five Eyes" partners, plus the EU, Japan, South Korea and India, followed by the announcement of comprehensive restrictions on connected vehicle technologies from "countries of concern," particularly China and Russia. These measures specifically target vehicle connectivity systems (VCS) and automated driving systems (ADS), reflecting concerns about both surveillance and potential sabotage capabilities. Recent US actions such as the moves to force the sale of TikTok and the threats of tariffs on any country that buys Huawei's Ascend AI chips demonstrate how cybersecurity risks related to cross-border data flows and economic rivalry in the development of data-based technologies are reshaping international economic relations.

The worldwide web is becoming the war-torn web featuring emerging trading zones for connected devices, expanding Great Firewalls, divergent content moderation standards, and inconsistent privacy laws for private and state actors. **Against this background, the paper explores the implications for cross-border data flows, national and international data regulatory design, WTO commitments, and the modalities for companies seeking to navigate an increasingly fractious geopolitical and geoeconomic landscape with bifurcating supply chains and firewall hopping.**

The paper is organized as follows. The next section develops the case that the technological breakthroughs that transformed data from "exhaust" to the "new oil" in economic applications and the "new plutonium" in security contexts represent a "revisionist" force in international relations. Section 3 is structured around seven hypotheses that explore the geopolitical, economic and strategic implications of this transformation, particularly for small open economies. The final section concludes with policy recommendations.

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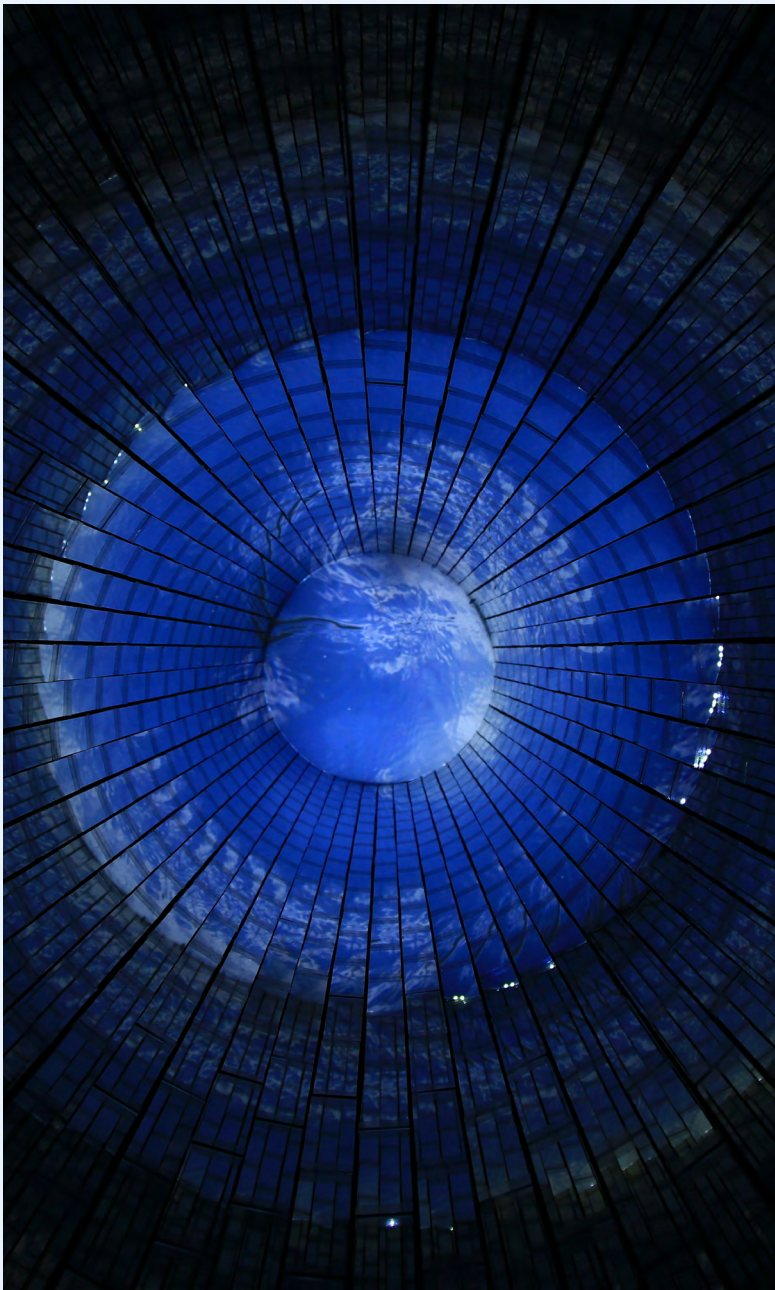
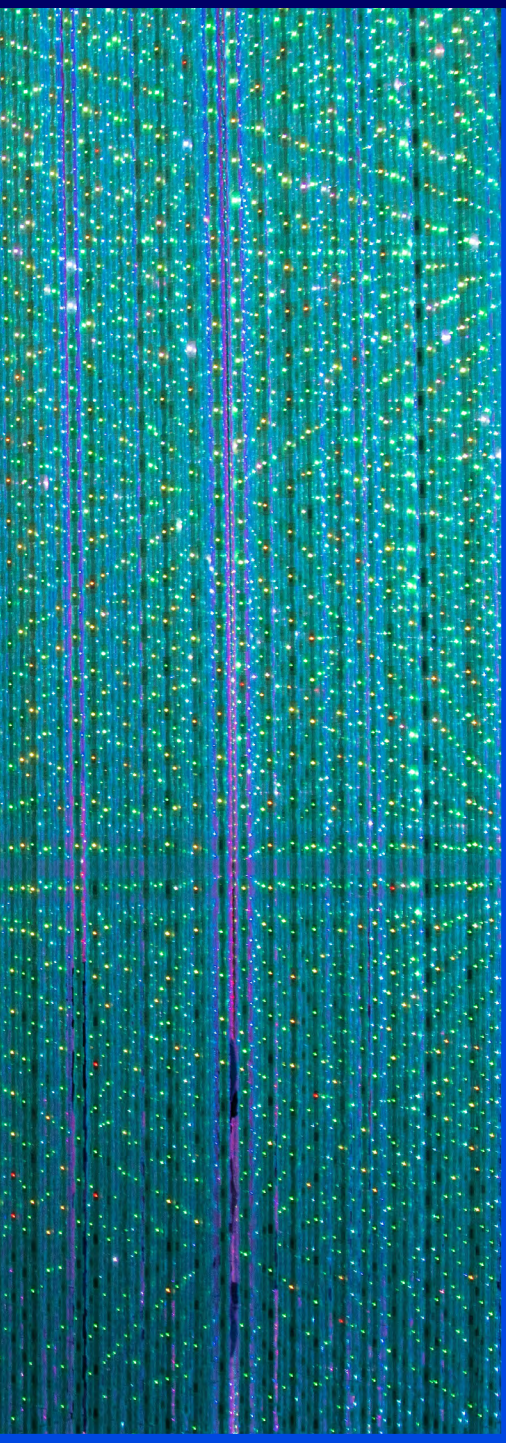




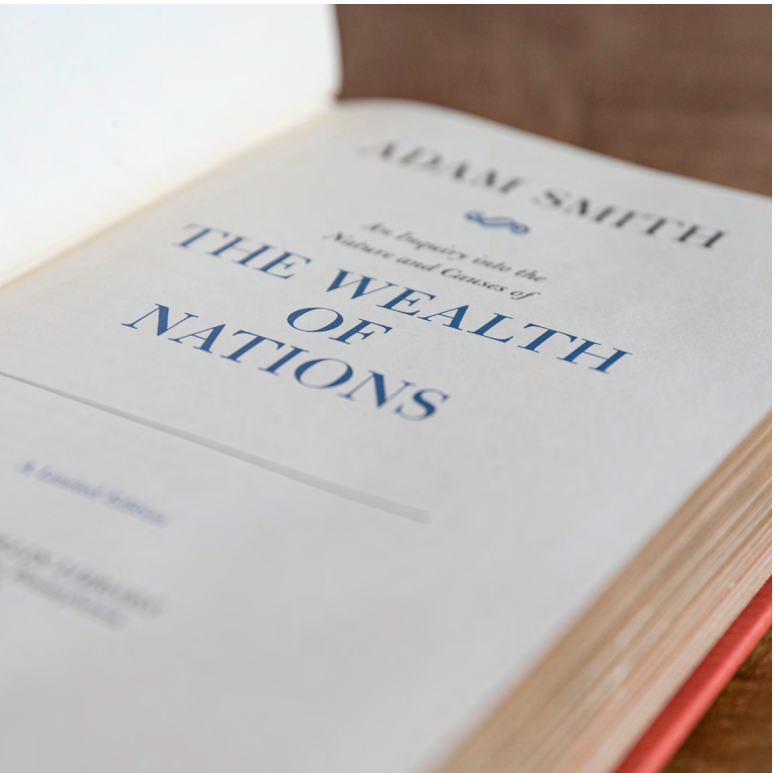
THE REVISIONIST NATURE OF A NEW PRODUCTIVE ASSET

02

02. THE REVISIONIST NATURE OF A NEW PRODUCTIVE ASSET

The term “revisionist” in international relations is usually reserved for states that seek to alter the prevailing global order. Yet, it is arguable that the major revisions in the international order have been based on the emergence of new productive assets – new forms of capital – that redistribute power, both within and among nations. Data, as a new factor of production, has played such a role.

The intuition is best grasped by considering the impact of the transition in recent memory from land being the dominant productive asset in the agrarian age to industrial capital assuming that role through the industrial revolution, and the subsequent shift from machinery of mass production to intellectual property as the key productive asset in the transition to the post-industrial knowledge-based economy ushered in by the computer revolution.



2.1 ESTABLISHING THE HISTORICAL TEMPLATE

When land was the dominant form of capital, geopolitical power derived from territorial extent, fertile acreage, and population — all of which favored the great continental powers of Eurasia. Adam Smith’s advice to the Americans explains why:

> “In agriculture too nature labours along with man; and though her labour costs no expence, its produce has its value, as well as that of the most expensive workmen.... No equal quantity of productive labour employed in manufactures can ever occasion so great a reproduction. In them nature does nothing; man does all; and the reproduction must always be in proportion to the strength of the agents that occasion it” (*Smith, Wealth of Nations*, I, 361–62).

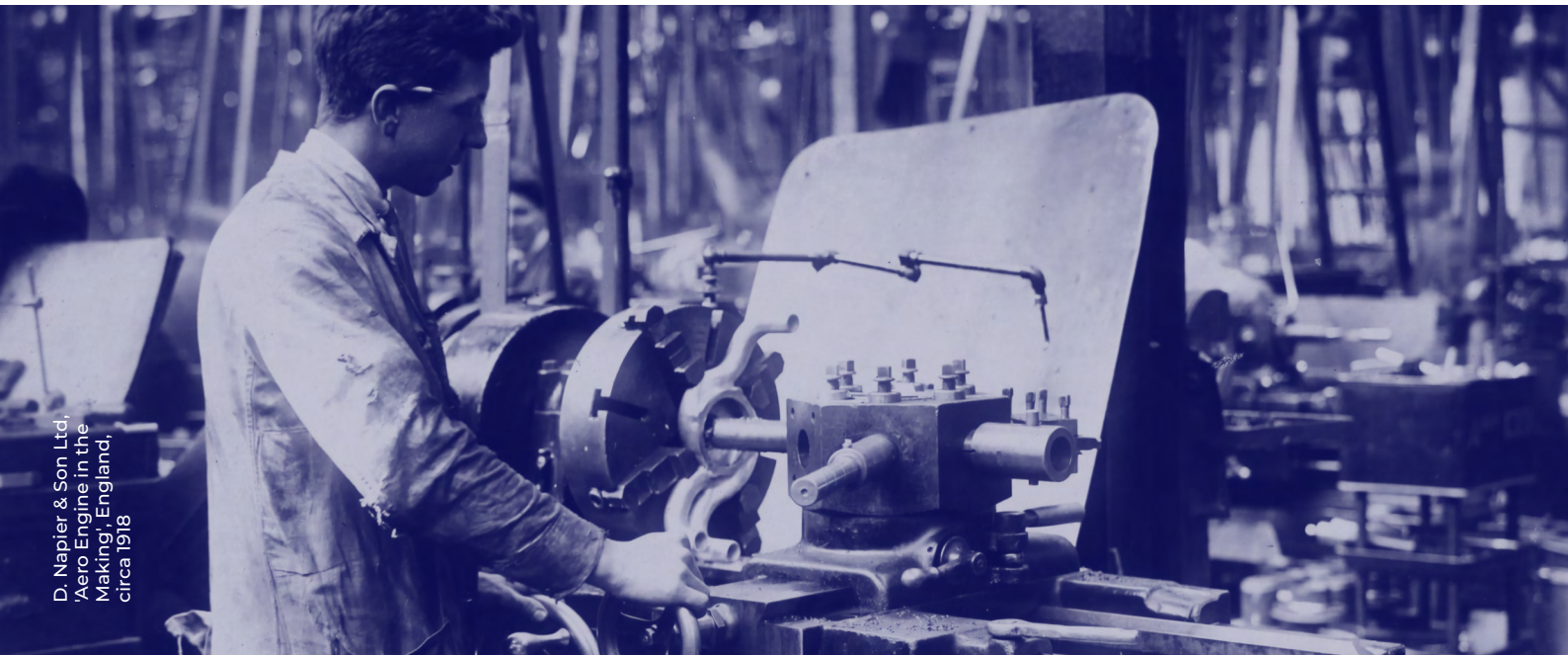
In pre-industrial artisanal manufacturing, “man does all” and wealth is proportional to the productivity of man alone. In agriculture, “nature labours along with man” and produces economic value beyond what man alone can achieve. This is the source of economic rent.

Economic rent is the source of wealth. Wealth is the source of power. Politics is ordered by the contest over the distribution of wealth – nationally between classes that form as a result of this contest and internationally through imperial claims on the surplus produced by land.

The fundamental change wrought by the industrial revolution was to introduce a new form of productive capital asset – the machinery of mass production. In industrial manufacturing, it was no longer "man does all" – machinery now did most. Unlike land, which is fixed and faces diminishing returns, the machinery of mass production is scalable and faces increasing returns (at least until minimum efficient scale is achieved). Everything changed. In pre-industrial times, agriculture contributed about 50% of gross domestic product (GDP), in the industrial era it fell to less than 10%. Population shifted from the rural areas to the urban centers where manufacturing was located to form the new proletariat. A new politics was formed over the division of wealth: labour vs. capital. Social status shifted from the landed gentry to the industrial tycoons in top hats. Adam Smith's dictum was stood on its head by David Ricardo who advocated against the protection of land rents in pursuit of the economic rents enabled by scalable manufactures through free trade.

The geopolitical consequences were transformative. In the pre-industrial age, who controlled the Eurasian land mass (the "world island") ruled the world. Britain's first-mover advantage in harnessing steam power and factory production enabled it to decouple geopolitical power from land and population, projecting influence not by territorial conquest but through industrial output, control over global trade routes and control of ports. Calcutta and Bombay were the keys to India; the treaty ports established by the British and other European powers (including latterly the Americans) in the Opium Wars were the key to China. A small island now ruled the world. The mechanization of the art of war with the Gatling gun helped, of course, as demonstrated by Churchill's account of the Battle of Omdurman in the Sudan, where the Dervish Army of 52,000 was annihilated by the Gatling gun ("Maxim gun" in British terminology) and artillery. Teddy Roosevelt's famous charge up San Juan Hill was won by the withering fire of the Gatling not by the boots on the ground.

To illustrate that this was not a one-off development, we can fast forward to 1980. The United States, which had supplanted Great Britain as the pre-eminent global power on the basis of its industrial capacity to produce naval ships, airplanes and bombs, was losing its pre-eminence in the face of industrial competition from Japan. The geopolitics of that confrontation played out through trade measures (the rise of anti-dumping, countervailing duties, and industrial policies aimed at breaking up Japan Inc.) and currency measures (e.g., the Plaza Accord to revalue the yen and to a lesser extent the deutschmark). But the decisive factor was three major developments that transformed the technological context. These events were the passage of the Bayh-Dole Act in December 1980 by the Carter Administration, the release of the IBM personal computer (PC) in 1981, and the release of CAD-CAM software for the PC in 1982, making this tool available to mainstream manufacturers at low cost. Industrial design was revolutionized through CAD (computer aided design) and a new wave of automation was enabled through CAM (computer aided manufacturing) as computer numerical control (CNC) systems took over the task of guiding machine tools. Everything changed.



D. Napier & Son Ltd, 'Aero Engine in the Making', England, circa 1918

In the first-mover economy, the United States, the capture of economic rent shifted from industrial towns to college towns. The former rusted and became petitioners for protection; the latter flowered. The share of national income flowing to capital, which had been stable or falling for decades, started to rise. But the new form of capital was not physical and rooted in local production where it could be taxed to support the social safety net that is essential for the modern market economy. It was intangible and could be parked in tax havens. As well, a new division of labour income emerged with "skill-biased technological change" favouring the university-trained whose skills were complementary to the new forms of capital, and disfavouring those whose skills competed increasingly with automated machinery. Political alignments changed from a polarization between parties championing unionized workers in manufacturing centers squaring off against those representing the interests of capital, to one in which parties championing the new professional "elites" with progressive ideals squared off against those drawing on populist discontent for support in the emerging "precariat".

The geopolitical contest shifted to international capture of the rents accruing to intellectual property (IP). The United States, quickly realizing what was the new source of wealth, moved expeditiously to introduce new means to strengthen IP protection abroad starting with the Omnibus Trade and Competitiveness Act of 1988, which introduced the Special 301 Report, first published in 1989. Using Special 301 as leverage, and Fast Track/ Trade Promotion Authority which set out ambitious IP protection objectives for US trade policy, the United States pioneered the introduction of IP protection into trade agreements, starting with the US-Canada Free Trade Agreement in 1989, and the NAFTA that followed. The United States was also the main demandeur for the inclusion of Trade-Related Aspects of Intellectual Property Rights (TRIPS) in the 1995 World Trade Organization (WTO) Agreement and pushed strongly for the Anti-Counterfeiting Trade Agreement (ACTA), which failed to achieve ratification and remains dormant, and the progressive ratcheting up of criminal penalties for infringement in the Trans-Pacific Partnership (TPP) agreement concluded in 2016.

2.2 APPLYING THE TEMPLATE TO DATA

These historic transitions provide the template for understanding how data reordered production, society, politics and geopolitics.

First, there were the technological changes that would enable the capture of data at the scale at which it gained transformative power as well as the introduction of the tools to exploit it at that scale (Kelly 2014):

2006 The development in 2006 of deep learning techniques based on stacked neural nets by Geoffrey Hinton at the University of Toronto.

2007 The release of the iPhone in 2007 which launched the age of mobile and massively increased the amount of data continuously accumulated and streamed into the now rapidly expanding cloud.

2009 The application in 2009 of graphics processing units (GPUs) – computer chips designed for the massively parallel processing requirements of videogames – to run stacked neural nets, putting Nvidia on the road to becoming a superstar corporation.

The impact of this was almost immediate: at the Barcelona World Mobile Conference in 2010, Google's Eric Schmidt announced the arrival of a new age. Schmidt described it as the age of mobile – mobile computing and mobile data networks. Regarding the importance of data flows across the digital networks, he stated:

> "...these networks are now so pervasive, we can literally know everything if we want to. What people are doing, what people care about, information that's monitored, we can literally know it, if we want to and if people want us to know it."[1]

Here, it is critical to appreciate the interplay between data and the tools that utilize it. Consider in this regard, the story told by Kevin Kelly, the former editor of Wired, of a conversation he had with Larry Page, the co-founder and future CEO of Google, about Google's free web service:

> "Around 2002 I attended a small party for Google—before its IPO, when it only focused on search. I struck up a conversation with Larry Page, Google's brilliant cofounder, who became the company's CEO in 2011. "Larry, I still don't get it. There are so many search companies. Web search, for free? Where does that get you?" ... Page's reply has always stuck with me: 'Oh, we're really making an AI'." (Kelly, 2014)

This leads to an important feature of data as a capital asset: because AI, whether used for prediction or for generation, becomes more powerful the larger the data set, data also becomes more valuable as the data set expands. If we think in terms of data sovereignty from an economic perspective, data is more valuable to the large countries than to the small ones. Given this, it is hardly surprising that the superstar firms of the data-driven economy were all either American or Chinese. Notwithstanding a European Schengen zone for data flows, the EU was not successful in producing data superstars.

A closely related feature of data is the information asymmetry that underpins its value in capturing economic rent. If one considers the evolution of an industry in which first movers have the equivalent of an industrial-strength "sixth sense" that permits them to "literally know everything," in Eric Schmidt's words, one can see immediately why a data-driven economy would not feature competitive markets but, rather, would be dominated by superstar firms – even at the global level.

The tendency for market failure in this economy is strongly reinforced by:

- The extreme economies of scale that derive from the massive upfront infrastructure investments to capture data at the scale that makes it valuable
- Essentially zero marginal costs in its exploitation
- Powerful economies of scope implicit in the information that can be extracted by correlating different types of data

> It goes without saying that systems of market regulation developed for essentially competitive markets will themselves fail when dealing with a business model that is squarely based on market failure.

A third important feature of data is that, unlike other forms of capital that were pressed into service, it is often acquired in zero-price transactions that generate no invoices, no receipts and no taxes.[2] This bypasses the market frameworks developed since the marginal revolution for attributing a price to an asset — no marginal cost, no marginal price, no inference as to market value. These features make it difficult for traditional institutions—both domestic and international—to regulate or to set frameworks for the distribution of its associated rents.

> To be sure, data assets can be bought and sold in secondary markets (once assembled into databases owned by companies); however, the most valuable data assets – those assembled by the superstar platform firms that define the data-driven economy – are not traded.

Closely related to the lack of prices is a fourth feature of data as a capital asset. Uniquely among capital assets, data is not reducible to its individual constituents – the datums. In other words, there are no micro foundations to this value.

“To take one analogy of non-reducibility, Georges Seurat’s famous pointillist painting, A Sunday Afternoon on the Island of La Grande Jatte, consists of approximately 220,000 dots (Goldstein 2019). Knowing that — and even knowing the distribution of the colours of the dots across the spectrum (Seurat used virtually every one of the 72 colours on Michel-Eugène Chevreul’s colour wheel, the creation of which in 1839 was an inspiration for his work [ibid.]) — tells us nothing about what we see in the painting or even the colours that we perceive. Notably, all colours are interpretations that we place on wavelengths of light, but some colours do not even exist in nature as a discrete part of the spectrum; they are, to some extent, optical “illusions.” Similarly, the value of data is rather like the meaning of the collection of dots on a canvas. Viewing the dots as individual points, their value may be considered an emergent property, rather than an intrinsic one.” (Ciuriak 2025).

With these features, the data-driven economy was set up to deliver a second “gilded age” – and it did. The question was: who would be the gilded ones? As we now know, the shift in wealth was to the technology campuses of the superstar firms. The college towns, which had flourished in the preceding era started to come under the same types of consolidation pressures experienced by the industrial centers before them.[3] This world was run by college drop-outs, not post-grads. As the value of a university education declined, investments in academic qualifications ceased to pay for themselves. A generation that invested in degrees to become part of the “skill-biased technological change” elite fell into the precariat, with unrepayable student debt. The basis for a political realignment between the “elite” class of university-educated professionals with progressive (“woke”) values and a precariat that defiantly embraced the “deplorables” label laid on them by Hillary Clinton, with their smoldering resentment fanned into open flames in the echo chambers of social media, was set.[4] A Donald J. Trump was expected in this context.

At the same time, data's dual-use nature as both a commercial input and a security asset makes it inherently strategic. In this regard, data's unique characteristics shape the contours of the conflict. Cyberspace is borderless – corporates and hostiles can operate in a country without passing through immigration. The web has already been weaponized and the attack landscape is expanding exponentially as the backbone infrastructure of the economy becomes increasingly digitalized and akin to a hackable interactive central nervous system, while Internet-of-Things (IoT) connected devices from cars to pagers become potential weapons, software updates can introduce backdoors into digital control systems to be exploited at the discretion of foreign actors at the time of their choosing, and immense amounts of data are streamed into the cloud to be processed by increasingly powerful artificial intelligence systems, allowing societies to be, in effect, read like a book – Russia used Cambridge Analytic a data scraped from Facebook to promote Brexit and the election of Donald Trump by amplifying divisiveness within those societies. And that was a decade ago.

> Battlefield dynamics have been radically transformed by data-driven technologies, including autonomous weapons, loitering drones, swarm tactics, electronic warfare, and big-data/ AI-enabled real-time tactical planning.

It is now military doctrine that data-driven information advantage and systems integration is pivotal for dominance on the battlefield. Not surprisingly, therefore, cyberspace has been militarized for kinetic war with all the major powers forming Cyber Commands.

The introduction of data as a productive asset has thus, like previous instances of the introduction of a new form of productive asset, changed everything – economic, social, political, military and international relations. The novel features of data mean that there is no established playbook to draw on to help with governance reforms. Moreover, the pace of change has overwhelmed the ability to distill lessons from experience to help devise workable models. And, to make things only harder, the transition from the combination of data and *predictive AI* to the combination of data and *generative AI* has introduced a further major impulse of change into the economy.

On this basis, the following section considers how the small open economy can proceed to attempt to capture the benefits of a data-driven economy, while putting in place the essential safeguards to address the vulnerabilities this economy generates

THE GEOPOLITICS OF DATA IN THE AGE OF MACHINE KNOWLEDGE CAPITAL

03

03. THE GEOPOLITICS OF DATA IN THE AGE OF MACHINE KNOWLEDGE CAPITAL

HYPOTHESIS 1:
SMALL OPEN ECONOMIES' INVESTMENT IN DATA YIELDED NEGATIVE RETURNS

At the moment, national statistical authorities are unable to establish the value of data assets or to attribute a return to them. The conventional "sum of costs" approach that is used for establishing the value of intangible assets and of the contribution to GDP of non-market sectors such as government services measures the cost of capturing and curating data (i.e., the cost of "datafication") but does not capture the economic rents generated by data. Economic rents *are* captured in the market valuation of firms; however, there is no line item in firms' financial reports that make such an attribution. As regards the use of data in public governance, such as the development of digital twins of cities, there are estimates of how much is being spent on developing them but nothing on the efficiency benefits.

Investment in datafication should be reflected in growth in multi-factor productivity (MFP) if the investment is generating returns. But the decade of the 2010s, when the data-driven economy was taking shape and investment in datafication was high, was one of *slowing* TFP growth, including in the United States and China, the data economy leaders.

We can rationalize this straightforwardly by analogy with oil and gas resource development: during the initial phase when activity is focused on exploration and investment preparatory to the first hole being drilled, there are expenses and no returns. Measured productivity falls initially only to pick up when the oil and gas start to flow. The decade of the 2010s was one of spending on datafication, which is preparatory to extracting benefits. At the same time, we know that

some firms hit gushers in the 2010s and became superstars. By extension, this implies that for most countries and most firms, the investment aimed at capturing the benefits of big data failed to generate returns that covered the costs of datafication.

Allen et al. (2025) provide a decomposition of the sources of labor productivity growth in the United States, Europe and Canada over the period 2000-2019 that takes into account investment in intangible data assets. In the United States, there was investment in data assets *and* there was measured MFP growth of the same order of magnitude. Europe and Canada, meanwhile, invested in data assets but had MFP declines of a similar order of magnitude as their investment in datafication. In short, datafication contributed to GDP and thus to labor "productivity" but the data invite the inference that this activity did not generate the hoped-for profitability, which would show up in the form of declining MFP. That is not proof, but it does invite research and analysis.

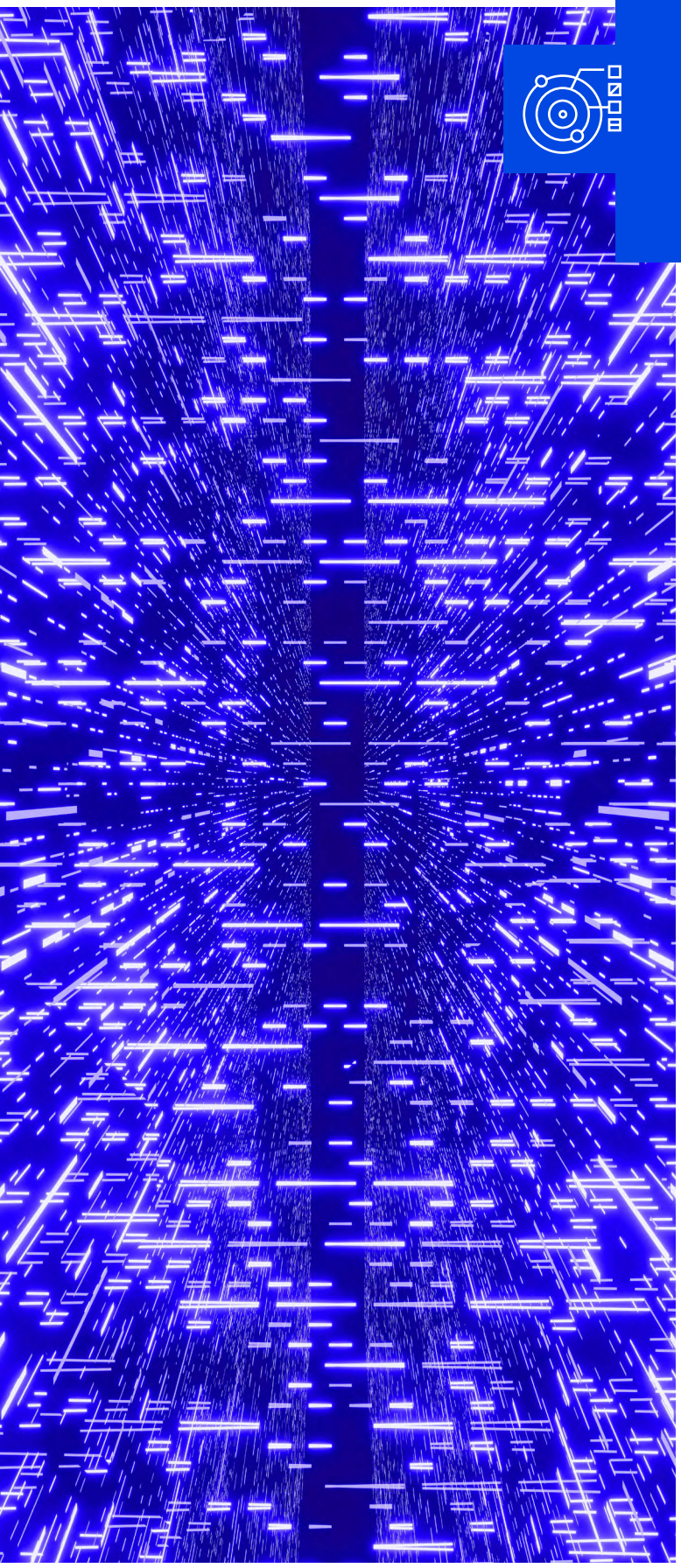
Table 1: Sources of Business Sector Labour Productivity Growth in the United States, Europe and Canada, 2000-2019

	UNITED STATES	EUROPE	CANADA
Labour composition	0.27	0.26	0.23
Tangible capital deepening	0.50	0.42	0.59
Intangible capital deepening: non-data	0.42	0.25	0.17
Intangible capital deepening: data	0.35	0.22	0.06
Total factor productivity growth	**0.35**	**-0.10**	**-0.05**
TOTAL	1.90	1.05	1.00

Data source: Allen et al. (2025, Chart 7).

On a first principles basis, it is plausible to assume a steep skewing of returns to investment in data assets with a handful of firms and countries capturing most of the benefits. This is consistent with the fact that superstar data firms emerged in only two countries – the United States and China. It is also consistent with the many reports that firms were having trouble extracting value from their data assets. By extension, it is also reasonable to conclude that the public investments in exploiting big data in exercises such as development of digital twins of cities only recovered costs in the most ambitious exercises such as Singapore and Shanghai.

This leads to the first hypothesis:
The small open economies largely missed out on the data-driven economy in the 2010s and may actually have realized negative returns from the attempt to participate in this economy because of lack of scale. The geopolitical consequence of this is that the small open economies grew relatively weaker in their relations with the large, quasi-closed economies (LQCEs) that dominated this new economy.[5]



HYPOTHESIS 2:
THE INTANGIBLE NATURE AND HIGHLY SKEWED DISTRIBUTION OF DATA BENEFITS EXACERBATED THE BEPS PROBLEM AND DROVE A WEDGE BETWEEN THE DEMOCRACIES

At its core, the OECD-G20 Inclusive Framework (IF) was designed to address a structural problem for taxation of base erosion and profit shifting (BEPS)—the ability of multinational enterprises (MNEs) to minimize tax liabilities by exploiting mismatches in tax rules across jurisdictions. This problem has long existed due to capital mobility, but the advent of data as an intangible productive capital asset radically exacerbated it in both scale and complexity.

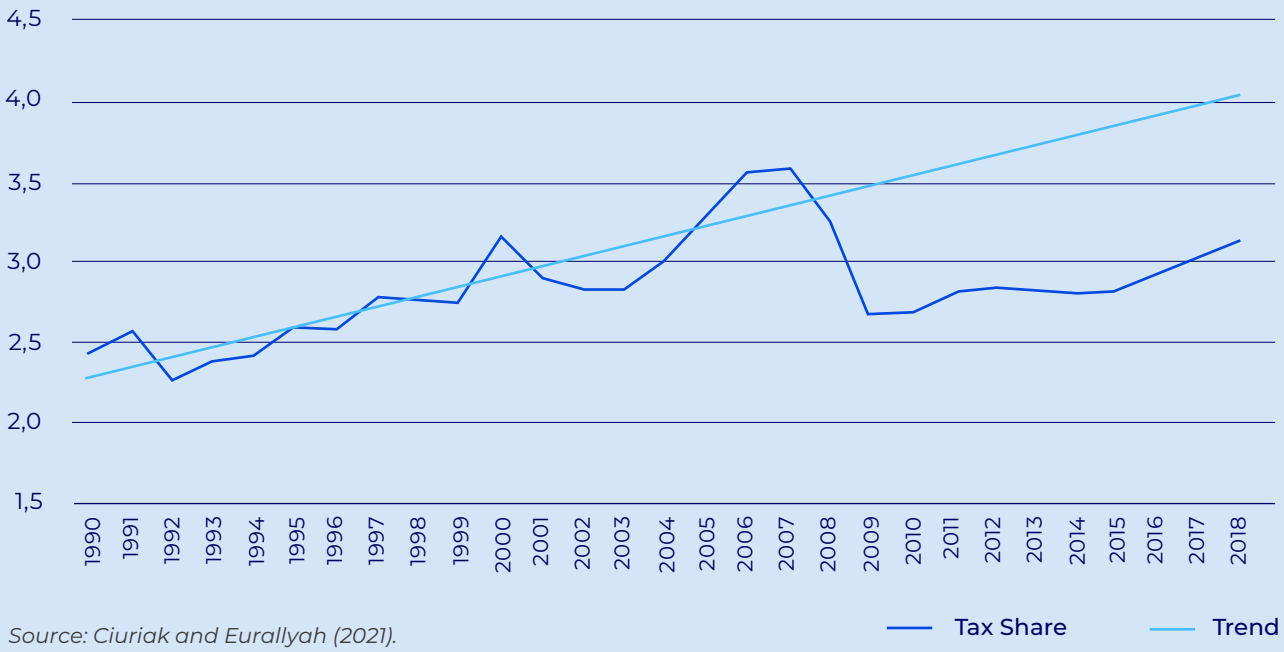
> Data, unlike physical or even traditional intangible assets like patents or trademarks, is (1) non-rivalrous, (2) non-depletable, and (3) placeless. These characteristics allow it to be collected in one jurisdiction, processed in another, and monetized in a third—without triggering tax liabilities in any.

The emergence of global platform firms with virtual presence and minimal local footprints exploited legacy tax rules, in which tax liability is predicated on physical "permanent establishment," thereby eroding the capacity of data-source countries to tax the profits generated in the digital economy.

This created growing fiscal pressures, especially for small open economies and developing countries, which (a) had limited ability to tax intangibles; (b) saw tariff erosion from digital substitution for tariff-eligible material goods; and (c) were structurally excluded from sharing in data-generated rents accruing to MNEs headquartered in advanced economies. Meanwhile, the advanced economies hosting the largest digital firms

– especially the United States –had an inherent conflict of interest: while they too were struggling with the fiscal consequences of BEPS, their national champions benefited immensely from global data flows and intangible asset arbitrage. Consequently, the IF agreement was only possible based on the most modest reforms, which fell well short of what was required (Ciuriak and Eurallyah 2021).

Figure 1.
Corporate Taxes as Share of GDP - OECD Average



Source: Ciuriak and Eurallyah (2021).

This failure to reform global tax governance to address the unique features of data had three geopolitical consequences:

1

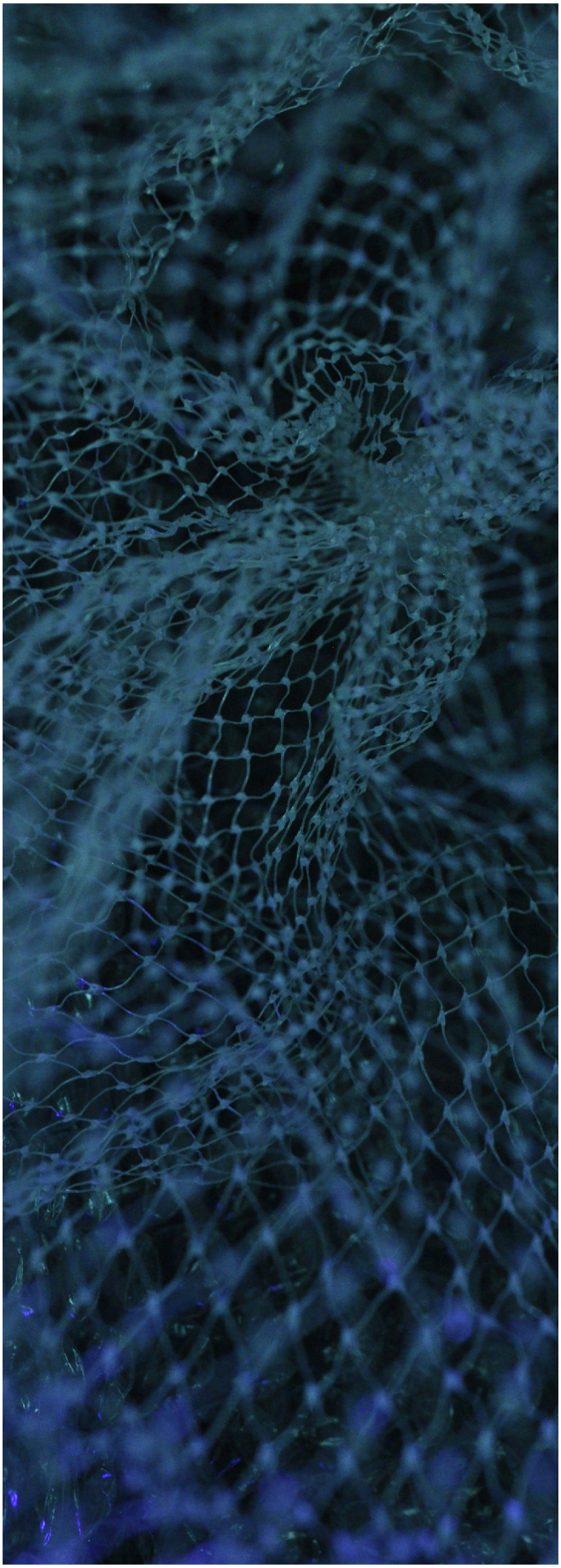
Strained US alliances, including the critical trans-Atlantic US-EU relationship:
While the US pushed for untrammeled access to data in its economic partners to capture economic rent (e.g., through requirements for free flow of data across borders and a ban on data localization), US-allied democracies frustrated by revenue erosion due to the virtual operations of US tech giants resorted to digital services taxes (DSTs). This provoked retaliatory threats – including higher "reciprocal tariffs" – and eroded trust between allies – in effect, it hastened the transition of the United States from ally to "frenemy" by creating a major new bone of contention that divided the alliance system.

2

Undermined the rules-based system:
The inability to agree on equitable tax sharing reinforced perceptions of institutional capture and asymmetry in global governance, weakening multilateral legitimacy on which the small open economies depend for collective pushback against the LQCEs.

3

Weakened small open economies:
Small open economies, unable to tax virtual presences or to capture spillovers from data production, were left fiscally weaker, exacerbating their geopolitical vulnerability.



HYPOTHESIS 3:
THE TRANSITION FROM THE DATA + PREDICTIVE AI (OR DATA-DRIVEN ECONOMY) TO THE DATA + GENERATIVE AI (OR THE MACHINE KNOWLEDGE CAPITAL-DRIVEN ECONOMY) DIALLED SMALL POPULATION BUT ENERGY-RICH COUNTRIES BACK INTO GEOPOLITICAL INFLUENCE

The economy of machine knowledge capital – data + generative – doesn't need people, it needs energy. This dials small-population and energy-rich countries like Saudi Arabia and UAE into the geopolitical picture. Meanwhile the EU, which is human-capital rich but energy poor, is dealt out of the geopolitical picture.

In the data-driven economy, data enabled prediction, which was monetized in large-population countries because it was inherently consumption-based monetization. With the rise of generative AI, which displaces skilled human capital but requires massive computational energy and large volumes of capital investment to build and operate advanced data centers and AI infrastructure, we are seeing a reconfiguration of the geopolitical landscape. Countries with small populations but abundant energy and sovereign capital are now strategically dialling themselves into the frontier of AI development. Their ability to power and finance the infrastructure underpinning AI models (e.g., through state-owned energy wealth and investment funds) gives them leverage disproportionate to their demographic scale.

In contrast, energy-poor and capital-constrained regions such as the EU find themselves in a structurally weaker position, notwithstanding (in the EU's case) a large population and steady progress in the energy transition towards domestically-generated renewables. The EU's commitment to carbon neutrality compounds its vulnerability in an AI economy dependent on high energy density. Moreover, as the United States consolidates its lead in AI through its own energy base and tech sector, its dependency on Europe—as a security or technology partner—diminishes.

> This undercuts the traditional postwar trans-Atlantic alliance. The logic of realpolitik – countries have no permanent friends, only permanent interests (and even interests aren't permanent as technological conditions change) – reasserts itself.

As strategic interests diverge, the elements of cooperation that generate positive-sum benefits shrink reducing their ability to offset the elements of friction that lead to zero-sum or even negative-sum behaviors. The EU's regulatory assertiveness on AI (the "Brussels Effect"), which is predicated on a power base that has eroded, is increasingly less tolerated in Washington. Meanwhile, Gulf states forge AI partnerships with both U.S. and Chinese firms, asserting newfound diplomatic clout.

In the emergent geopolitics shaped by data + generative AI, energy and capital – not population or traditional alliances – define strategic relevance. Europe's relative shortfall in both areas strains its geopolitical influence, while a new class of techno-petrostates rises to prominence. The fact that, in the economy of machine knowledge capital, the United States was in conflict with the EU – underscoring the "no permanent friends" part of the Palmerston aphorism – removed a major countervailing force to the accelerating geopolitical drift.

HYPOTHESIS 4:
DATA + PREDICTIVE AI DIALLED RUSSIA BACK INTO GEOPOLITICAL RELEVANCE AS TRADITIONAL SOVIET “ACTIVE MEASURES” WERE TURBOCHARGED FOR INFORMATION WARFARE

In the geopolitical calculus, data is not just the "new oil" but also the "new plutonium" – a dual-use, weaponizable resource that can be used to reshape power relations. For Russia, which retained its Cold War capabilities in information warfare, the new plutonium was a strategic force multiplier to reassert its geopolitical ambitions.

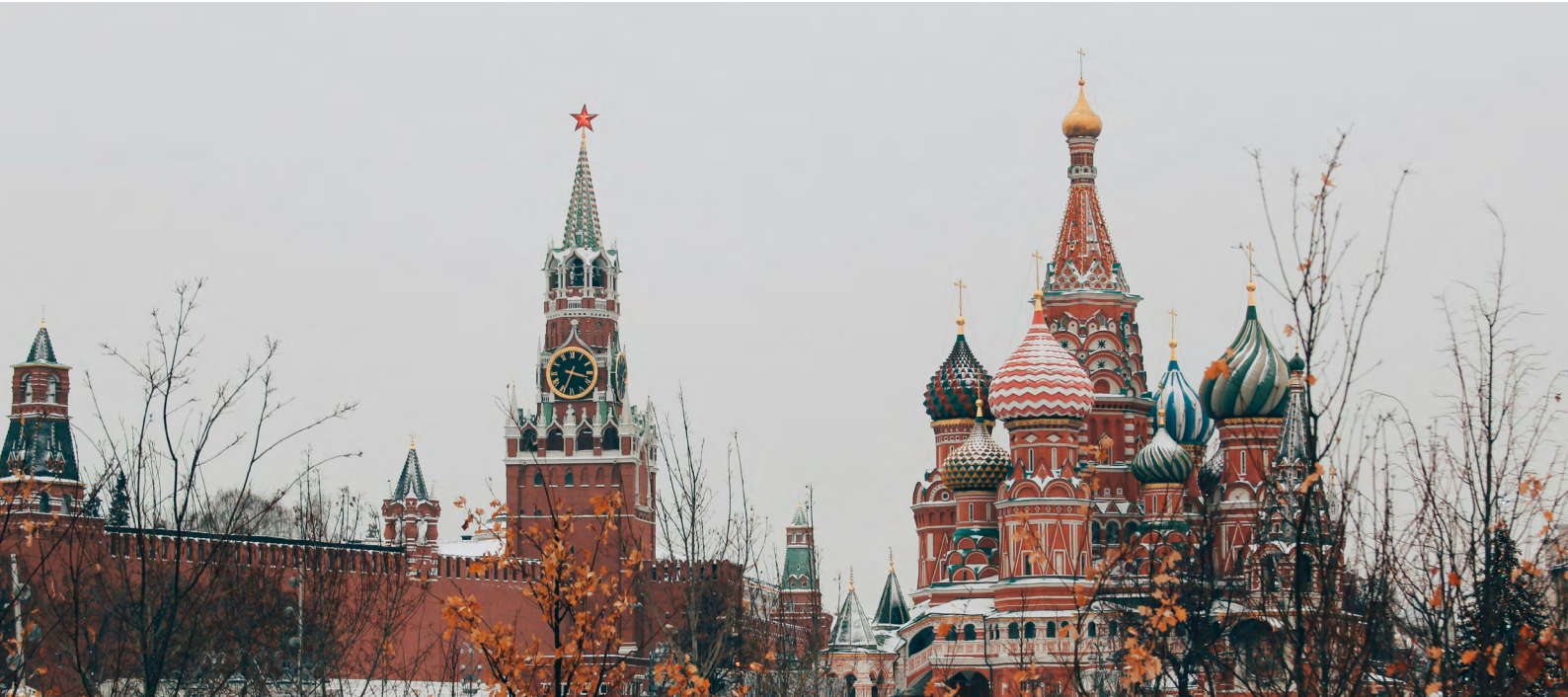
With the rise of big data and machine learning, societies became transparent to those who could harvest and process data at scale. The data-driven economy allowed open societies to be "read like a book" – and then rewritten through algorithmic manipulation.

Russia is known to have accessed Facebook data through the agency of Cambridge Analytica and powerful circumstantial evidence aligns its influence with the rising divisiveness within western societies that catalyzed Brexit and the election of Donald Trump – both events that weakened trans-Atlantic cohesion. These were not necessarily ends in themselves. Rather, a fragmented and distracted West gave Vladimir Putin the buffer to launch kinetic operations, beginning with Crimea and culminating in the full-scale invasion of Ukraine, to address long-harboured resentments.

States have differing strengths in their geopolitical arsenal. The data-driven economy quietly rebalanced geopolitical strength, playing to Russia’s advantage. The failure to recognize this and to anticipate the consequences led to the Obama “pivot to Asia” to confront China, while drawing down its presence in Europe.

> Russia plays chess, China plays Go and the United States plays neither very well. As the United States pulled out of Europe, Vladimir Putin moved in. As the United States moved to contain China through its maritime Indo-Pacific/ Quad/Aukus, China looked west through the Belt and Road Initiative and to the west lies Moscow. And the rest is history – and a not very nice history at that.

Echoing Shakespeare’s opening lines to Romeo and Juliet, *"From ancient grudge break to new mutiny..."*, the dawn of the age of data opened a new chapter in geopolitical conflict by re-opening old wounds.



HYPOTHESIS 5:
UNCERTAINTY FAVORS THE STATE THAT CAN ACT

The age of data is characterized by shortened time horizons because of the acceleration of the pace of technological change, which is enabled by: the industrialization of learning through machine learning; and the zero marginal cost of replication of the training, which is downloadable as in The Matrix.[6] The unprecedented pace of change means there is much less time to "learn by doing" both for the public and private sectors.

We can take some lessons from past breakpoints in economic history (e.g., the Nixon Measures), namely that everything changes and unexpected developments drive change, but that is not helpful in predicting what will change and forming cogent responses because: (a) the technological conditions are unique; (b) the deep integration of global economies under the "made in the world" form of globalization is unique; and (c) the nature of modern technology (particularly social media) has compromised the ability of societies – especially open, democratic societies – to function as political entities. In effect, we are flying by the seat of our pants over uncharted territory looking for a potentially non-existent landing zone.

For the public sector, the challenge lies in formulating policy under uncertainty. Governments have the uncomfortable experience of accelerating around a blind curve, which leads to a combination of grand announcements ("Zeitenwende") but glacial movement in actually translating such calls to action into action.

For private capital, accelerated change and heightened uncertainty both work to increase the rate of return required to commit to investments. The shorter the time frame to recoup an investment, the higher must be the immediate rate of return. Uncertainty meanwhile increases the real option value of waiting for more information (Dixit and Pindyck 1994), further raising the required rate of return for capital to commit. The result has been an erosion in the pace of business entry (Calvino et. al. 2020), skewing investment towards existing superstar firms.

While private capital can sit on cash, states have no such luxury – they must act.

In the West, the erosion of state capacity during the neoliberal era – and indeed the self-identification of states as rule-setters rather than actors – now leaves countries in a weakened position relative to China, which developed a private sector but did not relinquish its capacity to act through state-owned enterprises to seize the opportunities afforded by the positive externalities of the new technologies or through defensive measures to guard against the negative externalities. The geopolitical consequence is that technological change has shifted the advantage to China.

HYPOTHESIS 6:
THE RISE OF STRATEGIC BEHAVIOR INDUCED BY COMPETITION FOR DATA RENTS AND THE REALIGNMENT OF INTERESTS MAKES COLLECTIVE ACTION BY THE SMALL OPEN ECONOMIES IMPERATIVE

The global institutional architecture formed in the era of US hegemony – including the specialized "clubs" that formed to govern specific features thereof, such as the G7, G10, G20, etc. – is effectively sidelined for a simple reason: none of these was formed to address the issues of the day, namely, the division of economic rents in the data-driven economy and the establishment of security frameworks aligned with the contours of conflict of this age.

Today's circumstances recall the "Great Game" of the 1800s when the bone of contention was control of Eurasia. The main players were the British and Russian empires – the former maneuvering to consolidate its control of the Indian subcontinent; the latter seeking to continue expanding its territory and to gain access to warm-water ports. The declining Ottoman Empire weighed in on the margins but China, under the declining Qing Dynasty, played almost no role. Nor did the United States. Today, China and the United States are the central players and the main bone of contention is control over technology. But one thing stands out as being in common – the legacy clubs of today have no more role in mediating the US-China rivalry than the legacy club of the 19th Century (the Concert of Europe) had in mediating the British-Russian rivalry of the day.

> The new game is coalition building, with the major economies using carrots and sticks to expand their own spheres of influence and to diminish the opposition's.

The United States openly uses this model, imposing tariffs to "reset" US economic relations with the world in line with its own domestic priorities and using the threat of tariffs to deter countries from dealing with China (e.g., the attempt to implement a world-wide ban on purchase of Huawei's Ascend computer chips). The "reciprocal tariff" is explicitly bilateral in nature – President Trump has even threatened doubling the tariff should states form a coalition to resist one-on-one deal-making to ensure the United States always holds the upper hand. China does it with only a little more subtlety through its Belt and Road Initiative, concentrating investments in individual states to drive wedges in foreign alliances.

Unlike the 19th-century Great Game, today's game involves literally all economies as it is played out in cyberspace and knows no territorial boundaries.

> The choices for small open economies are to align, to hedge, or to form non-aligned coalitions that provide sufficient counterweight to the majors to preserve the interests of the coalition members – and just possibly to enable them through collective action to become players in their own right.

Alignment cedes policy autonomy and accepts the role of being a pawn, to be left unguarded or to be sacrificed as part of a strategic gambit, at the decision of the great power. Canada's alignment with the United States on applying 100% tariffs on Chinese electric vehicles (EVs) provides a salutary lesson: alignment brought no benefits in EV production as the United States nonetheless pursued its own interests by slapping Canada with 25% tariffs on steel and aluminum (since raised to 50%) and on non-US content in automobiles, making it uneconomic for Canada to export automobiles to the United States; at the same time, Canada's alignment incurred retaliation from China, which slapped 100% tariffs on Canadian processed canola products, wiping out a major market for Canada.

Hedging, or the attempt to play off one great power against the other to maintain strategic autonomy, is an exercise in perpetual precarity, including domestic divisiveness as factions form around one or the other great power and ultimately exposes the hedger to attacks from both. Persia's history in the 19th-century Great Game attests to this with its ultimate division into spheres of influence under the 1907 Anglo-Russian Convention. The EU's "de-risking" strategy with respect to China can be seen as an echo of Persia's gambit and with similar results – attacks from both sides and internal divisiveness.

The safest and strongest response for small open economies is to form robust coalitions. The EU is itself an exemplar of this approach – it represents a coalition of 27 small open economies that, until the recent technological developments, served as a robust counterweight to the other geopolitical heavyweights in traditional areas of commerce. However, this result did not carry over into the data-driven economy as Europe fell behind.

> Practically speaking, the optimal way forward in the data-driven economy for small open economies (which includes the EU), is a geopolitical coalition. This could start with the EU and the CPTPP members, an idea that has already been floated.

Would others join? Recall the rush to join the WTO to get out from under the threat of US S. 301 measures, the possibility does not seem remote.

HYPOTHESIS 7:
INTERNATIONAL INSTITUTIONS ARE CREATURES OF THEIR AGE – WE CAN SEE THE SHAPE OF THE POST-US HEGEMONIC WORLD AT BEST THROUGH A GLASS DARKLY BUT NEW INSTITUTIONS ARE NEEDED

International political institutions are born of particular technological and political contexts and encode the dominant power structures, values, and economic logics of their time. Data has transformed geopolitics and that has consequences for the international institutions that mediate geopolitics. New institutions are needed. The context for the transition to a new equilibrium will have to address the following issues:

- The international role of the US dollar, the perpetual US current account deficit and the US provision of a broad security guarantee ("Pax Americana") were inextricably bound up together. With the unilateral termination of the security guarantee by the isolationist America of Donald Trump, the other two features cannot continue. How this is resolved will likely determine where there is a soft landing or a crash landing for the transition.
- The trade system for connected devices and AI will necessarily differ from the trade system for "inert" products because of the profoundly different national security implications.
- The system of capital flows will similarly have to be modified to reflect the new possibilities of operating across borders in virtual modes without effective taxation.
- The system of exchange rates, which serves both trade and capital flows, will have to change. As Robert Mundell argued:

> "Strong currencies are the children of empires and great powers. The dollar became the greatest currency of the 20th century because it was comparatively stable and America became the superpower. As the US came to dominate the international monetary system, the dollar elbowed out gold as the principal asset of the system" (Mundell 2000).

With the new uncertainty about the implications of the US defection from the rules-based system, gold is to some extent now elbowing out the dollar while China is rapidly developing a parallel international payments system independent of the Belgium-based but US-dominated SWIFT, which could come into play should China's RMB partially or largely supplant the US dollar as the international vehicle currency.

Technical institutions tend to survive geopolitical transitions and great power confrontations because they are useful to all – even if during periods of extreme conflict cooperation and functionality are severely impeded. Thus, institutions like the IEEE, ITU, ICANN, W3C, and even ISO/IEC in data and AI standard-setting are likely to survive great power conflict just as the Universal Postal Union and International Telegraph (later Telecommunications) Union survived great power conflict over the past two centuries. That said, neutral intermediaries become critical to preserve the acquis of these institutions to allow rapid restoration of full functionality and full membership once the great power crises have passed. Safeguarding the integrity of such institutions should be a strategic priority for small and medium powers in the current transition and conflict.

Institutions like the WTO, which have a technical and a political role, are particularly important for small and medium powers. Thus, the establishment of an alternative appeals mechanism in the face of the suspension of activity of the WTO Appellate Body is exemplary of what needs to be done. Pinchis-Paulsen and Ciuriak (2025) call for the formation of a caucus within the WTO of small open economies to respond to US demands in collective action in order to protect their own interests in an unequal contest, while, at the same time, maintaining their WTO commitments to each other, avoiding internecine trade wars amongst the small open economies, and preserving the foundational principles of the WTO.

At the same time, there is no obvious shared understanding of what a stable "landing zone" for the international system of trade and investment, currency relations, and security architecture could look like given the issues in play and the evolving power configuration – let alone what the political framework for managing that framework would look like. In a paper sketching out a potential landing zone for US-China relations (Ciuriak 2025b), I argue that a Bretton Woods-style moment of hegemonic reconstruction is not feasible. Rather, the analogous moment to today is the failed London Conference of 1933, which failed for lack of a shared understanding of the problem.

Therefore, the first step must be analytical: to develop a shared diagnosis of the problem. A Track 2 process could articulate interim cooperative solutions such as an interim solution on tariffs and trade (ISST) and an interim solution on money and exchange (ISMX), which could form the intellectual scaffolding for the eventual construction of a new global architecture.

Without this preparatory work, the transition risks becoming chaotic—a "crash landing zone" defined by protectionism, monetary disorder, and regional fragmentation.

04. CONCLUSIONS AND RECOMMENDATIONS

The analysis presented in this paper demonstrates that the introduction of data as a new productive capital asset has triggered a systemic transformation in economic, social, political, and geopolitical domains, in line with past transitions driven by the introduction of new forms of productive capital. Moreover, the distinct properties of data and its derivative technologies have produced asymmetric outcomes that have proven to be economically and strategically destabilizing. The small open economies – which includes the Member States of the EU individually and in the present economic and technological conditions as a collective – have been weakened relative to the large, quasi-closed economies both fiscally and technologically; have become more vulnerable to destabilization through information warfare exploiting their openness and because of the fracturing of the democratic alliance system as the persona and interests of the major nations changed; and have seen strategic value shift to assets they lack – access to energy and compute and state capacity to act.

The analysis also points to steps that small open economies can take to reduce their vulnerabilities and improve their economic outcomes and ability to resist economic coercion. In particular, it is essential to appreciate the implications for economic strategies of the changes in economic and technological conditions wrought by the shift from:

- **data + predictive AI**, which was the basis for the data-driven economy dominated by a handful of platform firms; to
- **data + generative AI**, which opens up the potential for hundreds of thousands of new firms developing industrial-level AI applications to drive economic development and capture the economic rents that underpin prosperity.

The economic strategies to prosper in these two types of economies are profoundly different in motivation and execution.

The small open economies largely missed out on the first phase of the data-driven economy – to illustrate the point, the European Commission has recently designated six firms as "gatekeepers" in this economy: Alphabet, Amazon, Apple, ByteDance, Meta, and Microsoft. None of them is European. There is logic in developing independent capacity in this economy as underscored in the decisions of Copenhagen and Aarus to replace Microsoft with EU-based alternatives because of the steep increases in Microsoft's prices as it leveraged its market power and newfound concerns over sovereignty in the digital domain. These are classic rationales for industrial policies. One thing to underscore, however, is that this follows China's business model and, to succeed at the strategic level, might well require China's state capacity to drive adoption.

Table 2: Number of Unicorns, Value and Average Size, May 2025

	NUMBER	VALUE (USD BILLIONS)	AVERAGE SIZE (USD BILLIONS)
US	704	2,861	4.06
China	162	702	4.34
EU	104	276	2.65

Source: CB Insights, Global Unicorn Club: Private Companies Valued at $1B+ (as of May 6th, 2025).

While the small open economies had almost no meaningful presence in the platform economy of the "data + predictive AI" era, they have a better foothold in the emerging economy of "data + generative AI". The EU, for example, is at least on the map in terms of number of unicorns (Table 2). About one-quarter of unicorns are considered to be "AI unicorns"; accordingly, the data in Table 2 shed some light on the extent to which the EU trails on the leaderboard. Importantly, not only does the EU trail badly in terms of number of unicorns it also trails in terms of average value. In other words, scaling of firms in this new economy remains a challenge for the EU as it did in the earlier phase of the data-driven economy. Providing EU-based platforms to supplement existing platforms will not resolve this issue.

The importance of the distinction raised above can be seen in how the EU is approaching the challenge of engaging in the AI economy. In February 2025, the EU launched InvestAI, a €200 billion programme (€50 billion public and an anticipated €150 billion private) aimed at enhancing AI infrastructure (including €20 billion dedicated to building up to five AI gigafactories for training complex models – characterized as a CERN for AI development). This represents a vast expansion on state-led AI funding in the EU. That said, the notion of "AI gigafactories" is more a response to failures of developing platforms in the first phase of the data-driven economy than it is to the principal concern of the second phase, which is that of scaling firms and retaining scalable firms in Europe.

THE FOLLOWING ARE SOME SUGGESTIONS FOR SMALL OPEN ECONOMIES IN GENERAL BUT FOR THE EU IN PARTICULAR.

1. Prioritize engagement in the data + generative AI economy by targeting the scaling of AI firms.
2. Develop palliative responses to backwardness in the data + predictive AI economy, drawing on familiar state-led modes.
3. Develop the understanding of the value of data based on economic rent rather than cost of datafication in order to better manage policy responses.
4. Move to safeguard the technical institutional acquis for full reboot in the post-conflict stage
5. Work towards identifying a landing zone for this new economy that does not involve a destructive crash-landing.

ENDNOTES

1 Personal transcript of the Youtube segment by the author, https://www.youtube.com/watch?v=ClkQA2Lb_iE.

2 The BEPS issue arises here as a geopolitical consequence

3 AI doesn't need universities – it competes with them, learning without degrees and training entities that deploy knowledge capital in competition with college graduates.

4 The identity of the elites changed and, with those changes, the persona of the country was altered – the phase change in the United States from its Wilsonian persona to a Jeffersonian/Jacksonian persona under Donald Trump is just the latest such shift in that country. The transitions here recall the concept of strange attractors from complexity theory – a relatively small shift in the political demography in the United States flips it into a different state. Europe faces similar consequences.

5 See Pinchis-Paulsen and Ciuriak (2025) for a discussion of the trade governance issues raised by heterogeneity in country size; this paper introduces the term "large quasi-closed economy" to distinguish them from small open economies.

6 As a tangential digression, as noted above, training is what universities do, but at high marginal cost. The advance of AI is slowest in spatial manipulation – i.e., manual dexterity. This suggests that human comparative advantage is being shifted towards flexible manual labour – namely the trades. This is not what universities teach – it is what vocational schools teach. High school is the new post-grad. The advance of the data-driven revolution thus pre-sages any number of profound societal transformations as the dominant political cohort changes, of which the United States might very well be early warning.

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IE UNIVERSITY
CENTER FOR THE GOVERNANCE OF CHANGE

AUTHOR:
Dan Ciuriak

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