Centre for International
Governance Innovation

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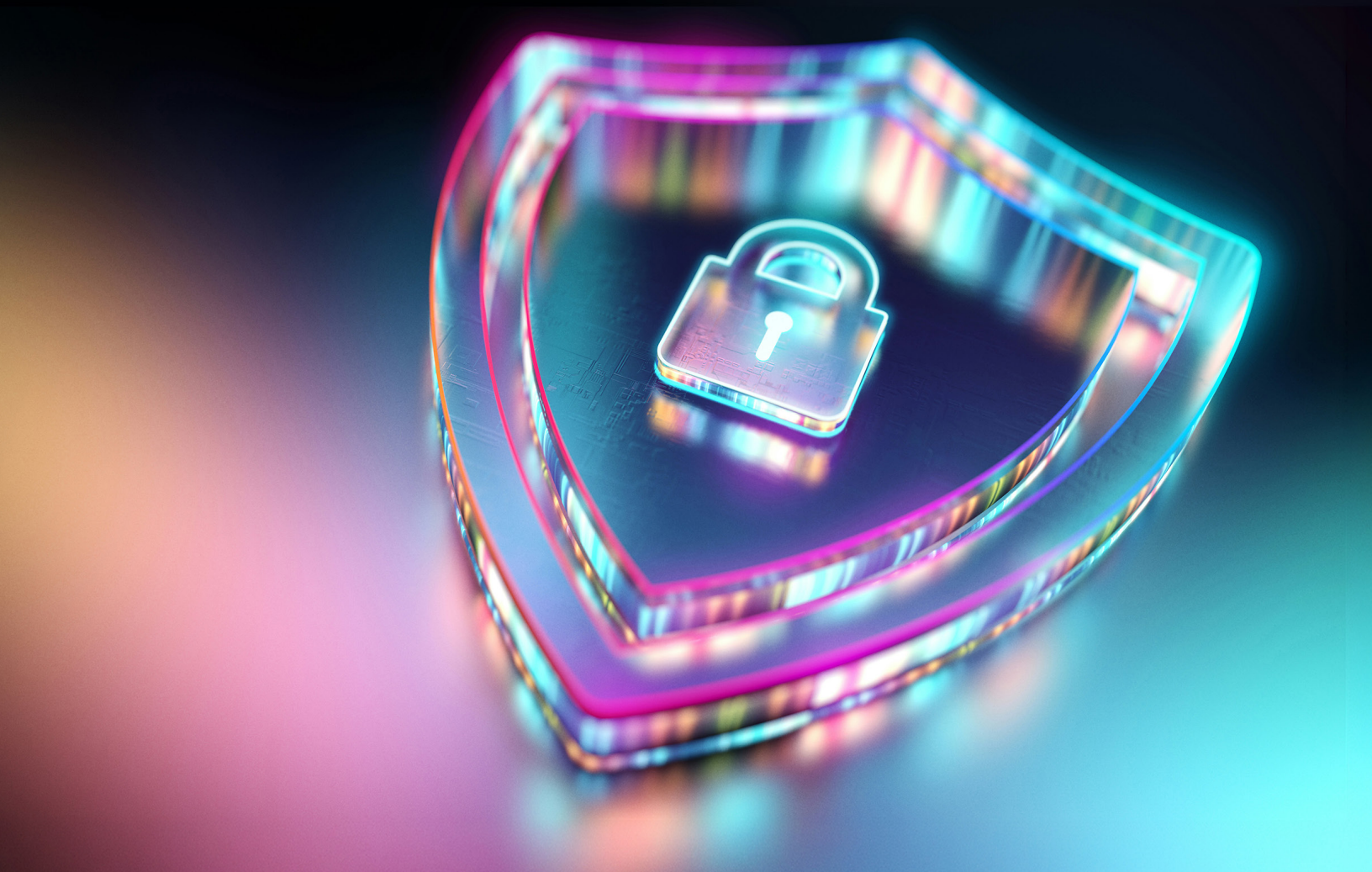
Defending Prosperity: Defence Industrial Policy in the Age of AI

Dan Ciuriak



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About the Author

Dan Ciuriak is a senior fellow at CIGI, where he 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.

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Acronyms and Abbreviations

AI	artificial intelligence
BDC	Business Development Bank of Canada
CADSI	Canadian Association of Defence and Security Industries
CAF	Canadian Armed Forces
DARPA	Defense Advanced Research Projects Agency
DIANA	Defence Innovation Accelerator for the North Atlantic
DND	Department of National Defence
EC	European Community
IMF	International Monetary Fund
IP	intellectual property
ISED	Innovation, Science and Economic Development Canada
ISR	intelligence, surveillance and reconnaissance
NATO	North Atlantic Treaty Organization
NSS	National Security Strategy
R&D	research and development
SNA	System of National Accounts
VC	venture capital

Executive Summary

This paper examines the strategic, economic and industrial implications of Canada's commitment to substantially increase defence spending. First, it emphasizes the massive gap between Canada's stated defence-spending commitments over the period to 2035 and the existing capacity of Canada's defence industrial base to fill that demand, which implies a defence technology start-up model as the organizing principle for Canada's new Defence Industrial Strategy, with dual use built in as a feature. Second, in an innovation-intensive era defined by machine knowledge capital, which features data and generative/agentic artificial intelligence (AI) as core factors of production in the civilian economy and as military assets and vectors of vulnerability in the security domain, this paper argues for prioritization of Canada's digital sovereignty programs in implementing the defence-related infrastructure spending commitments. It calls for policy designed to capture the economic value of Canada's data resources, the leakage of which explains Canada's lagging economic performance since the dawn of the data-driven economy. Third, with major categories of Canada's manufactured industrial products facing new barriers to entry into the United States on national security grounds under the "America First" trade policy, and with both Canada and its alliance partners in Europe facing hostile rhetoric from the White House and think tanks close to it, Canada's incremental spending on traditional defence assets needs to pivot to help fill the emerging economic security gaps. This includes job creation by expanding the Canadian Armed Forces (CAF), industrial retooling from autos to drones, expanding the production of munitions, and directing major equipment purchases toward Canadian-built vehicles and hulls. Canada's defence policy must now be organized not only to defend its sovereignty and territorial integrity but its prosperity as well.

Introduction and Overview

Canada has committed to increase defence and defence-related spending to five percent of GDP over the period to 2035, of which 1.5 percent is to be allocated to defence-related infrastructure and 3.5 percent to core defence spending (Prime Minister of Canada 2025). On the back of the envelope, assuming a straight-line expansion of spending from the two percent of GDP targeted for fiscal year 2025–2026, this would entail total defence spending over the period on the order of $1.275 trillion[1] (2025 prices), of which about $256 billion represents incremental, discretionary defence spending above the traditional two-percent-of-GDP benchmark and a similar amount for defence-related infrastructure. A new defence industrial policy is to deploy these funds strategically to support Canada's economic capacity to meet these spending targets — even as it responds to the security challenges of the moment. This paper sketches out three major challenges this policy will face.

First, at present, Canada lacks the industrial capacity to convert the projected spending on core defence requirements into either military capabilities or domestic economic growth. Canada's defence industrial base accounts for only 0.26 percent of GDP in domestic sales of core defence goods and services (Innovation, Science and Economic Development Canada [ISED] and Canadian Association of Defence and Security Industries [CADSI] 2024). The gap between the actual 0.26 percent of GDP and the targeted 3.5 percent of GDP on core defence spending in 2035 is more than striking. Without a generational mobilization of resources as part of the new defence industrial policy, the planned spending surge will primarily stimulate foreign economies while leaving Canada fiscally strained and strategically exposed — dependent on foreign-controlled supplies and technologies in a newly uncertain security environment.

Second, at the dawn of the age of machine knowledge capital, in which data and generative/agentic AI are critical factors of production in the civilian economy and strategic assets and vectors of vulnerability in the security

1 All dollar figures in Canadian dollars unless otherwise indicated.

domain, Canada's defence doctrine must also include establishing sovereign control over its digital space, including protection thereof from foreign surveillance and compromise through extraterritorial reach of foreign government laws or exploitation of asymmetric access to Canadian data by foreign platforms. In a recent survey, 94 percent of Canadian business executives said they were "very" or "somewhat" concerned about the US CLOUD (Clarifying Lawful Overseas Use of Data) Act, pursuant to which US-based technology firms must turn over Canadian data to US authorities, regardless of whether the data is stored physically within Canada, and without approval from Canadian authorities; and 90 percent expressed concerns about leakage of proprietary product information (including intellectual property [IP], supply-chain information and pricing) and considered data and AI sovereignty to be "non-negotiable" (Bell 2025).

In this light, the Budget 2025 reprofiling of previously planned federal, provincial and municipal expenditures to meet the 1.5 percent of GDP target of incremental defence-related infrastructure spend is disconcerting; it bespeaks a failure to connect Canada's observed lagging economic performance during the data-driven economy era (post-2010) with the failure to establish sovereign control over its digital space and to retain the benefits of its leading role in developing the scientific basis for this new economy. Addressing this issue should be a major pillar of Canada's new defence industrial policy.

Third, the challenge of articulating the defence-spending profile has been fundamentally transformed by developments in a number of different dimensions:

- The security frontier is expanding to include cyberspace, space and the Arctic; the latter is being transformed by climate change from a northern barrier to a geopolitically contested space for resource extraction and transportation.
- Military hardware requirements are being continuously transformed by the evolution in battlefield dynamics due to autonomous weapons, loitering drones, rocket-powered drones, shotgun drones, fibre-optic-linked drones, swarm tactics, electronic warfare, big-data/AI-enabled real-time tactical planning, the militarization of space and more.
- And, most fundamentally, the historical alignment of economic security with military security, which Canada historically enjoyed with the United States, has been shattered by the geopolitical/geoeconomic transformation of the latter through:
  - the new US National Security Strategy (NSS), which includes a "Trump Corollary to the Monroe Doctrine" that asserts US dominance in the Western Hemisphere;
  - "America First" economic policies that impose "national security" restrictions on Canadian exports to the United States and openly aim to undermine Canadian industrial development premised on access to the US market, the world's largest;
  - demands for a China exclusion policy that simultaneously compromises Canadian access to the world's second-largest economy; and
  - overt hostility toward the European Union as an economic bloc,[2] which threatens the stability of Canada's traditional "third option," including thinly veiled threats to its territorial integrity (Denmark's control of Greenland) that have already prompted Denmark to express national security concerns regarding the United States.

The enormity of the diplomatic and hard-power challenges for Canada can hardly be understated. The economic security challenges, while subordinate to the former, are no less challenging. To preview the main findings and recommendations, Canada's new defence industrial policy should:

- Use the 1.5 percent of GDP incremental spend on core defence requirements over and above two percent of GDP to drive the development of Canadian defence start-ups, targeting the novel features of today's security landscape, with dual use for civilian production and retention of IP and high-growth firms built in as policy design

2 See Henley (2025) on the "civilizational" assault on Europe in remarks by US Vice President J. D. Vance and the framing of the NSS; see Gardiner (2025) for the Heritage Foundation's support for EU dissolution, including endorsement of Elon Musk's comments to that effect; see also Ruge (2025) on the transactional interests.

features. Notionally, this allocates $256 billion over 10 years to create Canadian unicorns.[3]

- Use the 1.5 percent of GDP incremental spend on defence-related infrastructure to drive the development of a sovereign-controlled cloud that meters international access to Canadian data on a per-token basis, consistent with the pricing of tokens in commercial markets, to enable Canada to benefit from its contribution to the development of modern-era technology without facing the frictions of clawing back that value through *ex post* digital services taxes.
- Tailor the two percent of GDP targeted for traditional spending on core defence requirements to meet Canada's immediate defence needs and evolving alliance commitments, given the active shooter situation in Europe, while sustaining the economy with tit-for-tat responses to barriers to Canadian exports imposed on national security grounds, while honouring trade commitments to trade partners who honour theirs to Canada.

Scoping the Dimensions of the Response Challenge

This section contrasts the spending commitments that Canada is making for core defence procurement with the extremely limited established industrial capacity to leverage that for economic growth; draws out the implications for leaning into the trending "defence technology start-up" model for meeting core defence procurement needs; and further considers how the defence-related infrastructure development commitments could best be implemented to address the overarching imperative of digital sovereignty in the era of data and AI.

Defence-Spending Targets

Canada's 2025 federal budget announced an acceleration in defence spending to meet the North Atlantic Treaty Organization (NATO) target of two percent of GDP in fiscal year 2025–2026 and to meet the NATO target of five percent by 2035. Only part of this pledge is for core defence spending: 1.5 percent of the five percent targeted for 2035 is to consist of currently planned defence-related spending in areas such as telecommunications and emergency preparedness, with the remaining 3.5 percent to be on core defence requirements.

To get a sense of what a commitment to scale up defence spending to five percent of GDP by 2035 entails, we can extrapolate the current International Monetary Fund (IMF) growth projection for Canada out to 2035, generating a smooth increase of the defence-spending share of GDP from the two percent targeted in Budget 2025 for fiscal year 2025–2026 to five percent in 2035. If we consider the two percent target for 2025–2026 to be entirely "core" and raise that smoothly to 3.5 percent, we can then calculate the implied spending on core defence over the same period. The cumulative total in this envelope over the period 2025–2035 would be around $1 trillion at 2025 prices (see Table 1, core defence spending in 2035).

A major part of that, of course, will be on established commitments and basic requirements (from payroll to shells to maintenance), which will be little affected by the new defence industrial policy. But the incremental spend, over and above the traditional two percent of GDP target, can reasonably be allocated by the new policy — and that totals to a cumulative $256 billion over 10 years for infrastructure and an additional $256 billion for new incremental spending on core defence requirements. One can do a lot for defence and for the economy with that incremental expenditure — if spent strategically.

Defence Industry Capacity

A recent stock-taking of the state of Canada's defence industry by ISED in conjunction with CADSI (ISED and CADSI 2024) estimated that Canada's defence industry of 585 companies contributed $4.7 billion to Canada's GDP in 2022 or 0.16 percent of Canada's GDP that year.[4] Including the output of domestic value-chain partners pushed that figure to $7.4 billion or 0.26 percent of GDP. Since Canadian suppliers already accounted for 55 percent of Canada's defence industry supply-chain purchases, there is relatively limited scope

3 Private firms with a valuation of US$1 billion or more.

4 Note that CADSI has more than 900 members. These include the major US defence suppliers such as AECOM, Raytheon, General Dynamics and so forth.

Table 1: Defence-Spending Track to 5% of GDP in 2035, CAD Billions at 2025 Prices

Year	Canadian GDP	Growth	Defence and Related Spend % of GDP	Total Defence and Defence-Related Spend	Core Defence % of GDP	Core Defence Spend		Increment (above 3.5% of GDP) for Infrastructure
						2% of GDP	Incremental 1.5% of GDP	
2025	3,182	1.53%	2.00%	63.6	2.00%	63.6	0.0	0.0
2026	3,231	1.54%	2.19%	70.8	2.12%	64.6	3.1	3.1
2027	3,292	1.88%	2.40%	79.1	2.24%	65.8	6.6	6.6
2028	3,348	1.69%	2.63%	88.1	2.37%	67.0	10.6	10.6
2029	3,405	1.73%	2.89%	98.3	2.50%	68.1	15.1	15.1
2030	3,461	1.64%	3.16%	109.5	2.65%	69.2	20.1	20.1
2031	3,518	1.64%	3.47%	121.9	2.80%	70.4	25.8	25.8
2032	3,575	1.64%	3.80%	135.8	2.96%	71.5	32.1	32.1
2033	3,634	1.64%	4.16%	151.3	3.13%	72.7	39.3	39.3
2034	3,693	1.64%	4.56%	168.5	3.31%	73.9	47.3	47.3
2035	3,753	1.64%	5.00%	187.7	3.50%	75.1	56.3	56.3
Total				1,275		762	256	256

Source: IMF (2025); author's calculations.

to increase the contribution to Canadian economic output through "buy Canadian" policies.

Total industry revenue (which includes own value-added plus purchased supplies from domestic and foreign suppliers) amounted to $14.3 billion or 0.5 percent of GDP. Of the $14.3 billion in sales, $7 billion came from exports, meaning $7.3 billion or 0.26 percent of GDP came from domestic procurement. To get a sense of the scaling challenge, this 0.26 percent may be compared to the 1.5 percent target for incremental spending on core defence procurement: Canada's defence sector would have to expand its domestic sales almost six-fold to satisfy the implied demand. Moreover, given the rapid technological evolution under way in both civilian and military technology, much of this would involve products and services that presently are not being supplied.

In short, Canada lacks the military-industrial base that can supply the incremental defence requirements implicit in Canada's international commitments, which is a necessary condition if this spending is to also support the development of the Canadian economy.

Needed: A Defence Technology Start-Up Complex

It is well and widely understood that Canada's defence upgrade needs to emphasize dual-use technology development so as to simultaneously generate the economic capacity to pay for that spending. Commercial off-the-shelf products have accounted for a growing share of military procurement worldwide, notwithstanding issues of security and conformance to exacting military specifications, because of lower cost and rapid implementation in contexts where speed is critical. Today's commercial environment features massively parallel product development and ever-shortening product life cycles. Start-ups are proving to be nimbler in responding to the speed at which novel technologies are entering the market than the large prime contractors that dominate the traditional acquisition-centric defence procurement system (Varshavsky 2025; Whytock 2025).

Defence technology spending is thus rising steeply and is reflected in the coining of the term "military start-up complex." In the United States, this complex is rooted in Silicon Valley and features companies such as Palantir (market cap of US$450 billion as of December 28, 2025); Anduril, a unicorn with a valuation on the order of US$30 billion

(CB Insights 2025); and Shield AI, a unicorn with a valuation on the order of US$5 billion based on its 2025 funding rounds (Shield AI 2025).

Defence technology is also booming in Europe, as reflected in the emergence of players such as Munich-based Helsing (drones, AI, electronic warfare); Switzerland-based Destinus (autonomous flight); Munich-based ARX Robotics (unmanned ground systems); and Gilching- (near Munich) based Quantum Systems (unmanned aerial systems).[5] The European Union's European Defence Industrial Strategy has been galvanized by Russia's war of territorial aggression against Ukraine and the technological evolution of warfare that has rapidly unfolded in the course of that conflict. Drone development and cooperation with Kyiv are prominently featured, and issues around defence technology start-ups and scaling as well as retention are actively discussed.

Canada is not without its assets in this space. It also has several unicorns operating in areas that are defence-relevant or defence-adjacent. These include:

- Cohere, a Toronto-based CADSI member that has already received significant levels of Canadian government assistance,[6] provides enterprise AI systems — a key feature of any digital sovereignty strategy with potential military applications in areas such as ISR analytics (analyzing data from intelligence, surveillance and reconnaissance systems); notably, this is a space occupied by US defence technology firm Palantir.
- Quebec City-based LeddarTech, which provides raw data fusion and perception software for automotive advanced driver assistance systems/autonomous driving and automotive-grade 3D environmental models (areas of possible defence relevance would include unmanned vehicles/drones, robotics and autonomous ISR platforms). A prominent US defence technology start-up operating in this area is Anduril.
- Toronto-based Xanadu Quantum Technologies, a CADSI member that has already received a modest amount of support from Canada's federal government, focuses on practical quantum computing applications (a high-priority area for military procurement).
- AbCellera Biologics (a former unicorn, not a CADSI member, but a past Defense Advanced Research Projects Agency [DARPA] awardee), which provides a platform for rapid antibody discovery and pandemic response and is a potential contributor to biothreat countermeasures — a NATO priority.
- Unicorns in the cybersecurity area include Tailscale (not a CADSI member), which provides virtual private network technology to AI companies; 1Password (not a CADSI member), which provides zero-trust cybersecurity and identity management; Trulioo (not a CADSI member), which provides identity verification solutions, including know-your-customer and know-your-business technology; and Dapper Labs (not a CADSI member), which has expertise in distributed ledgers and digital asset provenance. Cybersecurity firms that are in CADSI include Montreal-based 123 Cyber.

Further, technology start-ups are pivoting toward defence: 20 Canadian companies are part of the latest, and largest-ever, cohort enrolled in the Defence Innovation Accelerator for the North Atlantic (DIANA) program, a NATO institution formed to find and accelerate dual-use innovation capacity (Riehl 2025). Two additional Canadian firms were recently awarded €300,000 each for progressing to the second stage of their DIANA accelerator programs (McLauchlan 2025a).

Moreover, the announced figures for defence spending have unleashed a "gold rush" as domestic companies move to reposition themselves to meet defence requirements (Scott 2025a). Canadian venture capital (VC) is also smelling the money and pivoting to defence technology (for example, Toronto-based VC firm Kensington Capital Partners acquired defence-oriented ONE9 to build a defence technology VC platform [Bradshaw 2025]).

On the face of it, the Government of Canada gets it regarding the importance of targeting dual-use technologies: "Modern militaries must adopt commercial and dual-use technologies to maintain operational effectiveness and interoperability with allies. Our North, Strong and Free and the Pan-Domain Force Employment Concept both emphasize the importance

5 See GoHub Ventures: https://gohub.vc/european-defense-tech/.

6 See Department of Finance Canada (2024).

of embracing innovation to stay ahead of adversaries" (Government of Canada 2025a).

In addition, Canada's minister of finance, François-Philippe Champagne, has been outspoken in urging Canadian companies to produce their own "defence strategy" to participate in the economic opportunities opened up by the fiscal expenditures (Norman 2025).

This approach is not too far-fetched, as highlighted in a recent *Wall Street Journal* headline: "In Germany, Everyone Is a Defense Manufacturer Now" (Fairless 2025). Some of the pivots made in Germany are highly relevant for Canada. For example, Germany's auto industry is in a crisis because of falling exports to the United States and competition from China, and the pivot is to drones: "German auto supplier Schaeffler…has signed a memorandum of understanding with defence technology firm Helsing to cooperate on drone development…the agreement covers the supply of components for drone systems, a resilient supply chain and scaling up drone production" (Reuters 2025).

The $256 billion of incremental spend on core defence could notionally catapult as many as 256 Canadian start-ups into unicorn territory. The conceptual key for Canadian defence industrial policy is to think in terms of firms — not "picking winners" but rather "building winners," as advocated by Laurent Carbonneau and this author (2024). Such an approach would be transformative for Canada's economy. Moreover, with this approach, the development of defence-relevant technology would not be on a one-off transactional basis, but would instead establish the firm-level capability to continually adapt that technology to rapidly changing needs.

The Innovation Tempo Challenge

The pace of innovation has accelerated, which means product life cycles have shortened, and rapid adjustment to changing needs becomes paramount. Nowhere is this more apparent than in defence, where technology is evolving in the crucible of live fire. In-Q-Tel, a US defence-oriented technology fund, argues that national security now depends on the ability to design for agility, iterate at speed, build at scale and secure resilient supply chains (Anderson 2025). Germany's Quantum Systems, a drone manufacturer, works with Ukraine's Frontline Robotics to continuously adapt to changing battlefield conditions, drawing on continuous feedback from the front (Quantum Systems 2025).

Speed, in this case, is not about speed, per se — it is about process transformation. Mark Greeven, head of IMD China, describes China's manufacturing innovation as a case of "reinventing the world's factory" in which execution speed and aligned resource mobilization allow technology rollout at scale and tempo (Greeven 2025). This is underscored by the actual experience of automotive company Renault, which opened a research centre in Shanghai to develop a new model from scratch. Renault's lead engineer on the project, Jérémie Coiffier, stated: "We humbly came to learn how to go fast. And learning to move fast is not just learning how to do the same thing faster. It is doing things differently. It is a transformation" (Bertrand 2025).

As Arnaud Bertrand (2025) describes, Renault had its first prototype "in an insanely fast 4 weeks!!! The entire development process took just 21 months. The end product is priced under €20,000…making it one of Europe's cheapest EVs and competitive against Chinese EVs."

Meanwhile, in the United States, we see an arms race in research and development (R&D) in GPS technology to enhance accuracy and reduce vulnerability to electronic warfare, not only between countries but also between competing technological streams — in this case, quantum systems, low-Earth orbit systems, and new and improved GPS M-code systems (Zeeberg 2025).

We do not see the sense of urgency in Budget 2025 that the accelerated tempo should instill. The allocation for defence technology spending over five years, starting in fiscal year 2025–2026, includes:

- $656.9 million to develop and commercialize dual civilian-military technologies in a range of industries, including aerospace, automotive, marine, cybersecurity, AI, biodefence and life sciences; and
- $334.3 million to help anchor quantum technology companies in Canada and provide pathways to technology adoption in defence-related applications and industries.

To this can be added:

- The $357.7 million Regional Defence Investment Initiative to help businesses integrate into domestic and international defence supply

chains, as well as increase their industrial and innovation capacity.

At this (initial) scale, the defence technology measures amount to less than $2 billion cumulatively over the first half of the period of interest. This will hardly be transformative for the economy or rise to the security challenge of the moment. Canada needs to get this start-up party started.

Moreover, there is an issue of institutional design. Canada has long had an institutional framework to support defence-related innovation, in addition to its participation in the NATO DIANA system:

- Defence Research and Development Canada, the science and technology organization within the Department of National Defence (DND), provides research, technology and analysis in support of Canada's armed forces and national security partners through seven research centres across the country.[7]
- The DND runs the program Innovation for Defence Excellence and Security, which has five funding mechanisms, including prizes, to support research that solves problems facing the CAF.[8]

These mechanisms provide early-stage support and have a history of some success in earlier, slower times. They do not, however, appear to provide dual-use start-ups a bridge over the so-called valley of death in deep-technology areas (i.e., the stage between early proof-of-concept work and progress through accelerator programs and a scalable, revenue-generating product that is sufficiently derisked for funding by late-stage VC on the basis of the commercial prospects of the dual-use proposition). Canada is not alone in this situation — the following could be written about Canada, but it is about Europe: "European startups produce impressive patent output and cutting-edge R&D, but too often these breakthroughs 'perish in the valley of death' between lab and market deployment. The result is a persistent gap: Europe generates world-class innovations, yet comparatively few deep-tech startups scale into global commercial leaders" (Ivezic 2025).

This implies it is systemic. In the United States, mechanisms such as In-Q-Tel and the Office of Strategic Capital directly address this gap by providing strategic risk capital coupled with early access to government customers (ONE9 2024; Freling, Barna and Wettach 2025). Accordingly, these kinds of mechanisms must be built — and if not by the private sector, then by the public sector (in Canada's case, by Crown corporations).

The Business Development Bank of Canada's (BDC's) establishment of a new $4 billion defence platform, announced December 17, 2025, responds directly to this issue. However, it allocates only $500 million to the three streams of VC that would build this bridge: "a deep-tech, dual-use focused StrongNorth Fund, the Catalyst Innovation Fund, and indirect investments in VC funds 'aligned with Canada's defence and sovereignty priorities'" (McLauchlan 2025b) — and there is, of course, no track record yet of how it will function. So, while the government does appear to get it here as well, the late start compounds the back-end loading of the defence technology support that is being put in place, which underscores the urgency of accelerating the pace.

The Innovation Retention Problem

Even if the defence industrial policy solves the initial challenges of scaling to commercial viability if sufficient funding is made available with appropriately tuned support mechanisms and public-sector launch customers, much of this could go to nought in an economy-building sense if the companies are acquired and leave the country. Several examples illustrate this point:

- DNNresearch, the start-up company founded by Geoffrey Hinton, the father of deep learning, and his students Alex Krizhevsky and Ilya Sutskever at the University of Toronto, was acquired in 2013 by Google; Sutskever would, of course, go on to greater things as co-founder and chief scientist at OpenAI (CBC News 2013). Note that DNNresearch was the ninth Canadian company bought by Google as of that date.
- Deep-learning start-up Maluuba, founded by AI pioneer Yoshua Bengio, was acquired in 2017 by Microsoft, with Bengio becoming an adviser (Shum 2017).
- Waterloo-based start-up Darwin AI, founded by Alexander Wong, Canada Research Chair in Artificial Intelligence, was acquired in 2024 by

7 See www.canada.ca/en/defence-research-development/services/capabilities.html.

8 See www.canada.ca/en/department-national-defence/programs/defence-ideas.html.

Apple, with its founder and key staff becoming employees (Gain 2024).

→ Tenstorrent, a Toronto-based chip manufacturer that redomiciled to Delaware and set up shop in Santa Clara, California, in 2024, citing a restriction faced by one of its major US investors in its US$700 million Series D funding round unless Tenstorrent made the move, which dealt a body blow to the Canadian Sovereign AI Compute Strategy launched pursuant to Budget 2024 (Soltys 2024; Scott 2024, 2025b).

These examples put a very specific face on a general problem that is reflected in Canada's low share of global unicorns, notwithstanding its strong scientific contributions to technology development. As shown in Table 2, the United States dominates; China (with Hong Kong included) has 166; and the "Global North," which consists of the leading knowledge-based economies,[9] has 277 in total, of which 107 are accounted for by the 27-member European Union.

Table 2: Unicorn Counts, as of October 7, 2025

Region	Unicorns (Number)	Unicorns (% of total)
United States	718	55.7%
China	166	12.9%
Global North	277	21.5%
Global South	129	10.0%
Total	1,290	100.0%
Memo: Canada	21	1.6%

Source: CB Insights (2025); author's calculations.

The significant figure for Canada is the number of unicorns it has compared to the United States, the usual comparator. Where the usual back-of-the-envelope ratio is about 10 percent, when it comes to unicorns, Canada has only about three percent the number of the United States. As the above examples show, innovation tends to concentrate tightly in global hotspots such as Silicon Valley due to powerful centripetal effects; what is not anchored leaks out.

This underscores the need for Canada to make retention of the innovation assets it nurtures a top national security priority, if it is to prosper and retain the IP and the "freedom to operate" that ownership of IP provides (Hinton 2025), all of which is essential if Canada is to afford the ramp-up in defence spending required in this new age. This aim should be furthered by a fundamental review of foreign investment policies regarding investments in the innovation ecosystem (see Ciuriak [2024a] for a detailed discussion and specific recommendations).

The Defence-Related Infrastructure Dimension

The knowledge-based economy era (1980–2010) featured both the emergence of China and the widespread adoption of the personal computer in R&D and production through computer-aided design and computer-aided manufacturing, respectively, as well as in supply-chain management when paired with radio-frequency identification technology, and across the board in services industries (Ciuriak 2024b). This era witnessed increased concentration of innovation activity in the Global North, but global GDP growth was reasonably well distributed within that group, including within individual economies as evident from the proliferation of university-centred clusters. Canada, as shown in the middle panel of Table 3, more than held its own in this economy, increasing its share of global GDP by 0.26 percent between 1980 and 2010. But the data-driven economy featured remarkably different conditions, and Canada lost out this time as its share of global GDP fell by 0.46 percent.

However, the more instructive panel is the lower one, which shows that, in the post-2010 period, the main shift in global GDP share was from the Global North to the United States. Overall, the United States increased its share of global GDP, notwithstanding the rise of China, and it did so at the expense of the Global North — including Canada.

For the United States, the increase in its share of global GDP, excluding China, during the data-driven economy era amounts to US$6.45 trillion. This is an annual boost to US national income. How important is this to Canada?

→ Insofar as the rise in the US share of global GDP, excluding China, was due to data rent capture, then the transfer from Canada to the United States would, by itself, amount to US$314 billion,

9 The "Global North" includes the European Union, the United Kingdom and the European Free Trade Association, plus Canada and the high-income economies of the Western Pacific Rim, namely, Australia, Japan, Korea, New Zealand, Singapore and Taiwan; and Israel. The "Global South" includes the rest of the world economy.

Table 3: Regional Shares of Global GDP, 1980–2025

	1980	2010	2025	Change 1980–2010	Change 2010–2025
Global GDP	12,842	67,106	117,305		
United States	2,857	15,049	30,616		
China	304	6,139	19,399		
Global North	5,853	29,088	39,214		
of which Canada	276	1,617	2,284		
Global South	3,828	16,830	28,077		
Shares of Global GDP					
United States	22.25%	22.43%	26.10%	0.18%	3.67%
China	2.36%	9.15%	16.54%	6.78%	7.39%
Global North	45.57%	43.35%	33.43%	-2.23%	-9.92%
of which Canada	2.15%	2.41%	1.95%	0.26%	-0.46%
Global South	29.81%	25.08%	23.94%	-4.73%	-1.15%
Shares of Global GDP, Excluding China					
United States	22.79%	24.68%	31.27%	1.90%	6.59%
Global North	46.68%	47.71%	40.05%	1.03%	-7.66%
of which Canada	2.20%	2.65%	2.33%	0.45%	-0.32%
Global South	30.53%	27.61%	28.68%	-2.93%	1.07%

Source: IMF (2025); author's calculations.

equivalent to 13.7 percent of Canada's estimated 2025 GDP of US$2.284 trillion.

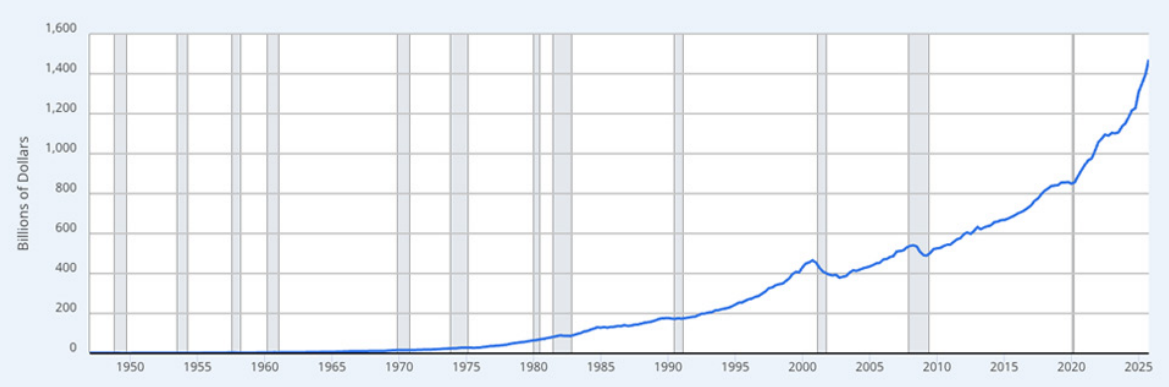
- The boost to Canada's income from capturing the foregone GDP would have increased its general government revenue by US$133 billion (at the IMF's estimated 2025 revenue share of Canada's GDP of 42.45 percent). This amounts to 5.83 percent of Canada's 2025 GDP, which would have more than fully paid for the defence-spending increase to meet Canada's security commitments.
- At the same time, the boost to Canada's GDP would have mitigated the relative decline in Canada's measured productivity.

The major development in the post-2010 period was the technological change powered by data (Ciuriak 2024b). The United States was the first mover in this economy and insisted on unrestricted access to global data — essentially plugging its data engine into the world's data (excluding China, which put up a protective "Great Firewall" and built up its own digital platforms behind it). The United States extracted the benefits of data from the rest of the open global economy, tax free, duty free and royalty free. By doing so, in the post-2010 period, the United States became the world's first "datastate" (to borrow from the notion of "petrostate") by capturing global data rents — the returns to data that are over and above returns that cover costs, including the cost of capital.

Unfortunately, this reality must be inferred because the economic contribution of data is largely invisible in the System of National Accounts (SNA). Under the latest iteration of the protocols for measuring GDP (UN Statistical Division 2025), the contribution of data to GDP is measured on the "sum of costs" approach (ibid., section 22.26 et seq.). Let us call this the cost of "datafication." This approach is otherwise primarily used to measure the output of public bodies and unpaid household services for which there are no market transactions to provide a basis for establishing value. Under this approach, the contribution of data to economic output is assumed to be in line with the costs incurred to capture, process and exploit it. There are no additional returns (i.e., above-normal profits that constitute economic rents).

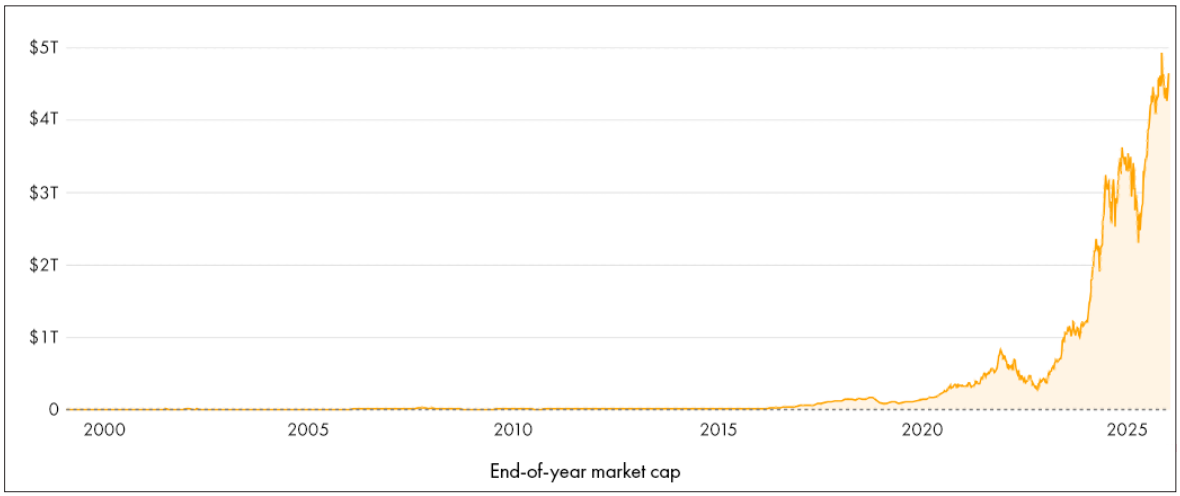
Since data value over and above the cost of datafication is not captured in the GDP statistics, its contribution must be inferred from measured aggregates such as profits; consumption financed by the monetization of wealth gains from the data-driven equity market boom (an important factor in sustaining the US economy in 2025 and thus far in 2026); capital expenditure on information processing (see the boom in US information processing capital expenditure post-2010 in Figure 1); and the value of corporations such as Nvidia that are able to capture supernormal returns due to their dominant position in supplying the hardware that processes data — in particular, AI chips since 2022 (see Figure 2).

Figure 1: US Private Fixed Investment in Information Processing Equipment and Software



Source: See https://fred.stlouisfed.org/series/A679RC1Q027SBEA.

Figure 2: Nvidia Market Capitalization, USD Billions, 1999–2025



Source: See https://companiesmarketcap.com/cad/nvidia/marketcap/.

For its part, the United States is keenly aware of the value of data, which it has been capturing tax free and royalty free from its trading partners over the course of the data-driven era. This awareness is reflected in its rejection of any attempt to impose a global minimum tax on profits generated through virtual activity, let alone a reasonable royalty to allow the countries generating the data to share in the benefits. Canada's announcement of its intent to impose a digital services tax was met, for example, with outsized threats of tariff retaliation.

The solution to this problem for the small open economies thus involves retaining the data rents rather than trying to claw them back through taxes once they have been captured by foreign corporations. Since the leakage is through the cloud, the answer must be to establish a sovereign cloud.

The risks of not asserting sovereign control over Canada's digital space are well understood, as reflected in the views expressed by Canadian corporate executives in the poll conducted by Bell (2025) and the concerns expressed by the Government of Canada (2025b) itself. The above calculations underscore the value at stake.

In principle, developments in two streams are coming together to enable sovereign control over a country's data space *and* the capture of the value of its data:

- the development of the technical architecture to manage trusted access to data spaces through initiatives such as the European Union's Gaia-X, Japan's NTT, the International Data Spaces Association, the European Alliance for Industrial Data, Edge and Cloud; and
- the emergence of secondary markets for data with prices based on tokens used in training AI systems.

In the initial phase of the data-driven economy (data plus predictive AI), raw data was captured in what might be characterized as "primary markets." It was measured in bytes and mostly resided in "dark pools" of walled-off data controlled by the platform firms.

In the second phase of data-plus-generative/agentic AI, AI model inference and training are being priced per token, which has emerged as a standardized unit of account for meaning representation suitable for machine knowledge. Token pricing gives traction to interplatform licensing agreements, monetary quantification in legal claims regarding use of copyrighted materials (for example) and even potentially for royalty claims at the national level, insofar as access to national data can be metered under a sovereign data framework.

The national security dimension of data sovereignty is well understood and is the main focus of work in this area. The issue raised here is to add a metering/tokenization/payments layer to the gatekeeper role in a sovereign data scheme for data egress from the sovereign data space; in effect, it would establish a royalty for data, in keeping with the role of data as the most valuable resource input in the data-driven economy — mineral oil captures royalty returns and so should data, the new oil.

The North Atlantic Pivot

Over its history, Canada's trade relationship with its southern neighbour has oscillated between deepening continental integration and strengthening trans-Atlantic ties. Sometimes the shocks have come from Europe, sometimes from the United States. Given that economic geography favours a north-south alignment for Canada, the shocks from the south have grown in importance:

- US abrogation in 1866 of the Elgin-Marcy Reciprocity Treaty of 1854, Canada's original free trade agreement with the United States, which was a material factor in driving Britain's Canadian dominions into Confederation in 1867 and prompted Sir John A. MacDonald's National Policy and nation-building undertakings such as the Canadian Pacific Railway;
- the US Smoot-Hawley Tariff Act of 1930, which deepened Canada's trans-Atlantic relationship as Britain adopted a new tariff in response to Smoot-Hawley and entered into free trade agreements with Canada and Britain's other colonies, through the 1933 Ottawa Agreements;
- the US Nixon Measures of 1971, followed by the United Kingdom's accession to the European Community (EC) in 1972, which led the Pierre Trudeau government to seek its aptly named "third option" — a free trade agreement with the EC; and
- the rise of US protectionism under the first Trump administration, which prompted Canada's Justin Trudeau government to rename the position of trade minister as the Minister of International Trade Diversification in the Cabinet shuffle of July 18, 2018.

Yet again, in 2026, Canada is pursuing strengthened ties with Europe in response to a trade and security shock from the United States. These shocks are not unusual as Canada's history shows, nor is Canada's textbook response in seeking stronger economic and security ties with Europe.

Canada's incremental spending on traditional defence assets thus needs to pivot to help fill the emerging economic security gaps in the context of the moment.

On the domestic front, this includes job creation by expanding the CAF; industrial retooling (for example, from autos to drones); and directing major

defence equipment purchases toward Canadian-built vehicles and hulls that draw on Canadian supply chains for steel and aluminum and other products whose access to the US market is impaired by tariffs and "Buy American" provisions.

On the international front, Canada has deep interests in showing that a US-less NATO is not actually useless. In political code language, "clear-eyed" used to refer to how Western powers were supposed to view China. Today, it is — jarringly — used to refer to the relationship of the "rest of the West" to the United States, as captured in the following comment by Jana Puglierin, senior policy fellow at the European Council on Foreign Relations: "We need to be pretty clear-eyed.... In the old days, there was a clear mainstream understanding of the old transatlantic relationship enshrined by the Western values and norms and principles, the rules based international order. And now I think we see a competing project emerging" (quoted in Stokols [2025]).

As noted, Canada's short history has featured an oscillation between Europe (the British mothership and France) and the United States. Today, the oscillation puts Canada in its trans-Atlantic phase rather than its continentalist phase. Considered from the economic side of the equation, a "clear-eyed" perspective on the current situation requires Canada to talk the traditional post-Second-World-War talk but to walk a different traditional walk, namely, the pre-Second-World-War walk, when Canada went twice to war with European allies while the United States bided its time.

Canada's defence production should, thus, prioritize expanded production of munitions to supply Europe in resisting Russian aggression. More generally, Canada should tailor the two percent of GDP spending on core defence requirements to meet its immediate defence needs and evolving alliance commitments as dictated in the first instance by the needs of its European allies.

Discussion and Summary of Recommendations

Canada's commitment to raise defence and defence-related spending to five percent of GDP by 2035 requires a generational mobilization of resources — if the planned spending surge is to benefit the Canadian economy rather than leaking out and leaving Canada fiscally strained and strategically exposed, dependent on foreign-controlled supplies and technologies in a newly uncertain security environment.

First, several considerations point strongly to the need for Canada to develop new dual-use technologies in meeting this target, both to adapt Canada's defence production to the evolving configuration of needs and to make the five percent spend affordable and sustainable. This is well understood and is reflected in numerous statements by Canada's political leadership, as well as in initial moves in Budget 2025 and the creation of a defence-lending platform at the BDC. The need to prioritize new dual-use production is also evident in the emergence of a "defence technology start-up complex" in the United States and Europe, in which the emphasis is on nurturing agility, iteration of product cycles at speed, building at scale and securing resilient supply chains.

Second, the age of machine knowledge capital has led to a convergence of economic and military security. Data and generative/agentic AI are now core factors of production in the civilian economy and strategic assets — and vulnerabilities — in the defence domain. The case can be made that Canada's persistent lagging economic performance since 2010 is tied up with its failure to establish sovereign control over its digital space, which left it vulnerable to the extraction of rents generated by Canadian data and to the powerful concentrating dynamics of the data-driven economy. Defence-related infrastructure spending to address the security vulnerabilities that are proliferating in the age of machine knowledge capital thus also needs a dual-use framing with data rent capture built in by design to correct this structural economic weakness.

Third, the geopolitical environment has shifted decisively. "America First" economic and security nationalism, the weaponization of national security exceptions in trade, and open hostility toward

European partners have shattered the historical alignment between Canada's economic and military security interests. Canada has historically oscillated between its traditional European orientation and the continentalism that economic geography favours. Canada once again finds itself looking to its European allies even as Europe faces acute defence production-scaling needs driven by Russia's war of aggression. Canada's defence-spending profile must therefore pivot toward filling real alliance capability gaps, while supporting the adaptation of its defence industrial base to meet these specific needs, while also supporting Canada's supply chain where the latter has been damaged by the "America First" trade shock.

These conclusions suggest that Canada's new defence industrial policy should be structured around three mutually reinforcing pillars:

Develop a Defence-Technology Start-Up Complex at Scale

The incremental 1.5 percent of GDP allocated to core defence spending above the traditional two percent benchmark — approximately $256 billion over 10 years by the calculation in this paper — should be explicitly deployed to build an ecosystem of Canadian dual-use technology firms. Canada is encouraging Canadian industrial firms[10] to identify dual-use applications (Van Praet 2025). These firms should be supported through:

- early government demand, including for pilots (see, for example, DARPA contracts for Q-CTRL [2025] AI-quantum inertial guidance systems);
- provision of patient-risk capital (drawing on examples such as the US Office of Strategic Investments, the British National Security Strategic Investment Fund and the Australian Signals Directorate's cybersecurity venture arm) (ONE9 2024); and
- provision of real-time feedback (see, for example, Quantum Systems-Frontline Robotics collaboration [Quantum Systems 2025]).

Framed this way, the incremental defence envelope could support the creation of a large cohort of Canadian firms able to play in the defence space, while drawing on the defence procurement to attain scale economies for civilian production and creating the system for continuous adaptation to evolving military and civilian requirements.

Use Defence-Related Infrastructure Spending to Establish Digital Sovereignty

Where the defence-technology start-up complex idea works from the civilian to the military in terms of capabilities mobilization, the additional 1.5 percent of GDP allocated to defence-related infrastructure — if prioritized to develop a sovereign, security-hardened Canadian cloud architecture — would work in the opposite direction, leveraging essential security architecture to achieve the critical economic goal of dialling Canada into the data-driven economy. This infrastructure must include the capacity to meter and price access to Canadian data on a tokenized basis, consistent with emerging AI market practices for pricing access to data. Capturing data rents at source is superior in a political economy sense to attempting *ex post* taxation (which draws fire), and would materially strengthen Canada's fiscal capacity and enable economic strategies to boost productivity performance.

Pivot Traditional Defence Procurement to Economic and Alliance Realities

The baseline two percent of GDP defence spending covers the operational requirements of Canada's military (and now its Coast Guard), including personnel, operations, maintenance and established procurement streams. The steep ramp-up in this spending from the 1.3–1.4 percent of GDP range prior to 2025 provides considerable flexibility in where it is to be applied. Given the current geopolitical landscape, this aim should be aligned with immediate operational needs and evolving alliance obligations, particularly in Europe. This plan includes expanded domestic production of munitions, drones and other unmanned systems; industrial retooling of sectors facing trade exclusion in the US market; and prioritization of Canadian-built vehicles, hulls and supply-chain-intensive platforms. In profiling this spend, Canada should honour trade commitments to partners that honour theirs, while responding symmetrically to security-based barriers imposed on Canadian exports.

10 See, for example, Canada's BRP, which manufactures Ski-Doos and Sea-Doos: www.brp.com/en/.

Taken together, these measures would strengthen Canada's security, including the collective security it enjoys with alliance partners who respect Canada's sovereignty and whose sovereignty Canada respects, while addressing the nexus of innovation-productivity-trade shortfalls that characterized Canada's economic performance since the start of the data-driven economy era.

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