



The Institute for Integrated Economic Research - Australia was formed in 2018. Our purpose is to address our need for greater resilience in our society, both structurally and culturally, given the significant transition challenges that we will have to face in forthcoming decades, now compounded by the Coronavirus pandemic.

Productivity Commission Interim Report – Vulnerable Supply Chains

Global trade and diverse supply chains are essential for Australia’s economic and social well-being. However, over the past decade we have seen our trade and investment profile evolve without any apparent system-wide analysis of resulting risks and vulnerabilities. In pursuit of the lowest cost, we are incurring a very high price in terms of our sovereignty and resilience; one which we are yet to fully understand.

The Productivity Commission *Vulnerable Supply Chains* Interim Report¹ (Interim Report) notes that ‘Australia’s supply chains proved generally resilient in response to the COVID-19 pandemic, but the experience with COVID-19, following the devastating 2019-2020 bushfires has highlighted Australia’s potential vulnerability to supply chain disruptions.’² This observation is agreed. Further, the Interim Report’s recognition that Australia’s ‘preparedness’ is wanting is, in our opinion, at the core the challenge we face as a nation as we grapple with the myriad economic, environmental, and social disruptions that are looming.

Our security as a nation depends on our collective resilience, yet Australia’s ability to handle a growing range of economic, military, climate and medical threats has eroded in recent times. To quote the Home Affairs report on ‘*Profiling Australia’s Vulnerability*’ published in 2018, “what affects the nation’s resilience is the array of choices and decisions that have been made over generations and the decisions being made now that affect future generations. Fundamentally, the values and trade-offs inherent within these decisions have consequences and getting the balance right is a complex challenge.”³ However, we need to understand that the consequences of past and present decisions have had the perverse outcome of building in more vulnerability for us.

Where are we today?

The Coronavirus pandemic has exposed a global lack of resilience as a result of a collective failure to assess and act on national risks and vulnerabilities in the face of a rapidly changing world. The erosion of faith in, and effectiveness of, international institutions has also been under the spotlight because of the pandemic. Yet international collaboration and engagement will need to be a hallmark of the post-pandemic operating environment. Globalism is not dead, but merely in need of reshaping. Global cooperation will be essential to manage the ongoing effects of the pandemic, to restore trading systems and supply chains, and to reinvigorate western liberal democracies and the system of alliances that underpin them.

¹ Productivity Commission 2021, *Vulnerable Supply Chains*, Interim Report, Canberra

² Ibid, p. 1

³ Department of Home Affairs National Resilience Task Force, *Profiling Australia’s Vulnerability: the interconnected causes and cascading effects of systemic disaster risk*, 2018

<https://www.aidr.org.au/media/6682/national-resilience-taskforce-profiling-australias-vulnerability.pdf>

The UNISDR definition of resilience is: “The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and function.”

We should not try to replicate the pre-COVID-19 Australia in the recovery. We need to capitalise on the positive aspects of our response, such as the social solidarity and the Federal / State political collaboration displayed in Australia, and learn from the negative, such as the fragility and opaque nature of our supply chains and the lack of preparation in critical areas such as in our health infrastructure and parts of our economy.

The challenge we face could appear to be so daunting that we run the risk that the Government will default to the establishment of a Royal Commission to address our lack of resilience. Hearings will occur, submissions will be made, recommendations will be proposed; the months and years will slip by, and then there will be an election. This has been the pattern of many of our historical responses to significant events.

We do not have the time to prevaricate; we need to analyse, plan and act in a timely manner in order to improve our national resilience in preparation for the ongoing impacts of the pandemic and a range of possible future crises.

Our Institute's reports have addressed examples of the lack of resilience and security in Australia's economic, environmental, energy and infrastructure systems.⁴ For example, we currently import 90% of our medicines, 90% of our fuels (a 50% increase over the last decade) and 98% of our imports and exports depend on the foreign owned / controlled maritime trade system.⁵ This, without having conducted an integrated systems risk analysis for any of these areas. We have, in effect, left our resilience, and therefore our sovereignty and security, to the largely foreign-owned market. The import dependency is further compounded by the failure of successive Governments to mandate any stockholding levels for these critical imports, unlike most other developed countries.

In the case of exports, we find ourselves in a position where our largest trading partner, China, is also the main security concern for our nation. In other words, we have a trade and economic dependency with a country whose political leadership we do not trust.

If we are to maintain an acceptable balance between our sovereignty, security, and economic wellbeing, then we must recognise firstly that economic over-dependence on any one country in terms of exports or imports is a risk to our sovereignty and security. Secondly, the behaviours of several countries (including the United States) during the early stages of the pandemic, means that our blind faith in the largely foreign-owned market to meet all our needs in a crisis, without taking precautionary measures such as stockholding, is foolhardy.

Sovereignty – Supply Chains – Resilience

Australia is particularly vulnerable to trade disruptions in the global marketplace. We are an island nation, at the end of long global trade routes, heavily reliant on just in time supply chains, with limited resilience in those chains, and low tolerance for loss and disruption. Should any significant trade interruption occur, the flow on effects on the economy and our society would be significant.

⁴ IIER-A reports and public commentary on these issues can be found at: <https://www.jbcs.co/#/iieraustalia/>

⁵ Department of Infrastructure, Regional Development and Cities, Submission to Senate Inquiry on the Policy, Regulatory, Taxation, Administrative and Funding Priorities for Australian Shipping, March 2019, page 5.

The early days of the pandemic provided a graphic example of just how quickly societal cohesion can fracture when supply chains were compromised, or simply perceived to be compromised. During March 2020 Australia witnessed panic buying in the supermarkets, health professionals around the country were confronted with the reality of shortages of vital personal protective equipment (PPE) and pharmacists were struggling to fulfil prescriptions for medicines as people started stockpiling. The extensive global outsourcing of the production of pharmaceutical ingredients, medicines, PPE and other essential inputs to supply or finished products across a range of goods and services, has left many nations shocked and now saying 'never again.' More recently, European restrictions on exports of the Pfizer vaccines, combined with the concerns regarding locally produced AstraZenica vaccine clotting issues, have further highlighted our supply chain vulnerabilities.

Our economic and trade interdependencies have compounded over time and are now so complex that trying to understand and then manage the resulting risks, becomes a task too daunting for many to face. Yet now we must face it because at risk is our security, and national security should not be left to the very market forces that contributed to our vulnerabilities.

Global trade and diverse supply chains are essential for Australia's economic and social well-being and will remain the predominant model into the future. However, we need to redesign critical components of our supply chains under what we are calling a 'Smart Sovereignty' model. Smart Sovereignty infers not only a degree of Australian based manufacturing capability and associated domestic supply chains, but the appropriate research and development facilities and a skilled, experienced workforce. Sovereignty also implies Australian ownership and/or control over critical capabilities.

Smart Sovereignty is not socialism or nationalisation of whole sectors of the economy; nor is it ongoing subordination to the ideology of the free market. It is a conscious trade-off between sovereignty, economy, and our security. It is a decision that will have costs; most importantly it is a trade-off decision that needs to be made by Australians and not just left to foreign nations or individual business interests to decide in isolation. **While some may argue that the economic perspective ought to prevail in the final decision, the deliberations must factor in the unprecedented strategic uncertainty we face today.**

A country like Australia, with a relatively small population and economic base, will only ever have a moderate level of sovereign capabilities. We will not, nor should we try to, become self-sufficient. Countries like the United States will build a much greater degree of sovereign capability over the next decade, largely in response to the pandemic panic.

Determining the appropriate level of sovereign capability that we must have will be a complex task. We need more than we have today in key infrastructure and supply chains. Importantly, our sovereign capabilities need to be designed to improve our resilience, and not just left to the whim of market forces.

The Interim Report is underpinned by a constant discussion about 'cost' and managing / mitigating costs associated with the risk reduction of supply chain vulnerabilities. While real-world impacts of higher prices for goods and services must be a consideration for businesses and governments, it is worth emphasising that 'cost' is not always monetary. Indeed, the 'cost' to Australia, and Australians, of a major disruption to supply chains could be significant and in a worse-case scenario, result in society-wide collapse. For example, we could see a breakdown in social

cohesion, further increases in inequality, mental and physical health outcomes that overstretch the public health system, communications and technology failures, and an inability to respond to natural disasters in a timely manner. The author Binyamin Applebaum made this point in an interview about his 2019 book, *The Economists' Hour: False Prophets, Free Markets and the Fracture of Society*⁶ by commenting that not everything in policymaking or governance can be monetised, nor rationalised by a cost-benefit analysis. **The cheapest cost comes at a high price in a time of crisis.**

Annexes A and B provide an overview of Australia's vulnerabilities in relation to fuel and pharmaceutical import dependency and, by extension, the impacts on our resilience. The Medicines Australia's comment in the Interim Report that 'the pharmaceutical supply chain functioned well and "demonstrated significant resilience" ...'⁷ is not agreed. The European restriction on exports of the Pfizer vaccines is an obvious example.

In our view, the essential complement to Smart Sovereignty is the establishment of "Trusted Supply Chains." Where we depend on global trade imports, we must have diverse and transparent supply chains and have the ability to verify them. What is evident from the pandemic crisis is that the massive global outsourcing and dependence upon China for many pharmaceutical ingredients, medicines, and other essential supplies, cannot be considered as a 'trusted' supply chain as it is neither transparent nor verifiable and has had single points of failure with significant impacts on critical supply chains.

Resilience needs to be addressed by individuals, communities, businesses, and at all levels of Government. It is about being better prepared and having the ability and the will to act collaboratively whenever necessary. **Resilience should not be perceived as an inconvenience that gets in the way of living – it is an inherent, essential, part of living in the modern world.**

Where To Now?

We must recognise that societies are communities of people and institutions, not components in an opaque global marketplace in which the drive for efficiency and lowest cost shapes all decisions.

To address current and future challenges, and to be genuinely 'prepared', we need an integrated national sovereignty / resilience framework, strategy and action plan. We need to determine how we can better react, prepare for, adapt to changing conditions and, where feasible, prevent disasters and crises. The Interim Report Chapter 3 *Framework to Identify Vulnerable Supply Chains*⁸ is a step in the right direction. Such a framework would be a component of a broader, national, framework and could serve as a template for analysing the many other essential components that underpin the security of the Australian way of life.

Of course, our resilience is interdependent with that of our regional neighbours. We need to also address how we can assist them to improve their resilience as well; an interdependent partnership will be a foundation for building resilient and trusted supply chains.

⁶ Bloomberg Radio, Interview between Barry Ritholtz and Binyamin Applebaum, 13 October 2019, <https://ritholtz.com/2019/10/transcript-binyamin-appelbaum/> (accessed 16 Oct 19)

⁷ Productivity Commission 2021, *Vulnerable Supply Chains*, Interim Report, Canberra, p. 76

⁸ Productivity Commission 2021, *Vulnerable Supply Chains*, Interim Report, Canberra, Chapter 3, pp 31-41

There are numerous bodies of work related to aspects of Australia's resilience already in existence which have been acknowledged in the Interim Report. For example:

- the Royal Commission into National Natural Disaster Arrangements (Royal Commission into National Natural Disaster Arrangements 2020a)
- the Critical Infrastructure Resilience Strategy: Plan and other resources from the Critical Infrastructure Centre (DoHA 2015)
- Profiling Australia's Vulnerability by the Department of Home Affairs (DoHA 2018)
- Guidance for Strategic Decisions on Climate and Disaster Risk from the Australian Institute for Disaster Resilience (AIDR 2021).⁹

The *Profiling Australia's Vulnerability* report in particular provided conclusions, or perhaps more correctly threat assessments, worth thinking about in terms of our resilience, supply chains and vulnerabilities. We strongly support the observation that our biggest vulnerabilities are the intersections and interdependencies in the systems that support us in this country from local to global levels. Remembering that our society comprises people and communities, the report noted that we value and rely on the systems and processes that sustain us in our everyday lives, often unconsciously. The 'value' ascribed to these systems and processes varies depending on whether we are in the middle of a crisis or not. However, as previously discussed, we need to understand that the consequences of past and present decisions have had the perverse outcome of building in more vulnerability for us. Of note is, that due to the limited terms of reference, the Natural Disaster Risk Reduction Framework did not address the potential for 'unnatural disasters' to cause harm. Widening its scope, rather than 'reinventing the wheel', could be the best way to build a framework to help us address a broader range of potential future crises and to analyse our broader supply chain vulnerabilities.

A report that was not mentioned in the Interim Report, that should be considered when exploring the concept of 'essential' goods and services and sovereign capability, is the Henry Jackson Society (HJS) Report of 14 May 2020, *Breaking the China Supply Chain*.¹⁰ Relevant elements of this report are discussed at Annex C.

Whilst the focus of the HJS Report is the dependency of Five-Eyes nations on China (with Australia being the most dependent) the observations and recommendations can apply more broadly to our global dependencies and assist in the determination of the industries necessary for Smart Sovereign capability. The HJS report proposes that 'strategic industries' are those that support critical infrastructure including communications, energy, healthcare / public health, transportation systems and water. The report also identifies areas that should be afforded protection; these include artificial intelligence, autonomous robotics, computing hardware, cryptographic technology, materials and manufacturing science, nanotechnologies, networking and data communication, quantum technology and synthetic biology.

Supply chain fragilities and the need for a sovereign manufacturing capability are topics now being discussed across all levels of society and in the media. This is a positive indicator that the

⁹ Ibid, p. 15

¹⁰ The Henry Jackson Society, *Breaking the China Supply Chain: How the 'Five Eyes' can decouple from Strategic Dependence*; James Rogers, Dr Andrew Foxall, Matthew Henderson, and Sam Armstrong, 14 May 2020, <https://henryjacksonsociety.org/publications/breaking-the-china-supply-chain-how-the-five-eyes-can-decouple-from-strategic-dependency/>

necessary political, policy, structural and cultural changes could occur to deliver Australia a greater level of resilience, and thus enhance our national security.

IIER-A Action - The National Resilience Project

IIER-Australia is working on a National Resilience Project in collaboration with the Global Access Partners Institute in Sydney. Our intent for the project is to contribute to the conversation we have to have in Australia, and to offer constructive suggestions on where we, as a nation, need to head when we emerge from the pandemic crisis and face the challenge of building the next generation economy, more resilient societal systems and thus improved sovereignty and security.

Key themes emerging from the project include the need to:

- Conduct a comprehensive risk and vulnerabilities analysis using an expanded version of the framework produced by the Home Affairs report, *Profiling Australia's Vulnerability*. This should include:
 - The sovereign capabilities, knowledge and skills on which we must be self-reliant in times of crisis and where it is prudent to guarantee domestic supply.
 - The critical supply chains which must be trusted, i.e. transparent and verifiable.
 - Those capabilities, services and goods for which open, global supply chains should be maintained and encouraged.
- Develop an integrated national sovereignty / resilience framework, strategy and action plan, based on the risk and vulnerabilities analysis, that address what is critical to the Australian way of life and the functioning of our society, and then determines how to build such a sovereign capability.
- Implement the plan utilising an integrated team model; i.e. collaboration across all levels of government, industry, public and private sector enterprises and community organisations.

The IIER-A Resilience Project, the Medicine Supply Chain and other related reports are at:

[\(https://www.jbcs.co/#/iieraust/\)](https://www.jbcs.co/#/iieraust/)

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Australia's Fuel (In)Security and our lack of National Resilience – A case study

The Energy Minister, Angus Taylor, has made repeated assurances regarding the security of Australia's fuel supplies. Here are a few facts to consider:

- The last National Energy Security Assessment (NESA) in Australia was 2011. Despite repeated commitments to produce one in 2014, 2015, and 2016, none has been conducted.
- Between 2012 and 2015 the number of refineries in Australia decreased from 7 to 4. In 2014, the Department of Industry, in relation to a question regarding what would be the necessary minimum number of refineries that we must have in Australia for security /resilience purposes, advised that no refineries were necessary ... as it would be cheaper to import refined fuel.
- By 2015, Australia was importing 90% of its liquid fuel requirements wither as oil to be refined in the last four refineries or as refined fuel products. All of the shipments of oil and fuels were being conducted by foreign flagged ships.
- Three of the four major refineries in Australia are foreign owned. The fourth, Caltex, was considering sale to foreign owners in the past few years. It would be foolhardy to expect the refinery owners to act in any way other than to look after their own business interests. That is a free market reality - which has been playing out in real time over the period 2020-2021.
- The recommendations made in the fuel security reports written by AVM John Blackburn (Retd) between 2012 and 2014 for the NRMA were ignored by both Labor and Liberal Energy Ministers - <https://www.jbcs.co/#/energy-security/>
- The recommendations of the 2015 Senate Inquiry into "Australia's transport energy resilience and sustainability" were ignored by the Government.
- The March 2018 Parliamentary Joint Committee on Intelligence and Security recommended that the Government review and develop measures to ensure that Australia has a continuous supply of fuel to meet its national security priorities has not been addressed. The target date of Dec 18 for the report was missed.
- In April 2019 an interim report was released by the Government which highlighted significant problems such as "there is no overarching understanding of the whole liquid fuel market in Australia and how different parts interact with each other."
- On 9 April 2020, the media reported that the owner of the Geelong oil refinery was weighing whether to proceed as planned with a \$100 million investment in its future as the coronavirus outbreak wiped out fuel demand and gutted refining profits. Viva's announcement came after rival fuel giant Caltex said it would extend a shutdown of its Brisbane oil refinery, where margins had similarly collapsed in recent months.¹
- In April 2020, Energy Minister said the government was working with the refiners to ensure no disruption to Australia's fuel supplies amid the coronavirus emergency. "Australia has a

¹ <https://www.watoday.com.au/business/companies/geelong-oil-refinery-100m-investment-under-review-as-virus-hits-fuel-demand-20200409-p54iht.html>

highly reliable fuel supply and these decisions from refineries will not hinder our immediate fuel security." ² This statement was wishful thinking at best.

- On 22 April 2020, the Minister announced Australia would be 'boosting the nation's long-term fuel security ... by a deal with the United States to store Australian Government owned crude oil in the US Strategic Petroleum Reserve.'³ However, this is crude oil, held in American storage facilities, with no obvious plan for rapid transportation from the US to Australia in the event of a crisis, and then potentially no way of refining the oil to usable product in country given the ongoing threat of refinery closures .
- In September 2020, the Government announced another 'enhancement' to fuel security comprising three key elements: 'investment in a program to develop onshore diesel storage; creating a minimum stockholding obligation for key transport fuels; and, backing the refining sector by entering into a detailed market design process for a refinery production payment.'⁴
- By the end of 2020, there was still no final liquid fuel security report from the Government and the health and economic crises were still unfolding.
- 2021 began with more uncertainty around the future of Australia's remaining refineries^{5 6}, with two of the remaining four refineries announcing their intention to close, and the final two reviewing their future. The Energy Minister's September 2020 initiative of refinery retention payments was clearly too little, too late.

Ten years have now elapsed since the last NESAs and the world is a vastly different place – yet Australia has not reviewed its energy security assessment and does not appear to be planning to do so. We now look likely to become 100% dependent on foreign owned fuel imports, coming to Australia on foreign owned ships ... up from the present 90%. This is not reassuring, particularly when we saw an "every nation for themselves" pandemic-panic emerge around the world, disrupting critical supply chains. We then saw 'vaccine nationalism' shifted from a concept that could be a global risk, to a global reality.

The US administration is saying "never again" with respect to its supply chain dependence on some foreign countries. Whilst that is an emotional reaction in a time of shock, it would be reckless for us to contemplate 100% import dependency for one of our most critical supply chains.

A classic assumption related to fuel security, quoted in the Australian Newspaper in January 2019, was extraordinarily naïve, yet surprisingly prevalent: "The Energy Department said Australia's low supplies were not a serious concern as there had never been a serious interruption to Australia's supply." The chaotic cascading supply chain effects of the pandemic must surely cause a rethink of this naïve perspective.

² ibid

³ Minister for Energy and Emissions Reduction Media Release, *Australia to Boost fuel security and establish national oil reserve*, 22 April 2020, <https://www.minister.industry.gov.au/ministers/taylor/media-releases/australia-boost-fuel-security-and-establish-national-oil-reserve>

⁴ Minister for Energy and Emissions Reduction Media Release, *Boosting Australia's fuel security*, 14 September 2020, <https://www.minister.industry.gov.au/ministers/taylor/media-releases/boosting-australias-fuel-security>

⁵ Stockhead, *Kwinana oil refinery's approaching closure increases urgency for WA crude producers*, Mike Cooper, 24 March 2021, <https://stockhead.com.au/energy/kwinana-oil-refinerys-approaching-closure-increases-urgency-for-wa-crude-producers/>

⁶ ABC news, *Australia loses another oil refinery, leaving our fuel supply vulnerable to regional crises*, Gareth Hutchens, 11 February 2021, <https://www.abc.net.au/news/2021-02-11/australia-loses-another-oil-refinery-risking-fuel-supply/13139648>

Australia's Medicine Supply Chain – A Case Study in Vulnerability

One topical example of our lack of resilience is that of our fragile medicine supply chain. This is a much bigger problem that goes beyond PPE and the National Medical Stockpile. In mid 2019 we became aware of the US Government's US-China Economic and Security Review Commission which held a public hearing on '*Exploring the Growing US Reliance on China's Biotech and Pharmaceutical Products*'. We subsequently investigated our own medicine supply chain. Our report noted the following:

- The US Commission hearings highlighted that the US, our largest source of medicines, does not have a robust understanding of its medicine supply chains, its vulnerabilities are not fully understood and no one agency seems to have responsibility or accountability. They have concluded that an over reliance on foreign production for critical medication is a national security risk. We would be foolhardy to think that our situation is any less risky.
- Australia imports over 90% of medicines and is at the end of a very long global supply chain making the nation vulnerable to supply chain disruptions. The Therapeutic Goods Administration (TGA), in 2019 discussion paper, noted that Australia is particularly vulnerable to medicine shortages arising from factors outside our control. They stated that these factors could include manufacturing problems, difficulties in procurement, political instability, pandemics, another global economic crisis and a range of natural disasters. The scope and scale of the TGA register of medicine shortages reflects a regulator unable to intervene or address medicine shortages other than to note their (lack of) existence.
- There is no publicly available information on the level of medicine stocks in the commercial supply chain in Australia and the Australian Government does not mandate any minimum stockholdings of medicines. In contrast, the Finnish Government's Decree on Mandatory Reserve Supplies of Medicines identifies 1457 medicinal products to be stocked in their pharmaceutical supply chain, including several active pharmaceutical ingredients. Stock levels vary between 3 and 10 months depending on the medicine.
- Australia has extremely limited and diminishing manufacturing capacity across all sectors of pharmaceutical products apart from vaccine manufacture, and this has been tested, and sadly found wanting, as the Australian Government scrambled to roll-out a COVID-19 vaccination program in the early months of 2021. As a benchmark, Australia has almost no capacity to manufacture any active pharmaceutical product for most of the products listed on World Health Organisation's list of Essential Medicines.
- There are also significant risks associated with large scale reliance on imported vaccines. Reminiscent of the shortages of imported medicines in the early stages of the COVID-19 crisis, stocks of imported vaccines have been slow to arrive. This is due in part to the fact that the main geographical locations associated with the manufacture of COVID-19 vaccines (U.S. Europe and India) are dealing with far greater COVID-19 problems than we have experienced in Australia and have restricted exports. Limitations on Australia's access to imported product will likely continue until medical need in other countries subsides. We need to face the reality that, in a crisis, every country will look after themselves first.

We need to conduct a robust analysis of our medicine supply chains and the lack of resiliency must be addressed as a matter of urgency.

Breaking the China Supply Chain: How the 'Five Eyes' can Decouple from Strategic Dependency

The Henry Jackson Society (HJS) Report of 14 May 2020, *Breaking the China Supply Chain: How the 'Five Eyes' can Decouple from Strategic Dependency*¹ provides an analysis of 'strategic industries' and 'core areas' that it deems essential for the 'national security, economic security, prosperity, and health and safety' of the Five-Eyes nations. While the focus of the report is the dependency on China (and Australia is heavily dependent), the observations and recommendations can apply more broadly to assist in the determination of the industries necessary for Smart Sovereign capability and to develop Trusted Supply Chains.

The HJS report proposes that 'strategic industries' are those that support critical infrastructure and that this infrastructure includes at least the five following components:

- Communications
- Energy
- Healthcare and public health
- Transportation systems
- Water (including wastewater and storm water systems)²

Furthermore, critical sub-components identified included: banking and financial services; emergency services; food and agriculture, and information technology.

Besides supporting traditional strategic industries, the report identifies 'core areas of the Fourth Industrial Revolution' that should be afforded protection. These 'core areas' are:

- Artificial Intelligence
- Autonomous Robotics
- Computing Hardware
- Cryptographic technology
- Materials and manufacturing science
- Nanotechnologies
- Networking and data communication
- Quantum technology
- Synthetic biology³

¹ The Henry Jackson Society, *Breaking the China Supply Chain: How the 'Five Eyes' can decouple from Strategic Dependence*; James Rogers, Dr Andrew Foxall, Matthew Henderson, and Sam Armstrong, 14 May 2020, <https://henryjacksonsociety.org/publications/breaking-the-china-supply-chain-how-the-five-eyes-can-decouple-from-strategic-dependency/>

² Ibid, p.10

³ Ibid, p. 12

The report argues that these industries should also be considered 'strategic' because:

'... they are expected to provide significant technological and economic benefits to those countries that come to lead in them ...Indeed, the COVID-19 crisis has revealed the extent to which recent and emerging technologies – networked communications, pharmaceuticals and biotechnology – are themselves part of a nation's critical infrastructure.'⁴

In terms of immediate actions, the report makes four recommendations:

- Conduct and publish audits at national and company level, so as to identify where dependency on China exists in relation to raw materials, components and complex supply chains;
- Undertake a national review of strategic industries to identify and prioritise those that require protection from dependency on China;
- Review bilateral investment treaties and free trade agreements, to assess how effectively they manage risk from strategic dependency from China; and
- Review existing trading partnerships to identify ways in which increased cooperation could reduce strategic dependency on China.⁵

Again, while the report, and actions, are China-focused, Australia should expand the field-of-view and undertake these reviews and assessments as a matter of priority across all those supply chains that deliver critical goods and services to the nation. Essentially, actioning the four recommendations above will facilitate the establishment of Trusted Supply Chains and also deliver the means to identify where to focus our efforts for Smart Sovereignty.

⁴ Loc. Cit.

⁵ Ibid, p. 6