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THE CASE FOR AUKUS
SUBMARINES ARE HALF THE INTELLIGENT SOLUTION

Adam Slonim

JOHN CURTIN RESEARCH CENTRE
Labor ideas for a better, fairer Australia

About the author

Adam Slonim is the Secretary of the John Curtin Research Centre. Adam is also the founder and director of the Blended Learning Group, an Adjunct Fellow at Victoria University, consultant to the Australian Institute for Machine Learning, and co-convener of Australia-Israel Labor Dialogue. He co-authored the 2019 John Curtin Research Centre report 'Artificial Intelligence and the Future of Work', and edited the 2021 ASPI report "Artificial Intelligence: Your Questions Answered'.

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In The Case for AUKUS: Submarines are half the intelligent solution, Adam Slonim unpacks Australia's strategic plans for the next three decades, including acquiring Virginia class submarines and designing new nuclear-powered submarines. At the heart of the $368 billion plan is counterbalancing China's growing assertiveness as a great power in the Indo-Pacific region, its weaponisation of trade with Australia, and its challenge to the international rules-based order. Slonim argues for the benefits of the AUKUS strategy, emphasising the economic impact and advanced industrial capabilities accruing to Australia. While stressing the importance of protecting sea and air lanes, economic supply chains, and enhancing industrial complexity, Slonim urges policymakers to leverage AUKUS in the national interest. The potential of artificial intelligence (AI) in modern warfare, demonstrated in conflicts such as Israel's AI-assisted operation and Ukraine's use of AI-enabled weapons, he assists, must be the cornerstone of a new Australian advanced industrial capability. The Case for AUKUS shows how AI and software-centric capabilities are crucial in modern warfare, and Australia must focus on developing AI expertise. This is not an 'either or' choice, Australia can and must invest in both submarines and AI innovation to secure its strategic interests and ensure long-term growth and prosperity.

Introduction

"... changes of tactics have not only taken place after changes in weapons, which necessarily is the case, but that the interval between such changes has been unduly long. It can be remedied only by a candid recognition of each change, by careful study of the powers and limitations of the new ship or weapon, and by a consequent adaptation of the method of using it to the qualities it possesses, which will constitute its tactics."

Alfred Thayer Mahan, The Influence of Sea Power On History, 1890.[1]

Over the course of the next three decades, Australia will upgrade porting facilities for rotational visits of United States and United Kingdom nuclear-powered submarines; acquire three US Virginia class nuclear-powered submarines in the 2030s; and design and build (in concert with the UK) a new nuclear-powered submarine (SSN-AUKUS). The number of boats is yet to be specified, but believed to be up to eight, at a price tag of $368 billion.[2] The Albanese Labor government says this equates to 0.15% of Australian GDP and a fair price for the strategic and industrial benefits the submarine purchases which will accrue to our country and to our region.[3]

As the dust settles on Labor's recent national conference which ratified the government's AUKUS strategy, it is incumbent on savvy policymakers to deepen the conversation and for the general public to deepen its understanding of the immense benefits this strategy will provide Australia and furthers opportunities that await.

We know nuclear powered submarines are a formidable weapons platform. Acquisition of the submarines is an undertaking not for the faint of heart and means a large-scale re-orientation of Australian's national security posture. Namely through the projection of military power into our region for two reasons:

1. as a counterbalance to the growth across the Indo-Pacific of an aggressive, authoritarian China intent on challenging the global rules-based order, and as a consequence of this aggression.

2. to protect Australia's air and sea lanes.

The AUKUS plan to develop and build submarines in Australia will also have a measurably positive economic impact on Australia's industrial base, estimated to have create 20,000 good, secure, and well-paying jobs.[4]

Further, 'Pillar Two' of the AUKUS Agreement aims to create advanced capability through shared cooperation around next-generation technologies such as quantum and cyber. It also represents an opportunity unique to Australia's extraordinary research capability and global leadership, namely Artificial Intelligence.

The future of warfare, as evinced by, for example, the Ukrainian conflict, involves the application of non-kinetic weapons platforms, especially the use of Artificial Intelligence, in close coordination with, and parallel to, massive firepower.

'Grey zone' warfare is already with us. Yet Australia arguably lacks a coherent defence capability in developing and using AI – arguably a more important capability than the purchase of nuclear submarines alone, and which in turn will lift Australia's industrial base from that of a farm and quarry, and into a dominant regional power.

Prior to the ALP conference, I tested these arguments within ALP and informal left-wing circles. I was astounded that many Labor people were opposed to AUKUS. Much resistance seemed to be borne of a reflexive anti-Americanism. More surprising was a 'romantic' view of China as a victim of international circumstances, and not the weaponiser of trade sanctions Australian industry contends with.

It's China, stupid!

Is the rise of an adversarial China the reason why AUKUS was midwived? There are several reasons behind the AUKUS decision and taken together there is one common thread: the rise of China as an assertive and increasingly aggressive nuclear regional hegemon, which potentially poses a threat to Australia's and the Asia Pacific Region's open access to sea and air routes, to say nothing of the Chinese Communist Party's coercive attempt to define the terms of all international engagement and even domestic affairs, such as the right to free speech.

To be clear, the rise of China as Asia's regional superpower is not the underlying issue per se. China's destiny as a great global power was foreseen as inevitable as far back as the 1940's when it was given permanent membership of the United Nations Security Council. What is at stake is China's actions as a belligerent great power – threatening its neighbours, its region, and the international rules-based order. China has taken on an assertive role commensurate with its enhanced military and economic capabilities and worked hard to expand its influence in the region and globally.

It is not coincidental that Australia's Deputy Prime Minister and Minister for Defence, Richard Marles, in explaining the AUKUS submarine deal, described China's expanding military capabilities, thus: "China will have 21 submarines and 200 surface ships by the end of this decade … that is a hard power equation we face."[5]

Critical to Australia's national interest is protecting its sea and air lanes through the South China Sea to maintain unrestrained trade (and terms of trade) with four of our top five trading nations – Japan, Korea, the US, and China itself. Freedom of navigation and overflight through this area is essential to our national interest.

Yet China's less than benign approach to its neighbours has darkened Australia's international sensibilities. First, China has unilaterally asserted sovereignty over the South China Sea by creating artificial militarised islands around the sea's perimeter in contravention of the United Nations International Law of the Sea and in disregard of International Arbitration. The latter ruled that China's unilateral actions constituted a breach of international law. Indeed, China has created an Anti-Access/Area Denial strategy throughout the South China Sea, bringing it into direct conflict with coastal nations whose international waters spill into those waters: Vietnam, the Philippines, Malaysia, Brunei, and Indonesia.

Second, more disturbingly, China has politicised trade with Australia by sanctioning some exports when the Australian government, along with other states, sought to open an international investigation into the origins and initial spread of COVID-19. In the face of Chinese reluctance to share scientific data on the then new coronavirus, Australia was not alone in thinking sunlight was the best disinfectant.

As a form of punishment, a senior Chinese official openly declared that Beijing had singled out Australia for economic punishment, saying the federal government cannot profit from China while "smearing" it. China's government hit several Australian industries with economic sanctions, imposing hefty tariffs on barley and wine exports while throwing up barriers to other products including timber, lobster, and coal. The Chinese reaction cannot be dismissed as mere grandstanding. It was a straightforward application of the use of trade power to compel changes in Australia's foreign policy.

Third, China's military actions around Taiwan constitute more than sabre-rattling. Aggressive

militarisation of this conflict puts all Pacific nations on guard.

In the context of an unstable, insecure strategic environment, Australia needs to work with the global community and notably its allies to protect sovereignty and maintain freedom of trade, an issue that is also of key strategic concern to all nations in the Asia-Pacific region, including iron-ore dependant China.

One other key factor is of national strategic concern. Covid starkly revealed the vulnerabilities within Australia's supply chains. While protection of sea lanes is vital to a trading island continent at any time, and especially during uncertain times, Australia's national interest is also imperilled by a lack of economic supply chain security and, increasingly, our lack of economic complexity.

The Harvard Country Complexity Ranking measures a country's economic development resulting from the accumulation of productive knowledge and its use in complex industries. Simply put, the more complex a country's economy, i.e. the scale and depth of diversity and mastery of diverse industries, the more it is likely to build and self-sustain long term economic growth and prosperity.

Australia's economic complexity is poor – ranking 91st out of 133 nations.

Namibia is 92nd yet its economy is 124 times smaller than Australia.

Kenya is 90th yet its economy is 12 times smaller than Australia.

In an interdependent world defined by rapid techno-scientific change and agility, Australia in many ways remains a 20th century quarry and farm. Don't get me wrong; we are globally efficient miners and farmers, but we must value-add and diversify our economic base. Mining as a share of Australia's GDP constitutes some 14.6%; agriculture 11%, and manufacturing 5.5%, having fallen from 30% in the 1960's.

The ambition to rebuild Australia's industrial base is now a pressing national concern. And this necessity, essential to preserving our quality of life, requires, among other things, protecting trading lanes in both the sea and the air.

Is it any wonder Australia is acquiring the most powerful submarines and aircraft – F-35 fifth generation fighters – available? Given this reality, and measured on purely national security grounds, Australia, as an island continent located at the juncture of two global oceans (Indian and Pacific), is left with few other geo-political options.

There remains, however, the opportunity cost of these procurements.

Are SSN's and F-35's the only answer to Australia's strategic circumstances, or could our defence be secured by complementary or different military means?

The choices of securing Australia's national interests through acquisition of major defence and offense systems requires meeting three criteria; that the platform is needed by the time of entry into service; that the technology works as specified; and that the platform has not been made obsolete by technological developments.

In answering these questions, what global defence platform trends does Australia need to consider to be salient vis-à-vis its national security decision making?

AI wars

In a galaxy here and now AI is central to twenty-first century warfare.

Australia has much to learn.

Consider Western Asia. On 10 May 2021, Israel conducted a military operation against the Hamas regime ruling the 365 square kilometre Gaza Strip. For 11 days, Israel deployed its armed forces, sans infantry, to conduct what has been termed the first Artificial Intelligence war. Collecting data using signal intelligence (SIGINT), visual intelligence (VISINT), human intelligence (HUMINT), geographical intelligence (GEOINT) and more, the Israel Defence Forces amassed mountains of raw data that was combed through and assessed by supercomputers running sophisticated AI programs to find the key military pieces necessary to carry out targeted armed strikes.[6]

For example, Hamas' underground 'Metro' tunnel network was heavily damaged over the course of several nights of coordinated airstrikes originating from air and sea. The IDF revealed it was able to map the tunnel network, consisting of hundreds of kilometres under residential areas, to a degree where they knew almost everything about them. The mapping of Hamas' network was achieved via a massive intelligence-gathering process fusing and analysing every source of data. Once mapped, the IDF was able to gain a full picture of the Hamas network both above and below ground, including the depth of tunnels, their thickness, and direction of routes. It was thus able to assemble a plan of attack against these underground transport networks with minimum casualties.

Nine months later, a second AI war broke out, and is continuing, in the Ukrainian theatre of war. Here, AI is deployed by means of autonomous drones and other weapons systems. Ukraine and Russia have both employed uncrewed armed systems to gain battlefield advantage. These systems include autonomous aerial and undersea drones, uncrewed ground vehicles, and what are termed aerial-based loitering munitions. All of these weapons are powered by AI systems which integrate with real time data received from satellite imagery and then autonomously geo-locate objects for targeting, arrange flight paths and subsequent detonation.

Neural networks are used to combine ground-level photographs, drone video footage and satellite imagery to produce tactical intelligence advantages. Ukrainian soldiers deploy micro-drones and network systems that serve to expand and enhance specific battlespace and tactical advantages that allow over-the-horizon visibility.

This is distinct from the cyber use of AI whereby electronic warfare, encryption, and hacking have led to dramatic interception of Russian communications, including, apparently, collection of social media to pinpoint troop concentrations.

Ukraine was, at the outset of the Russian invasion, outgunned and outmanned, and expert opinion held that it could not endure. Technology, and its powerful application to the battlefield, has allowed a smaller country to turn the tables against a bigger, more powerful country that has ten times the armed forces at its disposal.

The fundamental lesson of the Ukraine-Russian conflict is a revolution in warfare: competitive advantage now consists in acquiring and harnessing the right technology. The networked battlefield, a military subject that has been discussed, debated and conceived for over thirty years, is with us and is here to stay.

Size isn't everything

As the examples above reveal software primacy is key to battlefield advantage.

Early in the current Ukraine-Russian war, Ukraine fired two Neptune missiles at the flagship of the Russian Black Sea Fleet, the Moskva, which afterwards sank. The Neptunes cost USD $500,000 each. The Moskva cost USD $750 million.

The Moskva's sinking is a salutary lesson. If small and cheap weapons are successful against a platform-centric Russian Goliath, then an anti-platform-centric Ukrainian David might possibly be the smartest way to fight asymmetric wars.

> Platform-centric means an approach or strategy where a particular platform serves as the foundation for deliverable activities, services and products. For example, an e-commerce or cloud computing platform. A submarine is a platform for various activities like remote intelligence gathering, missile launches or placing commandos close to foreign shores.

AUKUS is therefore a multi-decade platform-centric verdict on the strategic judgement Australia finds itself in the hard power confrontation with China. Yet new software-centric warfare suggests large scale military platforms, like submarines, are a legacy capability, and military investment must be concentrated in software-based agile systems coupled with autonomous weapons, like drones.

The question of whether submarines are redundant is often raised because developments in 3-D imaging LIDAR technology promise to remove the single most potent advantage of submarines – stealth. The ability to move without detection underwater to transfer weapons systems near an adversary is the most powerful deterrent effect of the submarine platform.

> LIDAR (Light Detection and Ranging) is a laser-based technology that can detect artifacts beneath the waves to a current depth of 160 metres, and research is currently underway to further the depth of detection to 500 metres. Nuclear submarines can currently travel at depths up to 300 metres.[7]

In one sense this is an impossible argument as advances in stealth will stimulate advances on stealth-detection, which in turn will cause more advanced stealth technology development ad infinitum. Practically speaking, the key defence concept is achieving a sufficient amount of stealth for deterrence to be effective.

But does this necessarily make Australia's future purchase of subs redundant? LIDAR cannot in and of itself replace the need for submarines in naval warfare. While LIDAR can provide valuable information about underwater terrain and detect objects, like underwater mines, it cannot match the mobility and offensive capabilities of submarines which include intelligence gathering, surveillance, reconnaissance, and an ability to detect and engage enemy vessels at sea, in the air, and on land.

These capabilities provide a powerful deterrent against potential adversaries and helps to maintain strategic stability. Yet, as warfare may now be increasingly characterised by anti-platform capability, what are the reasons behind Australia's

purchase of such a massive and expensive nuclear-powered submarine platform?

The first, as suggested above, is to defend Australia's vital interests in the sea lanes surrounding Australia, and to project power into the Indo-Pacific region. Nuclear-powered submarines provide much longer range, greater speed, and increased stealth capabilities than conventionally powered submarines, and given Australia's geography, nuclear submarines provide a greater degree of military capability.

Second, they provide strategic deterrence, demonstrating that Australia is committed to maintaining a strong defence capability in an increasingly unstable region.

Third, the decision gives significant heft to the strategic partnership that is at the heart of AUKUS in the face of an increasingly assertive, non-benign China.

Fourth, technology transfers involved in acquiring existing vessels and designing and building new subs will significantly enhance Australia's industrial base. Given our poor levels of economic complexity outlined earlier in this paper, this opportunity must be seized. The national security reasoning for the AUKUS pact stands on its own merits. The 'industrial policy' created in consequence is an additional reason that provides realistic and transformative economic benefits for Australia.

In concert with the Australian Government's $15bn National Reconstruction Fund, broadening our domestic industrial base is key. The subs alone are estimated to create up to 20000 jobs and inject $6bn into the economy over thirty years.

Responsible powers need the newest and best tools for their security, international commitments and to preserve peace in the Indo-Pacific region and beyond.

The question remains, however, are there alternative solutions? Ukraine has shown that size is not the determining factor in waging war. The will to succeed and best-practice civilian and military leadership is critical. Two addition factors define the successful theatre of today and tomorrow: networked battlefield and intelligent weapons. All four items – all of them – require excellent data upon which to make immediate, medium term and decade plus decisions.

Without data and its fundamental utility as the primary tool of warfare and of the twenty-first century more generally, old fashioned, costly trench warfare prevails.

The best form of defence is offence

Protecting Australia's sea and air lanes is a geographic truism. In a region characterised by an aspiring hegemon, Australia must equip itself against regional instability, in turn asserting Australia's strategic interests. In the absence of appeasement, this is Australia's only alternative if it desires to secure freedom of navigation. Wishing the situation were otherwise does not make for good policy.

A homeland-defence-only posture cannot secure Australia as the sea and air lanes surrounding our continent are thousands of kilometres in breadth. No country is an island in the international system and there is no suggestion Australia is arming itself or needs to arm itself to attack China. The region itself is searching for a counterbalance against China's military might. We are all interdependent.

U.S. and Chinese forward-deployed air and naval forces in Asia

U.S. military			Chinese military	
Current → 2025			Current → 2025	
250	250	Fighter jets	1,250	1,950
		Bombers	175	225
10	10	Patrol aircraft	15	30
1	1	Aircraft carriers	2	3
4	4	Amphibious assault ships	8	12
12	12	Warships	60	108
10	10	Submarines	56	64

Source: U.S. military and Department of Defense
Notes: Current figures are estimates and 2025 figures are projections.

In the absence of submarines, what are Australia's choices in protecting our vastly dispersed sea lanes? One suggestion is investment in land-based missile systems that deliver long-range strike capability. Australia has already decided to purchase missile systems because of the mobility and relative cost of deployment. Yet if Australia only invests in long-range missiles on land or at sea (itself requiring a sufficiently structured naval force, like SSN's), then its options for wider scale military response and manoeuvre are limited. Missiles can only be part of a security package deal.

Given the wide disbursement of missiles in the Indo-Pacific, Australia may also need to consider purchasing a missile defence system to protect the mainland from possible missile attack – not a cheap option in of itself. Then there are hypersonic missiles, apparently used by Russia against Ukraine, but without seemingly major impact. While still early in their life cycle, hypersonic missiles are much faster than any defensive system currently available and create an asymmetrical advantage. Rapid investment in these weapons is now considered urgent, and the western democratic alliance has yet to develop a finished package. As hypersonics are not readily available for purchase, this then requires investing in their development. Again, this constitutes a much more expensive decades-long process.

The conversation around the opportunity cost of submarines has often turned to drones. Why invest $368bn in eight-to-twelve subs when for half/quarter/tenth – take your pick – of the cost, Australia could invest in large and small aerial and/or underwater drone swarms, microdrones, and any drone type in between.

If Australia's posture was purely defensive, then it might make sense to surround our sea and air with drone swarms. Given the size of the continent with a perimeter of 34,000 kilometres, this might mean many millions of such devices would be required. We would also need to invest billions in creating, managing, maintaining, and upgrading the software systems required to run a drone-based 'Iron Curtain'.

Coincidently, I was overseas last year with a group of eminent AI scholars and this exact conversation came up. They thought it was feasible – if we started soon Australia could be world leaders in drone swarms. The key is the software, not the hardware. If the modern, network battlefield is built around Big Data, the critical enabling technology must be the software that links the constituent parts together.

Given Australia's circumstances the country does not have much choice when it comes to purchasing submarines. It isn't about conventional or nuclear as the physical distances required demand best-of-breed solutions.

Part of the total cost is a Keynesian-type stimulus to create a submarine industrial base. With the lessons of Israel and especially Ukraine, and given the inherent power unleashed by AI, we must double or triple down on the proposed investment in Australia's industrial base and maximise the innovative power of AI research and development allied to and extending far, far beyond the submarines themselves.

As Schmidt has noted, all-in on artificial intelligence will itself speed up innovation, generate new industrial and globally competitive industries and solutions across a wide range of global opportunities, and create breakthroughs in multiple sectors.

Australia could create solutions of incalculable value. Maybe, just maybe, a drone Iron Curtain is a stretch too far, but the process of developing such a solution will, by the very nature of AI itself, necessarily innovate other solutions along the way.

Like the 1960's Apollo Program, necessity mothered a host of inventions of which the most important, the Integrated Circuit, has contributed to an endless acceleration in computing power, with never-ending benefits flowing to people everywhere.

Harnessing Australia's intellectual genius in AI to create over-the-horizon and cost-effective solutions will spill over into many other domains of life. While western nations are catching up on building hypersonic missiles, none have yet developed guidance systems to accurately target these powerful weapons. Given Australia's globally competitive strength in Computer Vision, such an opportunity would be a game-changer, and the creation of such a software system will be in global demand, expand our industrial base and spill over into many other industries.

Computer Vision means enabling machines to interpret, analyse and derive meaning from visual data. There are a host of applications where this technology has multiple uses and benefits: object recognition, detection, tracking and surveillance; medical imaging; robotics; advanced automotive driver assistance systems; augmented reality; and especially agriculture. Applying computer vision to geographic location and big data imagery analysis starts to manage and, over time, predict climate change effects, especially fire outbreaks. For Australia, this is essential.

These are just a few examples of the many uses of computer vision alone outside the military domain.

Computer Vision is only one of the new domains of AI. As the technology continues to advance – and it is developing more quickly as AI does – it is likely that we will see even more applications in an ever-wider range of fields.

Imagine Australia being a Computer Vision superpower.

Subs are Australia's moon-shot.

Australia is a middle-sized power located in a strategic position between two oceans in an increasingly unstable part of the world. The real opportunity presented to the country in the designing and building of submarines is to cleverly leverage expenditure to super-size our native genius in Artificial Intelligence. In doing so we can expand our industrial base, cultivate specialist knowledge to expand our economic complexity, set the country up for long-term growth and prosperity, all the while protecting a rules-based order, trade freedom and keep Australia safe.

Innovation
begets innovation

Eric Schmidt, former Chief Executive Officer and Chair of Google recently wrote in Foreign Affairs about the intrinsic revolutionary power of AI: "Developments in in artificial intelligence in particular not only unlock new areas of scientific discovery; they also speed up that very process. Artificial intelligence supercharges the ability of scientists and engineers to discover ever more powerful technologies, fostering advances in artificial intelligence itself as well as in other fields – and reshaping the world in the process. The ability to innovate faster and better – the foundation on which military, economic, and cultural power now rest – will determine the outcome of the great-power competition between the United States and China".[8]

Schmidt calls AI the "foundational technology"; its generative nature is a platform upon which continuous scientific and technological innovation occurs, in turn stimulating more innovation as the technology expands. These AI systems, he writes, "will be able to produce breakthrough innovations in other emerging fields, from synthetic biology to semiconductor manufacturing ... and countless future developments in drug discovery, gene therapies, material science and clean energy."

In other words, innovation begets innovation.

Australia has some of the world's best AI research and development centres. Adelaide University's Australian Institute For Machine Learning is rated in the top five global research institutions when it comes to AI Computer Vision (outside China, seventh overall globally). Deakin University's Applied Artificial Intelligence Institute, Queensland University's Robotics Institute, and other academic centres of excellence are pushing the boundaries of AI innovation, but Australia lacks both a mature venture capital market and industrial base to super-size this capability.

Australia does not need to choose between submarines or anti-platform systems.

It's time to go all in on both.

Superpower vision

Given Australia's strategic circumstances the country must purchase subs, and given the physical distances required, best-of-breed long-distance capable solutions are demanded. Part of the total cost is a Keynesian-type stimulus to create a submarine industrial base. With the lessons of Israel and especially Ukraine, and given the power unleashed by AI, we must double or triple down on the proposed investment in Australia's industrial base and maximise the innovative power of AI research and development allied to and extending far, far beyond the submarines themselves.

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Like the 1960's Apollo Program, necessity mothered a host of inventions of which the most important, the Integrated Circuit, has contributed to an endless acceleration in computing power, with never-ending benefits flowing to people everywhere.

Harnessing Australia's AI intellectual talent to create over-the-horizon and cost-effective solutions will inevitably be cast across many other domains of life. While the western nations are catching up on building hypersonic missiles, none have yet developed guidance systems to accurately target these powerful weapons.

Given Australia's globally competitive strength in Computer Vision, to take one example, such an opportunity would be a game-changer, and the creation of software systems will likely stimulate global demand for exports, expand our industrial base through development of other industries, such as medical imaging and manufacturing quality improvements.

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