

## Beyond survival ...

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### ABSTRACT

The purpose of this closing paper is to “draw threads” from the collection of papers presented in this Special Issue, with the aim of exploring the defence industrialisation experiences of small and medium powers. Structurally, the paper begins by examining the challenges Tier Two and Three nations face in developing and sustaining defence industries. Attention then switches to assessing the coping strategies these countries adopt in seeking to overcome the limitations imposed by constricted scale and defence economic infrastructure. Government has an important role to play in addressing trade-offs linked to the autonomy, dependence, and efficiency trilemma. The aim is to ensure that the required degree of indigenous defence industrial capacity offers an acceptable level of sovereignty and manufacturing efficiency that is also affordable. The final section speculates on the future defence industrial opportunities and threats Tier Two and Three states are likely to confront. Whatever the future holds, there is a sense from the case studies presented that small and medium powers can survive the constraints of relative smallness and prosper.

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## Small-medium power defence industrial challenges

Defence industrial development of small and medium powers is an important topic and becoming more so with the passage of time. This is largely due to international supply chain disruptions caused by COVID-19 and Russia’s invasion of Ukraine, leading to the demise of defence globalisation and open defence trade. The inevitable result amidst emerging international insecurities has been the rehabilitation of defence industrial sovereignty, partially facilitated by “friendshoring” as a means of accommodating the conflicting requirements of autonomy and industrial efficiency. This trade-off is a phenomenon primarily affecting major Western defence economies, but smaller nations will also suffer due to US and European onshoring and friendshoring policies. Moreover, the January inauguration of US President Trump will add to the sense of strategic vulnerability felt by most states, irrespective of their defence industrial Tier status. Even big regional entities, such as Europe, are affected, evidenced by the recent launch of its first

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Defence Industrial Strategy aimed at bolstering Europe's "strategic autonomy" by reducing its acquisition dependence on the United States (EC 2024). Across the world, the search for sovereign defence industrial capability is growing. For all states, the challenges are immense, but for the small and medium powers, the difficulties are magnified.

Smaller states suffer for a variety of reasons, but perhaps the biggest is the inability to secure a minimal critical mass of activity, including constrained acquisition scale, that inevitably raises unit cost and disincentivises local production. Additionally, there is the problem of accelerated cost escalation of acquisition due to the growing Research and Development (R&D) intensity of modern weapons systems. This affects all nations, but the rich defence industrial powers are leveraged by powerful economies, and while still not painless, the heavy financial burden can be shouldered more easily. For example, the world's richest nation is the United States, which generated a Gross National Income of over \$29tn in 2024 (Trading Economics 2025), enabling it to allocate a gargantuan defence budget of \$850bn and within that a research spend of \$143bn (DoD 2024a; Martin 2025). These sums dwarf those of other countries, and certainly small and medium powers do not have the economic power to match this level of defence expenditure. Consequently, they face harsh trade-offs and difficult choices in protecting territorial integrity in an uncertain strategic environment, shorn of major power security guarantees. Indeed, even when the principal arms suppliers are "friendly" nations, there is always the risk of arms embargoes (for example, since October 2023, Israel has suffered arms embargoes from Italy, Japan, Spain, Canada, the Netherlands, and Belgium) and acquisition restrictions (US sales to Turkey and Japan) imposed by Western supplier governments. More generally, economic warfare, including export controls, embargoes, and aid restrictions, has become almost as intimidating as the threat of military aggression.

The traditional view of smallness is that it acts to limit both defence industrial autarky and thus freedom of action. This relationship has politico-economic implications, not least because defence is a public good and the responsibility for its provision falls on government. This responsibility must also include the risks associated with constructing costly arms production capacity, irrespective of whether it is a public or private enterprise. If commercial companies are encouraged to participate as means of raising operational competitiveness, the defence market is still far removed from Adam Smith's competitive structures. On the supply-side, the emergence of monolithic industrial champions will likely raise costs through restricting competition. If the defence companies are publicly owned, then additional layers of bureaucracy and organisational lethargy will exacerbate the difficulties, albeit this is a malady afflicting the defence programmes of even Tier One Western powers. At the industrial level, immature Tier Two and Three industrial economies will suffer from innovational inefficiencies due to the absence of specialised Small Medium size Enterprise (SME) suppliers, leading to high import dependence on foreign systems. Government sponsored defence industrial entities also tend to operate in isolation from the rest of the economy and hence fail to contribute to broader economic, industrial, and technological development. More generally, rising defence expenditure will drive a raft of diseconomies via induced inflationary, fiscal, and debt pressures that act to retard the host country's rate of economic growth and impose high social costs on society. Further, defence programmes are

invariably complex and expensive, leading to production delays and, as previously mentioned, cost escalation.

The demand-side of the defence market also operates under imperfect competitive conditions, reflected by the government representing the sole source of demand. The result is a high-cost “monopoly-monopsony” market structure, leaving government with the only option of intervening to raise competitiveness: on the supply-side this will be through an open trade policy to incentivise market entry; and on the demand-side the focus will be on diversifying the customer base through export promotion. Historically, small and medium powers struggle to implement such policies, because open trade will ensure the incipient defence industry will not survive and export endeavours are constrained by limited overseas diplomatic and military relations to promote client states, as well as the absence of an international brand, connoting trust in the quality of the equipment transferred.

Further, from a policy and planning perspective, Tier Two and Three nations are likely to face profound difficulties in pursuing transformational strategies aimed at expanding defence industrial boundaries and increasing the efficiency of defence resource allocation. The notion that the defence industry is solely focused on the production of platforms and ordnance is no longer feasible. The US, UK, EU, and Australian governments are presently seeking to implement policies aimed at achieving enhanced defence industrial sovereignty by promoting greater acquisition agility, a deepening of technological skills, more robust and resilient domestic supply chains, and the enhancement of civil-military integration. These efforts to rebuild sovereign capability are critical at several levels. Firstly, because an increasing proportion of modern weapons systems contain dual-use technologies that derive from the commercial sector, from a prosperity perspective, it makes sense for government to support the development of viable “cross-domain” industries, such as sensor, IT, Artificial Intelligence (AI), and electronics suppliers. Secondly, almost every tier of supply chains is populated by commercial companies, and therefore there is a consequent planning need to broaden the conventional definition of a defence industry. Thirdly, as Japanese defence-industrial strategy acknowledges, today’s civil-military model facilitates innovational spin-off, whereby defence industrial investment sponsors growth and innovation in the commercial sectors of the economy, and vice versa through innovational spin-ons moving from the commercial sector to defence production. In this way, the defence economy acts as a positive force that fosters economic vitality and prosperity of the wider economy. Yet, small and medium powers are often characterised as having underdeveloped commercial technology sectors, operating below a critical mass of capability, and thus making the transition to Military-Civil Fusion (MCF) difficult to implement.

### **Size does matter, but there are coping mechanisms . . .**

Global defence powers are few, but small and medium powers are plenty, so studies exploring the latter’s ability to nurture and sustain defence industrial capacity are important. This Special Issue adds to the growing scholarship on the topic and offers new insights not only in terms of the defence industrial challenges these states face but also on the policies employed to overcome them. Small and medium powers pose numerous conceptual and practical problems. The dominant practical

limitation is obviously limited scale, but an appropriate planning strategy focusing on systems specialisation and dual-use technology synergies has been effectively employed by numerous Tier Two states to generate scale through export demand. Richard Bitzinger, as well as other notable scholars mentioned in this Special Issue, have sought to construct a typology of states at different stages of the defence industrial life cycle. It is a helpful analytical framework, but the pace of change suggests that the environmental dynamics of stage transition requires continuous (re-)evaluation. Indeed, from a conceptual standpoint, there is a pressing need to go back to fundamentals to more closely define the boundaries of a modern defence industry. For example, the recent US National Defence Industrial Strategy (DoD 2024b) indicated that the civil-military supply chain is for the first time deemed to be part of the country's defence industrial base.

The papers in this Special Issue explore Tier One and Two policy dynamics, and interestingly the discussion is blended into the practical "reality" of small and middle power defence industrialisation. For this purpose, a country case study analysis is adopted, and states under scrutiny have been selected wisely, offering valuable perspectives on the motives for defence industrialisation. Although the primary goal of self-reliance is to weaken dependence on overseas arms suppliers, the collected papers highlight several other defence industrialisation goals, including prestige (UAE), history, culture, geography and climate (Argentina and Finland), patriotism (South Korea and Japan), nationalism (Turkey), unique defence needs (Japan), an engine of growth (Israel and South Korea), bargaining power (Japan), military interoperability (EU), and Military-Civil Fusion (MCF – Israel and Japan). A wide spectrum of planning experiences is offered, incorporating defence economy contexts ranging from industrialising to industrial, large to small geographies, foreign dependence to (relatively) self-reliant, with all facing the common denominator of strategic insecurity. Moreover, once the defence industrialisation push is underway, the case studies reveal that exports are commonly accepted as the most sensible way to defray the high costs of constrained scale. Yet, successful export performance demands a high degree of domestic industrial competitiveness, and it has long been folklore that smallness is antithetical to competitiveness at both the product and process levels. Yet, this stereotype may no longer be tenable.

The International Institute for Management Development (IMD) country competitiveness rankings offer a different perspective, suggesting that "small is beautiful." The 2024 data identify the tiny island state of Singapore as the world's most competitive nation, ahead of 10 other "small" states, with the Tier One, United States, ranked only 12th (IMD World Competitiveness Rankings, World Competitiveness Center 2024). The IMD analyses a panoply of economic and financial factors to calculate the rankings, but innovation is considered a principal determining "pillar" of competitiveness. The IMD makes clear that the process of creative destruction is an essential ingredient of economic success and posits the important role played by what it calls the innovation ecosystem, comprising supply chains, R&D expenditure, researcher volume, the prominence of research institutions and industrial clusters. Government can stimulate innovation through, for example, artificially accelerating the clustering process, whereby geographical proximity of primes and sub primes facilitates mutual problem-solving to sponsor technological breakthroughs. Notwithstanding the important interventionist role that government can play, constrained geographical space may be an inherent factor in

fostering innovation because smaller nations operate within one integrated industrial and technological cluster.

Aligned with commercial competitiveness is the notion of military competitiveness. It reflects in-country capability to produce superior “cost-effective” weapons, representing an imperative for victory over military aggressors. If this translates into battlefield success, then “International demonstration effects” will likely have positive impacts on export performance. This is evidenced by the Turkish defence industry’s foresight to have specialised in the development and production of simple but effective Bayraktar TB-2 drones. Turkey also had the “luck” of showcasing the impressive capabilities of these drones during the 2020 conflicts in Libya, Syria, the second Nagorno-Karabakh conflict between Azerbaijan and Armenia, as well as the ongoing Russia–Ukraine war, leading to a surge in export orders. A similar rationale can be applied to battle proven Israeli military equipment following decades of conflict in the Middle East.

This Special Issue’s country case studies emphasise the central role that government plays in the political economy of defence. Foreign policy, as an element of statecraft, can create the demand for arms, which defence economists refer to as “public” goods, because they benefit all citizens and, therefore, should logically be funded through tax revenue. Hence, it falls on the government to craft appropriate defence industrial strategies to ensure successful indigenisation outcomes. Success will depend on the government creating an environment that is favourable to import substitution industrialisation, a process otherwise described in the South Korean case as “protective nurturing.” As defence industrialisation progresses, policy must recognise the contemporary essentiality of promoting broader defence industrial ecosystems rather than simply a weapons platform manufacturing capacity. Most of the case study countries exhibit such ambitions, but it is Japan, South Korea, and Israel that have achieved proven success, especially in what has come to be termed fourth industrial Revolution (4iR) defence industrial transformation. Japan and Israel are archetypal examples of Tier Two powers that have made remarkable 4iR progress through investment into MCF-driven defence industrial ecosystems, comprising integrated civil-military technology clusters, R&D intensive supply chains populated by local and foreign technology corporations, plus substantial numbers of highly skilled technologists and engineers.

MCF strategies require small states, such as the UAE, to treat defence industry as a strategic asset, in which the goal of “techno-nationalism” is the dominant development theme. It is an objective that resonates with the pursuit of defence industrial sovereignty, and though infeasible for most states, given affordability constraints, remains psychologically ingrained in military planning regimes. Indeed, even the defence industrial powerhouse, Israel, suffered from financial overstretch in the development of its “indigenous” Lavi combat aircraft. It is a good example of where ambition supersedes affordability, cautioning other smaller nations, such as Finland, to adopt “selective” self-sufficiency strategies prioritizing systems specialisation rather than development of entire weapons systems. The Finnish case also demonstrates the importance of close innovational partnerships between government and elements within the defence industrial ecosystem, such as between primes and sub primes within industrial clusters that comprise technological universities and dedicated centres of excellence in cyber, AI, the internet of things, and space. The power of partnership also extends into the international sphere, embracing technological cooperation with foreign Original Equipment

Manufacturers (OEMs) and through regional cooperation. Several of this Special Issue's country case studies illustrate the significance of international defence industrial cooperation, including: Finland, which enjoys a regional industrial division of labour with other Nordic nations, particularly Sweden and Norway, creating inter-state design and production complementarities; the UAE, through the forging of close defence industrial partnerships with other Gulf States, such as Saudi Arabia, and to a lesser extent Egypt, as well as with other Islamic states, including Indonesia; and Turkey, through collaborative manufacturing partnerships across the Middle-East, with, for example, Saudi Arabia (drones) and Qatar (military vehicles).

Finally, in nearly all cases, the country studies highlight the important role offset plays in catalysing local defence industrialisation. Positive judgements on offset performance should, however, be qualified by the requirement that a minimum level of technological absorptive capacity is required to facilitate learning effects from the associated technology transfer. Japan and Turkey are prime examples of states that have built-up their defence industrial capacity via the offset route, and local absorptive capacity is either in place or ensues. The UAE has also exploited offset opportunities, where increasingly its strategic focus has been on the expansion of local human capital. Additionally, in common with Turkey and South Korea, the UAE has recently demonstrated a preference for joint venture projects, prioritising long-term international partnerships opposed to traditional short-term "transactional" offset arrangements. Finland too has benefitted from offset, and with the emergence of major local primes, such as Patria, has secured high levels of technological cooperation with frontier overseas OEMs. Additionally, Israel has used offset, though to a lesser degree than South Korea, but for both states it is a moot point whether offset has played a key or subsidiary role in the development of defence industrial capability, given that both states have benefitted hugely from American military aid programmes.

### **As the future unfolds ...**

In the way of offering a closing commentary on this Special Issue's collection of fascinating papers, it would be remiss not to speculate on the future trends and prospects of small and medium nations in the development of local defence industrial capacity. For this purpose, it is helpful to borrow the theoretical apparatus presented in the South Korea case study, which highlights the tricky politico-economic balance that Tier Two and Three nations must achieve in the development credible and robust defence industries. In fact, these states face a "trilemma" of trade-offs between autonomy, dependence, and economic efficiency. The search for strategic autonomy is probably the overarching goal of all states, big or small, and represents the contemporary clarion call of the EU as it seeks to reduce import dependence on US military and defence industrial capability. Autonomy is critical for achieving operational advantage and freedom of action, but it is expensive, and especially so for small and medium nations with limited defence budgets. A sensible future coping mechanism, therefore, is the pursuit of niche systems specialisation, whereby frontier platforms are procured from foreign OEMs, with locally developed systems integrated into the foreign warship, aircraft, or land vehicle. The development of niche capability expertise is already evident and will likely increase with the passage of

time, not least because the capability it provides will assist in penetrating overseas arms markets, either through national effort or via access into OEM global supply chains.

Full 360-degree autonomy is not feasible, and hence some degree of dependence on overseas suppliers will be inevitable, reflecting the need to pursue cost-effective and affordable procurement strategies. The challenge for small and medium powers will be to construct an efficient strategy balancing the acquisition of foreign weapons with high value-added domestic systems development. Additionally, these states will need to continue to devise offset policies that facilitate technology access opportunities via joint ventures to ensure long-term OEM investment commitment. Yet, offset is a two-way street, and just as country offset authorities seek reciprocal development benefits, offshore vendors will demand an attractive corporate return. Thus, while offset has become necessary to both parties to close a sales deal, it is not sufficient, and mutual long-term benefits must accrue to enable host country development of a defence industrial ecosystem capable of indigenous innovation. Japan, Finland, Israel, and South Korea have all pursued successful strategies in this regard. Arguably, Japan and Israel represent best practice through the former's efforts to encourage MCF flows between corporate divisions within the same industrial conglomerate, and the latter's policies to promote commercially innovative high technology SMEs that actively engage at every point along the prime contractor's defence R&D life cycle. There is also an emerging trend, as illustrated by Finland, Israel, and the UAE, of launching government policies to consolidate diverse defence businesses into "national champion" conglomerates, mirroring the industrial template of Japan's *Zaibatsu* and South Korea's *Chaebol*.

There is no doubt that the future effective defence enterprise will be characterised by a heavy focus on innovation. Smaller nations must aim to evolve dynamic comparative advantages in 4iR technologies, as efficiency and competitiveness have become the dominant features of the defence industrial landscape. At the product level, innovation is the dominant characteristic of the so-called Revolution in Military Affairs (RMA), as illustrated by US deployment of stand-off precision guided weapons during the Gulf War. In the decades that followed, successive waves of military innovation have occurred in harmony with developments in the commercial 4iR environment. This suggests that rather than simply "revolutions" in technological innovation, there is also an evolutionary process at work, involving continuous waves of interconnected innovational development, resulting in warfare irrevocably changing. In 2025 and beyond, Sino-American rivalry will channel huge R&D resources into the development of disruptive weapons technologies, such as AI-driven decoys, "autonomous" systems, including avian drone swarms, as well as bioengineering and genomics (Matthews and Matthews 2024). Similar technological dynamism is beginning to impact on defence manufacturing structures through investment into robotics and 3D printing, removing the need for complex networks of supply chains. Going forward, "a return to the future" beckons, whereby the industrial architecture of defence production is likely to be one characterised by the redundancy of SME outsourcing as prime contractors become increasingly vertically integrated.

The theme of the case studies is that the policies of second Tier nations go beyond supporting defence industrial survival and view defence industry as a lever to promote national prosperity, as reflected through Japan's cultural notion of "Rich Nation, Strong Army" (Samuels 1994). In the pursuit of defence industrial survival

and prosperity, this Issue's survey of case studies hints at several strategic options to achieve an appropriate balance between autarky, overseas dependence, and affordability. This includes MCF, which has become a critical component of contemporary defence industrial transformation, and its role will continue to grow in the future. Future government policy must also focus on securing the supply of crucial inputs, such as critical minerals, that will power the RMA. These minerals, and the components and systems that will house them, are the dual-use technologies of the future, representing the principal elements of modern weapons systems. Their increasing use will drive skills, innovation, growth, prosperity, and affordability of the civil-military economy. Moreover, as industrial maturity advances, arms export opportunities are likely to emerge, and will contribute to ameliorating small country scale and cost disadvantages. Finland offers a pragmatic defence trade model featuring attractive revenue, technology, and affordability opportunities. One part of the Nordic nation's trade strategy has regard to cost-effective acquisition of ageing second-hand but still operational weapons systems. It is a market that has grown rapidly in recent years, with Finland refurbishing and upgrading second-hand aircraft systems, such as the Hawk procured from the Swiss Air Force and the Grob trainer aircraft sourced from the UK's Royal Air Force. The Finnish example demonstrates that the second-hand market offers the potential for not only acquisition of ageing but low-cost military inventory but also the opportunity for in-country maintenance, repair, overhaul, and upgrades of these weapons systems. Israel employs this strategy through foreign sales of its stock of Soviet, American, and indigenous arms, often along with upgrades. By contrast, Argentina struggles to enter the used weapons market, due to several factors, including its weak maintenance, repair, and overhaul capabilities, the lack of funding to procure replacement parts, and to some extent UK sanctions (Wu 2024).

As a final comment, this Special Issue's collection of papers offers a positive prognosis for small and medium defence industrial powers. Synthesising the results, these nations have designed development paradigms that can legitimately be described as successful, falsifying the traditional stereotype that only "big is beautiful." Success has been achieved through smart acquisition strategies and organic and international partnerships. Japan provides a powerful example of what can be achieved through international partnerships, demonstrating that Tier status is not static and immutable. This is evidenced by Japan's recent invitation to participate in the Australian, UK and US AUKUS Trilateral Security Partnership's Pillar 2 activities (collaborative development of advanced capabilities in undersea capabilities; quantum technologies; AI and autonomy; advanced cyber, hypersonic and counter hypersonic capabilities; electronic warfare, and in two broader functional areas: innovation and information sharing – Nicastro 2024), as well as actual membership of the Global Combat Aircraft Programme, along with the UK and Italy. Tokyo's commitment to international cooperation, supplemented by raised defence spending, the shift to offensive capability, and a liberalised arms export regime, has been described in this volume as the "third way" to sustainable defence industrialisation, placing it on the threshold of Tier One classification. Similar opportunities for defence industrial transformation and even Tier transition will likely occur for other small and medium powers, inviting further scholarly contributions to widen and deepen the debate on this fascinating intellectual field of enquiry.



## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Notes on contributor

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## Data Availability statement

No new data were created or analysed during this study. Data sharing is not applicable to this article.

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