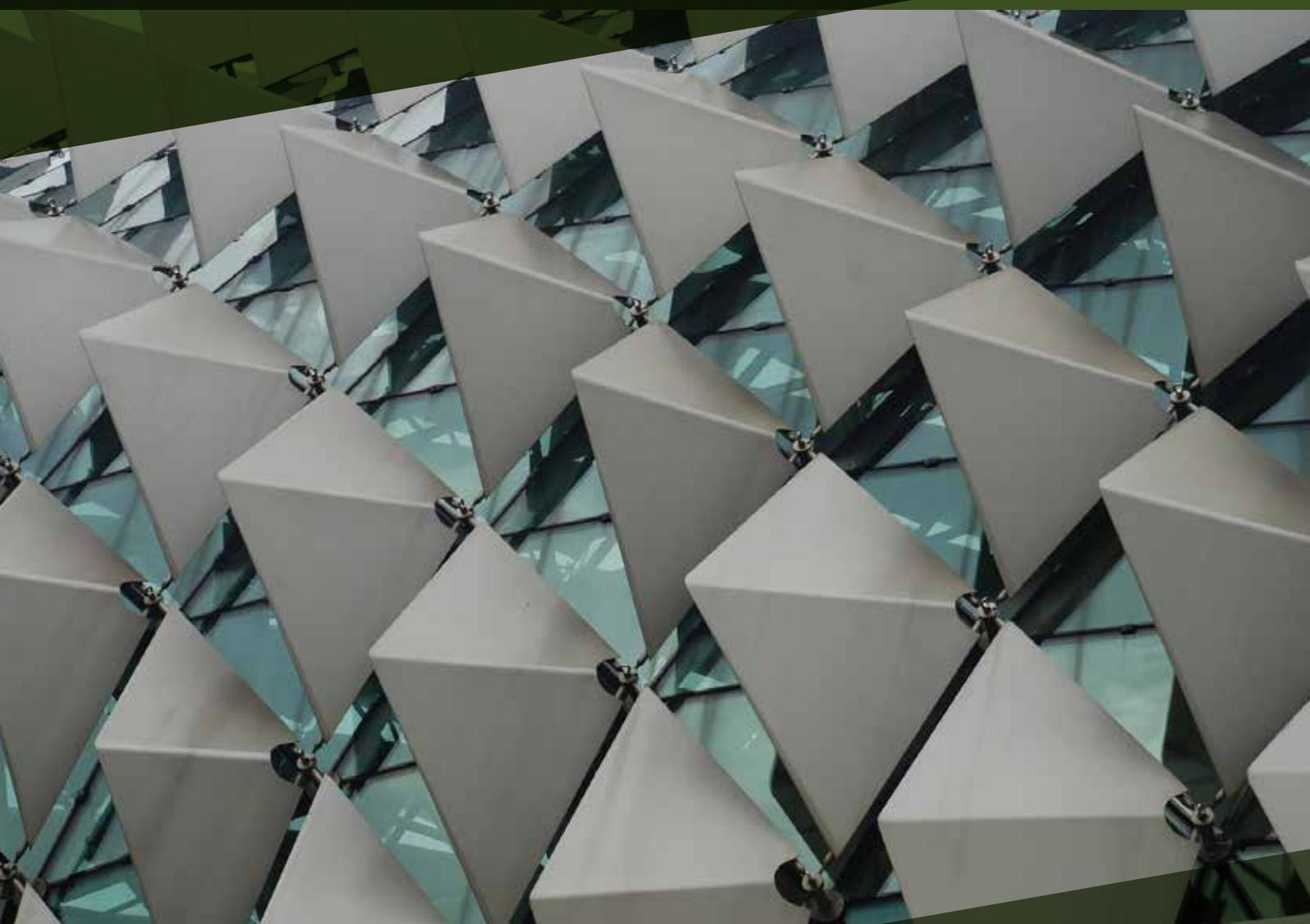


DISCUSSION PAPER 3/2017

The Security Sector in **SINGAPORE**

Contributions and Challenges

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*Strengthening Africa's
economic performance*



Executive Summary

Singapore is perhaps the standout example of holistic economic transformation globally in the second half of the 20th century. The contribution of the security forces in taking Singapore from a newly-independent South East Asian city-state in the mid-1960s that was poor and riven with fault-lines, to an economic powerhouse with a higher GDP per capita than its former colonial power, the United Kingdom, is instructive. Singapore's perception of vulnerability and precariousness led it to prioritise the development of an indigenous military capacity, together with the technological means to sustain it. This paper examines the ways in which military development supported other forms of economic and social development in the country, through the institution of national service, the building of a robust defence industry, and the deployment of military manpower for civilian purposes. Arguing for a broader conception of the military's role, it demonstrates the impact that the military as an institution has had on nation-building and national identity, skills development and technological innovation. While efforts to leverage the military for development have not always been successful, they have had important effects on Singapore's economic trajectory. As such, the Singaporean experience offers helpful lessons to other countries charting their own development paths.

Singapore was faced with a series of pressing problems when it was granted self-rule by the British in 1959, including an unemployment rate of 14%, poor housing, a climate of uncertainty amidst workers' strikes, and unsettled communal relations. The country would make good progress in tackling these problems, prioritising economic development and education, undertaking a successful public housing programme, and being careful to safeguard and nurture community relations. Singapore looked to diversify from an economy traditionally based on *entrepôt* trade with the surrounding region and embarked on an industrialisation programme soon after self-rule under the direction of the People's Action Party government, focused initially on an import-substitution strategy for an anticipated common market with the Federation of Malaysia (a political union which Singapore entered in 1963). When Singapore was released from the Federation over political differences in 1965, thus gaining its independence, and the common market never materialised, Singapore switched gears to an export-oriented strategy centred on attracting multinational corporations (MNCs) and foreign direct investment from Europe, Japan, and the US to set up labour-intensive manufacturing, taking advantage of Singapore's comparatively lower labour costs.

Singapore switched gears to an export-oriented strategy centred on attracting multinational corporations

The switch was typical of the many adjustments that Singapore would have to make over the years to ensure that the country, with its small population, lack of natural resources, and open economy, would survive and prosper in the face of changing regional and global political situations and economic circumstances. With resourcefulness and a determination to make the best of the hand it was dealt and the situations it would face, Singapore worked with the economic inclinations of MNCs in the 1960s when many newly

decolonised countries were more wary; tackled the challenge of the British withdrawal east of Suez in 1967 when British military presence contributed significantly to Singapore's economy and local employment, the Singapore government taking over ownership of a British naval yard for the nominal sum of a Dollar and soon successfully converting it into a commercial shipyard;² and served as a supplies and logistics centre during the Vietnam War. When recession hit in 1985, Singapore mobilised labour discipline to seek wage restraint, and lowered business costs as it sought to restructure its economy toward skilled, value-added manufacturing and services in the face of declining prospects for labour-intensive manufacturing in Singapore.

The state has also stepped in to establish wholly or partially state-owned enterprises when necessary

Singapore has ensured a good success, despite three more recessions (the latest in 2009), through a continued commitment to an open, export-oriented economy; policies establishing good infrastructure, and facilitating and encouraging foreign investment and MNC presence; a disciplined labour; and an education system made responsive to the changing requirements of economic success. The state has also stepped in, especially early on, to establish wholly or partially state-owned enterprises when necessary, including to spearhead pioneer ventures, especially for national purposes (e.g., the early defence industry). These were run on a commercial basis, with many later divested from (although often with a substantial remaining ownership of shares through the state-owned holding company Temasek Holdings).³ There has been a continued dedication to remaking the economy as Singapore's place in the structure of the world economy and the world economy itself changes, with a most recent emphasis on remaining a transportation, financial and services hub; on high-technology manufacturing;

research and development; and establishing itself in the digital economy, with focuses on innovation, entrepreneurship, and locally-based enterprises with a regional and global reach.⁴

Singapore has, as such, defied expectations through 50 years of independence to emerge as a safe and prosperous city-state. This discussion paper examines the contributions of Singapore's security sector to this state of affairs. While considerations of the security sector sometimes leave out defence industry and research,⁵ they are here included as integral providers of Singapore's security. The paper starts by outlining the condition of vulnerability that has motivated Singapore's quest for security, before examining the institution of National Service (NS) and the development of the Singaporean defence industry and technology as answers to this problem. It then briefly considers some of Singapore's experience in relating its security sector to developmental concerns.

Singapore has defied expectations through 50 years of independence to emerge as a safe and prosperous city-state

While Singapore's view of security has included non-traditional security threats,⁶ the conventional defence of Singapore remains a high priority for the state, with the two pillars of Singapore's defence policy being deterrence and diplomacy. Singapore does not identify a particular existential threat in its neighbourhood, but instead seeks, through these pillars, to prevent one from arising in the first place. Should both fail, the Singapore Armed Forces (SAF) is to 'secure a swift and decisive victory' in any conflict.⁷ Expanding on Singapore's view of security is the concept of Total Defence (TD), with military, civil, economic, social and psychological aspects. Underlying this concept is the notion that all of Singapore's resources should be mustered toward its defence in a whole-of-government approach.⁸ This provides some explanation for both the institution of NS and Singapore's approach to its defence industry and

technological institutions. To better understand these, however, one must first explore the security concerns of Singapore policymakers – a problem of vulnerability and precariousness that arose from Singapore's early experiences as a newly-independent city-state.

The conventional defence of Singapore remains a high priority for the state, with the two pillars of Singapore's defence policy being deterrence and diplomacy

Although considerations of Singapore's vulnerability sometimes start from its geostrategic aspects, Singapore's perception of vulnerability has both material *and* ideational causes.⁹ In particular, Singapore's early history is critical to understanding the approach of the Singaporean political leadership. The Japanese occupation between 1942 and 1945 provided first-hand experience of the effects of occupation for Singapore's leaders, and lessons on the speed with which the Malay Peninsula and the 'impregnable' fortress of Singapore fell.¹⁰ Difficult internal federal politics and the 'acrimonious manner' in which Singapore separated from Malaysia in 1965 over disagreements about the place of race in citizenship rights not only soured initial relations, but also created worries about domestic insecurity arising from racial tensions and political contestation, with clashes and riots between Chinese and Malays breaking out in 1964. Meanwhile, externally a low-intensity conflict – the *Konfrontasi* (1963–1966) – was being waged against Malaysia by Indonesia, including in Singapore, with bombs exploding in the city, the two battalions of the Singapore Infantry Regiment (SIR) skirmishing with infiltrating Indonesian troops in Johor and Sabah, and reportedly plans to invade Singapore.¹¹

Malaysian troops initially refused to vacate Singapore upon separation, and Brigadier-General Alsagoff 'insisted on providing a military escort' to then-Prime Minister Lee Kuan Yew to the first

opening of parliament. There were also worries that Alsagoff or remaining Malaysian troops might be persuaded to stage a coup by hardliner ‘Ultras’ in Malaysia. Remembering a later 1969 disturbance, which had spread from race riots in Malaysia, Lee recounts how he noticed the ‘sullen’ expressions of the policeman driving him, and of the soldiers. They were Malay, and Lee worried ‘they might not have shot’ if ordered to shoot other Malays (along with Chinese participants in the disturbance). Together, these incidents underline the sense of vulnerability of Singapore’s early policymakers.¹²

Historical experiences helped to write vulnerability and precariousness over the physical and human geography of Singapore and its neighbours

Furthermore, in 1967 the British announced the withdrawal of forces ‘east of Suez’, including from Singapore. Originally to be completed by 1975, in 1968 the British announced an accelerated withdrawal by 1971. This left the fledgling SAF, established in 1965 with conscription instituted in 1967, a mere three years further to prepare. Together with the concern of Prime Minister Lee that should something happen to then-Prime Minister of Malaysia Tunku Abdul Rahman, Tun Abdul Razak as successor could be pressured to reverse the grant of independence, these incidents created a sense of precariousness. That the foreign policy of external powers, and the leaders of neighbouring states – and with them bilateral relations – could change so abruptly was further reinforced by the end of *Konfrontasi* soon after the fall of Indonesian President Sukarno and the improvement of Singapore’s relations with Indonesia under President Suharto (and oscillating, occasionally difficult relations with Indonesia under

various presidents after Suharto); and by sometimes problematic relations with Malaysia under Prime Minister Mahathir. This sense of precariousness is further highlighted in Lee’s anxieties about “‘rash political acts” from Malaysian political elites ... [or] a “random act of madness””.¹³

These historical experiences helped to write vulnerability and precariousness over the physical and human geography of Singapore and its neighbours. At just 719.1 square kilometres, Singapore is miniscule compared to its neighbours: as then-Defence Minister Goh Keng Swee bluntly put it, ‘it is no use pretending that ... the island cannot be easily overrun within a matter of hours by any neighbouring country within 1 000 miles’.¹⁴ It has no natural resources, not even a naturally sufficient supply of fresh water; indeed, for much of its history Singapore was dependent on water piped from Johor.¹⁵ With a resident population of 3.9 million in an often densely packed urban space, its small, Chinese-majority population has been colourfully called a ‘Chinese nut/island’ in a ‘Malay nutcracker/sea’, including by Singapore’s leaders, evoking a sense of strategic isolation.¹⁶ Its strategic location along Sea Lines of Communication (SLOCs) between the Indian and Pacific Oceans is a boon for wealth through international maritime trade, but also draws attention from great powers that may be tempted to intervene should domestic instability erupt in Singapore to threaten maritime passage; at the same time, its territorial waters are completely surrounded by those of Indonesia and Malaysia, making Singapore vulnerable to naval blockade as 90% of its food is imported.¹⁷

The biggest security concerns, though rarely explicitly stated, remain Malaysia (predominantly) and Indonesia, with Lee stating in 1966 that ‘your neighbours are never your best friends[,] wherever you are’.¹⁸ While interdependence has increased and relations have improved since the early days of ‘survival crisis’,¹⁹ numerous incidents over the years have reinforced the country’s sense of vulnerability and precariousness. These have included threats from Malaysia to shut off water and frictions over water-price negotiations in the

late 1980s and 1990s, tensions during the Asian Financial Crisis (1997–1998), the banning of sand exports used for Singapore’s land reclamation, and the naming, in 2014, of an Indonesian frigate after two Indonesian marines executed by Singapore for a bombing committed during *Konfrontasi*. A joint Malaysian–Indonesian military exercise in 1991 that saw paratroopers scheduled to drop in southern Johor on Singapore’s National Day, in an operation codenamed *Pukul Habis*, was sufficiently problematic for Singapore to order an open mobilisation of its reserves.²⁰ Racial-economic tensions and domestic politics in Malaysia and Indonesia still occasionally spill over into Singapore, if mostly in terms of rhetoric in state-to-state relations. Nonetheless, Singapore’s military capabilities are much improved from its early days, thanks to the institution of national service and Singapore’s defence industry and technological institutions.

Building the Singapore Armed Forces, and the social and economic contributions of National Service

The early experience of separation highlighted the inadequacy of Singapore’s armed forces. When established, the SAF consisted of two understrength battalions of predominantly Malay soldiers, who early leaders like Lee felt would be forced to make a difficult choice between trans-border community, religious or family ties, and a commitment to a brand-new polity, itself recently shaken by racial riots.²¹

The SAF was predominantly infantry and without significant armour or artillery, possessed no air force, and only three dated naval vessels (one unseaworthy), with a strength of just over a thousand, including volunteers. By contrast, Malaysia possessed nine battalions, armoured vehicles (although no tanks) and artillery, and Indonesia possessed soldiers tested during *Konfrontasi* and with some experience and limited capability in ‘invasive amphibious operations [gained] from counter-insurgency warfare in the

1950s and 1960s’, along with Soviet-supplied naval and air assets that included one cruiser, seven destroyers, heavy bombers and jet fighters.²² British withdrawal loomed, to be replaced by steadily diminishing Commonwealth troop commitments under the Five Power Defence Agreement (FPDA) that did not commit to a defence guarantee and in any case did not apply to Malaysia, since Malaysia was also part of the FPDA. Although domestic preoccupations in Indonesia and Malaysia, the presence of external powers in the region (with Singapore used as a logistics hub during the Vietnam War), the ‘psychological deterrence’ provided by the FPDA, and the FPDA’s enmeshing of Malaysia in a common (external) security vision with Singapore²³ mitigated Singapore’s vulnerability during this initial period, the sense of precariousness mandated an accelerated build-up of the SAF regardless.

A significant issue was the opportunity cost of building an SAF of professional soldiers sufficiently large to deter invasion, with a small population of just 2.5 million which was also needed to develop the economy. It was assessed that 12 regular battalions would be necessary, but Singapore could afford neither the direct cost nor the lost contribution to its economy. Conscription was proposed in order to provide the mass of trained soldiers needed in a crisis ‘at a press of a button’ without untowardly displacing their everyday role in the workforce.²⁴ Additionally, the cost savings of a reduced full-time force could be put towards acquiring needed military hardware. Manpower potential was boosted so dramatically by the policy that the number of eligible soldiers was ten times the SAF’s infrastructural capacity. Today, Singaporean law mandates that all Singaporean and second-generation permanent resident (PR) males must serve two years of full-time NS, during which they are known as NSF’s, or Full-Time National Servicemen, and afterwards are liable for a maximum of 40 days per year of in-camp training as Operationally-Ready NSmen (OR-NSmen, earlier known as ‘reservists’), until the age of 40 for non-officers and 50 for officers, for mobilisation in the event of a crisis.

A second concurrent aim of NS was to build a Singaporean identity. Upon separation, Singapore

was bequeathed a colonial legacy of disparate peoples, most originally arriving or brought in to service the colonial economy or administration, and administered under a policy of ‘divide and rule’ where different ethnicities ‘met in the marketplace’ but lived separately and rarely mixed or formed strong bonds.²⁵ Founded in 1819, by 1871 the Chinese census category attained a majority of 56% in the colony, and has retained it since. Colonial administrative categories obscure fractured relations even within deceptively monolithic communities, with violence between Chinese dialect groups (even until the 1960s) and social class disjunctions between immigrant and ‘straits-born’ Chinese.²⁶ The racial politics of separation have already been noted. Forging commonality along some axis between multiple *patois*, religions and races was desirable not least because in the long-term it was thought to aid national survival. Armed service and national identity were meant to be mutually reinforcing – it was hoped that ‘[n]othing [would create] loyalty and national consciousness more speedily and more thoroughly than participation in defence and membership of the armed forces’,²⁷ and the sooner one did not have to worry over who was in charge of the machine-gun unit, the more effective the country’s defence.

Armed service and national identity were meant to be mutually reinforcing

Singapore has worked towards the integrative ideal over time. Concerns over the reliability of Malay conscripts if they were forced to make a choice meant in the earliest days, although there was no categorical ban, Malays were only selectively called up and assigned to units that were less likely to face a dilemma in war, including the Singapore Police Force (SPF) and Singapore Civil Defence Force (SCDF), while a greater number of Chinese and Indians were recruited into the SAF to shift its ethnic distribution closer to that of the general population.²⁸ Anxieties over Communist infiltration and continued external

agitation meant that some Chinese met the same scrutiny.²⁹ While Malays were increasingly called up from 1977, culminating in the full conscription of every male citizen since 1985, and although promotion has been on the basis of merit, statements on ‘taking operational roles into account’ in the assignment of individuals³⁰ have continued to raise disquiet; Nasir and Turner assert that though ‘[n]o statistics are readily available ... it is common knowledge that almost two decades on, there is an overrepresentation of the Malay population drafted into the [SPF] and [SCDF]’. Nevertheless, 1992 saw the first Malay pilot, 2001 the first fighter pilot, 2009 the first brigadier-general, and today there are Malay colonels and Malays in elite SAF combat units like the Commandos and the Naval Diving Unit.³¹ In its earliest days NS also had to overcome language and class barriers, and recruits who were fluent in neither Mandarin nor English but instead in Chinese dialects – ‘*hokkien peng*’ in colloquial parlance – were not uncommon, while soldiers of varied levels of education and social backgrounds encountered one another.³²

Statements on ‘taking operational roles into account’ in the assignment of individuals have continued to raise disquiet

The success of NS as an integrative project can be seen in its permeation into many aspects of Singaporean life. Not only is the notion of NS as a ‘rite of passage’ turning ‘boys into men’ now commonplace, movies and plays on the subject have broken box-office records for local productions. These reflect the ideal of the integrative process within NS: a common experience of hardship, indiscriminately levelling – same food, same barracks, same punishment – the need to work together despite race, language or religion to get the bunk cleaned, the job done, the hill dominated; lest the instructor’s baleful gaze fall on all.³³ NS is a Wittgensteinian ‘form of life’ which language has permeated Singaporean society and the workplace: one ‘reeces’ a conference venue, is ‘arrowed’

with a task, is released from it with the directive 'own-time, own-target'. Singlish, described by Gwee as Singapore's 'wacky, singsong creole ... a patchwork patois of ... English, Malay, Mandarin and Tamil' and local dialects, forces its way into the chaste lexicon, and conversation between unfamiliar males quickly converges on NS stories as an icebreaker.³⁴

Beyond integration, NS offers an opportunity to teach valuable skills to young men, which may become useful in later employment. Commonly cited benefits include learning leadership skills, foresight in planning, how to work in a team of diverse people to achieve common goals, and the discipline, efficiency and mental toughness that military living instils.³⁵ Although combat training rarely imparts occupational skills that are directly relevant to employment, the diverse nature of the SAF, created by the mandate to conscript ubiquitously – including those not physically fit for combat roles – means several local musicians, actors, and journalists have begun future vocations in the SAF Music and Drama Company, or MINDEF's *Pioneer* magazine. Others have developed ground-breaking entrepreneurial ideas in response to the day-to-day challenges of conscript life.³⁶

Apart from these additional benefits, NS has helped the SAF to achieve a critical mass crucial in the early days of Singapore's independence, in its quest to achieve a credible deterrent. However, the subsequent evolution of Singapore's deterrence strategy required the development of Singapore's defence industry and its technological institutions.

The contribution of defence industry and technology

Singapore's defence industry and technological institutions as they stand today are represented by Singapore Technologies Engineering (STE) and the Defence Science Organisation (DSO). STE has its origins in the Chartered Industries of Singapore (CIS), established in 1967, and the Sheng-Li (Victory) Holding Company, established in 1974 to gather under it the various industries established

since CIS to cater to the SAF's defence and maintenance needs. Sheng-Li was renamed Singapore Technologies Holdings in 1989 to reflect an increasing commercial orientation. Restructured in 1997 and incorporated as STE, the publicly-listed company has over 100 subsidiaries and companies within it organised in four main sectors: Aerospace, Electronics, Land Systems and Marine, and it boasts the vision of being a 'global defence and engineering [g]roup'.³⁷

DSO developed from the Electronic Warfare Study Group formed in 1971. A secret undertaking meant to develop the SAF's 'technological edge', it was established as the 'Electronics Test Centre' (ETC) in 1972, an innocuous and prosaic-sounding name that actually formed an acronym for the names of its first scientists.³⁸ In 1977, the centre was renamed the Defence Science Organisation. Gradually more closely integrated with MINDEF's technology and logistics bureaucracy yet given increasing autonomy, it was made an independent national research laboratory in 1991 and corporatised in 1997 as DSO National Laboratories to allow it more flexibility and to better its prospects in the competition for scientific talent. Today, DSO is engaged in dual-use research with application to both civilian and military worlds, but seeks to cater practically to the SAF's operational needs by developing technology as yet unavailable in the commercial market. Both STE and DSO are brought together by the Defence Science and Technology Agency (DSTA), a statutory board under MINDEF. DSTA handles defence procurement, platform design, maintenance and programme development, and systems integration for MINDEF, putting together the best of local and foreign technology, capabilities, and production customised to the SAF's specific operational needs. It also seeks to nurture Singapore's defence science and engineering community.³⁹ If STE and DSO have each been commercialised and corporatised, DSTA, as middleman, remains MINDEF's anchor to both.

Singapore's defence industry and technological institutions have played a key part in actualising the country's evolving strategic doctrine and in assuaging its security concerns. With three years to develop before the British withdrawal, CIS sought to ensure that the SAF would have the means

– a reliable local source of basic small arms and ammunition, safe from the precariousness of foreign supply and favour – to delay as long as possible the capture of Singapore by meeting a potential opponent ‘at the water’s edge’ before engaging it in gruelling urban combat meant to exact a prohibitive cost for each block taken, and so discourage an opponent from seeking to capture Singapore in the first place. The first-generation SAF focused on building capability not only to make Singapore difficult to capture, but also to eventually negate the need for such a bleak strategy.⁴⁰ Sister industries to CIS were established to manufacture medium-calibre weapons and ammunition, and when used Israeli AMX-13 light tanks were acquired in 1969, to rebuild and upgrade them. From the mid-1970s, the SAF had started to progress towards a second generation centred on offensive pre-emption in the Malay Peninsula, to create a FEBA (Forward Edge of Battle Area) far enough north to secure water supplies in Johor while keeping the population and built-up areas of Singapore out of range of opponent artillery.⁴¹

Singapore’s spending on ‘defence, justice and police’, ‘security’, or defence has made up the largest segment of government expenditure

With limited resources and a need to focus on the economy, Singapore had to make the acquisition of such capabilities as affordable as possible, while developing indigenous expertise and production where economically feasible and most beneficial. This often meant acquiring used platforms and modifying them to suit local conditions and desired operational requirements, with locally designed and fitted upgrades to extend shelf-life, efficacy, and performance.⁴² Foreign weapons, from general-purpose machine guns to artillery guns, were sometimes reverse-engineered to gain insight towards indigenous design and production, much to the chagrin of some suppliers.

Even so, Singapore’s spending on ‘defence, justice and police’, ‘security’, or defence has made up the largest segment of government expenditure for the vast majority of years since 1969. Since 1997, the earliest year when disaggregated figures are available, defence spending often has made up over 25% of government expenditure, and sometimes just less than a third, though it has dropped below 25% since 2010 and below 20% since 2015. Defence spending is projected to make up the largest share of government expenditure in 2017, at 18.9%. Indicative of Singaporean leaders’ view of precariousness, and the long gestation periods of defence projects, Singapore has favoured a consistent level of defence spending that has weathered recessions and financial crises alike.⁴³

Several examples may elucidate the contribution of Singapore’s defence industry and research establishment. The American A-4 Skyhawk, a ground attack craft, complements the second-generation SAF vision of a ‘porcupine’ with quills projecting force into opponent territory, by providing air support capability for advancing ground forces while also capable of air combat. Forty used A-4s were purchased from the US with more A-4s acquired over time. The A-4 platform was upgraded per RSAF requirements variously into the A-4S and A-4S-1, and later progressively the A-4SU Super Skyhawk, with airframe modifications, upgrading of avionics, and, after a spate of accidents, a new engine. The refurbishment of US A-4Cs into A-4S-1s and the engine upgrade for the A-4SU in particular involved the predecessors of Singapore Technologies (ST) Aerospace. Continual upgrades, modifications and maintenance helped to sustain the platform’s viability until its phasing out from 2003 to 2005.⁴⁴

A second example is the history of the *Sea Wolf* missile gunboat. In 1969, a precursor of ST Marine signed an agreement with a German ship-building company to build six missile gunboats, with the first two built in Germany and the rest in Singapore shipyards. In doing so, Singapore not only acquired a ‘technological edge’ from being the first in Southeast Asia to introduce the capability, and developed shipbuilding expertise and experience, but also acquired radio receivers from which DSO was able to examine and develop

'its own capability in missile guidance systems and radio wave propagation."⁴⁵

Most recently, the new Littoral Mission Vessel (LMV) has been developed to replace the *Fearless* patrol vessel. Designed and built locally after DSTA first evaluated available commercial options, the LMV was developed by ST Marine in collaboration with a Swedish defence firm, with the project managed by DSTA. The LMV is an example of the third-generation SAF, leveraging forces networked with information technology through Integrated Knowledge-based Command and Control (IKC2) systems, which DSO helped to develop. Cognisant of Singapore's limited manpower, the LMV is designed to require a smaller crew, necessitating a smaller, integrated bridge, Combat Information Centre, and Machinery Control Room, which DSTA worked together with RSN sailors through simulations and trials to develop.⁴⁶ The LMV is an example of Singapore's defence industry and technological institutions working together to provide a unique answer to Singapore's defence requirements.

As a small country, many of Singapore's defence needs are beyond reasonable expectations of its defence industry

As a small country, many of Singapore's defence needs are beyond reasonable expectations of its defence industry, especially the indigenous production of air combat and transport platforms. Singapore has mainly acquired these from the United States.⁴⁷ Nevertheless, Singapore has achieved most success in indigenous production of land platforms, which include an Infantry Fighting Vehicle (IFV), Armoured Personnel Carriers (APCs), and artillery customised to Singapore's operational needs, as well as the building of surface combatants, if not necessarily their design, and their integration with a judicious selection of foreign-produced weapons and systems.⁴⁸

The SAF, however, ultimately remains a small customer, and STE has mitigated this limitation

by its commercialisation and entry into the global market. STE has moved from a 70% reliance on defence contracts to having commercial customers make up 65% of its revenue. As defence contracts tend to result in 'feast or famine', depending on whether major defence projects are approved, commercial operations have enabled STE to retain its staff and expertise, develop dual-use technologies and build relationships beyond its domestic customer, when cycles of defence procurement are completed and new projects are being considered.⁴⁹ Today STE relies heavily on its aerospace sector, which provides 48% of its profits, and its maintenance, repair and overhaul operations are the largest in the world, with facilities in the US, China, and Germany. ST Marine owns shipyard facilities in the US, provides commercial shipbuilding, conversion, and repair services for US firms, and counts the US National Oceanic and Atmospheric Administration as a repeat customer. ST Kinetics is developing various commercial autonomous vehicles for use in commuter ferrying and logistics, and is a distributor for Germany's MAN Truck and Bus in Myanmar and Singapore.⁵⁰ These endeavours have helped STE remain not only commercially viable but also profitable without relying solely on the needs of the SAF.

Singapore's defence industry and research institutions have also made contributions to the civilian economy and ordinary life

Also noteworthy are STE's defence exports, which contribute similarly by helping the company to develop and retain expertise and experience in military production, maintenance, and upgrading outside of contracts with the SAF, while making a contribution to STE's revenue.

Singapore's defence industry and research institutions have also made contributions to the civilian economy and ordinary life. In developing CIS, Dr. Goh Keng Swee, the visionary progenitor

of the SAF, STE and DSO also had Singapore's industrialisation in mind, and DSO's flourishing both contributed to and benefitted from the decision in the 1990s to reorient Singapore's economy toward specialised technological sectors.⁵¹ Today STE employs just over 15 000 people in Singapore. DSO's biological diagnostics facilities also played a role processing suspected samples during the 2003 SARS outbreak, and more recently, a DSO and DSTA team helped to solve a signalling glitch on Singapore's Mass Rapid Transit rail-system in one weekend.

Developing far from their humble beginnings as an ammunition line and a three-man team, Singapore's defence industry and research have helped to mitigate the problems of Singapore's limited manpower resources through military hardware and with technology as a 'force multiplier', repaying Dr. Goh's 'abiding faith in the practical value of technology to transcend physical constraints',⁵² and providing answers to Singaporean leaders' sense of vulnerability and precariousness.

Development and conscription in Singapore: The Construction Brigade

Singapore has premised its rationale for NS primarily on defence, deterrence and nation-building, rather than Singapore's developmental goals. Outside of limited synergies, with the imparting of attitudes, leadership and discipline through NS towards greater productivity afterwards in the civilian economy; the commercialisation of STE into a greater pursuit of non-military projects, both locally and as a global firm; and a cross-pollination between civilian and military applications in the dual-use research conducted by DSO, the programme of most relevance in Singapore's experience may be Singapore's Construction Brigade scheme.

Promulgated in September 1981, the Construction Brigade scheme sought to better utilise conscripted manpower which had been directed toward part-time service in the Vigilante Corps, one of the branches of NS then assisting

Singapore's police force, rather than the SAF. The rationale for the scheme was, for much of its justification, simultaneously and interdependently two-fold between development and security needs. In 1981, Singapore was facing a public housing shortage, with demand for flats built by the state's Housing and Development Board (HDB) sharply exceeding supply, with those on the waiting list for new housing rising from 57 738 in 1979 and 68 381 in 1980 to an estimated 102 000 for 1981; a tripling in the rate of increase. Part of the reason for the low supply was a labour shortage in construction.

At the same time, thought was being put to scenarios of war and civil engineering disasters, where the necessity for civil defence purposes of a reserve of NSmen trained in structural damage containment, emergency construction, reconstruction, repair of buildings and essential services, and demolition was identified. Prime Minister Lee Kuan Yew also identified homeownership for Singaporeans as a national security concern, arguing that Singaporeans would be most motivated to fight to defend land that was identifiable theirs – their own, not rented, homes. As early as November 1981, Lee was planning for 2 000 full-time national servicemen in the Construction Brigade as one part of the effort to ameliorate the housing shortage; an indication that civil defence but also housing concerns were on the minds of Singapore's political leadership when the scheme was introduced.⁵³

Arguing that the desired skills for civil defence were best acquired by learning construction skills, and those skills best learnt through on-the-job training at construction worksites, enlistees were for three months taught paramilitary discipline at the Civil Defence School and (depending on aptitude) basic and/or specialised construction trade skills at vocational schools that also served the general public, before undergoing on-the-job training for nine months at locations ranging from construction worksites for HDB and MINDEF public sector projects, including with private sector contractors for the HDB, to private sector lift maintenance units and prefabrication industries. During the one-year training period, enlistees were paid conscript allowances comparable to those in the SAF or police. They were then suspended from

active conscript service and dispatched to mainly HDB and government project worksites in the 'free market' but also to private sector worksites. In all cases the NSF's were initially expected to be paid market wages by private contractors, comparable to construction workers of equivalent skill. NSF's completing 18 months of work in the construction industry were deemed to have fulfilled their NS obligations and entered the reserves in the Civil Defence in Emergency Response Units.⁵⁴ If dismissed by their employers for poor performance or absenteeism, the NSF's were recalled into active service with only two-thirds of their time spent in employment counting toward their conscription obligations. Construction Brigade NSF's were subject to oversight on disciplinary issues for the entire two-and-a-half years, including their time under private contractors, by the Vigilante Corps and later the SCDF.⁵⁵

The Construction Brigade scheme was revised in 1985, and later NSF's in the Construction Brigade served a shorter duration, and also underwent a different paramilitary, civil defence, and vocational training schedule, the latter depending on aptitude and vocational training performance. They were deployed to HDB and other public sector worksites, and compensation was also revised and stipulated rates mandated, although contractors were encouraged to pay good performers beyond the stipulated rates. In 1987, contractors paid better than stipu-

Construction Brigade NSF's were subject to oversight on disciplinary issues for the entire two-and-a-half years, including their time under private contractors

lated rates to 23% of the NSF's.⁵⁶

Besides national security concerns, the scheme was also developed with an eye both to the development of Singapore's construction industry, as well as opportunities for less-educated conscripts. In

the early 1980s, the vision was to move away from a construction industry dependent on unskilled and foreign labour, to a mechanised industry employing a skilled local workforce, with the hope of phasing out foreign construction labour entirely by 1991 and of exporting construction work.⁵⁷ It was hoped that the Construction Brigade scheme would encourage those trained vocationally to enter the construction industry thereafter, and contacts for vacancies in the construction industry were available for Construction Brigade reservists through their platoon commander or Construction Brigade headquarters. Additionally, the scheme addressed the cohort of national servicemen with less than secondary four education, with the majority expected to possess primary school education, allowing them to acquire vocational training, work experience, and potentially qualifications for further industry-recognised skills certification. Later on, language proficiency courses were also offered to NSF's to allow them to better absorb their train-

Although larger efforts were made to encourage a skilled and local construction workforce, the goal to phase out foreign construction labour was not achieved

ing as well as to work better with contractors.⁵⁸

The developmental aspects of the scheme were only partially realised. Although Singapore soon overcame its public housing shortage, problems remained in encouraging the development of a local construction workforce. Estimates of the number of Construction Brigade NSF's who later entered and remained in the construction industry range from about 25% of its reservists in 1987 to 22% in 1990. Although larger efforts were made to encourage a skilled and local construction workforce, in addition to the Construction Brigade scheme itself, the goal to phase out foreign construction labour was not achieved and as of December 2016 an estimated

315 500 remain employed, about 22.6% of the total foreign workforce in Singapore.⁵⁹ The Construction Brigade also encountered morale problems, with absenteeism from worksites and frictions between NSF and worksite contractors emerging as issues in the 1980s. Numbers enlisted into the scheme ultimately declined and the last NSFs were posted in November 2002.⁶⁰

The Construction Brigade scheme reveals some pitfalls of the attempt to link developmental concerns to conscription, at least in the Singaporean context. The situation faced by Construction Brigade NSFs, conscripted in the service of civil defence toward a more assured ability to respond in war and disaster (as the SCDF did to the Hotel New World collapse in 1986), and the Construction Brigade NSFs' employment for much of the liable period of service with commercial contractors on HDB and other construction worksites while being under the disciplinary purview of the SCDF, made the national security angle of the scheme less immediately obvious and more challenging to argue for. The initial notion of the enlistees being engaged in 'free market employment'⁶¹ was also difficult; while they were initially paid market wages, there was no 'exit' from the market without incurring a disciplinary penalty by the state and seeing only a partial fulfilment of NS obligations for the time spent.

A related issue was that the initial understanding worked out in 1967 to persuade Singaporeans to accept conscription was based on the notion of its necessity for deterrence, the defence of Singapore, and the building of a national identity. Conscription was initially controversial, with small protests against both a first introduction in 1954 by the British, and of NS in independent Singapore in 1967. Early batches of enlistees in the late 1960s received send-off dinners immediately prior to enlistment where their members of parliament (MPs), including ministers, repeatedly made the case for NS as essential to Singapore's defence and efforts at social integration. This initial rationale of defence and deterrence made it more challenging to make the case for having recruits work on construction sites, even while the ambit

of national security itself was being expanded with the formal introduction of the concept of Total Defence, and MPs and ministers of state took pains in parliament in the 1980s to explain the civil defence rationale of, and make the case for, the Construction Brigade. In 2004, as the last batches of the Construction Brigade were serving their NSF obligations, an opposition Member of Parliament noted some parents were unhappy their sons were sent to serve their NS at construction sites, the wider notion of Total Defence, promulgated since 1984, notwithstanding. By then, the development

The rationale for the service obligation must be carefully presented and explained, and thought put to securing popular support, and development and defence rationales carefully weighed

rationale had dropped out of the state's justification for the Construction Brigade.⁶²

Singapore's experience with the Construction Brigade scheme shows that, at least for the involvement of conscripts in developmental aspirations, the rationale for the service obligation must be carefully presented and explained, and thought put to securing popular support, and development and defence rationales carefully weighed, lest a loss of support for such projects should undermine the legitimacy of the wider institution of conscription itself. The experience also shows the difficulty of convincing individuals to enter a trade through exposure and training as a conscript, although more research needs to be done on the more general benefits of vocational training and language proficiency courses offered to Construction Brigade NSFs for their personal and professional development, and for the wider economy.

Conclusion

This paper has examined the security sector in Singapore, and sought to show how the institution of NS and the development of Singapore's defence industry and technological institutions have helped to address a historically-based perception of vulnerability and precariousness. NS has had most success in providing the critical mass needed for deterrence. While conscription can still help to alleviate critical shortfalls in manpower in difficult strategic environments, as a policy for defence in contexts other than Singapore's, conscription needs to be considered with an eye to a military's organisational capacity and technological capabilities to make the most of the conscripted manpower, and its appropriateness to the particular problems posed by its strategic environment.

Conscription needs to be considered with an eye to a military's organisational capacity and technological capabilities to make the most of the conscripted manpower

NS has also helped to provide an axis on which to hang divergent experiences to be stitched into a common tapestry by shared conscript-living and in-camp training. The integrative successes of NS have been real. However, if NS is a tapestry woven from disparate categories of Singapore society, it is worth examining the make. Several worrying observations can be made. First, while surveys have shown exceedingly strong support and understanding for the necessity of NS, the results warrant close interpretation. Asked to rank in importance a series of eight answers to the question 'What does NS mean to me?', respondents rated all positively on average (with scores of between 4.02 and 4.9 out of 6). Top of the list, however, were 1. 'To instil discipline and values among the young'; 2. 'For National Defence'; and 3. 'To transform boys into men'. At the bottom of

the list were 6. 'To promote understanding between people from different backgrounds'; 7. 'To learn skills useful for civilian job employment'; and last, 'To integrate new immigrants into our society'.⁶³

Second is the view expressed by some that new citizens and first-generation PRs are getting away with the benefits of life and employment in Singapore without paying the 'due' of conscription. Third is the face of NS in popular culture, with the commercially highly successful *Ah Boys to Men* movies showcasing a predominantly masculine and Chinese experience. Also an issue in online discussion was some disapproval for a feminist group, and debate over whether the group, whose women members are not liable for conscription, possessed the standing to critique an unsanctioned variant of a route march song that normalised rape. Last is how discourse addressing terrorism threats in Singapore has sometimes put an onus on Malay-Muslims to reject violence and not harbour terrorists, echoing earlier demands that they establish their reliability in security and combat roles.⁶⁴

These observations suggest the common pur-

The view is expressed by some that new citizens and first-generation PRs are getting away with the benefits of life and employment in Singapore without paying the 'due' of conscription

pose and the extent of tolerance established by NS are premised on security first,⁶⁵ and the bonds established are masculine, sometimes deeply problematic in the socialisation of gender roles, and may unconsciously reflect majoritarian experiences and expectations. They seem to suggest NS builds bonds, but that these bonds become complicated where they aim to extend more fully outwards to realise the boundaries of the nation. While more research needs to be done to buttress, or indeed discredit, the points raised here, which remain

mere intuitions arising from these observations, at the very least, the project of nation building and of inculcating a national identity through a common experience of conscription begs careful scrutiny of, and reflection upon, the woven tapestry. This is food for thought for countries considering conscription or common service as a means of nation building.

Singapore has managed its security sector primarily with an eye to defence and deterrence, together with the social aspects of nation building. The military in Singapore has not, in general, sought to contribute *directly* in significant ways to Singapore's development (the Construction Brigade being part of the civil defence apparatus rather than of the military, strictly speaking).⁶⁶ "More indirectly, however, NS is commonly held to impart several other benefits: it inculcates leadership qualities, discipline and teamwork in young men who will afterwards enter the civilian economy ..."; the National Computer Board, which encouraged computerisation in Singapore and the development of the information technology industry, had its genesis in a department of the defence ministry; and in other security sector institutions the dual-use research conducted by DSO has done its part in developing an economic focus in Singapore on research and development. Additionally, Singapore's early desire for its state-owned enterprises to be run on a commercial basis and stand financially on their own merits has meant that with time, as the defence industry and enterprises linked to the provision of Singapore's security developed and increasingly sought customers outside the SAF, industries originally meant to address the SAF's needs have contributed more widely to Singapore's economy. ST Aerospace and its precursors, for instance, have played a significant role in the development of Singapore as a regional hub for aircraft maintenance, repair and overhaul, while Singapore Food Industries, originally established to centralise the SAF's food supply, has wended its way additionally as a supplier to Singapore's prisons and hospitals, and currently exists as part of SATS (Singapore Airport Terminal Services), serving the aviation, healthcare and hospitality sectors, but where it also continues to manufacture field rations.⁶⁷

Singapore's experience with the Construction Brigade highlights the difficulties faced in harnessing the institution of conscription for development. Although the public housing shortage in 1981 was soon addressed, the goal of developing a local construction workforce by 1991 was not achieved, and the construction industry in Singapore remains dependent on foreign manpower. While efforts to address the housing shortage and the structure of the construction industry were larger endeavours in which the Construction Brigade played one part among many, the Construction Brigade was only able to retain about less than a quarter of its trainees in employment in the construction industry, and faced morale problems and challenges in persuading the public of the project's relation to national security. Even as the SAF's NSF manpower has occasionally been utilised for one-off events such as the Summer Youth Olympics held in Singapore in 2010, these remain more closely aligned with the ideational project of national building rather than a more literal one.

In addition, skills transfer from military service to the civilian economy, itself likely to be limited,

Skills transfer from military service to the civilian economy, itself likely to be limited, will be least substantial and relevant as economies mature

will be least substantial and relevant as economies mature and require specialised or technical knowledge that cannot be easily picked up from conscript combat or ordinary clerical vocations and directly transferred, unless the civilian economy happens to have especially synergistic qualities with conscript vocations. Conscripts who transition into related civilian industries are likely to be serendipitous exceptions rather than the norm, unless a special effort in both the military, and the civilian economy is made to develop such linkages. Most recently, Singapore has hoped that cyber defence vocations for national servicemen could have a synergistic

benefit in developing a desired cybersecurity industry. Singapore has recently moved to allow pre-enlistees to indicate preferences for conscript vocations, and is looking to spot suitable individuals in schools for its cyber defence vocation through sponsored camps and competitions.⁶⁸ This could improve retention rates, but whether the enterprise will pan out remains to be seen.

Some reports from former Singapore servicemen, noted earlier, indicate their belief that the rigour, and discipline and leadership demands of military service develop general qualities that carry over into employment in the civilian labour force. However, this is a general contribution that cannot easily be quantified or evaluated here, especially considering that improvements in labour productivity have been in various periods independently encouraged by the Singapore government concurrent with the experience of NS in Singapore.

Singapore's defence industry and technological institutions appear set to remain cornerstones for mitigating enduring perceptions of strategic vulnerability and precariousness. The relative success of the Singaporean case shows that, approached carefully and thoughtfully, it is possible for even small countries to develop an indigenous defence industry that goes some way beyond the manufacture of basic infantry arms and ammunition, though high-levels of self-sufficiency in all aspects will remain a quixotic undertaking not just for Singapore but for many countries besides. The organisational 'umbrella' of STE, spanning aircraft maintenance,

ship-building, land-platform production, and electronics, and running the gamut of defence and commercial, local and overseas contracts, helpfully buttresses constituent parts that find it relatively more difficult to concurrently harness a specialisation in defence production into non-defence commercial contracts, such as ST Kinetics, as a part of a larger commercial enterprise that may be kept active and viable even should demand from the SAF be depressed. The close coordination between STE, DSO, and DSTA helps to ensure that the commercialised defence industry and research institutions remain connected to the operational needs of the state's military.

Ultimately, the 'technological edge' provided by carefully curated and customised capabilities will protect Singapore from some external threats, but creating a robust sense of community will require more thought on the common tapestry that nationally integrative efforts like NS should seek to achieve, and an understanding that existing social relations may shape such integrative endeavours as much as the latter might shape social relations. Nonetheless, Singapore's experience with conscription and its defence industry and technological institutions provides helpful lessons for countries seeking their own path in building up a limited indigenous defence capacity, and a national identity.

Endnotes

- 1 The author thanks Barry Desker for helpful comments and suggestions for revision on a draft of this paper. All errors remain mine.
- 2 Peter Ho, Anuradha Shroff, Codey Tan, Hazel See and Lena Leong, *Singapore Chronicles: Governance* (Singapore: Institute of Policy Studies and Straits Times Press, 2016), pp. 34–35.
- 3 This is a necessarily truncated account of Singapore's economic trajectory since independence. For a history of Singapore since independence, see the latter chapters of C. M. Turnbull, *A History of Modern Singapore 1819–2005* (Singapore: NUS Press, 2009). For a readable digest of Singapore's economic development, see Peter Ho et al, *Singapore Chronicles: Governance* (note 2), especially chapter 2. For more detailed examinations, see Cheng Siok Hwa, 'Economic Change and Industrialization' in Ernest C. T. Chew and Edwin Lee, *A History of Singapore*. (Singapore: Oxford University Press, 1991); the chapters on

- Singapore's economy in the edited volumes Kernial Singh Sandhu and Paul Wheatley, *Management of Success: The Moulding of Modern Singapore* (Singapore: Institute of Southeast Asian Studies, 1989) and Terence Chong, *Management of Success: Singapore Revisited* (Singapore: Institute of Southeast Asian Studies, 2010); and chapters by Nathalie Fau, and by Ooi Giok Ling in Karl Hack, Jean-Louis Margolin and Karine Delaye, *Singapore from Temasek to the 21st Century: Reinventing the Global City* (Singapore: NUS Press, 2010). For a brief overview of politics in Singapore, see Ho Khai Leong, 'Political Consolidation in Singapore: Connecting the Party, the Government and the Expanding State' in Terence Chong, *Management of Success: Singapore Revisited* (Singapore: Institute of Southeast Asian Studies, 2010).
- 4 Committee on the Future Economy, *Report of the Committee on the Future Economy: Pioneers of the Next Generation* (Singapore, 2017), retrieved 7 June 2017 from https://www.gov.sg/~media/cfe/downloads/mtis_full%20report.pdf.
 - 5 Especially in the context of examining security sector reform. For examples, see Felix Heiduk, 'Introduction: Security Sector Reform in Southeast Asia', p. 6 and Carolina G. Hernandez, 'Security Sector Reform in Southeast Asia: From Policy to Practice', p. 24, both in Felix Heiduk, *Security Sector Reform in Southeast Asia: From Policy to Practice* (New York, NY: Palgrave Macmillan, 2014), and Mark Beeson and Alex J. Bellamy, *Securing Southeast Asia* (Abingdon, Oxon: Routledge, 2008), p. 23.
 - 6 See, for example, Alan Chong, 'Deliquescent Security Threats: Singapore in the Era of Hyper-Globalisation' in Barry Desker and Ang Cheng Guan, *Perspectives on the Security of Singapore: The First Fifty Years* (Singapore: World Scientific Publishing, 2016) on the transnational threat of disease (specifically the Severe Acquired Respiratory Syndrome, SARS, crisis in 2003) and terrorism, Joey S. R. Long, 'Desecuritisation and after Desecuritisation: the Water Issue in Singapore-Malaysia Relations' in Barry Desker and Ang Cheng Guan, *Perspectives on the Security of Singapore: The First Fifty Years* (Singapore: World Scientific Publishing, 2016) on the securitisation of Singapore's water supply. Other examples include maritime piracy, the threat of cyber attacks, and environmental disasters.
 - 7 Ministry of Defence, Singapore, *Mission* (2016), retrieved 29 December 2016 from https://www.mindef.gov.sg/imindef/about_us/mission.html.
 - 8 See, for example, Peter Ho, 'Organising for National Security – The Singapore Experience' in Barry Desker and Ang Cheng Guan, *Perspectives on the Security of Singapore*, pp. 287–288, 292 (note 6). For details on the five pillars of Total Defence, and a statement of TD operationalised in everyday life, see Ministry of Defence, Singapore, *Total Defence* (2015), retrieved 29 December 2016 from https://www.mindef.gov.sg/imindef/mindef_websites/topics/totaldefence/home.html.
 - 9 This is Loo's argument. Bernard F W Loo, 'Explaining Changes in Singapore's Military Doctrines: Material and Ideational Perspectives' in Amitav Acharya and Lee Lai To, *Asia in the New Millennium: APISA First Congress Proceedings, 27–30 November 2003*, (Singapore: Marshall Cavendish Academic, 2004), pp. 353–354.
 - 10 The Malayan Campaign took just over three months with Singapore falling in a week. Mr. Lee Kuan Yew, who would be Singapore's Prime Minister (PM) (hereafter simply 'Lee'), came close to losing his life during the Japanese occupation, narrowly escaping a checkpoint detaining for execution those among the Chinese population suspected or accused of malfeasance against the interests of the occupying forces. Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence* (Singapore: Institute of Policy Studies and Straits Times Press, 2015), p. 37. Loo argues the Malayan Campaign strongly shaped

- the SAF's perception of its geostrategic vulnerability, and in return, its threat perception. Bernard F W Loo, 'Explaining Changes in Singapore's Military Doctrines', p. 370 (note 9).
- 11 Michael Hill, 'The Religious Factor in Singapore: Conscription and Containment', *Australian Religion Studies Review* (Vol. 10, No 2, 1997), p. 29; Ali, Mushahid, 'Konfrontasi: Why Singapore was in Forefront of Indonesian Attacks', *RSIS Commentaries* (No. 62/2015, 23 March 2015), retrieved 16 January 2017 from <https://www.rsis.edu.sg/wp-content/uploads/2015/03/CO15062.pdf>; Bernard F W Loo, 'Goh Keng Swee and the Emergence of a Modern SAF: The Rearing of a Poisonous Shrimp' in Emrys Chew and Kwa Chong Guan, *Goh Keng Swee: A Legacy of Public Service* (Singapore: World Scientific Publishing Co., 2012), pp. 131–132. *Konfrontasi* was waged by Indonesia against the formation of the Federation of Malaysia, which it saw as a neo-colonial plot. Johor is on the southern tip of peninsula Malaysia, separated from Singapore by the relatively narrow Straits of Johor. Sabah is in East Malaysia, on the island of Borneo, with a land border with Indonesia.
 - 12 Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence*, p. 286 (note 10); Bernard F W Loo, 'Goh Keng Swee and the Emergence of a Modern SAF', pp. 131–132 (note 11); Lee Kuan Yew, quoted in Irene Ng, 'How to Move Race Dialogue Forward', *Straits Times* (9 October 1999), retrieved 28 January 2017 from <https://global.factiva.com>.
 - 13 Bernard F W Loo, 'Goh Keng Swee and the Emergence of a Modern SAF', p. 132 (note 11); Lee Kuan Yew quoted in Bernard F W Loo, 'Explaining Changes in Singapore's Military Doctrines', p. 363 (note 9).
 - 14 Goh Keng Swee in 'Singapore Army Bill', *Hansard, Singapore Parliament Reports* (Singapore: 1st Parliament, Session 1, Vol. 24, Sitting 10, 23 December 1965), col. 542, retrieved 27 March 2017 from https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00052213-ZZ¤tPubID=00069138-ZZ&topicKey=00069138-ZZ.00052213-ZZ_1%2Bid008_19651223_S0003_T00031-bill%2B.
 - 15 In 1970, 80% of Singapore's daily water needs were imported from Johor. Joey S. R. Long, 'Desecuritisation and after Desecuritisation', p. 104 (note 6).
 - 16 Alan Chong and Samuel Chan, 'Militarizing Civilians in Singapore: Preparing for 'Crisis' Within a Calibrated Nationalism', *The Pacific Review* (Vol. 30, No. 3, 2017), p. 379. The population of Malaysia in 2016 is estimated at 31.7 million, and of Indonesia at over 250 million in 2014, though the metaphor needs to be assessed with care since ethnic categories are seldom monolithic. Department of Statistics, Singapore, *Census of Population 2010, Statistical Release 1: Demographic Characteristics, Education, Language and Religion* (Ministry of Trade and Industry, Singapore, 2010), p. viii; Department of Statistics, Malaysia, *Current Population Estimates, Malaysia, 2014–2016* (22 July 2016), retrieved 1 February 2017 from https://www.dosm.gov.my/v1/index.php?r=column/cthemebByCat&cat=155&bul_id=OWlxdEV0YlJCS0hUZzJyRUcvZEYxZz09&menu_id=L0pheU43NWJwRWVSZklWdzQ4TlhUUT09 On the complexity of ethnicity in Indonesia, see Aris Ananta, Evi Nurvidya Arifin, M. Sairi Hasbullah, Nur Budi Handayani and Agus Pramono, *Demography of Indonesia's Ethnicity* (Singapore: Institute of Southeast Asian Studies, 2015).
 - 17 Bernard F W Loo, 'The Management of Military Change: The Case of the Singapore Armed Forces' in Jo Inge Bekkevold, Ian Bowers, and Michael Raska, *Security, Strategy and Military Change in the 21st Century: Cross Regional Perspectives* (Abingdon, Oxon: Routledge, 2015), p. 72; Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence*, p. 28 (note 10)

- 18 Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence*, p. 25-26 (note 10), Lee Kuan Yew in *Transcript of a Speech Made by the Prime Minister, Mr. Lee Kuan Yew, At a Seminar on 'International Relations', Held at the University of Singapore on 9th October, 1966*, retrieved 12 May 2017 from <http://www.nas.gov.sg/archivesonline/data/pdfdoc/lky19661009a.pdf>.
- 19 Bilveer Singh, *Singapore's Defence Industries* (Canberra: Strategic and Defence Studies Centre, Research School of Pacific Studies, Australian National University, 1990), p. 39. For instance, Malaysia is Singapore's third largest export destination for merchandise goods, and fourth largest source of merchandise imports. Department of Statistics, Singapore, *Yearbook of Statistics Singapore* (Ministry of Trade and Industry, Singapore, 2016), pp. 167–168. For a deeper consideration of better and worse relations, ties and interdependence between the three countries over the years, see Barry Desker, 'Strategic Certainties Facing Singapore in 2065' in Barry Desker and Ang Cheng Guan, *Perspectives on the Security of Singapore*, pp. 321–322 (note 6); Theophilus Kwek and Joseph Chinyong Liow, 'Singapore's Relations with Malaysia and Indonesia' in Barry Desker and Ang Cheng Guan, *Perspectives on the Security of Singapore*, *passim*.
- 20 Sand exports were banned by Malaysia in 1997, and later Indonesia in 2007. Singapore is sometimes portrayed domestically in both countries as siphoning their natural resources (sand) to enrich itself. The MacDonald House bombing in 1965, during *Konfrontasi*, killed three and injured 33. The frigate KRI *Usman Harun* remains *persona non grata* in training exercises with the Republic of Singapore Navy (RSN) and Singapore ports and naval bases. *Pukul Habis* is translated by Boey as 'Total Wipeout'. Theophilus Kwek and Joseph Chinyong Liow, 'Singapore's Relations with Malaysia and Indonesia', pp. 140–142 (note 19); Jessica Cheam, 'MND Rejects Claims of Sand Smuggling', *Straits Times* (26 June 2010), retrieved 12 January 2017 from <https://global.factiva.com>; Jermyn Chow, 'Indonesian Warship Usman Harun Disallowed from Calling at Singapore Ports and Naval Bases', *Straits Times* (18 February 2014), retrieved 13 January 2017 from <http://www.straitstimes.com.ezlibproxy1.ntu.edu.sg/singapore/indonesian-warship-usman-harun-disallowed-from-calling-at-singapore-ports-and-naval-bases>; David Boey, 'A Strong and Silent Keeper of the Peace', *Straits Times* (1 July 2008), retrieved 12 January 2017 from <https://global.factiva.com>.
- 21 Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence*, p. 286 (note 10). Several decades later, Mr. Lee Kuan Yew would put the matter thusly: 'If, for instance, you put in a Malay officer who's very religious and who has family ties in Malaysia in charge of a machine-gun unit, that's a very tricky business'. Irene Ng, 'How to Move Race Dialogue Forward' (note 12).
- 22 Bernard F W Loo, 'Goh Keng Swee and the Emergence of a Modern SAF', p. 134 (note 11); Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence*, p. 45, 51 (note 10). Initial Soviet-supplied Indonesian assets soon steadily diminished in a time of poor relations with the Soviet Union, with the cruiser sold in 1972. Wu Shang-Su, *The Defence Capabilities of Small States: Singapore and Taiwan's Responses to Strategic Desperation*. (Houndmills, Basingstoke: Palgrave Macmillan, 2016), pp. 35–36, 39, 40–43.
- 23 On the FPDA and its 'psychological deterrence' effects, see Ralf Emmers, 'Why the FPDA Still Matters to Singapore', in Barry Desker and Ang Cheng Guan, *Perspectives on the Security of Singapore*, pp. 173–187 (note 6) pp. 173–187. Joint commonwealth troop commitments lasted until 1975, but it was only in 1989 that the last New-Zealander forces, an infantry battalion, withdrew from being based in Singapore. Ho Shu Huang and Samuel

- Chan, *Singapore Chronicles: Defence*, pp. 81, 88 (note 10).
- 24 Lee Kuan Yew, quoted in Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence*, pp. 45, 62–63 (note 10). On the success of conscription in raising manpower, see Lily Koh, 1967 – *In Defence of the Singapore Oasis: First Call-up since Independence* (7 February 2002), retrieved 23 January 2017 from https://www.mindef.gov.sg/imindef/about_us/history/overview/birth_of_saf/v06n02_history.html ; Bernard F W Loo, 'Goh Keng Swee and the Emergence of a Modern SAF', p. 139 (note 11).
- 25 J.S. Furnivall, cited in Mohammad Alami Musa and Mohamed Imran Mohamed Taib, 'Managing Religious Diversity in Singapore: Context and Challenges', in Barry Desker and Ang Cheng Guan, *Perspectives on the Security of Singapore*, p. 254 (note 6); Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence*, p. 30 (note 10).
- 26 Chua Beng Huat, 'Multiracialism as Official Policy: A Critique of the Management of Difference in Singapore', in Norman Vasu, *Social Resilience in Singapore: Reflections from the London Bombings* (Singapore: Select Publishing, 2007), p. 52; Ernest Koh, *Singapore Stories: Language, Class, and the Chinese of Singapore 1945–2000* (Amherst, NY: Cambria Press, 2010), pp. 19–20.
- 27 Goh Keng Swee in 'National Service (Amendment) Bill', *Hansard, Singapore Parliament Reports* (Singapore: 1st Parliament, Session 1. Vol. 25, Sitting 16, 13 March 1967), col. 1160, retrieved 27 March 2017 from https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00052828-ZZ¤tPubID=00069159-ZZ&topicKey=00069159-ZZ.00052828-ZZ_1%2Bid016_19670313_S0004_T00071-bill%2B ; Bernard F W Loo, 'Goh Keng Swee and the Emergence of a Modern SAF', p. 142 (note 11).
- 28 Leong Chan Hoong, Yang Wai Wai, and Jerrold Hong, 'National Service: The Holy Grail in the Management of Social Diversity' in Mathew Mathews & Chiang Wai Fong, *Managing Diversity in Singapore: Policies and Prospects* (Singapore: World Scientific Publishing Company, 2016), p. 307; Goh Keng Swee in 1977, quoted in Lee Hsien Loong, 'This is a Singapore Problem. We Will Solve it Ourselves', *Straits Times* (18 March 1987), retrieved 28 January 2017 from <http://eresources.nlb.gov.sg/newspapers/Digitised/Article/straitstimes19870318-1.2.23.3> . Additionally, Israeli trainers (*incognito* as 'Mexicans') were then conducting training for the SAF at a time where clashes were being fought intermittently between Israel and several Arab-Muslim majority states in the Middle East, and it was Lee's belief that Malays, as Muslims, could find this situation difficult. Lee Kuan Yew, in 'Integration has Brought Benefits to All', *Straits Times* (4 March 2001), retrieved 28 January 2017 from <https://global.factiva.com>. The majority of Malays in Singapore are Muslims; in 2010, the percentage stood at 98.7%. Department of Statistics, Singapore, *Census of Population 2010*, p. ix (note 16).
- 29 Khong notes support in moral and material terms from the People's Republic of China for communist insurgents in Southeast Asia continued even until 1978, when Lee Kuan Yew advised Deng Xiaoping against it. Khong Yuen Foong, 'Singapore and the Great Powers', in Barry Desker and Ang Cheng Guan, *Perspectives on the Security of Singapore*, p. 212 (note 6); although for a dissenting view see C. M. Turnbull, *A History of Modern Singapore*, p. 303 (note 3). Decades later Lee Kuan Yew noted that checks are carried out even on Chinese Singaporeans before appointment to sensitive positions, and in 1987 then-Trade and Industry Minister and Second Minister for Defence Lee Hsien Loong noted concerns over Chinese loyalties in the 1960s and 1970s. Mr. Lee Hsien Loong is presently Prime Minister of Singapore. 'Group Welcomes Dialogue with SM', *Straits Times* (2 October 1999), retrieved 28 January 2017 from <https://global.factiva.com> ; Lee

- Hsien Loong, 'This is a Singapore Problem' (note 28).
- 30 For example, Lee Hsien Loong, 'This is a Singapore Problem' (note 28), and Lee Kuan Yew in 2001: 'in deciding which outfit to post an NSman to, we have to consider the sensitivity of the posts and the racial and religious mix of the units'. 'Integration has Brought Benefits to All' (note 28).
- 31 Kamaludeen Mohamed Nasir and Bryan S. Turner, *The Future of Singapore: Population, Society and the Nature of the State* (Abingdon, Oxfordshire: Routledge, 2014), p. 58; Alan Chong and Samuel Chan, 'Militarizing Civilians in Singapore', p. 373 (note 16). For comparison, the Republic of Singapore Air Force saw its first female fighter pilot in 2003, the SAF its first female brigadier in 2015. Hedy Khoo, 'A Thorn on Our Side', *New Paper* (14 February 2012), retrieved 16 May 2017 from <https://global.factiva.com>; Jermyn Chow, 'SAF Gets its First Female General', *Straits Times* (26 June 2015), retrieved 2 February 2017 from <https://global.factiva.com>.
- 32 First Chief of Defence for the SAF Winston Choo, quoted in Judith Tan, 'S'pore Soldiers Can Fight', *New Paper* (2 July 2014), retrieved 27 January 2017 from <http://news.asiaone.com/news/singapore/spore-soldiers-can-fight?nopaging=1>. Also see Interview with Martin Tan, quoted in Judith d'Silva, Eugene Chew, Mervin Tay, Caleb Yap, Eugene Mark, Lee Hwee Ling and Goh Eck Kheng, *Giving Strength to Our Nation: The SAF and Its People* (Singapore: Ministry of Defence, 2015), pp. 63–64. Hokkien is a Chinese dialect, and *Peng* is 'soldier' in several Chinese dialects.
- 33 Paraphrasing from a *Pioneer* article, cited in Derek Da Cunha, 'Sociological Aspects of the Singapore Armed Forces', *Armed Forces and Society* (Vol. 25, No. 3, Spring 1999), p. 461. Also see interviews with Singaporean men in Judith d'Silva et al, *Giving Strength to Our Nation*, pp. 58, 63–64, 71, 299 (note 32), and note Elizabeth Nair, 'Conscription and Nation-Building in Singapore: A Psychological Analysis', *Journal of Human Values* (Vol. 1, No. 1, 1995), pp. 94, 98. *Ah Boys to Men* was a movie released in two parts between 2012 and 2013, with the first breaking box office records and the second the 'top-grossing Singapore film of all time'. Boon Chan, 'Superheroes Ruled at Box Office Here in 2016', *Straits Times* (7 January 2017), retrieved 9 January 2017 from <https://global.factiva.com>. The play *Army Daze* is Singapore's 'most successful stage comedy' to date. Keith Tan, 'SAF in Popular Media', in Judith d'Silva et al, *Giving Strength to Our Nation*, p. 331. For an example of the notion of NS as a 'rite of passage', see the forum letter, Lee Chiu San, 'Achieving Sporting Glory, Serving NS Not Incompatible', *Straits Times* (16 August 2016), retrieved 3 January 2017 from <https://global.factiva.com>.
- 34 Colin Goh, '10 Things That Prove You've Been Through the SAF' in Judith d'Silva et al, *Giving Strength to Our Nation*, p. 334 (note 32); Kenneth Cheng, 'Curiosity Prompts Creation of Online Singlish Dictionary', *Today* (9 August 2016), retrieved 3 January 2017 from <https://global.factiva.com>; Gwee Li Sui, 'Do You Speak Singlish?', *New York Times* (13 May 2016), retrieved 2 February 2017 from <https://global.factiva.com>.
- 35 See comments by citizens and business community leaders in Judith d'Silva et al, *Giving Strength to Our Nation*, pp. 58, 63, 298–299 (note 32), and the reports of SAF officers on their conscripts in Elizabeth Nair, 'Conscription and Nation-Building in Singapore', pp. 98–99 (note 33), 'echoed' by half the sample of undergraduate former NSFs in her earlier study.
- 36 Dick Lee, 'Music and Drama Company: Stars Shining with Purpose', in Judith d'Silva et al, *Giving Strength to Our Nation*, p. 341 (note 32); Adrian Tan, 'Pioneer Alumni', in Judith d'Silva et al, *Giving Strength to Our Nation*, p. 344; Isabelle Liew, 'Singapore University of Technology and Design Student Invention Prevents Falling Asleep at the Wheel', *Straits Times*

- (10 December 2016), retrieved 3 January 2017 from <http://www.straitstimes.com.ezlibproxy1.ntu.edu.sg/singapore/transport/student-invention-prevents-falling-asleep-at-the-wheel>.
- 37 Philip Yeo, 'Dr. Goh Keng Swee and the Building of Singapore's Defence Industrial Capability: A First-Person Account of the Early Challenges in Building the Republic's Defence Industry' in Barry Desker and Ang Cheng Guan, *Perspectives on the Security of Singapore*, p. 311 (note 6); Bilveer Singh, *Singapore's Defence Industries*, p. 32 (note 19); Singapore Technologies Engineering, *Engineering with Passion: Annual Report 2016* (Singapore: Singapore Technologies Engineering, 2017), pp. 24–25; Singapore Technologies Engineering, *Vision, Mission, and Corporate Values* (2016), retrieved 30 March 2017 from <http://www.stengg.com/about-us/vision-mission-and-values>.
- 38 Melanie Chew, 'DSO National Laboratories: A Battlefield of the Future', in Judith d'Silva et al, *Giving Strength to Our Nation*, p. 244 (note 32). The men were surnamed 'Er, Toh, and Chan'.
- 39 Defence Science and Technology Agency, *Overview* (2016), retrieved 26 January 2017 from <https://www.dsta.gov.sg/about/overview>. On statutory boards in Singapore, entities still part of the Singapore government but outside the bureaucracy of the civil service to maximise 'autonomy and flexibility', see Jon S. T. Quah, *Public Administration Singapore-Style*, Research in Public Policy Analysis and Management, Vol. 19 (Bingley: Emerald Group Publishing Limited, 2010), p. 42.
- 40 Jermyn Chow, 'Logistics & Engineering: Keeping Things in Shape and Ever Ready', Judith d'Silva et al, *Giving Strength to Our Nation*, p. 263 (note 32); Bernard F W Loo, 'Goh Keng Swee and the Emergence of a Modern SAF', p. 137 (note 11).
- 41 This analysis is taken from Bernard F W Loo, 'Explaining Changes in Singapore's Military Doctrines', pp. 368–370 (note 9). Michael Raska, *Military Innovation in Small States: Creating a Reverse Asymmetry* (Abingdon, Oxon: Routledge, 2016), p. 140. On the fledgling defence industry's early work, see Bilveer Singh, *Singapore's Defence Industries*, p. 18 (note 19).
- 42 Bilveer Singh, *Singapore's Defence Industries*, pp. 51–52 (note 19). Besides AMX-13 light tanks, SAF capabilities developed from used foreign assets include the A-4SU Super Skyhawks, early landing ship tanks (LST) and minesweeper vessels, Centurion and Leopard 2 main battle tanks (MBT), and both classes of the RSN's submarines, spanning the early and contemporary history of the SAF. See Wu Shang-Su, *The Defence Capabilities of Small States*, pp. 35–39, 58–59 (note 22); Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence*, pp. 54–55, 61, 68 (note 10).
- 43 Bernard F W Loo, 'The Management of Military Change', p. 73 (note 17); Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence*, p. 41 (note 10). The exception is 1987, when 'economic services' narrowly beat out 'defence, justice and police'. Data for the years 1966–1996 were sourced from Department of Statistics, Singapore, *Yearbook of Statistics Singapore* (Ministry of Trade and Industry, Singapore), 1974/75, 1981/82, 1982/83, 1991, 1996, and 1997 editions; while data from 1997–2014 was obtained from the Department of Statistics, Singapore, retrieved 14 June 2017 from <http://www.singstat.gov.sg/>. Data for defence spending between 1966–1996 is not disaggregated from 'defence, justice and police' or 'security' spending, though data since 1997 shows that defence spending has exceeded spending on law, home affairs, and foreign affairs, by substantial, often overwhelming amounts. When data for development expenditure was not available, the calculation was made from 'current' or 'main' expenditure. Data for 2015–2016, and the estimate for 2017 were obtained from Ministry of Finance, Singapore, 'Analysis of Revenue and Expenditure', *Singapore Budget*

- 2017: *Revenue & Expenditure* (2017), p. 19, retrieved 28 March from http://www.singaporebudget.gov.sg/data/budget_2017/download/FY2017_Analysis_of_Revenue_and_Expenditure.pdf. Also see Ministry of Defence, Singapore, *Speech by Minister for Defence Dr Ng Eng Hen at the Committee Of Supply Debate 2016* (8 April 2016), retrieved 1 March 2017 from https://www.mindef.gov.sg/imindef/press_room/official_releases/sp/2016/07apr16_speech1.html, for a recent statement of the rationale of Singapore's political leadership for its levels of defence spending.
- 44 Wu Shang-Su, *The Defence Capabilities of Small States*, pp. 37–38, 205n102 (note 22); Bilveer Singh, *Singapore's Defence Industries*, pp. 24, 53 (note 19); Tengah Air Base, *Super Skyhawks: The RSAF A-4 Story* (Singapore: Tengah Air Base, Republic of Singapore Air Force, 2006), pp. 13, 23, 36–38, 46–53. On the metaphor of the 'porcupine', see Bernard F W Loo, 'Maturing the Singapore Armed Forces: From Poisonous Shrimp to Dolphin', in Bridget Welsh, James Chin, Arun Mahizhnan and Tan Tarn How, *Impressions of the Goh Chok Tong Years in Singapore* (Singapore: NUS Press, 2009), p. 180.
- 45 Bilveer Singh, *Singapore's Defence Industries*, pp. 25, 27 (note 19); Ho Shu Huang and Samuel Chan, *Singapore Chronicles: Defence*, p. 55 (note 10); Melanie Chew, 'DSO National Laboratories: A Battlefield of the Future', p. 243 (note 38).
- 46 Melanie Chew, 'DSO National Laboratories: A Battlefield of the Future', p. 247 (note 38); Ministry of Defence, Singapore, *Factsheet: Littoral Mission Vessel* (12 April 2016), retrieved 30 December 2016 from https://www.mindef.gov.sg/imindef/press_room/official_releases/nr/2015/jul/03jul15_nr/03jul15_fs.html; Yeo Suan Futt, 'DSTA: Acquisition and integration', in Judith d'Silva et al, *Giving Strength to Our Nation*, pp. 250, 253 (note 32). Third Generation SAF is based on the notion of leveraging on a superior ability to link and process information to gain a tactical advantage over the enemy. Bernard F W Loo, 'Maturing the Singapore Armed Forces', pp. 181–185 (note 44).
- 47 Bernard F W Loo, 'The Management of Military Change', pp. 72–73 (note 17).
- 48 The land platforms include the Bionix IFV, Bronco ATTC (All Terrain Tracked Carrier), and Terrex ICV (Infantry Carrier Vehicle). Locally-produced artillery include the Primus 3G-networked self-propelled howitzer, and the Pegasus heli-portable light-weight howitzer. Locally-built naval platforms of foreign design have included the Victory-class missile corvettes, Bedok-class mine hunter and the *Formidable*-class frigate. The *Formidable*-class frigate incorporates French and Israeli systems, and American and Italian weapons. Though not a combatant, the *Endurance* Landing Platform Dock (LPD) is designed and built by ST Marine. Wu Shang-Su, *The Defence Capabilities of Small States*, pp. 34, 56–57 (note 22); Ministry of Defence, Singapore, *Factsheet – Singapore Self-Propelled Howitzer 1 Primus* (25 May 2005), retrieved 23 January 2017 from https://www.mindef.gov.sg/imindef/press_room/official_releases/nr/2003/nov/24nov03_nr/24nov03_fs.html; Ministry of Defence, Singapore, *Factsheet – The Singapore Light Weight Howitzer (SLWH) Pegasus* (25 October 2005), retrieved 23 January 2017 from https://www.mindef.gov.sg/imindef/press_room/official_releases/nr/2005/oct/28oct05_nr/28oct05_fs.html; Richard A. Bitzinger, 'Southeast Asia's Naval Shipbuilding Industry: Challenges Ahead', *RSIS Commentaries* (No. 28/2017, 14 February 2017), p. 3, retrieved 14 February 2017 from <http://www.rsis.edu.sg/wp-content/uploads/2017/02/CO17028.pdf>.
- 49 My thanks to Barry Desker for this point.
- 50 Bernard F W Loo, 'Maturing the Singapore Armed Forces', p. 184 (note 44); Singapore Technologies Engineering, *Engineering with Passion: Annual Report 2016*, pp. 4–5, 14, 26–27, 35, 38–40 (note 37); Singapore Technologies Kinetics, *MAN Truck and*

- Bus Singapore: About Us* (2017), retrieved 30 March 2017 from <http://www.mansingapore.com.sg/man/aboutus.jsp>.
- 51 Adrian Wee Jin Kuah, 'Goh Keng Swee and Singapore's Defence Industrial Policy', in Emrys Chew and Kwa Chong Guan, *Goh Keng Swee: A Legacy of Public Service*. (Singapore: World Scientific Publishing Co., 2012), pp. 189–192. Kuah has, however, noted that the direct contribution of Singapore's defence industry to Singapore's period of rapid economic growth can be overestimated. Adrian W J Kuah, 'The Political Economy of Defence Industrialisation in Singapore: The Costs, Trade-Offs and Synergies', *Defence Studies* (Vol. 5, No. 2, 2005), p. 224. Examples of such specialised technological sectors include the biotechnology and information technology sectors. Ron Matthews and Nellie Zhang Yan, 'Small Country "Total Defence": A Case Study of Singapore', in Stefan Markowski, Peter Hall, and Robert Wylie, *Defence Procurement and Industry Policy: A Small Country Perspective* (Abingdon, Oxon: Routledge, 2010), p. 266.
- 52 Adrian Wee Jin Kuah, 'Goh Keng Swee and Singapore's Defence Industrial Policy', p. 190 (note 51).
- 53 See especially *Excerpts from Prime Minister's Discussion with PAP MPs on 17 Nov 81*, pp. 2–3, 25, retrieved 20 March 2017 from <http://www.nas.gov.sg/archivesonline/data/pdfdoc/lky19811117.pdf>; Shunmugam Jayakumar, *Speech at the Certificate Presentation Ceremony for the First Three Intakes of Construction Brigade Trainees at the Police Academy Gymnasium* (16 July 1983), retrieved 20 March 2017 from <http://www.nas.gov.sg/archivesonline/data/pdfdoc/sj19830716s.pdf>. Besides Construction Brigade NSFs, Lee also looked to recruit more foreign labour in construction from Macau and South Asia, and to retain existing Malaysian workers. Lee also sought solutions in mechanisation and skills upgrading in the construction industry, and construction prefabrication. The cost of, and qualifications for, buying public housing has at various times also been an issue of popular concern in Singapore, with unhappiness being occasionally expressed over the years on the issues.
- 54 Chua Sian Chin in 'Construction Brigade', *Hansard, Singapore Parliament Reports* (Singapore: 5th Parliament, Session 1, Vol. 42, Sitting 4, 4 March 1983), col. 417–419, retrieved 21 March 2017 from https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00058660-ZZ¤tPubID=00069444-ZZ&topicKey=00069444-ZZ.00058660-ZZ_1%2Bid034_19830304_S0009_T00401-written-answer%2B and in 'Construction Brigade (Progress)', *Hansard, Singapore Parliament Reports* (Singapore: 5th Parliament, Session 1, Vol. 43, Sitting 11, 19 March 1984), col. 1 285, retrieved 21 March 2017 from https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00059082-ZZ¤tPubID=00069464-ZZ&topicKey=00069464-ZZ.00059082-ZZ_1%2Bid003_19840319_S0003_T00081-oral-answer%2B, which indicates not all NSFs were deployed to HDB or government project worksites; Shunmugam Jayakumar, *Speech at the Certificate Presentation Ceremony* (note 53).
- 55 Chua Sian Chin in 'Construction Brigade (Progress)', col 1 283–1 284 (note 54); Ministry of Culture, Singapore, 'The Construction Brigade of the Civil Defence Corps', *Singapore Government Press Release* (9 September 1981), pp. 2–3, retrieved 20 March 2017 from <http://www.nas.gov.sg/archivesonline/data/pdfdoc/800-1981-09-09.pdf>.
- 56 Singapore Civil Defence Force, *Singapore Civil Defence Force Construction Brigade Serviceman's Handbook / Pasukan Pertahanan Awam Singapura Briged Binaan Buku Panduan Untuk Anggota Perkhidmatan* (Singapore: Singapore Civil Defence Force, 1986), pp. 21–26, 62; Chin Harn Tong, then-Senior Parliamentary Secretary to the Minister

- for Home Affairs, in 'Budget, Ministry of Home Affairs', *Hansard, Singapore Parliament Reports* (Singapore: 6th Parliament, Session 2, Vol. 49, Sitting 8, 23 March 1987), col. 856, retrieved 21 March 2017 from https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00060502-ZZ¤tPubID=00069535-ZZ&topicKey=00069535-ZZ.00060502-ZZ_1%2Bid015_19870323_S0002_T00051-budget%2B.
- 57 Lee Yock Suan, then-Minister of State for National Development, in 'Building and Construction Industry (Projected Labour Requirements)', *Hansard, Singapore Parliament Reports* (Singapore: 5th Parliament, Session 1, Vol. 42, Sitting 9, 18 March 1983), col. 1144, retrieved 21 March 2017 from https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00058731-ZZ¤tPubID=00069449-ZZ&topicKey=00069449-ZZ.00058731-ZZ_1%2Bid008_19830318_S0003_T00071-oral-answer%2B; Lee Yock Suan, *Speech at the Annual Dinner of the Singapore Institute of Architects* (17 July 1982), p. 3, retrieved 21 March 2017 from <http://www.nas.gov.sg/archivesonline/data/pdfdoc/lys19820717s.pdf>.
- 58 Chua Sian Chin in 'Construction Brigade (Progress)', col 1 282–1 283 (note 54); Singapore Civil Defence Force, *Singapore Civil Defence Force Construction Brigade Serviceman's Handbook*, p. 31 (note 56); Ministry of Culture, Singapore, 'The Construction Brigade of the Civil Defence Corps', p. 1 (note 55); Shunmugam Jayakumar, *Speech at the Certificate Presentation Ceremony*, pp. 2–3 (note 53); Lee Boon Yang, then-Senior Minister of State for Home Affairs in 'Construction Brigade National Servicemen (Training and Performance)', *Hansard, Singapore Parliament Reports* (Singapore: 7th Parliament, Session 1, Vol. 53, Sitting 12, 28 March 1989), col. 924, retrieved 22 March 2017 from https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00061572-ZZ¤tPubID=00069596-ZZ&topicKey=00069596-ZZ.00061572-ZZ_1%2Bid008_19890328_S0005_T00071-oral-answer%2B#.
- 59 Lee Boon Yang, then-Ministry of State for Home Affairs in 'Construction Brigade Programme (Success)', *Hansard, Singapore Parliament Reports* (Singapore: 6th Parliament, Session 2, Vol. 49, Sitting 7, 20 March 1987), col. 678, retrieved 21 March 2017 from https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00060478-ZZ¤tPubID=00069534-ZZ&topicKey=00069534-ZZ.00060478-ZZ_1%2Bid010_19870320_S0003_T00061-oral-answer%2B#; Lee Boon Yang, then-Senior Minister of State for Home Affairs in 'Construction Brigade (Progress Report on National Service Trainees)', *Hansard, Singapore Parliament Reports* (Singapore: 7th Parliament, Session 1, Vol. 53, Sitting 13, 26 February 1990), col. 1225, retrieved 22 March 2017 from https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00061914-ZZ¤tPubID=00069610-ZZ&topicKey=00069610-ZZ.00061914-ZZ_1%2Bid007_19900226_S0006_T00081-oral-answer%2B#; Ministry of Manpower, Singapore, *Foreign Workforce Numbers* (20 March 2017), retrieved 23 March from <http://www.mom.gov.sg/documents-and-publications/foreign-workforce-numbers>.
- 60 Abbas Abu Amin, in 'Budget, Ministry of Home Affairs', col 853–854 (note 56); Lee Boon Yang in 'Construction Brigade (Progress Report on National Service Trainees)', col 1225, (note 59); Ho Peng Kee, then-Senior Minister of State for Home Affairs in 'National Servicemen (Deployment at Construction Sites)', *Hansard, Singapore Parliament Reports* (Singapore: 10th Parliament, Session 1, Vol. 77, Sitting 17, 20 April 2004), col. 2859, retrieved 22 March 2017 from <https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00000366->

- WA¤tPubID=00004667-WA&topicKey=00004667-WA.00000366-WA_1%2B%2B#.
- 61 Chua Sian Chin in 'Construction Brigade (Progress)', col 1283 (note 54).
- 62 Saidi Haji Shariff and Chua Sian Chin in 'Construction Brigade (Progress)', col 1 282–1285 (note 54); Abbas Abu Amin and Lee Boon Yang in 'Budget, Ministry of Home Affairs', *Hansard, Singapore Parliament Reports* (Singapore: 6th Parliament, Session 2, Vol. 50, Sitting 16, 23 March 1988), col. 1 283–1 288, retrieved 22 March 2017 from https://sprs.parl.gov.sg/search/topic.jsp?currentTopicID=00061021-ZZ¤tPubID=00069558-ZZ&topicKey=00069558-ZZ.00061021-ZZ_1%2Bid014_19880323_S0002_T00031-budget%2B; Steve Chia, Ho Peng Kee in 'National Servicemen (Deployment at Construction Sites)', col 2 860 (note 60).
- 63 Leong Chan-Hoong, Yang Wai Wai, and Henry Ho, *Singaporeans' Attitudes to National Service* (Singapore: Institute of Policy Studies, October 2013), p.1.
- 64 On the dissatisfaction over the conscription non-liability of first-generation PRs and new citizens, see Leong et al, 'National Service: The Holy Grail in the Management of Social Diversity', pp. 311–315 (note 28). On the route-march song, see Yuen Sin, 'Lessons in Consent and Sexual Respect', *Straits Times* (19 August 2016), retrieved 3 January 2017 from <https://global.factiva.com>. See Kenneth Paul Tan, 'Crisis, Self-Reflection, and Rebirth in Singapore's National Life Cycle', *Southeast Asian Affairs* (2003), pp. 243–246 for considerations of discourses on terrorism that had been articulated soon after the discovery of the *Jemaah Islamiyah* organisation's operations in Singapore. Also see Chua Beng Huat, 'Multiracialism as Official Policy', pp. 58–59, 64 (note 26). At the same time, it needs to be noted that discourses have also been careful to stress that terrorism should not be seen as a Muslim problem and the Malay-Muslim community should not be stigmatised. Many of the exhortations to reject violence and report those at risk have come also from leaders of the Malay-Muslim community in Singapore itself. As such, the issue demands nuanced consideration, but in view of the points made by Tan and by Chua. For a feel of recent public discourse on terrorism in Singapore, see the following articles from Singapore's main newspaper the *Straits Times*: Danson Cheong, 'Guard Against Rise of Anti-Muslim Sentiment in Singapore: K Shanmugam' (5 June 2017); Joanna Seow, 'Don't Even 'Share' Extremist Views: Yaacob' (31 July 2016); Lim Yan Liang 'Act to Set Tone of Islam' Here, Muslim Leaders Urged' (4 September 2016); the forum letter by Muhammad Dzul Azhan Haji Sahban, 'More Threats and Challenges Ahead', (23 August 2016); Audrey Tan, 'Govt "Will Protect All from Threat of Violence"' (15 June 2016); and Sumiko Tan, 'Lunch with Sumiko: When the Going Gets Tough, Singapore's Mufti Writes Poetry' (5 February 2017), all retrieved 12 June 2017 from <https://global.factiva.com>. Also see the video statement and social media post by Yaacob Ibrahim (12 June 2017), retrieved 13 June 2017 from <https://www.facebook.com/yaacobibrahim/videos/1547683245266178/>. Mr. Shanmugan is currently Singapore's Minister for Home Affairs and Law, and Mr. Yaacob Ibrahim is currently Minister in charge of Muslim Affairs as well as Minister for Communications and Information.
- 65 See, for example, the thoughts of Benny Lim, a former permanent secretary in the Ministry of Home Affairs, Singapore, in *Straits Times*, 'Interview with Benny Lim: Nation Building Reboot Needed' (18 January 2017), retrieved 18 January 2017 from <https://global.factiva.com>.
- 66 Some limited exceptions include the release of six RSAF pilots between 1978 and 1983 to serve as commercial airline pilots for the national carrier Singapore Airlines (SIA), five of the six in 1978; and a

- brief and temporary dispatch of 48 army national servicemen as relief teachers at primary schools in 1981. The RSAF pilots were released in 1978 to 'reduc[e] the operational costs of [the RSAF] while ... helping to meet [SIA's] pilot requirements', and maintained a status and readiness as reserve air force pilots. The manpower needs of the RSAF meant that by 1983, SIA pilots were being called-up as RSAF reserve pilots instead. The army national servicemen were dispatched to meet a shortage due to a training and scheduling mishap at the then-Institute of Education (the teachers' training college). Ministry of Culture, Singapore, 'RSAF/SIA Reserve Pilot Scheme', *Singapore Government Press Release* (17 October 1978), retrieved 13 June 2017 from <http://www.nas.gov.sg/archivesonline/data/pdfdoc/932-1978-10-17.pdf>; Paul Jansen and Ronnie Wai, 'Air Force Taps Pool of Civilian Reserves' and 'SIA Pilot Made Air Force 2nd Lieutenant', *Straits Times* (12 November 1983), retrieved 13 June 2017 from <http://eresources.nlb.gov.sg/newspapers/Digitised/Page/straitstimes19831112-1.1.9>; and Raymond Moses, 'NS Teachers Take to Their Task with Gusto', *Straits Times* (13 August 1981), retrieved 12 June 2017 from <http://eresources.nlb.gov.sg/newspapers/Digitised/Article/straitstimes19810813-1.2.51>.
- 67 Peter Ho et al, *Singapore Chronicles: Governance*, pp. 103–104 (note 2); Chin Kin Wah, 'Singapore: Threat Perception and Defence Spending in a City-State' in Chin Kin Wah, *Defence Spending in Southeast Asia* (Singapore: Institute of Southeast Asia Studies, 1987), pp. 213–216; Philip Yeo, 'Dr. Goh Keng Swee and the Building of Singapore's Defence Industrial Capability', p. 313 (note 37); Bilveer Singh, *Singapore's Defence Industries*, p. 28 (note 19).
- 68 Committee on the Future Economy, *Report of the Committee on the Future Economy*, pp. 38–39 (note 4); Valerie Koh, 'Pre-enlistees Can Signal Interest in 33 NS Vocations from November', *Today* (9 September 2016); Wong Pei Ting, 'Winning 'Hackers' Might Be Among First Batch of NS Cyber Defenders', *Today* (9 June 2017), retrieved 3 January 2017 and 14 June 2017 respectively from <https://global.factiva.com>.