

# POINTER

The Journal of the Singapore Armed Forces

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by MAJ Adrian Choong

### **Interpreting Recent Military Modernizations in Southeast Asia: Cause for Alarm or Business as Usual?**

by MAJ Ooi Tjin-Kai

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by CPT Choy Yong Cong

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by ME5 Calvin Seah and Malini T. Deepan

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### **Operational Learning: The New Relevancy for Knowledge Management in the Singapore Armed Forces**

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### **Takeaways from Business School for the SAF**

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## **QUOTABLE QUOTES**

# Editorial

This first issue of *POINTER* for 2012 features the top three winning essays of the Chief of Defense Force Essay Competition 2010/2011. First prize essay “The Proliferation Security Initiative (PSI): Can It Deliver?” by MAJ Adrian Choong examines the shortcomings of the initiative in its role of interdicting the trafficking of weapons of mass destruction at sea. As legal and jurisdictional issues severely curtail the effectiveness of the current framework, MAJ Choong proposes consensus building among the international community to pave the way for universal acceptance of the PSI. Member states should thus establish a good track record of intercepting illegal shipments within their own waters to win over more skeptical or reluctant neighbors. MAJ Ooi Jin-Kai’s “Interpreting Recent Military Modernizations in Southeast Asia,” in second place, analyzes recent military acquisition programs in the region. He concludes that the rapid changes taking place are a natural consequence of growing economic prosperity among Southeast Asian states and in line with long term force modernization trends. However, the implication is that the Singapore Armed Forces (SAF) will find it increasingly difficult to retain its qualitative edge in the future as neighboring countries continue to develop and expand their military capabilities. He therefore recommends creating a collective security community with neighboring countries, supplementing Singapore’s conventional military deterrence with diplomacy. In “Forcing Strategic Evolution: The SAF as an Adaptive Organization,” CPT Choy Yong Chong, the third prize winner, tackles the challenge of future warfare. Concluding that uncertainty remains an integral part of warfare and that militaries increasingly face a shifting and ambiguous security landscape, he urges the SAF to adopt a culture of adaptability to prepare itself for any eventuality. Training that more closely replicates operational conditions, a digital knowledge management system that can quickly disseminate the lessons learned, a leadership model that can fulfill the need for both initiative and discipline, a military culture that rewards innovation and feedback, and a modular approach to capability development are identified as key elements of an adaptive SAF.

Indeed, the need for adaptability is greater than ever. The strategic uncertainty that began with the end of the Cold War and the current “War on Terror” continues to challenge defense planning. Faced with shrinking budgets, spiraling platform costs and rising wages, militaries struggle to stay relevant and make the best use of increasingly limited resources. From the high-technology Revolution in Military Affairs to decentralized Fourth-Generation Warfare, all modern warfare theories stress the need to transform military doctrine, structure, equipment and even thinking in order to cope with the demands of the changing battlefield. This issue of *POINTER* features articles relevant to the SAF as an adaptive organization: one that is truly able to transform and reinvent itself for the new century.

The uncertain security landscape is also a concern in “A Ready SAF: A Strategy for Tomorrow” by LTA Lim Guang He, who argues that Singapore should adopt a flexible strategy that can respond to a wide range of challenges but retains the ability to address the most imminent and dangerous threats. He draws lessons from commercial practice to suggest how the SAF may best tailor its limited resources to tackle future missions, emphasizing versatility and efficiency as crucial to this process. He also notes that these elements are part of the envisioned Third Generation SAF and concludes that force transformation is necessary for true force readiness. In “Transformers of the Third Generation SAF,” CPT Phua Chao Rong, Charles examines personnel development. He emphasizes the need for the SAF to win over the hearts and minds of its own personnel, motivating them to contribute willingly to the organization and developing in them the skills and knowledge necessary for transformation. The SAF as an institution must nurture the agents of its Third Generation transformation by encouraging efficient work processes, emphasizing both formal and informal learning, building a culture of innovation and extending opportunities for personal development and contribution to all levels of the organization.

In “Operational Learning: The New Relevancy for Knowledge Management in the SAF,” SLTC Karuna Ramanathan tackles the area of learning in the SAF. In order to develop the fundamental skills of adaptability, rapid learning and operational imagination in SAF leaders, the organization as a whole must become more accepting of constant change, develop deep rather than surface knowledge and anticipate and learn from the challenges it faces. This requires developing a knowledge management system that encourages sharing of information, promoting a systematic initiative to inculcate officers with the skills to gain insights and motivate their subordinates, and broadening organizational learning programs among SAF personnel. In “Takeaways from Business School for the SAF,” COL Frederick Chew identifies several key lessons that the SAF can draw from commercial practice. From organization behavior to human resource and operations management, the best practices of the business world can be adapted to improve efficiency in the military sphere.

Tech Edge article “Identification Friend or Foe (IFF): A Necessity on the Battlefield” by ME5 Calvin Seah and Malini T Deepan deals with the challenges and significance of implementing effective IFF systems. Despite the increasing use of precision weapons, “friendly fire” continues to plague armies. Examining the root causes of fratricide, the authors identify the characteristics of the ideal IFF system and weigh various technological solutions to the problem.

*POINTER* would like at this point to bid BG Tan Ming Yiak Mark, Commandant, SAFTI MI and our Editorial Board advisor, farewell as he moves on to greater things. We extend our warmest welcome to BG Benedict Lim as he takes over from BG Tan. This issue also sees the departure of two key members of the *POINTER* Editorial Team. Editor Dr Pang Yang Huei has steered the journal through a year of change and we wish him well as he departs for a new career in academia. We also bid farewell to CPL Ng Yi Ming, who will be heading off to university. May he find success in his future endeavors.

**The *POINTER* Editorial Team**

# The Proliferation Security Initiative: Can It Deliver?

by MAJ Adrian Choong

## Abstract:

The Proliferation Security Initiative (PSI) is a multinational initiative that aims to stop the trafficking of Weapons of Mass Destruction (WMD), their delivery systems, and related materials to and from states and non-state actors of proliferation concern. The core of the PSI's activity revolves around the interdiction of WMD trafficking at sea. As a framework for interdiction, the PSI suffers from a series of shortcomings in its current form which create significant loopholes that can be exploited by a determined trafficker. There are significant legal issues that severely restrict the interdiction and seizure of WMD materials at sea. The PSI lacks the participation of key nations in Asia straddling the major shipping routes between North Korea and Iran, two states of proliferation concern. The PSI also faces structural challenges that affect its transparency. Given these challenges, it is questionable if the PSI in its current form can be effective in preventing proliferation. However, the fundamental logic of the PSI as a non-proliferation tool is sound. The PSI's best strategy is to build international momentum against illicit trafficking of WMD and related material and expand the legal freedom to act through growing its membership. PSI participants should continue to increase their effectiveness at detecting and seizing WMD and related materials in their own ports and internal waters, and the PSI can help in these endeavours. A "kinder, gentler" PSI—one that is established firmly within the bounds of international law—would be naturally attractive to nations as a way of discharging their international obligations. By backing off from an aggressive interdiction posture, the PSI could win over more adherents and build momentum towards non-proliferation.

*Keywords: Maritime Security; Nuclear Proliferation; Proliferation Security Initiative; Weapons of Mass Destruction*

## INTRODUCTION

*"The greatest threat to peace is the spread of nuclear, chemical and biological weapons ... When weapons of mass destruction or their components are in transit, we must have the means and authority to seize them. So today I announce a new effort to fight proliferation called the Proliferation Security Initiative."*

*George W. Bush, Krakow, Poland, 31 May 2003<sup>1</sup>*

The Proliferation Security Initiative (PSI) is a multinational initiative that "aims to stop the trafficking of Weapons of Mass Destruction (WMD), their delivery systems, and related materials to and from states and non-state actors of proliferation concern."<sup>2</sup> The core of the PSI's activity revolves around the interdiction of WMD trafficking at sea, although the PSI has provisions for interdiction on land and in the air as well.<sup>3</sup> Since its inception in 2003, the level

of international interest in and commitment to the PSI has increased. Participation in PSI has expanded, from an initial membership of ten countries,<sup>4</sup> to 95 nations in 2010.<sup>5</sup> Multinational PSI exercises and workshops continue to be conducted on a regular basis with an average frequency of four events per year.<sup>6</sup>

Despite the promising level of international participation and commitment to the PSI, little evidence has been released to show that the PSI has thus far been effective at interdicting WMD traffic. The PSI continues to suffer from fundamental legal and practical issues that cripple its effectiveness and discourage broader participation.

The issue of nuclear non-proliferation is now high on the international agenda. The United Nations' (UN) resolutions against the North Korean nuclear test in 2009, Iran's refusal to cease high-level enrichment of uranium, the high participation in the 2009 Nuclear

Security Summit,<sup>7</sup> and the international attention focused on the 2010 Non-Proliferation Treaty Review Conference,<sup>8</sup> are all indications of a growing global search for effective mechanisms to strengthen non-proliferation efforts. In a cornerstone speech outlining his nuclear policy in Prague, Czech Republic, in 2009, President Barack Obama has declared that he would work towards making the PSI an enduring institution.<sup>9</sup> The 2010 Nuclear Posture Review Report reiterated that the United States (US) Department of Defense would act to impede trade in sensitive nuclear materials in light of President Obama's pledge towards the PSI.<sup>10</sup> It is timely to consider whether the PSI in its current form can deliver on its promise, and if not, how its effectiveness can be enhanced.

*The PSI continues to suffer from fundamental legal and practical issues that cripple its effectiveness and discourage broader participation.*

## BACKGROUND

In December 2002, President George W. Bush released his "National Strategy to Combat Weapons of Mass Destruction," National Security Presidential Directive 17 (NSPD-17). NSPD-17 outlined a three-pronged strategy to safeguard the United States from WMDs, namely counter-proliferation, strengthened non-proliferation, and consequence management.<sup>11</sup> Interdiction of WMD materials was a key component of the counter-proliferation strategy and aimed to "prevent the movement of WMD materials, technology and expertise to hostile states and terrorist organizations."<sup>12</sup> In May 2003, President Bush introduced the PSI as a new approach to prevent the spread of illicit WMD materials. Ten countries joined the United States as founding members of the PSI.<sup>13</sup>

The concept of multi-national cooperation on interdiction met with early validation in October 2003, five months after the announcement of the PSI. The *BBC China*, a German-flagged ship, was en-route



Port of Singapore



from Malaysia to Libya when the German government, acting on intelligence from the United States, ordered it to divert to Italy where it was detained. Its cargo of centrifuge parts, which could have been used for uranium enrichment, was seized.<sup>14</sup> Although the seizure of the *BBC China* was not a PSI operation, the success of the maritime interdiction operation appeared to validate the principles on which the PSI was founded. The large cast of nations involved in the operation reinforced the need for multi-national participation in such interdictions. Then US Secretary of State Condoleezza Rice credited the interdiction for its role in persuading Libya to abandon its WMD program.<sup>15</sup> The evidence uncovered by the seizure of the *BBC China's* illicit cargo was also instrumental in exposing and unraveling the A. Q. Khan nuclear proliferation network, which had previously supplied interested countries with the high-tech equipment and expertise required for their nuclear programs.<sup>16</sup> It seemed then that the PSI's strategy was sound. But is it really?

### CURRENT SHORTCOMINGS OF THE PSI

In order to be effective, an interdiction program must be able to target a large enough proportion of illicit shipments in order to deter prospective traffickers. There also has to be some latitude on time, place and conditions to make allowances for limited intelligence. Additionally, safe haven must be denied to suspect ships, as the existence of "bolt-holes" and safe zones would render interdiction ineffective.

As a framework for interdiction, the PSI suffers from a series of shortcomings in its current form which create significant loopholes that can be exploited by a determined trafficker. Almost immediately after the PSI's inception, it was recognized that there were significant legal issues that severely restrict the circumstances under which interdiction and seizure of WMD materials at sea is permitted.<sup>17</sup> The PSI still lacks the participation of key nations in Asia straddling the major shipping routes between North Korea and Iran, two states ostensibly "of proliferation concern."<sup>18</sup> The PSI also faces structural challenges that affect its transparency and dissuade participation. These issues are elaborated below.

### LEGAL CHALLENGES OF THE PSI

The PSI Interdiction Principles explicitly state that PSI activities are to be undertaken "consistent with national legal authorities and relevant international law and frameworks."<sup>19</sup> However, under international law the legal basis for interdiction on the high seas and in the air is extremely narrow. The current set of United Nations Security Council Resolutions do not give sufficient latitude to PSI participants or states to contravene international law by stopping and searching vessels suspected of carrying WMD and related material. Effectively, without the consent of the flag state, vessels of concern can only be stopped and searched in the internal waters of a PSI participant. This limits the conditions under which interdiction can legally take place, and severely hampers the integrity of the PSI in staunching the flow of WMD materials.

#### Limitations of Current UN Security Council Resolutions

The current UNSCRs do not give sufficient latitude to states to deviate from international law to interdict vessels of concern. There are three sets of UNSCR currently relevant to stopping the illegal transport of WMDs. UNSCR 1540 (2004) calls on all states "to take cooperative action to prevent illicit trafficking in nuclear, chemical or biological weapons, their means of delivery, and related materials."<sup>20</sup> However, UNSCR 1540 limits any action taken to those "consistent with international law." Another set of UNSCR refers to Iran's nuclear enrichment program. Of these, UNSCR 1803 (2008) is aimed at tightening restrictions on Iran's nuclear activities, and calls on states to "inspect cargoes to and from Iran" if there are "reasonable grounds to believe that the aircraft or vessel is transporting goods prohibited."<sup>21</sup> However, such action is again limited within the bounds of international law. The third set of UNSCR focuses on North Korea's nuclear program. Of these, UNSCR 1874 (2009), enacted in response to North Korea's 2009 nuclear test, calls for the inspection of "all cargo to and from the Democratic People's Republic of Korea (DPRK)" but also limits the inspections to that "consistent with international law."<sup>22</sup> Given that UNSCR 1874 still maintains this restriction despite clear evidence of nuclear capability

by North Korea, it seems the UN Security Council is unwilling to shut the proverbial barn door even after the horse has bolted. It is unlikely that any future UNSCR would allow PSI interdiction operations to contravene international laws to the extent needed to effectively halt nuclear proliferation.

*Given that UNSCR 1874 still maintains this restriction despite clear evidence of nuclear capability by North Korea, it seems the UN Security Council is unwilling to shut the proverbial barn door even after the horse has bolted.*

#### Limited Grounds for Interdiction on the High Seas

Apart from the UN Security Council Resolutions, the legal basis for PSI maritime interdictions under international law is very limited. On the High Seas, neither the 1958 Convention on the High Seas nor the United Nations Convention on the Law of the Sea (UNCLOS) allows for ships to be stopped and boarded solely on the suspicion of carrying WMD or related materials.<sup>23</sup> Under the UNCLOS, a warship can justify boarding a foreign merchant vessel on the high seas only when the ship in question is engaged in piracy, the slave trade, unauthorized broadcasting, is assessed to be without nationality, or suspected to be of the same nationality of the warship.<sup>24</sup> These limitations on interdiction apply in a similar manner to international straits and within archipelagic sea lanes, to which the regime of transit passage and archipelagic sea lanes passage apply respectively.<sup>25</sup> The carriage of illegal WMD and related materials does not in itself provide the legal basis for a vessel to be stopped and searched. Absent these conditions, a foreign merchant ship can be stopped and boarded if the flag-state of the merchant vessel agrees, or if the ship's master agrees to do so. Currently, the United States has boarding agreements with key flag states that facilitate such interdictions, including Panama, Liberia and the Marshall Islands, among others.<sup>26</sup> However, this approach depends completely on the willingness of the flag state to enter into such agreements.

Needless to say, states of proliferation concern are unlikely to authorize any interdictions on their flagged merchant vessels, and can be presumed to have instructed their ships' masters likewise.

#### Limited Grounds for Interdiction in Territorial Waters

There are also very limited legal grounds for the maritime interdiction of illicit WMD traffic in territorial waters. A coastal State has very limited legal basis to interdict a ship that is exercising innocent passage through its territorial sea. The UNCLOS favors the freedom of navigation, stating that coastal States "shall not hamper the innocent passage of foreign ships through the territorial sea."<sup>27</sup> Nor can coastal states enact any laws and regulations that impose on foreign ships constraints such that they "have the practical effect of denying or impairing the right of innocent passage," or "discriminate in form or in fact against the ships of any State."<sup>28</sup> Hence, the coastal state is limited in its ability to enact domestic legislation to prohibit the transport of illicit WMDs through its waters. In addition, the fact that the ship is carrying WMD or related material has no impact on the innocent nature of its passage.<sup>29</sup> Therefore, while the exercise of a State's sovereignty over their territorial sea is extensive, its rights are not extensive enough for the effective interdiction of illicit WMD traffic.



*The Straits of Malacca*

### Possible Exceptions in Territorial Seas

There may, however, be some scope for coastal states to contest the innocent passage of ships of concern. There have been instances where coastal states have unilaterally attempted to deny or restrict passage to ships transporting hazardous radioactive waste through their Exclusive Economic Zone (EEZ) or territorial seas based on the precautionary principle, due to the risk posed to the environment by these hazardous materials. For instance, in 1992 the Heads of Government of the Caribbean Community objected to the planned passage of the Pacific Pintail, carrying a shipment of radioactive waste through Caribbean waters.<sup>30</sup> Such cargoes were argued to be prejudicial to the peace, good order and security of the coastal state. In addition, the UNCLOS requires that “ships carrying nuclear or other inherently dangerous substances” when exercising innocent passage through the territorial sea, “carry documents and observe special precautionary measures established for such ships by international agreements.”<sup>31</sup> Presumably, there may be scope for the coastal state to deny innocent passage if this requirement has not been met.<sup>32</sup> However, the legal merit of such an argument is unclear.

### Greatest Latitude for Interdiction in Internal Waters

A PSI member has the greatest latitude to enforce its laws in its ports and internal waters where the right of innocent passage does not apply. A PSI member state would be permitted to “take the necessary steps to prevent any breach of the conditions to which admission of those ships to internal waters ... is subject.”<sup>33</sup> This would include the right to visit, board and search ships of concern, and seize illicit cargo if domestic legislation allows. This form of interdiction is encouraged in the PSI, which recommends that states take appropriate action to stop and search suspect vessels in their internal waters.<sup>34</sup> Indeed, major transshipment hubs

*A lack of transparency appears to be an institutional characteristic of the PSI, and this is detrimental to international perception of the PSI's impartiality.*

such as Singapore and Hong Kong have enacted legislation to this effect, thereby denying safe haven and replenishment points along the trafficking route.<sup>35</sup> This form of “port denial” may be instrumental in denying passage to the *Kang Nam I*, a North Korean freighter suspected of carrying weapons in contravention of UNSCR 1874. The *Kang Nam I* was unable to complete its journey from North Korea to Myanmar in June 2009, and turned back in the South China Sea.<sup>36</sup> Although the exact reason that *Kang Nam I* turned back is unknown, Vice President Joe Biden credited the reversal to the fact that “[t]here was no place [*Kang Nam I*] could go with certitude that they would not be, in fact, at that point boarded and searched.”<sup>37</sup>

### POLITICAL CHALLENGES OF THE PSI

While participation in the PSI seems high at 95 member states in 2010,<sup>38</sup> the PSI lacks the support of key Asian nations straddling the major shipping routes connecting North Korea and Iran, the two states ostensibly of greatest proliferation concern. These include China, Malaysia, Indonesia, India and Pakistan. Their non-participation creates holes in the WMD interdiction dragnet that can be exploited by a determined trafficker. The participation of these nations is held back by concerns over the concept of interdiction, freedom of navigation, and sovereignty issues, among others.

#### Gaps in Political Participation of Key Asian States

The lack of participation of key Asian states in the PSI—China, Malaysia, Indonesia, India and Pakistan, significantly limits the effectiveness of the PSI's interdiction efforts. Malaysia and Indonesia straddle the waters of the Malacca Strait—an important choke point linking the Pacific to the Indian Ocean.<sup>39</sup> China, India and Pakistan are nuclear powers and have significant industrial capabilities related to WMD and missile production, as well as ports lining the route between North Korea and Iran. Their participation in the PSI

or endorsement of its principles would add significant clout and momentum to the Initiative. Unfortunately, these states have serious reservations over the fundamental concept of the PSI—the legality of multinational interdictions.

### Concerns Over Interdiction and International Laws

Despite the PSI's close adherence to the regimes of international law clearly spelled out in the PSI Interdiction Principles, there remains concern that the PSI is an attempt to generate momentum for a parallel set of international norms that would dilute the current guarantees on freedom of navigation. For instance, China's Ministry of Foreign Affairs "remains concerned about the possibility that the interdiction activities taken by PSI participants might go beyond the international law [sic]."<sup>40</sup> This concern is not helped by transparent American attempts to push the envelope on the legal basis to stop and search shipping. For instance, the US has attempted to insert provisions into the 1988 Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation (SUA) that would allow the interdiction of vessels suspected of carrying WMD related materials.<sup>41</sup> Such a provision would dilute the protection of shipping on the high seas, as the UNCLOS allows ships to be boarded on the high seas if "interference derives from powers conferred by treaty."<sup>42</sup> This concern is exacerbated by the fact that there is no clear definition under the PSI on who is on the list of "states or non state actors of proliferation concern," nor is there any definition regarding what type of "related materials" come under the purview of PSI interdictions. The broadness of the PSI's potential list of interdiction targets does not provide much reassurance to states that are concerned about the PSI's potential impact on the freedom of navigation and trade. Partly due to these concerns, China does not subscribe to the idea that interdiction should be a primary method for non-proliferation. According to China's Ministry of Foreign Affairs, China believes that non-proliferation issues "must be settled through dialog and international cooperation,"<sup>43</sup> and prefers the "attainment of the non-proliferation goal through political and diplomatic means."<sup>44</sup>

### Concerns Over Sovereignty

Another major source of concern over the PSI derives from the fear that a PSI participant's sovereignty would be undermined by the implicit obligation to allow a multinational PSI force to operate within their territorial seas for the purposes of interdiction. While there is no explicit statement within the Interdiction Principles that compels this, Indonesia and Malaysia are particularly sensitive to this possibility. For instance, during a visit by Secretary of State Condoleezza Rice to Jakarta in 2006, the Indonesian Foreign Ministry underlined its concern that the PSI's activities could infringe on its sovereignty, and sought clarification from the US "for the location of the initiative [activities]," and whether they would take place in the EEZ or archipelagic waters.<sup>45</sup> Malaysia is similarly leery. Its abhorrence of foreign warships operating within the Malacca Strait was evidenced by its vehement rejection of the US-proposed Regional Maritime Security Initiative in 2004, which proposed a framework for a partnership of regional states to counter transnational threats in the Malacca Strait. Then Malaysian Deputy Prime Minister Najib Tun Razak stated that "control of the [Malacca] Strait is the sovereign prerogative of Malaysia and Indonesia, and the US military involvement is not welcome."<sup>46</sup> *Dato' Sri* Najib is now the Prime Minister of Malaysia. A multinational force operating in the Malacca Strait to interdict shipping would not be appreciated by him, nor by Indonesia.

### STRUCTURAL CHALLENGES

In trying to fast-track interdiction operations and avoid creating a cumbersome institution, the PSI has thus far neglected its organizational development. PSI participants have described the PSI as "an activity [and] not an organization,"<sup>47</sup> and indeed the PSI has few institutional structures. The PSI "has no international secretariat, no offices in [US] federal agencies established to support it, no database or reports of successes or failure."<sup>48</sup> To some extent, this loose structure facilitates speed of action, control of sensitive intelligence, and allows members to pick and choose their participation levels. However, the lack of organizational mechanisms

ultimately hinders the wider adoption of the PSI due to a lack of transparency, unclear definitions, a lack of operational and intelligence sharing, and an uneven web of bilateral agreements that threaten to complicate multilateral operations.

### Lack of Transparency

A lack of transparency appears to be an institutional characteristic of the PSI, and this is detrimental to international perception of the PSI's impartiality. Intelligence is not shared equally among participants, nor is there any intent to make actionable intelligence available to all PSI states.<sup>49</sup> There are also no mechanisms to verify the reliability of intelligence used for interdictions.<sup>50</sup> States can take interdiction action at their own initiative, or at the request of another state with good cause.<sup>51</sup> The veracity of the "good cause" is completely up to the states involved to decide.<sup>52</sup> The results of interdiction are kept in classified channels and are not shared with all participants.<sup>53</sup> Nor is there any requirement for PSI activities to come under the scrutiny of international bodies such as the International Maritime Organization (IMO), International Atomic Energy Agency (IAEA) or the UN. Indeed, a state could conceivably be a member of the PSI but not be fully aware of the PSI's activities unless other participants saw fit to share information. While these measures are understandable given the sensitive nature of intelligence and the need to safeguard sources, they do not give states any confidence to endorse the Interdiction Principles or be willing to come under obligation to "take all steps available to support PSI efforts."<sup>54</sup>

### Unclear Definition of the Targets of Interdiction Efforts

There is no internationally recognized and accepted basis for the definition of targets of PSI interdictions.<sup>55</sup> The PSI Interdiction Principles target "WMD, their delivery systems, and related materials" that are shipped to and from "states and non-state actors of proliferation concern."<sup>56</sup> The definitions of these terms and the targets of interdiction are not endorsed by the UN or any other international bodies. Legal shipments of WMD materials between those who are not Non-Proliferation Treaty (NPT) signatories are fair game for



*Chemical, Biological, Radiological and Explosive (CBRE) Defence Group*

PSI interdiction under this definition, as the fact that the state is not a member of the NPT has no bearing on whether the state is considered "of proliferation concern."<sup>57</sup> This is despite the fact that states that are not members of the NPT are technically not legally constrained in stockpiling or trading such weapons.<sup>58</sup> The definition of these terms is not even consistent within the PSI. Instead, countries of proliferation concern are defined as "those countries or entities that the PSI participants involved establish should be subject to interdiction."<sup>59</sup> The term "involved" suggests that there need not be consensus within the PSI when determining states of concern. These unclear definitions can create a situation for potential abuse, especially where dual-use materials are targeted for interdiction.

### Uneven Distribution of Bilateral Agreements

A lopsided web of bilateral ship boarding agreements have been established between PSI participants in order to facilitate interdiction. The US has established ship-boarding agreements with nine PSI members: Liberia, Panama, the Bahamas, Belize, Croatia, Cyprus, Malta, the Marshall Islands, and Mongolia.<sup>60</sup> Together, these flag states cover a significant proportion of global shipping by tonnage. While the PSI encourages participating states to enter into ship-boarding agreements, no other state has as comprehensive a set of agreements as the United States. This unbalanced set of bilateral agreements can potentially complicate multinational PSI operations, as each state participating in a joint operation would vary in their ability to board

shipping of different flag states. Potentially, the US with its broader set of agreements would take on a disproportionate share of interdictions, creating or reinforcing the perception that the PSI is a US-dominated activity.

## ASSESSMENT AND RECOMMENDATIONS

### The PSI Effectiveness Paradox

It is difficult to gauge the effectiveness of the PSI based on the number of interdictions. The paradox is that a lack of high-profile interdictions could either mean that the PSI is completely ineffective in intercepting these shipments, or so effective a deterrent that offenders have abandoned their efforts at trafficking. Secretary Condoleezza Rice revealed broadly that over the course of nine months from 2004 to 2005, PSI partners had cooperated on eleven “successful efforts” that prevented Iran from procuring goods to support its nuclear program.<sup>61</sup> However, there has been little evidence released regarding the number and nature of interdictions conducted under the Initiative, nor is it possible to judge Secretary Rice’s statements without a context of what percentage these numbers entail of the total volume of WMD trafficking. Secrecy aside, the very nature of the PSI’s paradox makes judging success difficult. The effectiveness of the PSI will therefore have to be judged on the basis of the legal and political impediments to its activities, and by its ultimate results.

### The PSI – Has it Delivered?

The PSI’s current legal and political shortcomings raises many questions about its ability to fulfill its mission to stop trafficking of WMD and related materials to state and non-state actors of proliferation concern. Despite the indications from Secretary Rice that the PSI interdictions have hindered proliferation, ultimately the PSI has not prevented North Korea from conducting two nuclear tests, nor has it halted Iran’s progress at producing uranium at ever higher levels of enrichment.

With respect to state actors such as Iran and North Korea, the current UNSCRs do not grant the PSI latitude to deviate from international laws, and so the

PSI’s dragnet is restricted in large part to the flagged ships, ports and internal waters of PSI participants. Regarding membership, the support of key Asian states of strategic importance are conspicuously absent, as discussed previously.

With respect to non-state actors, the PSI’s ability to stem the flow of WMD related material to terrorists and other criminal organizations is questionable. President Obama has said that the smallest amount of plutonium—the size of an apple—is all that is necessary for terrorists to fashion a device of catastrophic power.<sup>62</sup> Much less material would be required to make a “dirty bomb”—one that uses conventional explosives to disperse radiological material. The PSI’s ability to staunch this threat is dwarfed by the scale of the problem. The IAEA reports that from 1993 to 2008, there were 336 confirmed incidents of unauthorized possession and related criminal activities involving nuclear material or radioactive sources, and an additional 421 incidents involving the theft or loss of radiological materials.<sup>63</sup> Of these, 15 incidents involved possession of kilogram-scale quantities of highly enriched uranium and plutonium, and the IAEA has indications that the seized material was merely a sample of larger quantities available for illegal purchase.<sup>64</sup> This trafficking is also conducted over land and air routes,<sup>65</sup> both of which are within the PSI’s scope but are not the main focus of its maritime interdiction efforts. It is questionable if the PSI can put a halt to these shipments of small amounts of radiological material, given its current shortcomings

### The PSI – Could it Deliver?

Despite the realities of the current situation, as an ideal the PSI is a highly attractive initiative towards non-proliferation. The fundamental logic of the PSI is sound. By building coordinated international action to counter the illicit trafficking of WMD and related material, the PSI can drive up the cost and risk involved in developing WMDs and thereby delay, disrupt and dissuade potential proliferation. The net effect of an effective interdiction campaign is to concentrate illicit traffic into fewer channels, which in turn can be monitored and dealt with through other aspects of the non-proliferation effort.

If interdiction is successful, seized material can be used as evidence to bolster an international case against an offending nation, or to justify further action. The successes at derailing the Libyan WMD program and the unraveling of the A. Q. Khan nuclear proliferation network are testimony that interdiction can be the tipping point in a future non-proliferation effort.

*The successes at derailing the Libyan WMD program and the unraveling of the A. Q. Khan nuclear proliferation network are testimony that interdiction can be the tipping point in a future non-proliferation effort.*

In the current absence of any customary law against WMD trafficking, and short of the unlikely adoption of an explicit UNSCR authorizing maritime interdiction, PSI participants should continue to increase their effectiveness at detecting and seizing WMD and related materials in their own ports and internal waters. Indeed, states have an obligation to do so under UNSCR 1540. The PSI can be the framework to facilitate sharing legal guidance among those nations that are seeking to strengthen their domestic legislation against proliferation. The PSI can also facilitate the dissemination of operational lessons learned in port searches. Technology sharing is another avenue where the PSI can engage in a win-win exchange with member states. The sharing of detection technology such as hand held radiation detectors, cargo scanners and stand-off sensors can increase the effectiveness of PSI participants in screening port traffic, and thereby strengthen the effectiveness of the PSI's interdiction efforts. These advantages should be advertised to states that are still holding out against participation.

The PSI needs to encourage broader participation, especially among the key Asian hold-outs. By backing off from an aggressive interdiction posture, the PSI could win over more adherents and build momentum towards a new norm for non-proliferation. The PSI

should allay fears over sovereignty and freedom of navigation by persistently clarifying that any actions taken would fall firmly within the scope of international laws, as stated in the PSI's Interdiction Principles. A transparent panel could be set up to advise the PSI on the exact definition of dual-use materials that are of concern, and to ensure that interdiction operations undertaken by PSI members are consistent with international law. While imposing more restrictions on the PSI's interdictions might seem to be a step backward, the fact is that at this point, the PSI probably has more to gain from a broadened membership and international support than it does from executing interdictions that violate international norms guaranteeing the freedom of navigation.

A "kinder, gentler" PSI—one that is established firmly within the bounds of international law, would be naturally attractive to nations as a means of discharging their international obligations. PSI member states could consider their participation in the PSI as a fulfillment of their obligations to the United Nations under UNSCR 1540, 1803 and 1874, all of which call on states to inspect cargoes, and prevent the illicit transport of WMD and related materials to and from non-state actors, Iran and North Korea respectively. For instance, UNSCR 1540 requires states to present a report on steps they have taken or intend to take to implement the resolution,<sup>66</sup> thus states could use their participation in the PSI as evidence of their implementation.

Eventually, once the PSI has established a certain level of trust and international support, the PSI can then gently push the envelope on the legal basis for putting a halt to WMD trafficking. As the PSI grows in membership, proliferating nations will find that their freedom of action shrinks accordingly and they will become increasingly isolated. The PSI, together with legislative and treaty efforts against the trafficking of WMD and related material, could generate momentum towards an international norm or customary law aimed at halting WMD trafficking. The issuance of UNSCR 1540, the review of the Nuclear Non-Proliferation Treaty in 2010, and the UN actions to restrict Iran and North Korea's access to WMDs, are events that

have set the ball rolling in the right direction. The PSI has to keep this momentum going. With time and sufficient international consensus, illicit trafficking in WMD and related materials could take on an international image similar to that of narcotics trafficking, or the slave trade. If states are compelled to stop and search shipping for illegal WMDs from a sense of duty or law, the interdiction of WMDs could become an internationally recognized justification for visiting ships on the high seas. This is a long-term and uncertain prospect, but the PSI can be the vehicle in which to take the first steps towards this goal.

## CONCLUSION

The PSI was formulated with noble ideals—to enhance global security by reducing the threat of WMD proliferation. In the implementation of this ideal, the effectiveness of the PSI is hobbled by the current regime of international laws. Ironically, in order to expand the international support that it requires, the PSI will have to adhere ever so closely to the same laws that inhibit it. Despite the loopholes in the current framework, the PSI can deliver—by doing what it can in ports and internal waters. Doing this much might not stop the flow of illicit material, but it can slow it, as the curtailment of the *Kang Nam I* in 2009 attests. The PSI should continue to build international cooperation and interoperability to enforce non-proliferation—for the time could come when international laws change, or the UN Security Council authorizes action, and nations will be called upon to collectively safeguard the world from the catastrophic threat of WMDs. The PSI will help the international community remain prepared for that day. 🌐

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# Interpreting Recent Military Modernizations In Southeast Asia: Cause For Alarm Or Business As Usual?

by MAJ Ooi Tjin-Kai

## Abstract:

Observers of the security situation in the Asia-Pacific and more specifically Southeast Asia have recently commented on the various force modernization programs that have been taking place. While there are varying opinions as to their impact on regional security, there is a largely consistent perception that significant changes have begun over the course of the last decade. Singapore is part of the region and, due to its persistent sense of vulnerability, has contributed somewhat to this modernization trend since its creation, most recently in its bid to create “the Third Generation Singapore Armed Forces (SAF).” While Southeast Asia has clearly seen a spate of significant military modernization efforts in recent years, we must avoid coming to the conclusion that a potentially destabilizing arms race is under way. Instead, a more accurate conclusion would be to consider these activities as part of an ongoing and expected process of modernization that ensures each state’s conventional deterrence remains relevant and effective—it is a “stability-inducing” modernization in that it improves defenses without becoming a threat to neighbors.

From Singapore’s national security perspective, this conclusion means that its current defense policies remain relevant and appropriate. Consistent and substantial military expenditure since its independence has allowed Singapore to build and maintain a defense force which possesses sufficient deterrence potential to address the tiny city-state’s strategic vulnerabilities. However, as regional economies advance, the required increase in defense expenditure in the long term to maintain this deterrence is unsustainable for small Singapore. Therefore, beyond continued investment in defense to maintain its conventional deterrence edge as long as economically feasible, Singapore needs to take a leadership role in creating a regional collective security community. In the short term, this would require increased military transparency and cooperation, leveraging on existing ASEAN structures.

*Keywords: Arms Race; Deterrence; Force Modernization; Southeast Asia*

## INTRODUCTION

Observers of the security situation in the Asia-Pacific and, more specifically, Southeast Asia have recently commented on the impacts of the force modernizations that have been taking place. Thayer considers this military modernization to be both a major regional trend and a source of inter-state tension.<sup>1</sup> Bitzinger considers this “arms dynamic” to be the most recent iteration of an ongoing cycle that is focused on the “maintenance of the status quo military equilibrium”; it might not be perfect, but it is at least constrained and controllable.<sup>2</sup> While there are varying opinions on its impact on regional security, there is a largely consistent perception

that significant changes have begun over the course of the last decade. Singapore is part of the region and, due to its persistent sense of vulnerability,<sup>3</sup> has contributed somewhat to this modernization trend since its creation, most recently in its bid to create “the Third Generation Singapore Armed Forces (SAF).”<sup>4</sup>

This paper will analyze the impact of these ongoing modernizations within Southeast Asian militaries and their impact on Singapore’s national security.<sup>5</sup> Firstly, it will examine regional long term modernization and procurement trends at the macro level in order to ascertain if the recent surge should be a cause for increased concern—in other words, is it a destabilizing arms race? This paper will then discuss

Singapore's defence policy and force modernization efforts to understand if the current policies and capabilities are still relevant and effective. Finally, this paper will highlight the challenges that Singapore will need to address in the near future.

### **BUY, BUY, BUY – ALARMING DEVELOPMENT OR EXPECTED CYCLE?**

The Stockholm International Peace Research Institute (SIPRI) reported that conventional arms transfers to Southeast Asia “nearly doubled in 2005-2009 compared to 2000-2004,” with Indonesia, Malaysia and Singapore receiving special mention.<sup>6</sup> Thayer interprets this increased activity as “beyond force modernization” and, “although largely intended for defensive purposes, may have a destabilizing impact on regional security.”<sup>7</sup> Other observers such as Sam Bateman go further, declaring that “there are indications that a naval arms race is in fact developing in the region.”<sup>8</sup> However, while substantial procurement has occurred in recent years and military capabilities in specific areas (such as naval force

projection) have evolved, this should not be taken to indicate that an arms race—with all its associated destabilizing connotations—has suddenly developed within the Southeast Asian region.<sup>9</sup> Instead, a more accurate depiction of recent developments would be to perceive it as the latest phase of military modernizations that go “on continuously throughout Asia, and not every modernization activity is an area of concern, or presages an arms race. Quite the contrary, as adding systems or capabilities that are clearly defensive in nature and are carefully bounded in quantity and quality can actually contribute to stability.”<sup>10</sup> Four aspects will be analyzed to substantiate this assessment: long term military expenditure, block obsolescence cycles, stakeholder behavior, and external threats.

#### **Long Term Military Expenditure**

Considering the growth trends of regional countries, there are no indications that any of them have significantly increased military expenditure recently. In fact, aside from a 2% increase in Cambodia's budget from 1993-1994 (which was then followed



*The F-15SG*

by 11 years of consecutive decline), no country has implemented more than a 1% yearly increase (Brunei) and many countries have experienced either declining or constant Gross Domestic Product (GDP) allocation trends (see Chart 1).<sup>11</sup>

*However, while substantial procurement has occurred in recent years and military capabilities in specific areas (such as naval force projection) have evolved, this should not be taken to indicate that an arms race—with all its associated destabilizing connotations—has suddenly developed within the Southeast Asian region.*

When absolute expenditures are plotted, the effect of economic growth on state budgets shows a generally upward trend for Indonesia, Malaysia, Singapore, Thailand and Vietnam—referred to subsequently as the Big Five. This is no surprise as militaries from these countries have maintained sustained military modernization programs since the 1970s.<sup>12</sup> As they represent the largest spenders (and are the countries most mentioned by observers regarding recent military build-ups), these countries have been used for the subsequent Military Expenditure-Economic Growth Trend analysis.<sup>13</sup>

Overall, the charts demonstrate that **a link exists between economic growth and recent increased procurement.** It also supports Huxley's observation that while the financial crisis "severely undermines" the ability of Indonesia, Malaysia and Thailand to fund the military procurement "seen as necessary to modernize their armed forces," the past decade's economic recovery has allowed them to resume their procurement plans.<sup>14</sup>

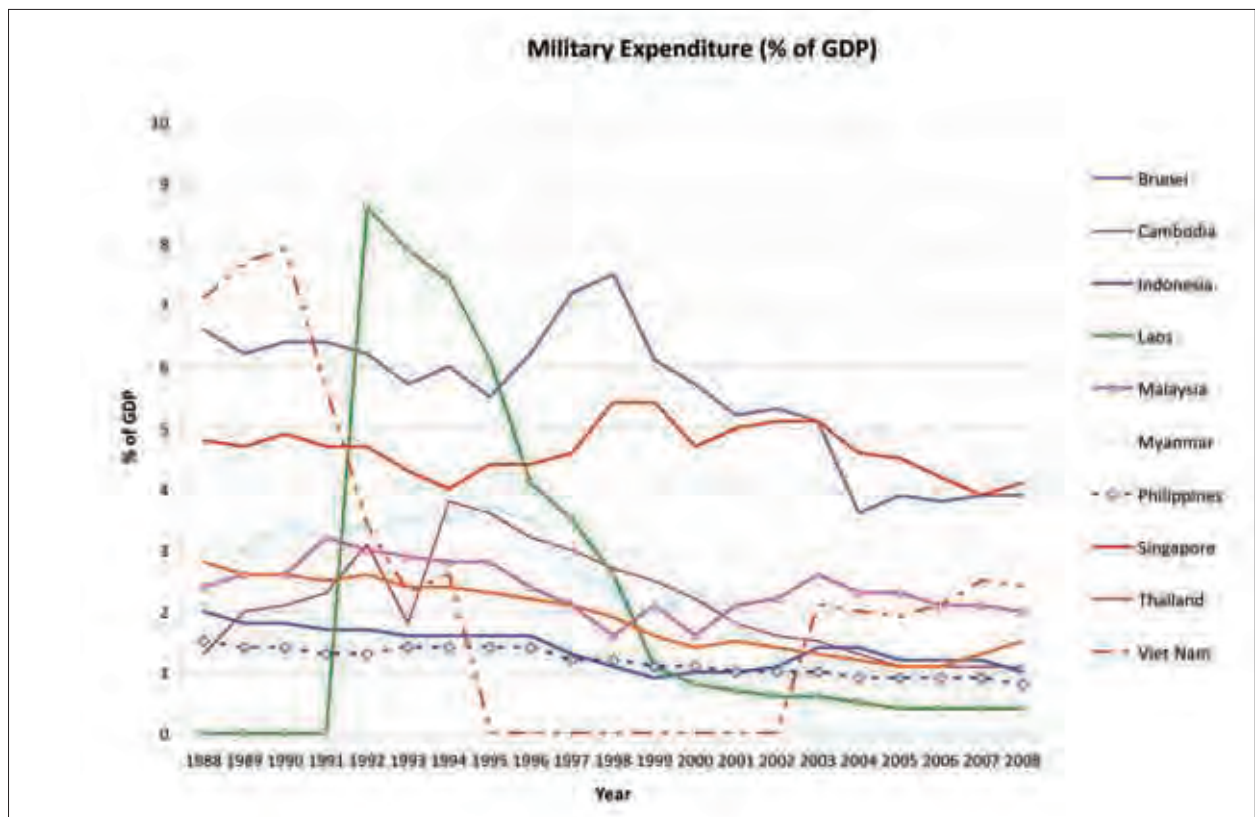


Chart 1: Regional military expenditure as a percentage of GDP (1988-2008)<sup>15</sup>

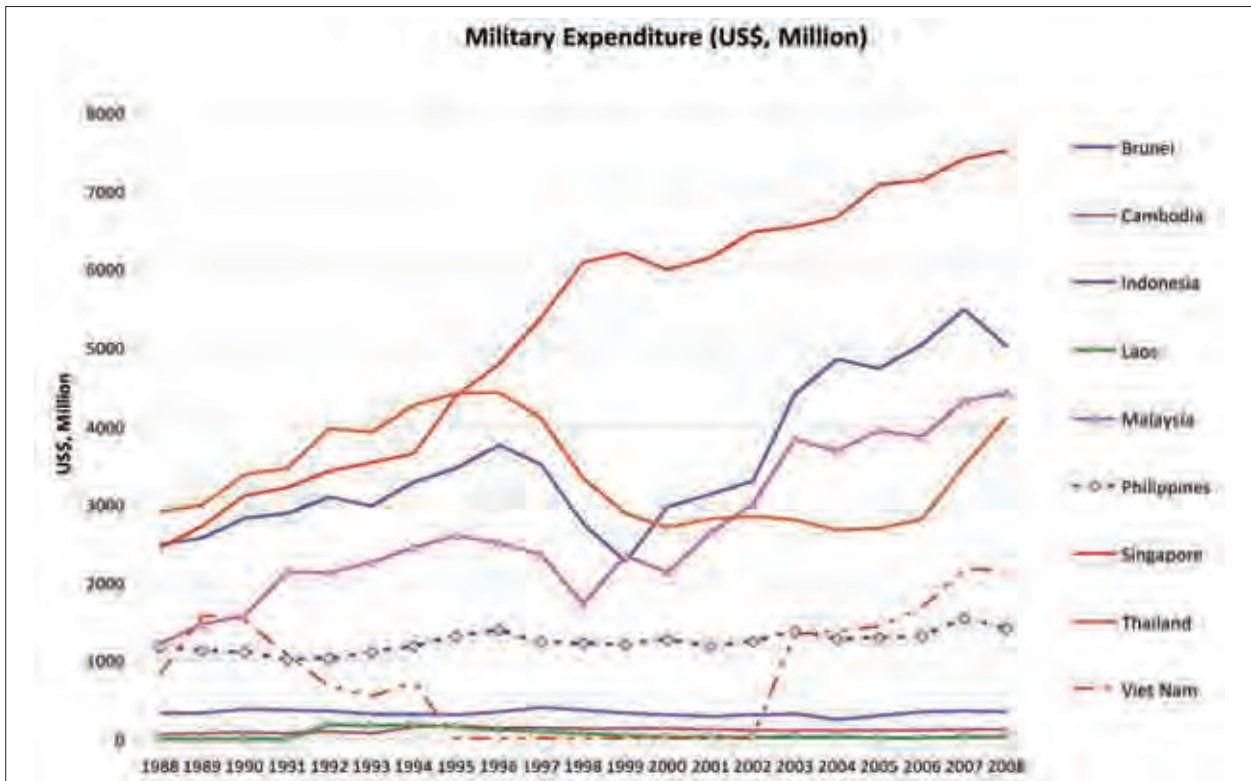


Chart 2: Regional absolute military expenditure in 2008 US\$ (1988-2008)<sup>16</sup>

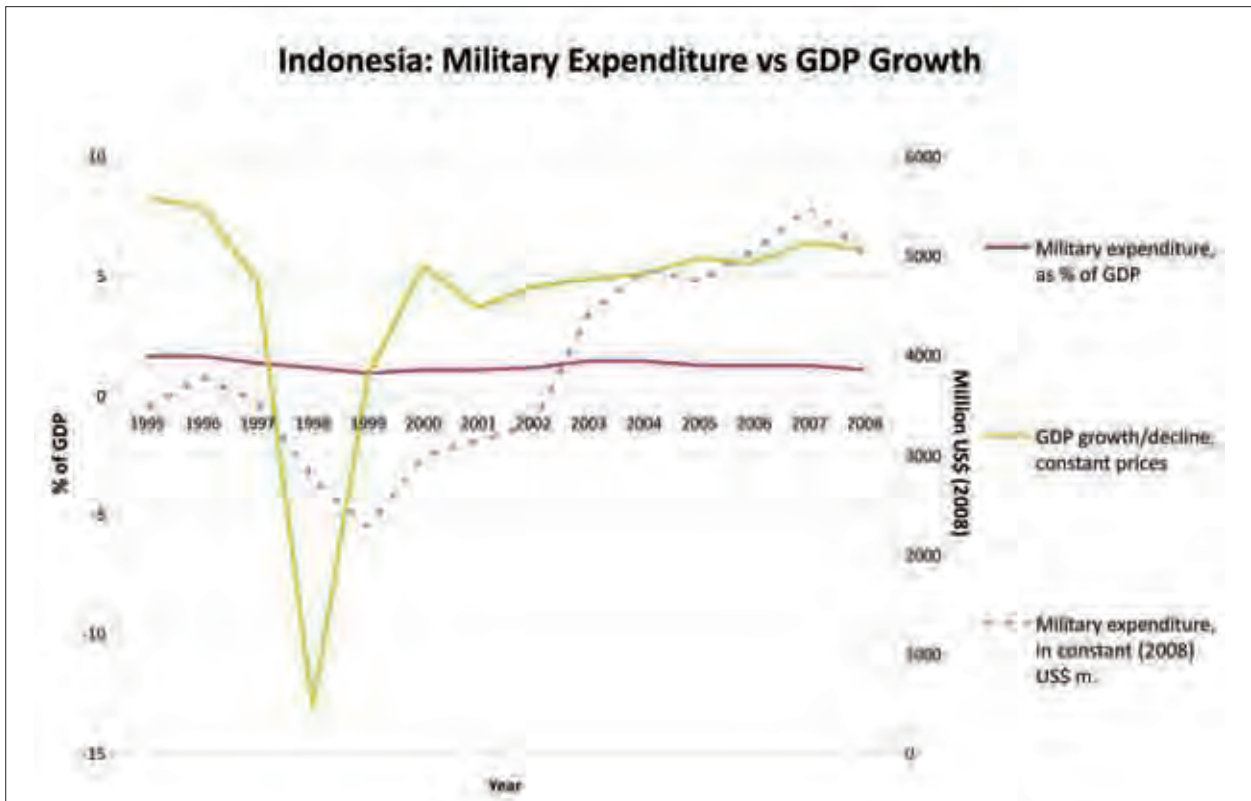


Chart 3: Indonesia's Expenditure-Growth Relationship

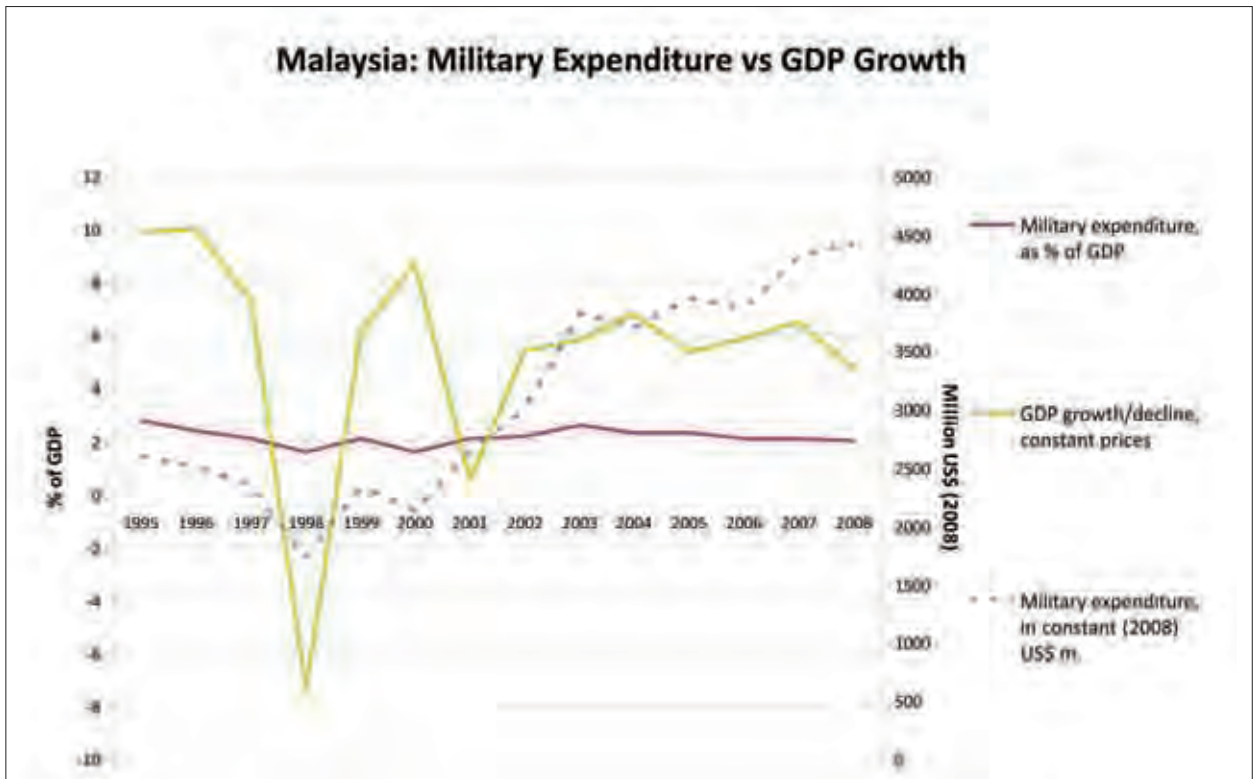


Chart 4: Malaysia's Expenditure-Growth Relationship

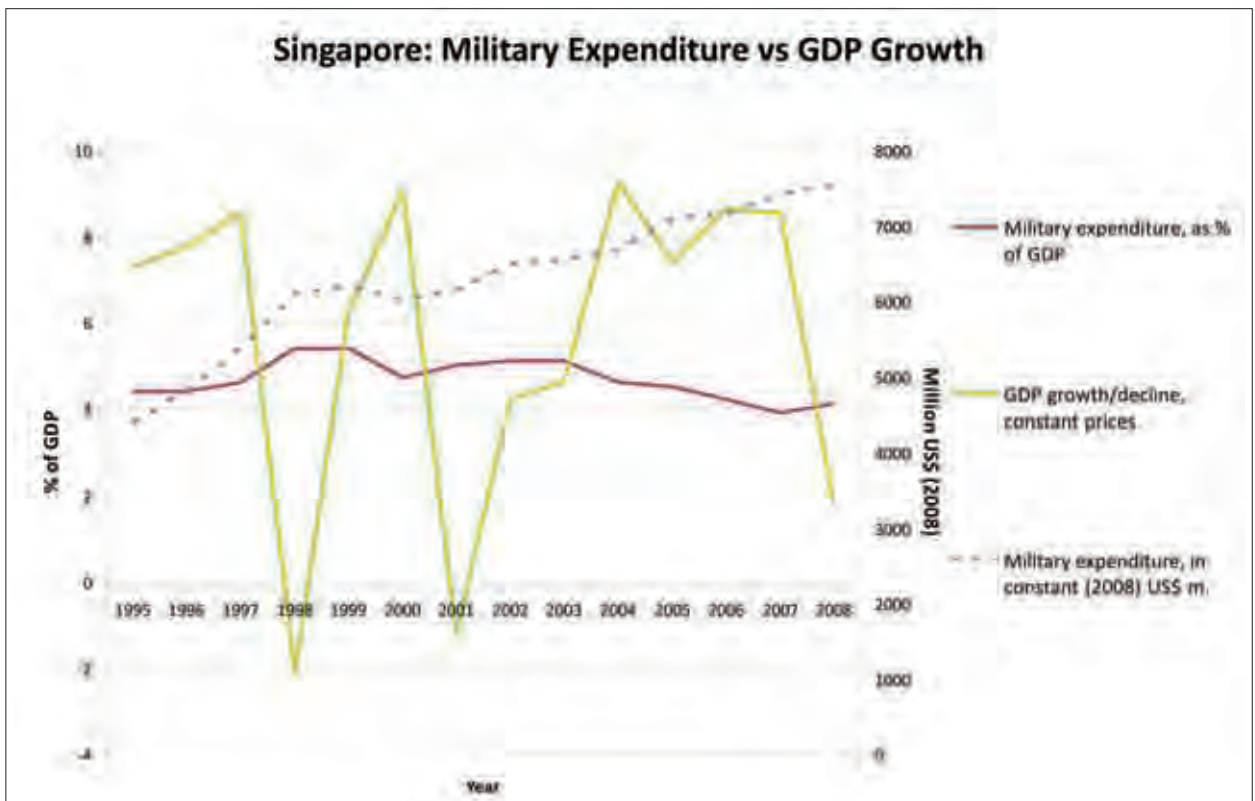


Chart 5: Singapore's Expenditure-Growth Relationship

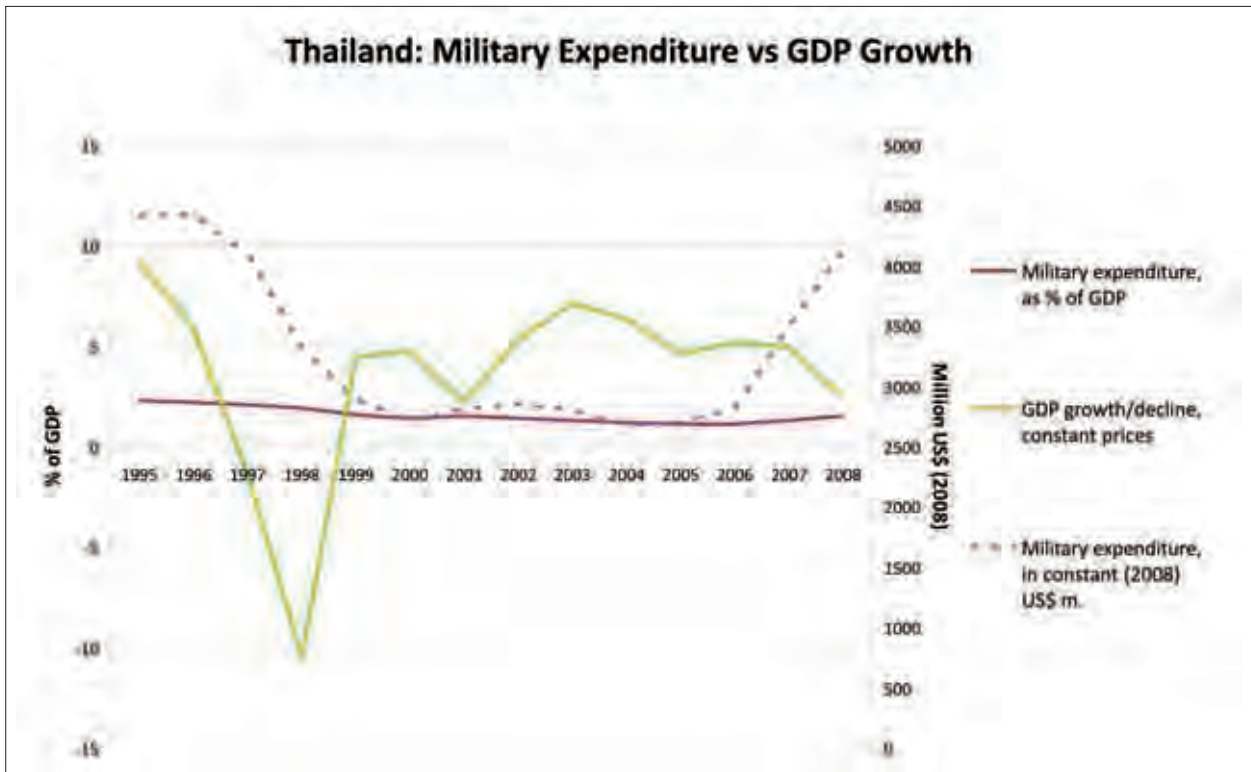


Chart 6: Thailand's Expenditure-Growth Relationship

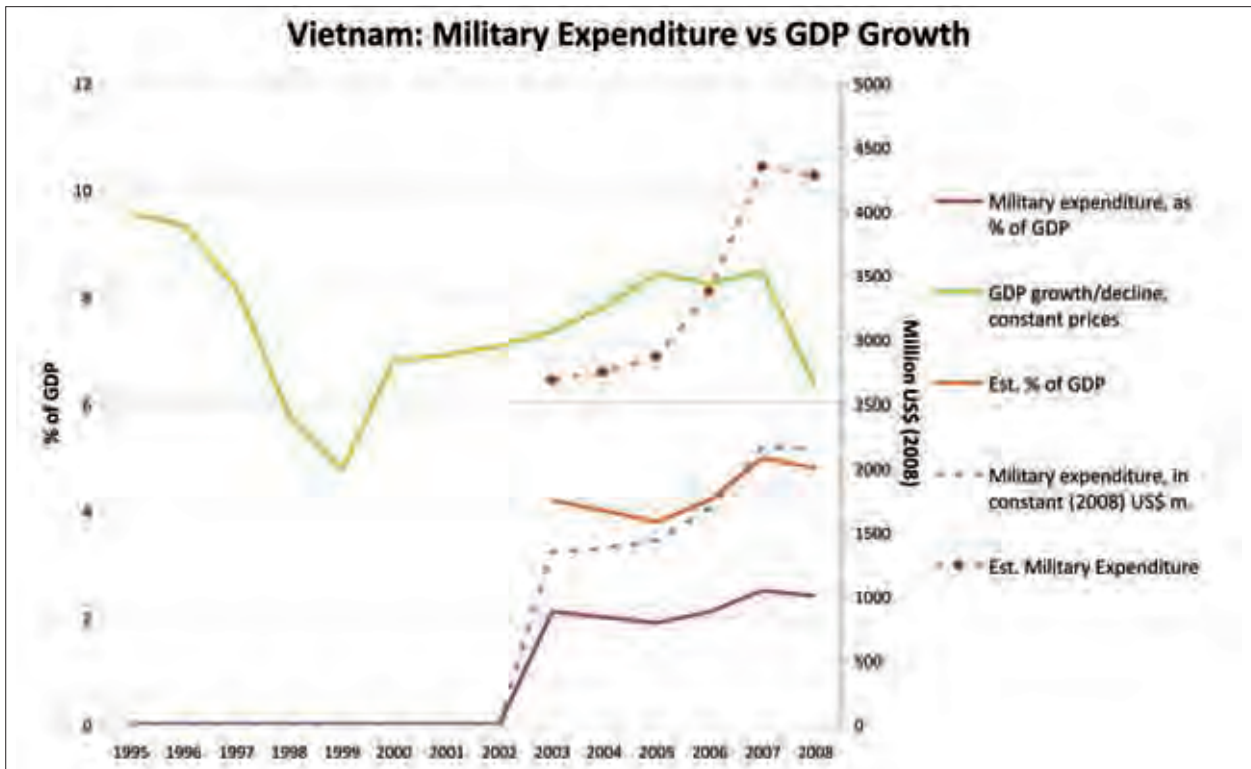


Chart 7: Vietnam's Expenditure-Growth Relationship<sup>17</sup>



### Block Obsolescence Cycles

The second factor explaining the recent surge in procurement is the need for states to maintain modern armed forces in the face of technological progress and platform aging. Using data on arms imports for the Big Five, the cyclical nature of arms procurements can be observed.<sup>18</sup> Chart 8 demonstrates that high technology capabilities such as aircraft and ships—which also make up the bulk of military procurement expenditures due to their high per unit costs—receive substantial investments every decade.<sup>19</sup>

Further observations can be made at the state level. For Indonesia, while a largely cyclic pattern can be observed, relatively lower investment in aircraft and reducing investments in naval capabilities indicate that increased future investment in these areas, economy permitting, should not be unexpected. This assessment is supported by recent announcements by Indonesia’s senior leaders.<sup>20</sup> Malaysia’s procurements—assuming no major military capability enhancements are planned—seem to have addressed the majority of this decade’s replacement needs.

Singapore’s procurements would initially indicate a significant surge in recent investment. However, when this trend is mapped onto Singapore’s long term

military expenditure, it reveals that increased expenditure this decade is part of the state’s continuously increasing absolute investment in defence (refer to Chart 5 and the expenditure trend-line plotted in Chart 11), which will be revisited later.<sup>21</sup>

Thailand was significantly affected by recent economic instability and other domestic developments. Based on its expenditure this decade, it can be expected that Thailand will engage in significant military procurements over the short term—assuming economic growth continues.

Data on Vietnam’s military expenditure is limited and consists largely of estimates. Recent reports of aircraft and submarine purchases are not reflected in SIPRI’s database—these have been plotted as Aircraft and Ships Estimates respectively.<sup>23</sup> Therefore, it is assessed that significant procurements are already under way and will continue.

The data for the Big Five indicates that both the region and individual countries have not seen sudden surges in military expenditure—in fact completed procurements are also the result of extended periods of negotiations that are often punctuated by economic upheaval.<sup>24</sup> Even Singapore’s procurement increases are part of a longer term trend.

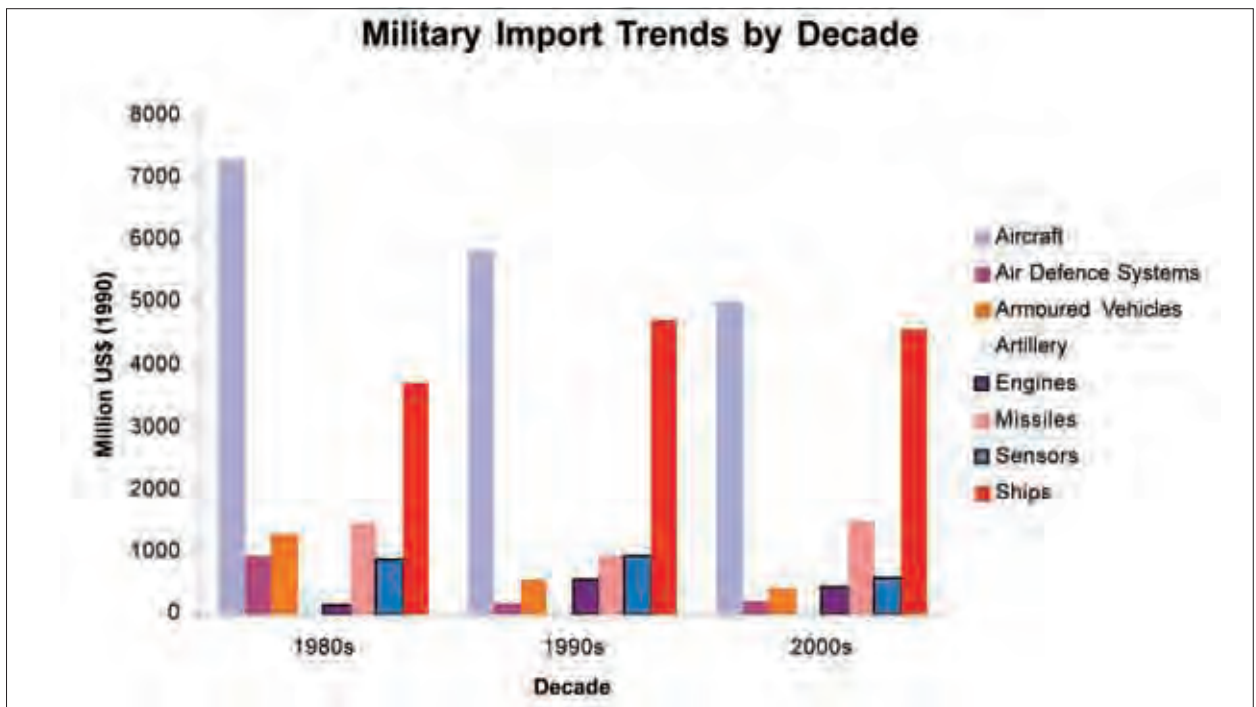


Chart 8: The Big Five’s military equipment imports by decade<sup>22</sup>

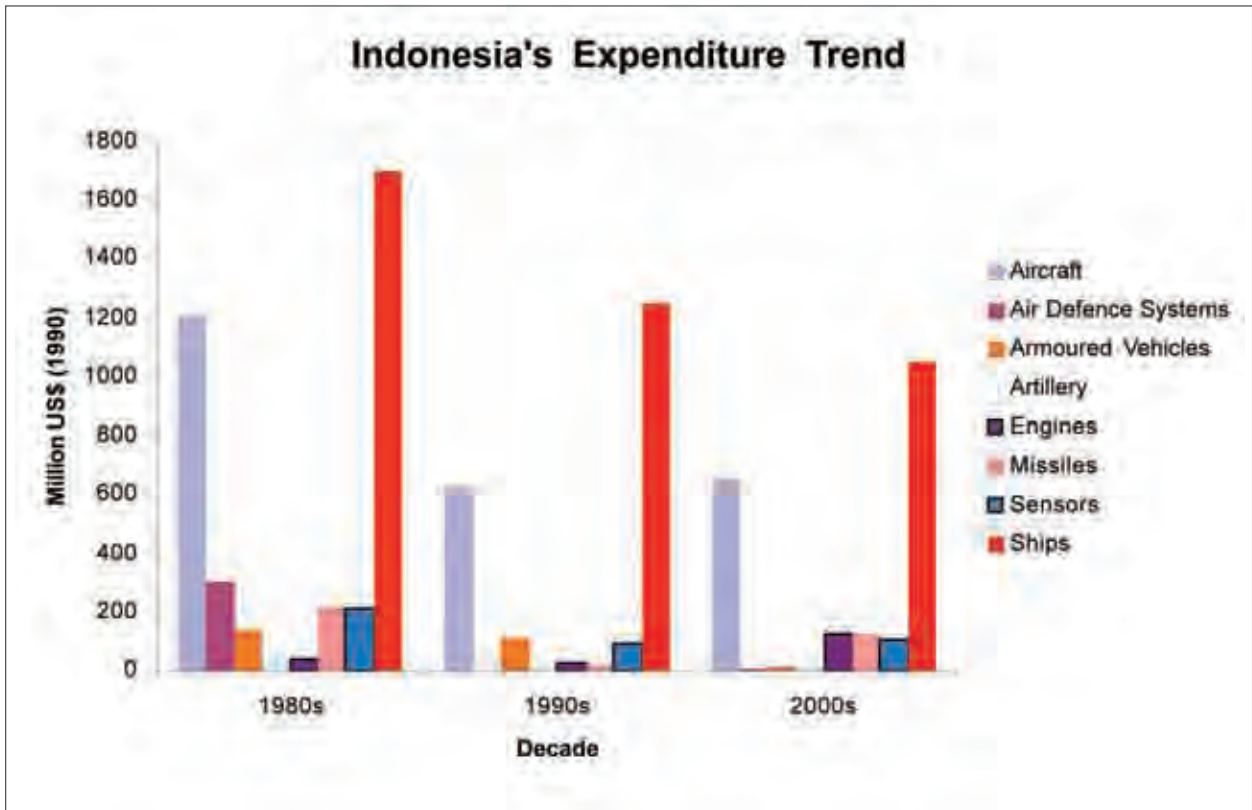


Chart 9: Indonesia's military equipment imports by decade

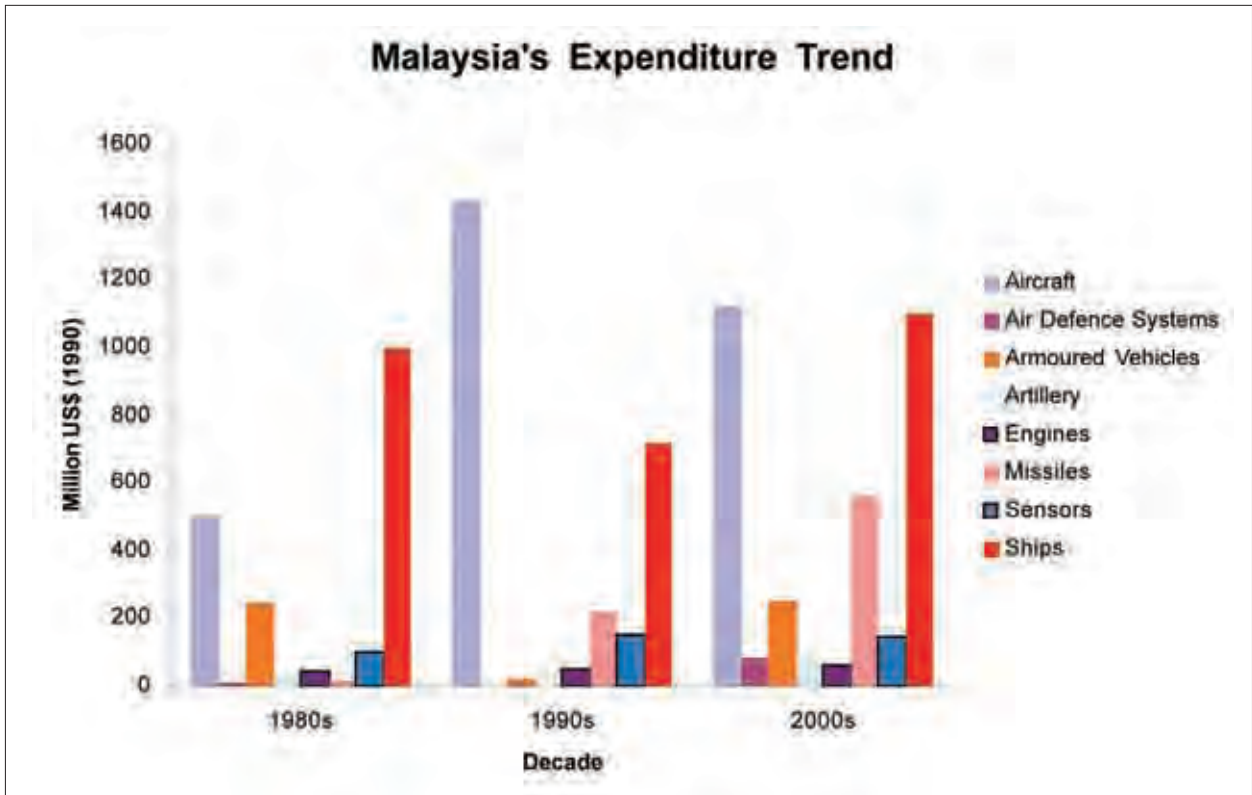


Chart 10: Malaysia's military equipment imports by decade

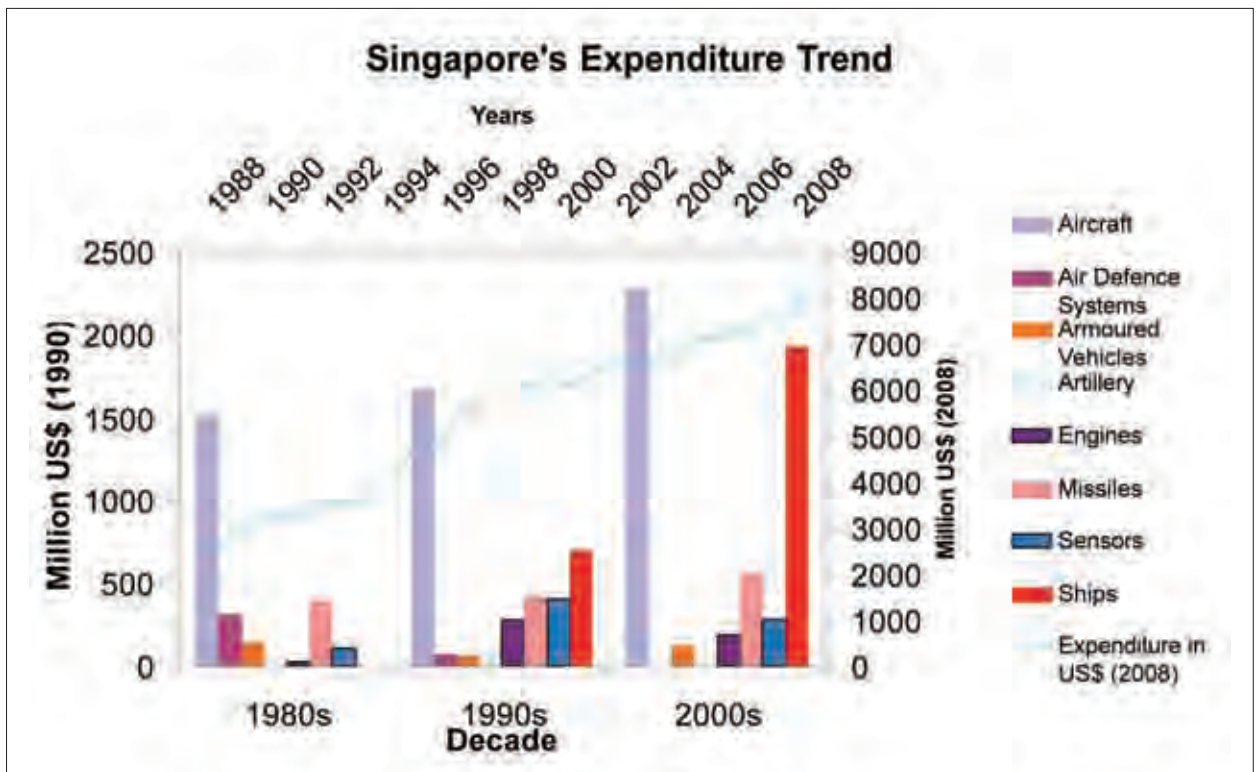


Chart 11: Singapore's military equipment imports by decade

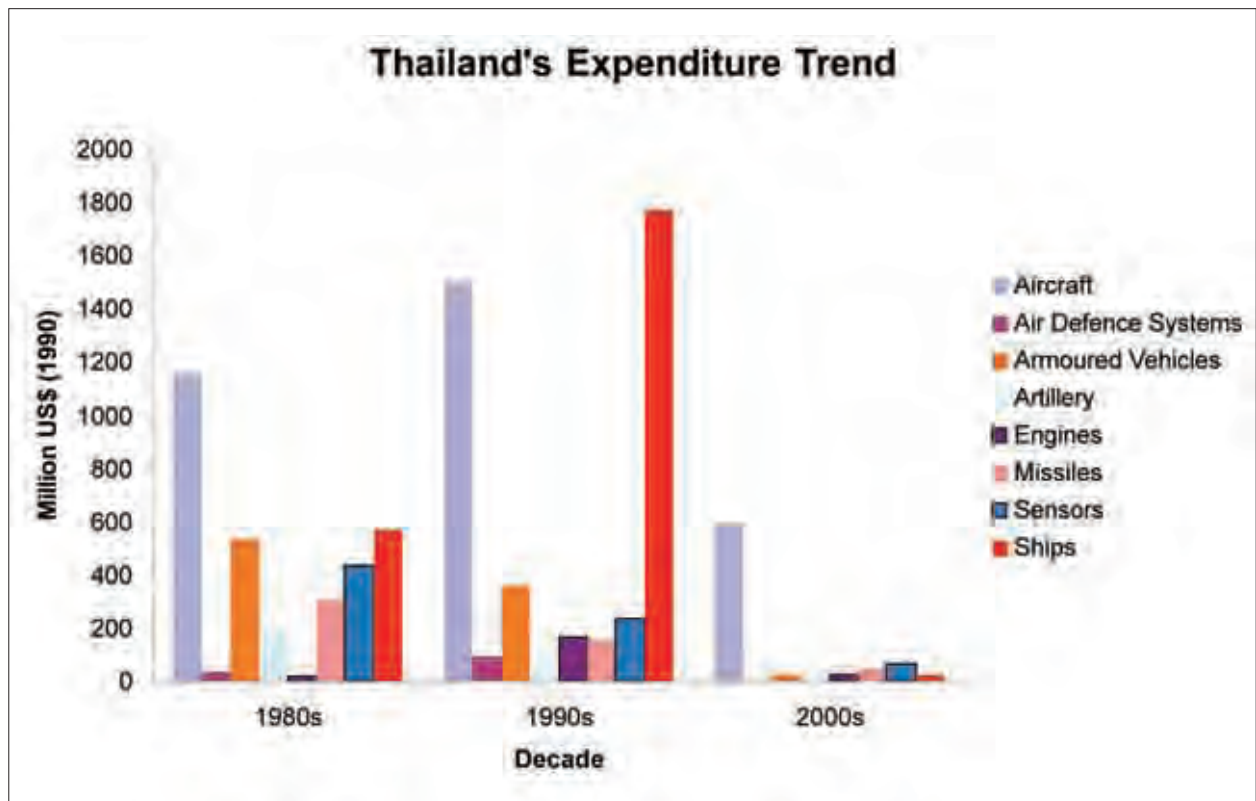


Chart 12: Thailand's military equipment imports by decade

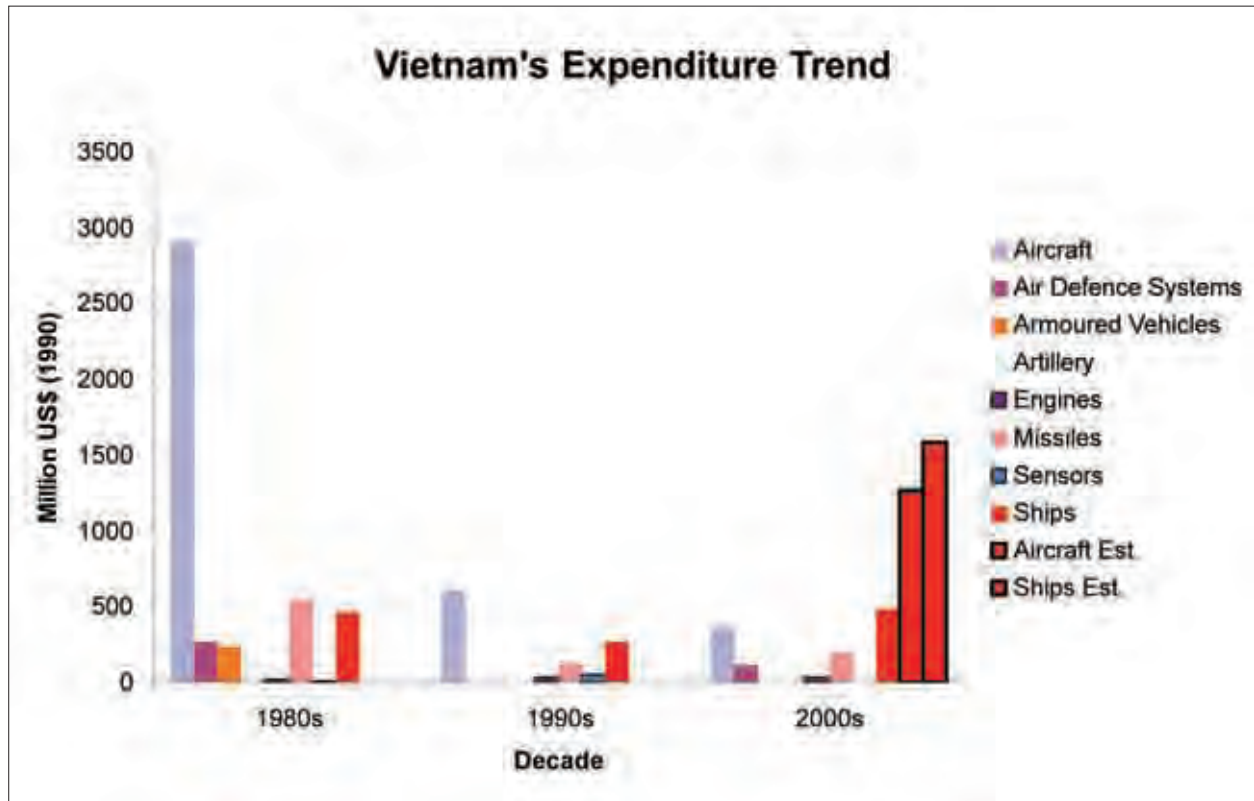


Chart 13: Vietnam's military equipment imports by decade

### Responsible Stakeholder Behavior

This section focuses on whether there has been a trend within the region of states introducing new and potentially destabilizing capabilities. It argues that states can be described as adopting “responsible stakeholder behavior”—avoiding the introduction of new and potentially destabilizing capabilities into the region wherever possible—in their procurement choices.<sup>25</sup> Given the relative advantage, both in terms of technology and investment, that Singapore has attained over the past three decades, it is logical to use Singapore as a case study. The following analysis will focus on the recent procurement of the F-15SG.

Based on Figure 1, Singapore did not introduce a new generation of fighter aircraft into the region until its adoption of the F-15SG. Until that stage, Singapore chose to maintain its air superiority deterrence by increasing or upgrading the capabilities of its F-16 fleet.<sup>26</sup> The recent decision to procure a new generation of aircraft was taken in order to replace the aging fleet of A-4SU aircraft.

Singapore demonstrated restraint and responsible stakeholder behavior in two areas. Firstly, it chose to replace the A-4SUs with a much smaller number of (admittedly much more capable) F-15SGs. Using direct cost conversion, Singapore would have been able to field many more advanced aircraft if it had chosen to. Secondly, Singapore elected to procure the F-15SG (a modified version of the F-15E) instead of the Eurofighter, even though it was considered less technologically advanced.<sup>27</sup>

### External Threats

From the Lowy Institute to the United States (US) National Intelligence Council, perspectives on the future range from an “Asian Balance of Power,”<sup>28</sup> to a “Global Multi-polar” world between 2020-2030.<sup>29</sup> However, despite the differences (and understandable uncertainty) in these predictions, a common theme across almost all observations is the rise of China. When this uncertainty casts its shadow over the comparatively small states of Southeast Asia, it should come as no surprise that regional governments are watching China’s recent military modernization—

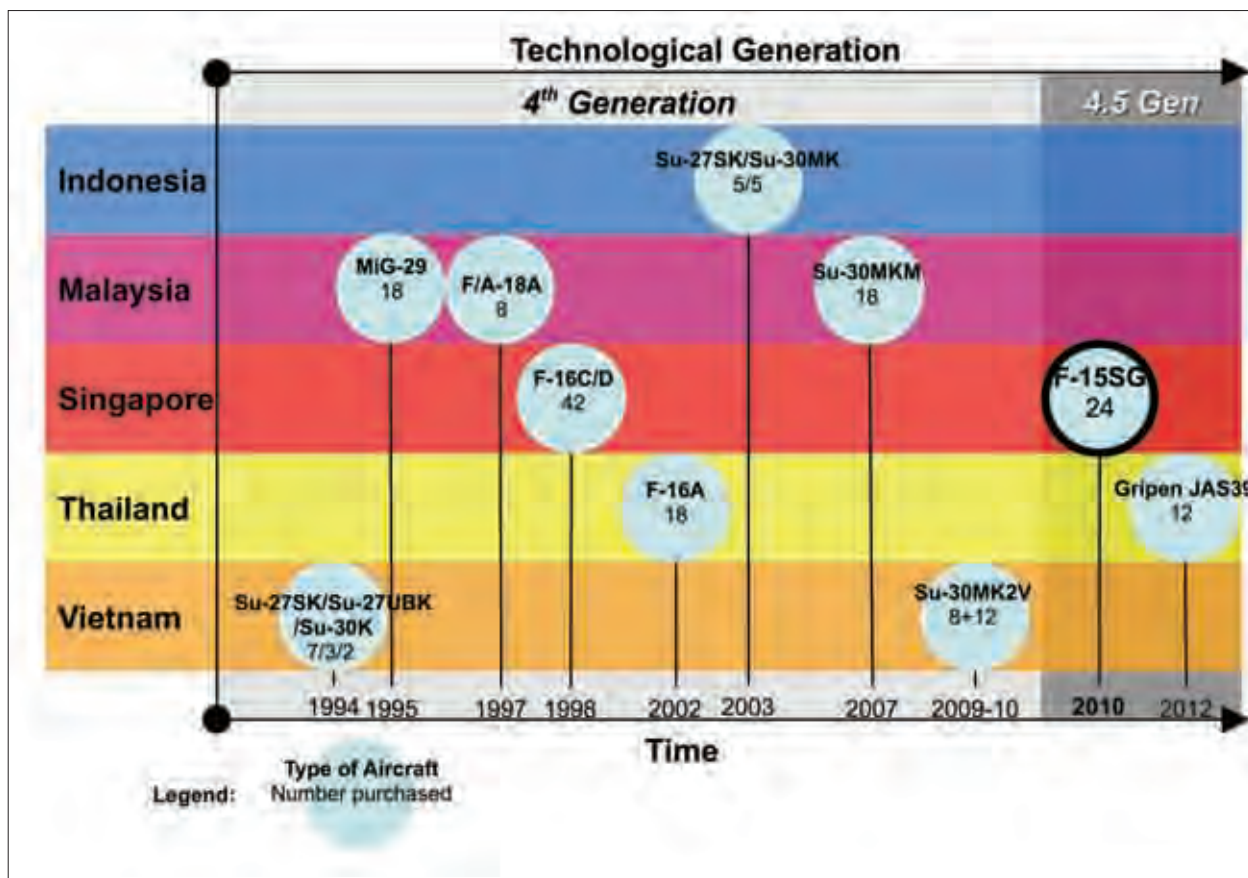


Figure 1: Types, number and technological generation of combat aircraft introduced by the Big Five since the 1990s<sup>30</sup>



Figure 2: Price and procurement size comparison<sup>31</sup>

especially its contribution to the perception of a burgeoning naval arms race—with concern.<sup>32</sup> China’s growing capabilities, combined with its sovereignty claims in the South China Sea,<sup>33</sup> and its propensity to use force to settle disputes,<sup>34</sup> has “created a security dilemma for regional states.”<sup>35</sup> Even beyond the territorial claims, China’s rise highlights potential flash points within the Asia-Pacific—Taiwan, Japan and the US—that could also destabilize the region.<sup>36</sup> There is also a pervading sense of relative American decline, increasing the perception within regional governments that they will need to “develop new military capabilities as a hedge against an increasingly uncertain future.”<sup>37</sup>

In summary, the recent modernizations that have taken place, while significant, should not be seen as symptoms of a Southeast Asian arms race. There exist many factors to indicate that it is but the most recent iteration of ongoing efforts by these states to ensure that their militaries remain relevant and effective as both technology and the geo-strategic environment evolves. The question for Singapore is whether its defence policies have kept pace with these developments.

## THE SINGAPORE ARMED FORCES (SAF) – AN INSURANCE POLICY

Significant annual defence spending on the SAF’s development was seen as investment in an “insurance policy,”<sup>38</sup> and the best means for Singapore to deter aggressors.<sup>39</sup> It was built upon a sense of strategic vulnerability that runs deep within the psyche of the city-state’s leadership.<sup>40</sup> The SAF is made up of a small cadre of professional soldiers, augmented by National Service or Reservist personnel.<sup>41</sup> This adoption of a conscript-based force balances the requirements for nation-building (through National Service), reduces the societal burden that a large armed force would create, and generates sufficient soldiers in the event of

conflict.<sup>42</sup> All these factors created the conditions for a defence policy that has placed Singapore in a strong position to deal with the recent modernizations. Firstly, it has meant that this citizen army needs to be complemented by an emphasis on technology as a “force multiplier.”<sup>43</sup> Chart 14 below presents this commitment and steady investment at work, with accumulated investment far surpassing those of the other Big Five—although uncertainty about Vietnam’s spending remains. Singapore’s “steady defence budget, through both good and difficult economic times,”<sup>44</sup> also further reinforced the message of deterrence.

*There is also a pervading sense of relative American decline, increasing the perception within regional governments that they will need to “develop new military capabilities as a hedge against an increasingly uncertain future.”*

Secondly, together with an emphasis on regular procurements of advanced technology, Singapore has also invested in local research agencies such as the Defence Science and Technology Agency (DSTA) to develop “silver bullets” for the SAF.<sup>45</sup> Chart 15 shows that the allocation of funding to ensuring that Singapore’s military retains

its edge is significantly higher than its immediate neighbors.

Therefore, despite recent modernization efforts within the region, Singapore’s defence policy has so far allowed it to remain effective in allowing the SAF to achieve its role as a means of conventional deterrence against a potential aggressor. However, this view is based upon Singapore’s short, albeit impressive, history thus far. Adopting a longer-term view may not deliver such a rosy prognosis.

## THE FUTURE – CHALLENGES AND OPPORTUNITIES

### Fundamental Premise – Singapore is Small

Despite apparent success thus far, there is doubt that Singapore’s current spending trajectory will allow it to retain its required advantage indefinitely. This is a simple fact of comparative economic and population sizes that Singapore cannot escape. Even assuming that Singapore’s educated workforce and high-technology foundations give it a substantial

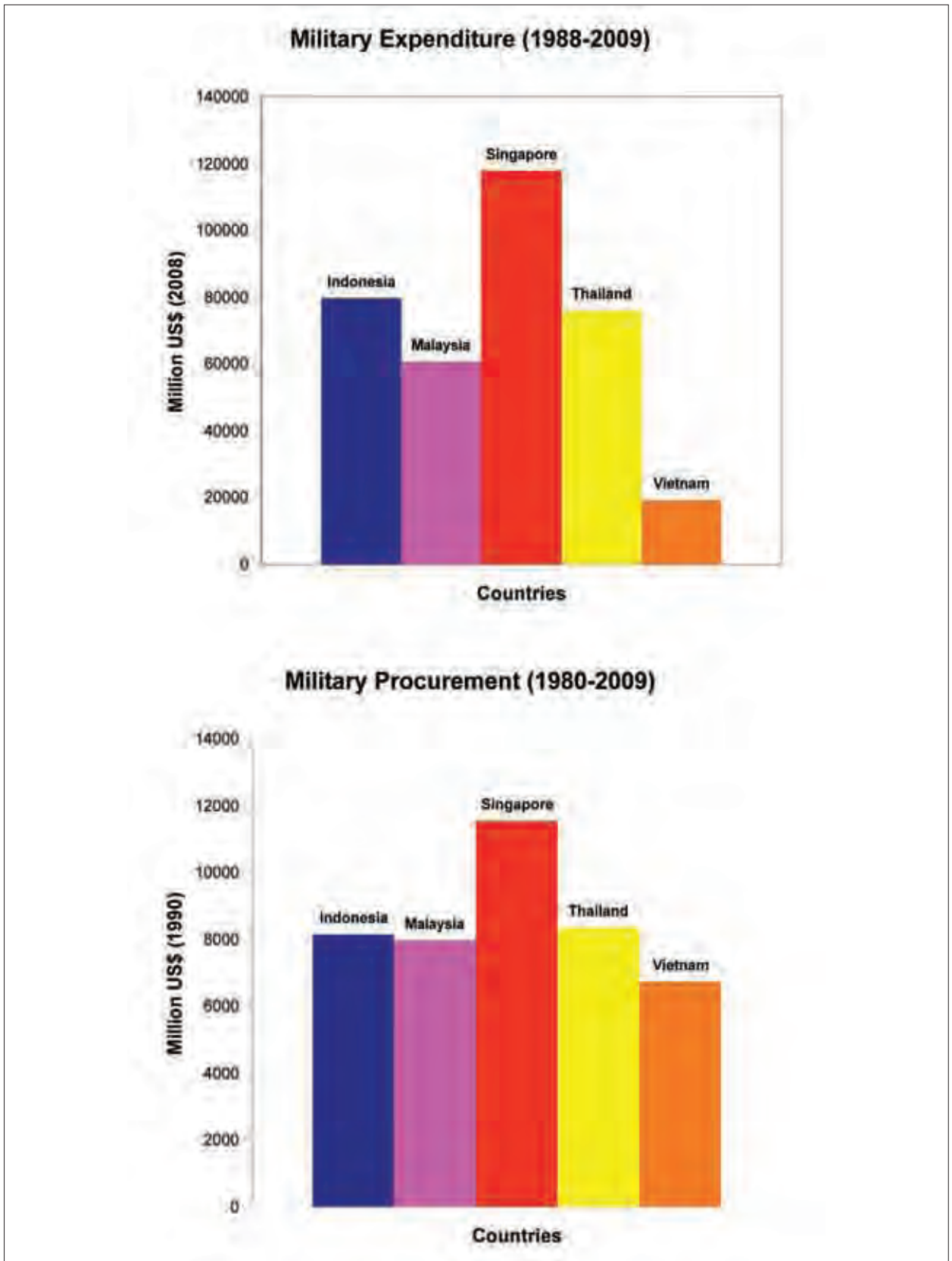


Chart 14: Singapore's military expenditure/procurements vs. other members of Big Five<sup>46</sup>

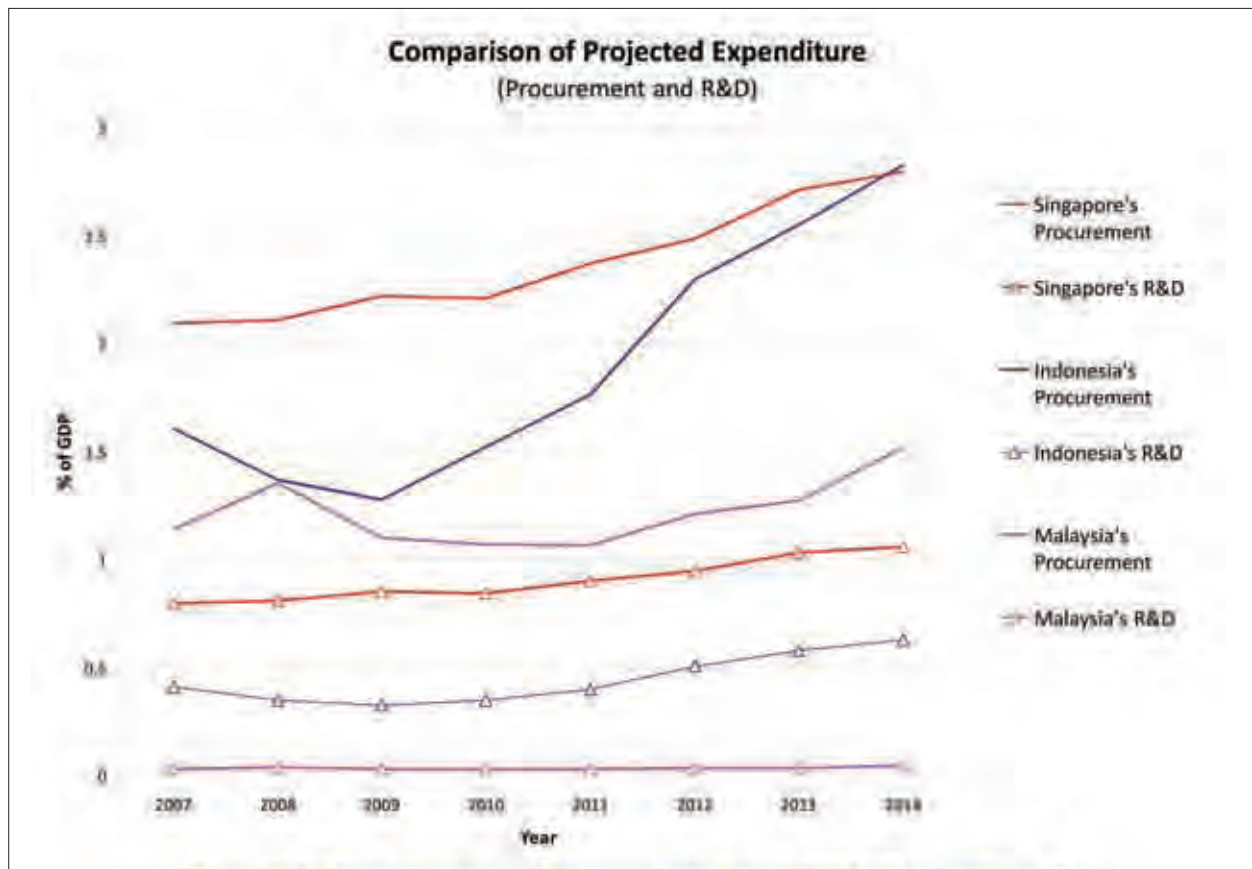


Chart 15: Comparison of Procurement and R&D Expenditure<sup>47</sup>

advantage, it will eventually be surpassed.<sup>48</sup> Referring back to Chart 15, the current prognosis over the short term already sees the procurement expenditure of Indonesia closing the gap. While it is true that securing Indonesia's exponentially larger territorial and maritime boundaries would require a defence expenditure many times that of Singapore, the fact that Indonesia's defence expenditure is expected to rise should not be dismissed. More importantly, returning to the economic drivers for defence procurement adopted in the earlier section, the sheer economic potential of both Indonesia and Malaysia makes competition in defence spending, perhaps no matter how technologically savvy and innovative Singaporeans may be, of questionable effectiveness in the long-term. This is the fundamental reason why a modification of Singapore's long-term defence strategy may be required. The strategic situation is further complicated by the US recently upgrading both Indonesia and Malaysia to potential "key strategic partner(s),"<sup>49</sup> potentially eroding Singapore's favorable

status with the US should tensions rise with these immediate neighbors.

### Finding a New Balance Between Deterrence and Diplomacy

The solution may therefore lie in an adjustment to Singapore's finely-tuned balance of deterrence and cooperation, with an increased emphasis on cooperation against a common threat and a (gradually) reduced signature of deterrence. This is by no means a declaration of surrender. Deterrence must and will continue to be achieved through the proven policy of continued investment in defence. Economic growth permitting, Singapore should continue to maintain "the quantitative and qualitative superiority of the SAF."<sup>50</sup> However, if we agree with the fundamental premise, economic growth and the disproportionate size and resources of Singapore's neighbors will likely bring about a situation when the deterrence effect of Singapore's SAF *aegis* may eventually decline. It is with this probable (or even inevitable) end-state



in mind that Singapore should begin adjusting its Deterrence-Diplomacy balance while it retains a strong conventional deterrence edge. This edge allows it to embark on this new policy course from a position of, if not strength, then at least parity.

This is not to say that Singapore's current policies have not already made headway in the direction of cooperation and collaboration within the region. Indeed, its active participation, and even leadership, in regional forums is well known. Singapore has established an extensive range of bilateral and multilateral defence relationships. These include extensive cooperation, exercises and procurement from the US,<sup>51</sup> Europe, Australia, Japan and the Five Power Defence Arrangement (FPDA).<sup>52</sup> Singapore has also engaged the rising powers of China and India,<sup>53</sup> and is focusing on enhancing the role of the Association of Southeast Asia Nations (ASEAN) Regional Forum "as a vehicle to promote regional peace and stability."<sup>54</sup> Singapore has also taken up the lead role in Maritime Security (MARSEC) efforts within the region, having set up the Changi Command and Control (C2) Center to coordinate local, regional and international efforts against maritime threats.<sup>55</sup> Added emphasis is required in increasing the regional collaboration and collective security components of its defence rhetoric. In order to reduce its dependence on deterrence, Singapore and, at the very least, its immediate neighbors will need to raise themselves more completely above the long-standing tensions that continue to plague their relationships.<sup>56</sup> This is a truly lofty goal for the region. Though many observers remain unconvinced that a collective security regime similar to that of the European Union is feasible,<sup>57</sup> it is perhaps only through a collective security vision of the future that the uncertainty of deterrence in the long-term can be overcome. Towards this end, Singapore could consider the following "baby steps."

*In order to reduce its dependence on deterrence, Singapore and, at the very least, its immediate neighbors will need to raise themselves more completely above the long-standing tensions that continue to plague their relationships.*

Firstly, Singapore needs to encourage greater regional transparency on security matters. To achieve this, it must take a leading role in maintaining as high a level of disclosure about its own military developments and procurements as possible. This would reduce the destabilizing effects of Singapore's investment in defence,<sup>58</sup> which must continue. This can be carried out by publishing annual White Papers or Defence Reviews that clearly present Singapore's plans and objectives for the SAF, to the extent of making transparent its future procurement plans. Regular White Papers stressing the importance of Singapore's commitment to regional cooperation on security—both through support of regional security initiatives and even collaboration in defence capability development—may encourage the region to embark on a similar path. Secondly, Singapore should increase its investment in facilitating the advancing of existing security cooperation (e.g. MALSINDO) to the next level. "Facilitating" is more appropriate than "leading" because Singapore's much larger neighbors are unlikely to want to follow in the "Little Red Dot's" footsteps.

## CONCLUSION

While Southeast Asia has clearly seen a spate of military modernization efforts in recent years, we must avoid coming to the conclusion that such procurements indicate a potentially destabilizing arms race is under way. Instead, a more accurate conclusion would be to consider these activities as part of an ongoing and expected process of modernization that ensures each state's conventional deterrence remains relevant and effective—it is a "stability-inducing" modernization in that it improves defences without becoming a threat to neighbors.<sup>59</sup> Analysis of long term trends supports this conclusion. States have not significantly changed their GDP allocations to military expenditure, and while absolute defence spending has increased,

this is associated with economic growth. Deeper analysis of the various types of military capabilities imported by states provides some evidence that recent purchases are the latest stage of procurement cycles meant to address obsolescence. Moreover, while new capabilities are introduced periodically, they seem to be responsibly selected to achieve deterrence without becoming destabilizing. Finally, developments within key actors outside the region, especially China, also provide impetus for Southeast Asian states to develop specific countering capabilities.

From Singapore's national security perspective, the conclusion that recent acquisitions are part of normal progressive military modernizations means that its current defence policies remain relevant and appropriate. Consistent and substantial military expenditure since its independence has allowed Singapore to build and maintain a defence force, which possesses sufficient deterrent potential to address the tiny city-state's strategic vulnerabilities. However, as regional economies advance, the required increase in defence expenditure to maintain this deterrence is unsustainable in the long term for small Singapore. Therefore, beyond continued investment in defence to maintain its conventional deterrence edge as long as economically feasible, Singapore needs to take a leadership role in creating a regional collective security community. In the short term, this would require increased military transparency and increased cooperation, leveraging on existing ASEAN structures. 🌐

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20. Indonesian legislators agreed on 20 October 2010 to boost the country's Fiscal Year 2011 (FY11) defence budget by IDR11 trillion (USD1.2 billion) to cover a shortfall in funds for maintenance and procurement programs. This stems from a pledge made earlier this year by Indonesian President Susilo Bambang Yudhoyono to increase total defence spending from around 0.8 per cent of GDP in 2009 to 1.5 per cent by the end of his tenure in 2014. Following a range of successful recent procurements, Indonesia is also expected to increase its fleet of fighter aircraft and submarines. J. Grevatt, "Indonesia Boosts FY11 Defence Budget," *Jane's Defence Weekly*, Jane's Information Group, 22 October 2010, <http://search.janes.com>.
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# Forcing Strategic Evolution: The SAF As An Adaptive Organization

by CPT Choy Yong Cong

## Abstract:

The evolution of warfare is analogous to the evolution of natural populations. The idea of Fourth Generation Warfare (4GW) and its evolution was first pioneered by William S. Lind and his co-authors in 1989, and has since gained prominence in describing the current state of asymmetrical warfare prevalent around the world. Akin to natural populations adapting to the changing environment and therefore evolving, there are societal factors driving the evolution of how organizations conduct warfare. In a flat, networked world where information is exchanged freely, the change in societal factors will be accelerated, resulting in an increasingly fast-changing and unpredictable environment. It is this environment that all militaries, including the Singapore Armed Forces (SAF), will find themselves conducting business in.

If the SAF operates in an environment of accelerated unpredictability, strategy must become adaptive—there is no other viable option. Thus the SAF should not plan to fight 4GW or any other predicted future state of war, because if the military environment changes faster than any strategic assessment or doctrinal implementation, it will always find itself fighting “the last war.” Instead, the SAF should re-engineer itself as an adaptive organization—one that can continuously and systemically reinvent itself to stay relevant and achieve its fundamental goal of enhancing Singapore’s peace and security.

*Keywords: Adaptive Organisation; Fourth Generation Warfare; Future War; Knowledge Management*

*"It is not the strongest of the species that survives, nor the most intelligent, but rather the one most adaptable to change."*

*- Paraphrase of Charles Darwin's On the Origin of Species by Leon C. Megginson<sup>1</sup>*

## INTRODUCTION

Charles Darwin’s contribution to humankind was immense. His scientific theory of evolution,<sup>2</sup> which established that natural selection was the mechanism responsible for the variation and diversity of life, became the unifying theory of life sciences. Its relevance today to other sciences such as complexity theory and genetics confirms its status as an enduring principle to explain trends of adaptive systems in complex environments, both social and non-social.

The evolution of warfare is analogous to the evolution of natural populations. The idea of Fourth Generation Warfare (4GW) and its evolution was first pioneered by William S. Lind and his coauthors in

1989,<sup>3</sup> and has since gained prominence in describing the current state of asymmetrical warfare prevalent around the world. Akin to natural populations adapting to the changing environment and therefore evolving, there are societal factors driving the evolution of how organizations conduct warfare. In a flat, networked world where information is exchanged freely, the change in societal factors will be accelerated, resulting in an ever faster-changing and unpredictable environment. It is this environment that all militaries, including the Singapore Armed Forces (SAF), will find themselves conducting business in.

This essay will argue that if the SAF operates in an environment of accelerated unpredictability, strategy must become adaptive—there is no other viable option.<sup>4</sup> The SAF should not plan to fight 4GW, or any other predicted war, because if the rate of change of the environment is faster than strategic assessment or doctrinal implementation, it will always find itself fighting “the last war.”<sup>5</sup> Instead, the SAF should

re-engineer itself as an adaptive organization—one that can continuously and systemically reinvent itself to stay relevant and achieve its fundamental goal of enhancing Singapore's peace and security.<sup>6</sup>

## THEORY OF EVOLUTION AND NATURAL SELECTION

First, it would be illuminating to appreciate Darwin's theory of evolution and natural selection. Ernst Mayr, a biologist, summarized it well through a series of facts and inferences.<sup>7</sup> Since every species has the potential for exponential reproduction, but resources such as food are limited and stable over time, there must be a fierce struggle for existence, resulting in the survival of only a small part of the populations. Individuals that are more suited to the environment will survive and reproduce, whereas individuals that are not will be less likely to survive and reproduce. Those that are successful will leave their inheritable traits to future generations, which is the process of natural selection. Combined with the fact that genetic traits can be varied and hereditary, in a changing environment over a long period of time, variations are seen in populations, resulting in evolutionary change

Throughout the centuries, the natural environment has changed unpredictably. Humans, or more accurately the collection of their genes,<sup>8</sup> are able to survive and dominate their environment not because the species was born adaptive—but through the process of natural selection, has evolved into an adaptive species. To satisfy their inherent urge of survival and dominance, even over each other, humans have continued to evolve not just their genetic traits, but ideas, processes and systems.

## EVOLUTION OF WARFARE

The natural environment changes unpredictably due to factors beyond our control—climate, dynamic interactions between complex organisms, etc. Analogous to this is the environment in which warfare is conducted. Colonel Thomas X. Hammes, in his book *The Sling and the Stone*, built upon Lind's work to attribute the evolution of warfare from First Generation Warfare (1GW) to 4GW to four societal aspects—political, economical, social and technological.<sup>9</sup> These are the environmental factors that have eliminated and created warfighting organizations

over generations, and through natural selection the conduct of warfare has been evolved as such:

The development of agriculture 10,000 years ago changed human society. Societies were no longer preoccupied with the daily struggle for food, were able to settle and developed a political structure with a ruling class. This social organization allowed specialization in other areas, including the conduct of warfare. With the ruling class able to harness manpower, a professional class of warriors emerged. From the classical times up to the French Revolution, this was the first generation of warfare, the ability to mass manpower.

The Industrial Age brought about the second generation of warfare, which focused on massed firepower. Technological advances brought about gunpowder, rifles, machine gun, artillery, the industries required to produce such materiel, and the railroad to transfer these huge amounts of materiel. This culminated in the stalemates of World War One (WWI) where firepower dominated manpower and defense triumphed over offense.

Third generation warfare was pioneered by the Germans in their blitzkrieg tactics. Unable to match the manpower or firepower due to the limitations imposed upon them after WWI, the Germans adopted maneuver tactics to overcome their shortcomings. Made possible by further technological advances of reliable tanks, mobile artillery, motorized infantry, close air support and radio communications, the Germans applied third generation maneuver warfare to devastating effect.

Similarly, the current state of warfare, 4GW, is driven by the four societal aspects. With globalization in full swing, Samuel P. Huntington's prediction that conflict will be predominately along ethnic and religious fault lines has been accurate for the past few decades.<sup>10</sup> Social psychology suggests that our identities arise not from who we are, but who we are not, compared to others.<sup>11</sup> Economically, resource markets have matured, wealth has been distributed



*The Singapore Armed Forces in The Gulf Of Aden*

around the world and transfer of resources has become easier. Socially, globalization and immigration have created social reactions ranging from discrimination to bigotry, causing non-assimilated minorities to look for ways to recover their identities. More crucially, technology has ushered in the Information Age, easing information transfer and idea propagation. These factors have led to the asymmetric character of 4GW organizations compared to conventional militaries:<sup>12</sup> possibly stateless, transnational, geographically unconstrained, networked, adaptive, creative, avoids high-intensity direct battlefield confrontation but chooses low-intensity strategic strikes. It imposes its will on adversaries through idea propagation and public perception—by convincing adversaries' decision-makers that their strategic goals are either unachievable or too costly for the perceived benefit.

As militaries and security agencies around the world scramble to deal with the new 4GW threat, the question becomes: can they remodel themselves in time to operate in the new environment? More importantly: can the future of warfare be predicted?

### **UNPREDICTABILITY AS A CONSTANT IN WARFARE**

The venerable military theorist, Carl von Clausewitz, in his book *On War*, recognized that warfare is inherently uncertain and ambiguous, popularizing the term “fog of war.”<sup>13</sup> Although third generation maneuver warfare has been around for decades, its chief proponent, the United States (US), found it inadequate to deal with evolved adversaries in Vietnam and Iraq<sup>14</sup>—its prediction of the future of warfare was inaccurate. With the advent of the Information Age, unpredictability about the conduct of warfare will be the key problem.

In the 1980s, Berkeley professor Rashi Glazer provided insight regarding the relationship between information and predictability, albeit in the business world, that has proven to be accurate in the following decades: “A firm is information-intensive to the degree that its products and operations are based on the information collected and processed as part of the exchanges along the value-added chain. Whereas traditional products and operations are relatively



static, information-intensive products and operations change as new data from the environment become incorporated into them.”<sup>15</sup>

Warfighting organizations are information-intensive as military operations and capabilities are definitely based on information collected and processed about the adversary as well as the environment. Furthermore, political, social, economic and technological entities are information-intensive as well. As these environmental aspects change with influx of information, it should be expected that warfare would evolve at a rate proportionate to the ability to absorb information. With the Information Age, the time required for incorporating of information has reduced drastically. Therefore, unpredictability about the future of warfare, tactically, operationally and strategically, should be taken as the default.

### THE STRATEGY: BE AN ADAPTIVE ORGANIZATION

Many organizations, born out of the Industrial Age, place a premium on efficiency and have a prescriptive culture, with a hierarchical structure to effect it. Frederick Winslow Taylor, an early proponent of industrial efficiency, was quoted as saying, “It is necessary in any activity to have a complete knowledge of what is to be done and to prepare instructions. The laborer has only to follow instructions.”<sup>16</sup>

In the Industrial Age, this approach worked well as long as the leaders had a “complete knowledge of what is to be done.” As the rate of change accelerates a fast information incorporation and unpredictability becomes the norm, it is impossible to have “complete knowledge” to follow the efficiency model. Long-term strategic plans decided by a central planning staff, disseminated through a hierarchical structure and complied in detail by subordinate units, will increasingly lead to ineffectiveness and irrelevancy.

Therefore, in face of unpredictability, the only viable strategy is to be adaptive. The SAF must plan and develop itself as an adaptive organization, not to prepare itself to fight a conventional, 4G or future war, but to be adaptive to the environment, continuously and systematically reinventing itself to achieve its desired outcomes.

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Like in natural selection, organizations will naturally evolve when the operating environment changes—as they find ways to solve new problems that arise. However, just as species that fail to adapt are dominated or become extinct, left to natural selection, organizations can also become ineffective and irrelevant. Therefore, the evolution of the SAF must be engineered. The SAF must take deliberate efforts as part of a coherent strategy to become an adaptive organization. Several key thrusts are identified to effect this strategy:

- Creating the Correct Environment for Evolution
- Knowledge Management – Sensemaking Information
- Transforming the Leadership Role
- Inculcating the Culture to Mold Behaviours
- Resolving Long-Term Planning – Modular Organizational Structure

### CREATING THE ENVIRONMENT

In the natural world, survival is the basic instinct for all organisms in order to reproduce and replicate the genes within them. In parallel, for humans, tools, ideas, systems and processes evolve as practical people, consciously or subconsciously, find practical solutions to solve problems to ensure survivability. The direction evolution takes is highly dependent on the “problems” faced in the environment.

The SAF faces an important limitation in this aspect. A huge proportion of its capabilities are in the environment of training, not operations. This brings about two crucial issues to address:



*The Singapore Armed Forces in Afghanistan*

- If the environment in training does not match reality, the problems faced by units will be inaccurate, and they will learn and adapt wrongly. Simply put, if the wrong questions are set, the wrong answers will be given.
- Survivability is the strongest drive for adaptability. Short of creating life and death situations, the environment in training must replicate similar consequences of competition.

Therefore, in training, realistic environments must be replicated. The knowledge of these environments will come from intelligence, experience, and insights from operational units around the world. Importantly, the dynamic factor—the behavior and actions of the enemy and other stakeholders—in the environment needs to be replicated as realistically as possible. For example, in Army training, it would involve replicating the enemy, civilians, other stakeholders, the urban or close terrain, etc., accurately. Furthermore, short of creating life and death situations, Conflict Resolution (CONRES) systems need to be accurate and effective to simulate consequences and competition.

The SAF will also have to expose itself to environments beyond conventional full-scale war in the full spectrum of operations. As part of the international effort, the SAF has had opportunities to deploy units in these operational environments, for example the 2004 Operation Flying Eagle,<sup>17</sup> its efforts in Afghanistan,<sup>18</sup> and Gulf of Aden since 2009.<sup>19</sup> Beyond contributing to the international peace and stability efforts, these units will experience first-

hand the environments in which they can adapt and evolve, as well as provide insights to better replicate these environments back home.

Ensuring that the SAF is immersed in an accurate environment, either in training or in operations, is therefore fundamental to it adapting and evolving to real conditions, beyond providing “realistic training” for its soldiers or “contributing to international efforts.” But in order to adapt, its units must also learn the lessons, draw insights and share them within the organization.

## KNOWLEDGE MANAGEMENT

Seth Lloyd, the complexity scientist, argued that sensemaking is a principle of adaptive systems.<sup>20</sup> Paraphrased by Stephen H. Haeckel in his sense-and-respond adaptive model, the insight is that successful adaptive systems have the property of translating apparent noise into meaning at a faster rate than the arrival rate of apparent noise.<sup>21</sup> John Boyd’s Observe-Orient-Decide-Act (OODA) Loop gives further credence to the importance of sensemaking the environment at all levels.<sup>22</sup>

The challenge for organizations therefore is to develop sensemaking as an adaptive competence. According to economist Brian Arthur, “The challenge to management in this game is not so much to optimize ... Instead, the challenge is to make better sense out of the situation than the next guy ... The strategic challenge here is a cognitive one ... A system that is to [adapt] successfully ... must adapt by constructing models that allow it to decide what information to get, and how to act on it.”<sup>23</sup>

In his 1995 book *The Knowledge-Creating Company*,<sup>24</sup> Ikujiro Nonaka warned against defining knowledge as simply hard, quantifiable data, and limiting the organizational competence to simply processing and disseminating information. He argued that creating knowledge in an organization is key, and depends on tapping the insights, intuitions and ideals of its people. Out of this was born the discipline of knowledge management, which involves the organizational competence to sensemake the environment by identifying, creating, distributing and adopting insights and experiences.



*Realistic Training Environment*

The SAF today has come a long way in developing this organizational adaptive competence of sensemaking. Since the Learning Organization (LO) was introduced in 2000,<sup>25</sup> the culture of learning from operations, training and activities is widespread within the SAF. The SAF's Center for Leadership Development (SCLD) is currently refining the framework for the Action Learning Process (ALP) and its conduct for units and commanders. Assuming that the training and operational environment is realistic and accurate, the SAF and its units have developed the competence to draw lessons and insight from its experience.

However, the SAF is limited by sheer size. Knowledge created is often difficult to share and adopt. Nor does it suffice to simply archive knowledge in a huge database for access. As the environment changes unpredictably, knowledge can easily become outdated. As David H. Petraeus included succinctly in the *Counterinsurgency Field Manual*, "if a tactic works this week, it might not work the next week; if it works in this province, it might not work in the next."<sup>26</sup> The SAF, as it manages knowledge, must develop a system beyond archiving; it must be able to ensure relevance and allow ease of access.

The Internet provides illuminating examples on knowledge management. The most useful sites on the Internet: Google, Wikipedia, Facebook, and even TripAdvisor, do not simply create and archive knowledge or attempt to draw relevance on their own. In their own domains, they allow their users to self-manage and determine what is relevant at a specific point in time—Google with its PageRank algorithm and Facebook with its NewsFeed algorithm,

for example. Google outlines its search technology through four principles:<sup>27</sup>

- **Relevance** – using algorithms including PageRank to determine the importance of a web page at any point in time.
- **Comprehensiveness** – integrating all possible web pages, including images, videos, news, books, etc.
- **Freshness** – updating its archive in minutes.
- **Speed** – fast response time to facilitate ease of access.

The SAF can leverage on LEARNet infrastructure to create such a system for knowledge management. The potential power of LEARNet is not its ability to teach lessons electronically through an interactive medium—this is merely applying old ideas to new technology. Using the LEARNet's networked medium, its true potential lies in the possibility of a modern knowledge management system:

- Allowing users to upload lessons and insights to be **shared** across the network, archived to ensure comprehensiveness and freshness;
- A **search** engine that is accurate and fast to ensure relevance and ease of access;
- A **peer review** and commenting system to gauge relevance and quality (similar to Facebook's Newsfeed "Like" and "Comments" functions);<sup>28</sup>
- A **clean, easy design** encompassing the above to encourage its use.

## TRANSFORMING THE LEADERSHIP ROLE

It has been argued that with constant unpredictability, Frederick Taylor's model will not hold up and central planning groups are increasingly ineffective. However, the other extreme is that decision-making is decentralized, with leaders merely articulating vision and values. Some business companies have tried this without success—because interpretation of vision and values is different at different levels, there is no coherence within the organization—these companies become more chaotic instead of more adaptive.<sup>29</sup> Friedrich Hayek, the visionary economist, articulated this in his 1945 paper *The Use of Knowledge in Society*:<sup>30</sup>

If ... the economic problem of society is mainly one of rapid adaptation to changes in the particular circumstances of time and place, it would seem to follow that the ultimate decisions must be left to the people who are familiar with the circumstances ... We cannot expect that this problem will be solved by first communicating all this knowledge to a central board which, after integrating all the knowledge, issues its orders. We must solve it by some form of decentralization ... But the “man on the spot” cannot decide solely on the basis of his limited but intimate knowledge of the facts of his immediate surroundings. There remains the problem of communicating to him such further information as he needs to fit his decisions into the whole pattern of changes of the larger economic system.

The leadership role is therefore to bridge this gap between decentralization and coherence. Haeckel in his sense-respond adaptive model proposes two main roles for leadership to provide context and coordination.<sup>31</sup> Contextualized to the SAF, it can be paraphrased as follows:

- 1. Providing Context for Subordinate Decision Makers**
  - a. Articulate purpose and desired outcomes
  - b. State governing principles and boundaries
  - c. Establish relationships between subordinate units
- 2. Providing Coordination and Accountability**
  - a. Coordinate the outcomes owed between subordinate units and Higher Headquarters (HHQ)
  - b. Hold subordinate units accountable for these outcomes

First, leaders are responsible for providing the context for their subordinates to make decisions. This hinges strongly on the purpose of being and desired outcomes required from the subordinate units. Leaders will keep the subordinates’ decisions aligned by articulating broad governing principles and strict, specific boundaries. Also, leaders are required to educate the subordinates of the organizational design, so that they understand the relationships between each other and HHQ, and the outcomes owed to each other.

Second, after providing the context, leaders need to ensure coordination and accountability. The leader will coordinate the outcomes owed between subordinate units. Furthermore, leaders will ensure that the outcomes owed between units manifest by holding their subordinates accountable for these outcomes.

Given this context, subordinate leaders are free to utilize the knowledge, resources and people at their disposal to creatively achieve the desired outcomes. The concept of building an organization capable of performing in a fast-moving, unpredictable environment by fostering both high alignment and high autonomy is not new—the Prussians developed it in the 1800s—and the culture and practices became known as *Auftragstaktik*, or Mission Command.<sup>32</sup> The SAF will do well to return to military roots in the new environment. Adopting the practices is easy, creating the culture is not—the Prussians themselves took decades to achieve it. The SAF will require a fundamental shift in its culture within leadership schools and the larger organization as a whole.

## INCULCATING THE CULTURE TO MOULD BEHAVIORS

In order to fully utilize a functional knowledge management system, and to transform the role of leadership in the organization, the organizational culture needs to shift fundamentally. The SAF and its people must shift from an authoritative, hierarchical and prescriptive culture to one that is collaborative, flexible, resourceful, empowering and accountable. To achieve this cultural shift, systems will need to be adjusted to offer incentives for the desired behaviors. One system that can be adjusted to encourage such behaviors is the organizational human resource management system—specifically the performance evaluation and feedback process.

Currently, the SAF’s performance evaluation process is strongly top-down with superiors ranking their subordinates annually based on their perceived performance. This process prompts the subordinates’ behavior to align themselves strongly with their superiors, sometimes at the cost of their adjacent units and their own people. Also, the expectations the superior has can be prescriptive—to get what he wants done—with no regard for feedback from the ground. The incentive model is inconsistent with the desired behaviors in an adaptive organization.

The SAF has adopted a 360 degree feedback system through Multi-Source Leadership Feedback (MSLF) for Regular senior commanders.<sup>33</sup> This process can be expanded as part of the evaluation to drive behaviors and therefore cultural change towards an adaptive SAF.<sup>34</sup> Leaders will be encouraged to have strong alignment with HHQ to deliver the desired outcomes, to build collaborative relationships with their peers by sharing and adopting knowledge, and to empower their subordinates by setting the context and then giving them autonomy.

## RESOLVING THE ISSUE OF LONG-TERM PLANNING: A MODULAR ORGANIZATIONAL STRUCTURE

There are some realities that the SAF faces that, unlike a business, makes its transformation to an adaptive organization difficult. One of it is in the area of capability development. If the argument is that there should be no other strategy beyond being adaptive, what will drive the development of new capabilities, since its development needs to be projected years in advance? If the SAF cannot and should not predict the future of warfare in twenty years' time, how does it decide what capabilities to build today?

*The solution here is to ensure the modularity of the SAF's organizational structure—units should be modular, have clear capabilities and have a “plug-and-play” interface with other units.*

The solution here is to ensure the modularity of the SAF's organizational structure—units should be modular, have clear capabilities and have a “plug-and-play” interface with other units. Units can then combine with any other number of units under a unified command to achieve different desired outcomes. The development of a new capability will be driven by the knowledge and information gleaned in today's environment. However, if it is developed with modularity in mind, it can collaborate with existing units to provide outcomes, even if the operating environment has changed by the time development has finished and it is introduced. The development of capabilities cannot be stand-alone or they lose their relevance even before they are ready. Instead, they

must be involved in an iterative process of “plug-and-play” to cater to the changing environment.

Modularity is also an inherently flexible and adaptive structure. Based on the type of situation and the desired outcomes required, modular units can be combined or separated to form organizations. After 9/11, the US found success with the modular Incident Command System for emergency response operations, where the organization can expand and contract as required by the incident scope and type.<sup>35</sup>

## CONCLUSION

This essay has argued for the need to build strategic adaptability in the SAF and explored five key initiatives towards that transformation. These recommendations provide broad insights and are neither exhaustive nor prescriptive in nature. What is certain is that in an age where all aspects of society, including the conduct of warfare, are changing faster than anyone can accurately predict, it is imperative to transform the SAF into an adaptive organization capable of achieving its mission. In the natural world, *homo sapiens* did not plan centuries in advance to dominate their environment, but evolved to do so. The SAF needs to force its own evolution to ensure its continued dominance and relevance. 🌐

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# A Ready SAF: A Strategy For Tomorrow

by LTA Lim Guang He

## Abstract:

As Singapore forges closer ties with the rest of the world, the security landscape becomes increasingly unpredictable. The multitude of threats taking turns to feature on stage—national, regional and global—demand different strategies from conventional warfare. The Singapore Armed Forces (SAF) has pursued a broader operational strategy that incorporates Operations Other Than War (OOTW) into its agenda of war-fighting readiness. The kaleidoscope of conventional and non-conventional security challenges calls for a strategy for tomorrow—a strategy which provides broad coverage over all these challenges, and has the capacity to address the most immediate threats. It is thus necessary to invest in a robust readiness model and culture that will “respond swiftly and decisively” to any threat. The SAF is ripe for such an adaptive readiness strategy.

*Keywords: Third Generation SAF; Full Spectrum Operations; Operations Other Than War; Operational Readiness*

## INTRODUCTION

Singapore embraces the world as its hinterland. But in today's globalized world, problems will spill over borders. As Singapore forges closer ties with the rest of the world, the security landscape becomes increasingly unpredictable. The impetus for full spectrum operations as part of Singapore Armed Forces' (SAF) Third Generation transformation stems from an operating environment which features new challenges, such as transnational terrorism, epidemic outbreaks and disaster relief, distinct from conventional war. A radical strategic shift is underway. The multitude of threats taking turns to feature on stage—national, regional and global—demand different strategies. SAF has pursued a broader operational strategy that incorporates Operations Other Than War (OOTW) into its agenda of war-fighting readiness. This expanded *modus operandi* requires commanders to weigh the urgency of each concern and constantly tweak the security agenda based on these *ad hoc* changes. No single strategy is a panacea. Instead, the kaleidoscope of conventional and non-conventional security challenges calls for a strategy for tomorrow—a strategy which provides broad coverage over all these challenges, but simultaneously provides the capacity to address the most immediate threats.



*Special Operations Task Force – Full Readiness*

## ORDER FULFILLMENT: LOOKING AT THE READINESS STRATEGY IN A DIFFERENT WAY

A corollary exists in the sphere of commerce. In economic terms, the Order Fulfillment (OF) process describes the functions from product inquiry to product delivery.<sup>1</sup> As firms seek to customize their products and offer greater variety, effective OF strategies become essential to trimming production costs. Likewise, as the SAF seeks to achieve its diverse strategic goals, it will have to adopt more effective methods to maximize the value of its capabilities in achieving these initiatives. As a small force, the SAF needs to maintain a qualitative edge over its potential

adversaries. Although OF is a concept grounded in supply chain management, it is a potential model for an operational strategy to prepare for tomorrow's missions, whatever they may be.

This article will cover three areas. First, it assesses how the roles in the OF model can be adopted in a military context. Second, it uses the OF model to define what the readiness strategy for tomorrow entails. Third, it contends that the SAF is well poised to exploit this strategy. The prospects of cooperation with external partners will also be evaluated.

### ESTABLISHING THE ROLES IN AN ORDER FULFILLMENT (OF) MODEL

The roles of an OF model in a military environment are best described by first comparing them with that of a commercial entity shown in Figure 1. Besides the composition and dynamics of each role, there are some distinctions between the two, most notably:

- The conduct of military operations is influenced by both battlefield commanders and political masters. In this aspect, the dynamics of power between these two groups will inevitably affect the duration and freedom of strategic planning.
- Commercial operations forecast demand to avoid holding excessive inventory. Military operations forecast threats to avoid acquiring excessive capabilities.
- A military operation desires closure through victory; a commercial operation desires perpetuity through magnification and refinement of its operations.
- The model shown in Figure 1 also incorporates John Boyd's Observe-Orient-Decide-Act (OODA) Loop to illuminate the allocation of energies in the process

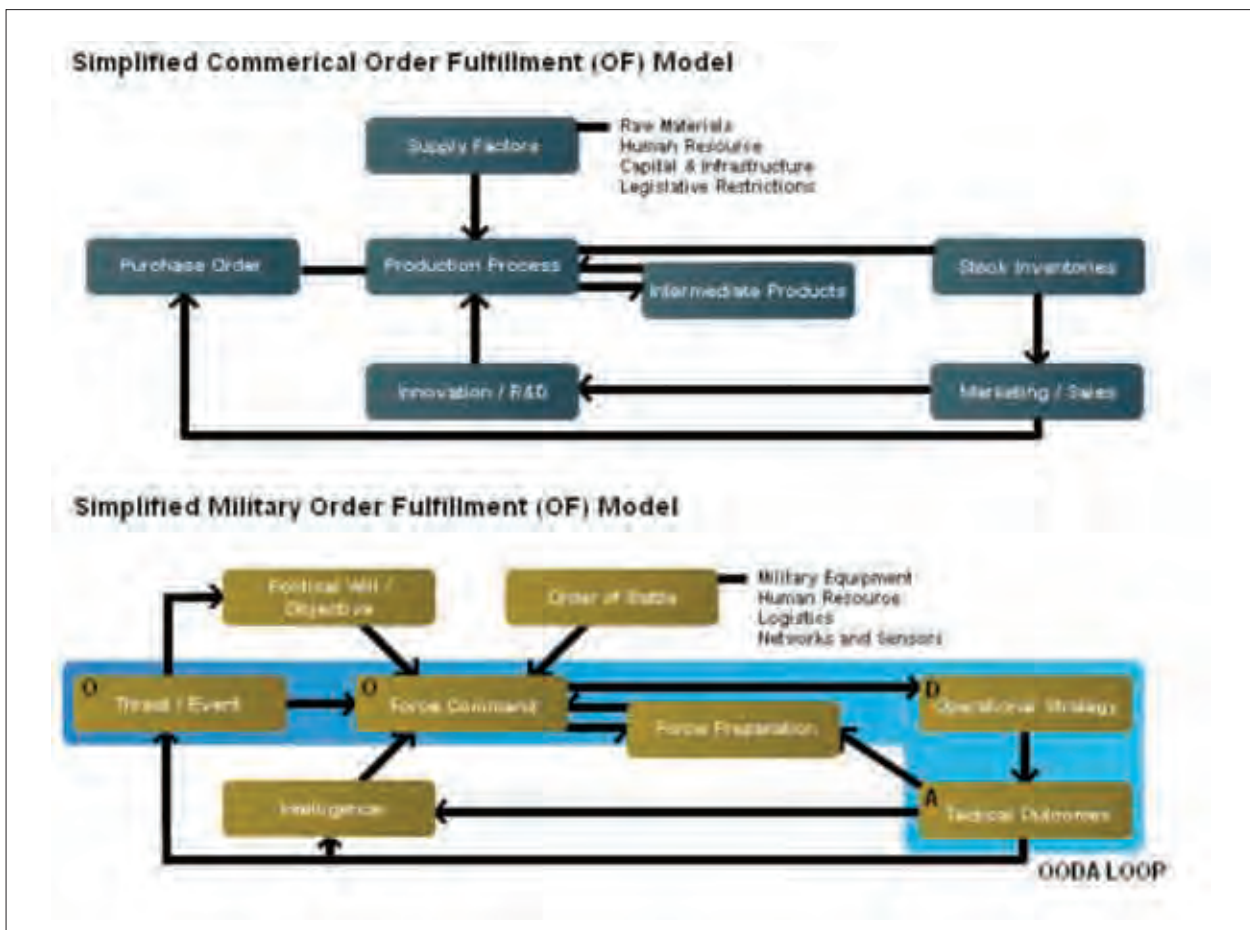


Figure 1: The Commercial and Military OF Models.



of strategic planning.<sup>2</sup> In contrast to the commercial model, a military operation strives to reduce the time taken for the OF cycle to renew itself.

These differences revolve around a central theme: readiness. Even the most technologically gifted or integrated military organization cannot succeed if it is not ready for the threat.

## READINESS STRATEGY AS DEFINED BY FULFILLMENT OPTIONS

There are also similarities between the strategic options of both models. The fulfillment options in the production process of a commercial model rely on the demand and production lead-time of the product itself.<sup>3</sup> The demand lead-time ( $D$ ), represents how long customers are willing to wait for the order to be completed, while the production lead-time ( $P$ ) represents how long it takes to manufacture the product. Mather's discussion on the  $P:D$  ratio gives rise to the following strategic options, represented in Figure 2:<sup>4</sup>

- Engineer to Order (ETO) – ( $D \gg P$ ) The product is custom designed and manufactured to the customer's specifications (e.g. housing projects).
- Build to Order (BTO) – ( $D > P$ ) The product is based on a standard design but component production and the final product are linked to the customer's specifications (e.g. automobiles).
- Assemble to Order (ATO) – ( $D < P$ ) The product is built to customer specifications based on a stock of existing components (e.g. computers).
- Make to Stock (MTS) – ( $D = 0$ ) The product is built against a sales forecast, and sold to the customer from a finished product inventory (e.g. groceries).

Fulfillment options can be applied to different military operations just as they are to different types of goods. The primary strategy which the SAF adopts against other conventional military forces is equivalent to ETO because the nature of the opponent will necessitate a period of tension before an outbreak

of war. Beyond conventional war-fighting, however, the amorphous nature of opponents means choices are blurred. ATO options might feature predominantly in the strategies of Humanitarian Assistance and Disaster Relief (HADR) operations, such as during Operation Flying Eagle, when “standby teams were deployed within 24 hours and specially assembled teams within 48 to 72 hours.”<sup>5</sup> On the other hand, MTS options should be employed in the event of potential epidemic outbreaks: during the recent episode of Influenza A, SAF medical centers were already prepared with stocks of *Tamiflu Prophylaxis* and rapid test kits for H1N1 diagnosis.<sup>6</sup>

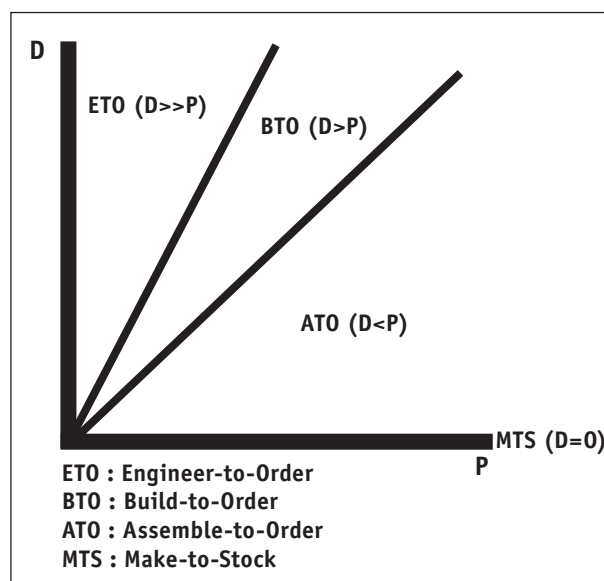


Figure 2: Fulfillment options as defined by demand and production lead times.

It will be careless generalization, however, to categorize every operation as a plot on the  $P:D$  graph. Very often military operations require a combination of two or more of these options. On 22 January 2008, two F-16 fighters were scrambled to intercept a civilian aircraft, a Cessna 208, which “was heading towards Singapore airspace without an approved flight plan.”<sup>7</sup> In this instance, strategy is constrained by both the singularity of the situation and the limited time available. For this mission, a successful operation would likely rely on careful allocation of interception assets (ATO) and a robust response plan (MTS). These two fulfillment options in turn require the following conditions, or factors, to be met: (1) fighter aircraft trained to intercept and engage such aircraft, (2) logistical support to support ad-hoc aerial scrambles,



*Operation Flying Eagle*

(3) proper coordination with the Civil Aviation Authority of Singapore (CAAS), and (4) surface-to-air missile sites capable of providing backup.<sup>8</sup> Without these factors, there is a high likelihood of mission failure should the worst case scenario materialize. In this simplified scenario we can also conclude that ad-hoc strategic planning can only succeed when all the crucial factors are in place.

Another observation about the top-down relationship, from operational strategy to fulfillment options to factors, as explained above, is that making factors as versatile as possible should be pursued as a strategy in itself. Figure 1 shows that a critical intermediary stage exists in an OF structure: represented by intermediate products in commercial operations and force preparation in military operations. In a commercial setting, the margin of profits can be increased by encouraging the streamlining of work

*Although OF is a concept grounded in supply chain management, it is a potential model for an operational strategy to prepare for tomorrow's missions, whatever they may be.*

processes and recycling of materials. The success of Toyota as the world's largest automaker bears testament to the Toyota Production System (TPS) strategy, which saved costs by developing an intelligent system that minimized the amount of in-process inventory held while ensuring smooth operations.<sup>9</sup> In other words, commercial margins benefit from negating the cost of excessive inventory. Although military operations do not pursue profit, it is logical

to develop an SAF "production system" by developing a force preparation strategy that will utilize its resources in a manner that can cover as many fulfillment options, or type competencies, as possible—a strategy that will provide the strategies of tomorrow.

#### **FULLFILLMENT OPTIONS FOR TOMORROW**

The OF model has so far explained that the readiness strategy is to cultivate the right fulfillment options today for use tomorrow. The SAF faces two challenges.

First, to actively explore and orientate its resources in the readiness cycle, and second, to develop a doctrine that conditions its leaders to think strategically when managing these resources.

To adapt to rapidly changing conditions, it is important for the SAF to orientate its factors to achieve growth:

**Multi-Role Order of Battle (ORBAT).** The procurement of military equipment ought to be akin to that of searching for a missing piece to the jigsaw puzzle of full spectrum operations. In the instance of naval operations, while the need for specialized vessels such as minesweepers and patrol vessels remains, multi-role support vessels such as the Endurance Class Landing Ship Tanks (LSTs) provide overlapping capabilities that give a huge advantage in naval patrols, disaster relief and peacekeeping operations.<sup>10</sup> Also, future procurement packages must be designed for successful integration with the existing ORBAT to maximize its return-on-investment.

*It will be careless generalization, however, to categorize every operation as a plot on the P:D graph. Very often military operations require a combination of two or more of these options.*

**Silver Bullets.** While developing multi-role assets, there is a need to develop “trump card” capabilities that will be deciding factors in any strategy. While combined arms provide a range of fulfillment options, certain missions require indispensable expertise, such as specialized equipment for responding to biological attacks and major disasters. Recognizing this, the SAF has set up groups that focus on specific threats, such as the Chemical, Biological, Radiological and Explosive (CBRE) Defense Group in 2003 to deal with chemical, biological and explosive threats,<sup>11</sup> and the Special Operations Task Force in June 2009 to “combat terrorism, hostage-taking incidents and rescue tasks.”<sup>12</sup> As a combination of multi-role combat and support assets coupled with silver bullet capabilities are likely to feature as the backbone of any operational

strategy tomorrow, these groups play an important role by preparing their assets for seamless, horizontal integration with other units.

**Superior Networks.** Networks are valuable resources. On the SAF level, the primary objective as embodied in Integrated Knowledge Command and Control (IKC2) efforts is to employ capable systems and networks that will integrate all units into the information matrix and shorten the decision-making cycle in the OODA loop. On the national level, the SAF needs to establish higher levels of trust and more robust operating procedures with civil agencies to reduce friction caused during the Orient phase of the OODA Loop. One example is the Risk Assessment and Horizontal Scanning (RAHS) system set up in 2004, which “has the potential to be a strategic planning process to facilitate agency collaboration and to put in place a whole-of-government framework to think about a complex and uncertain future.”<sup>13</sup> Beyond that, cooperating with regional and international bodies through networks and systems allows us to share the economy of effort to tackle regional, global, and transnational security issues. The Information Fusion Center (IFC) located in the Changi Command and Control Center is an example of future global security networks. It houses the Regional Maritime Information Exchange (ReMIX), the Malacca Straits Patrols Information System (MSP-IS), and the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia Information Sharing Center (ReCAAP ISC) web-based systems. These systems provide timely information-sharing between their subscribers around the world to meet their maritime security needs.<sup>14</sup> The SAF should continue leveraging on its technological edge to spearhead these initiatives in preparation for tomorrow's developments.

**Total Defense.** Responding to the concept of Fourth Generation Warfare (4GW), Dr. Bernt Anderberg advocates replacing military strategy with a national security strategy as part of force transformation.<sup>15</sup> The erosion of state power means that the future of state security will be one increasingly defined by human security. Civil forces, be it domestic, regional

or international, are critical to addressing modern day threats, none more so than the long shadow cast by transnational terrorism. American journalist Fareed Zakaria made an interesting observation, "If civilians are not terrorized, then terrorism does not work."<sup>16</sup> Britain survived World War II because its population displayed determination in their support for the war effort. As the SAF's Total Defense strategy expands its mission to serve the economic and social interests of national security, a resilient, active, and supportive civil sector will be crucial should hardship strike tomorrow.

*Should the SAF expect every scenario it prepares for today to happen tomorrow? No. Should it expect to be up to the challenge when some of them do? Yes.*

**Diplomacy.** Singapore has no enemies, only interests. Diplomatic goodwill and defense relations do function, albeit unpredictably, as a fulfillment option in military operations. The emergence of a multi-polar world between the United States and other rising powers,<sup>17</sup> as well as the gathering enthusiasm for ASEAN integration, are opportunities for joint military exercises, discussion forums, technology exchanges, and defense industry collaboration. Some examples of each include the annual Southeast Asia Cooperation Against Terrorism Exercise (Ex SEACAT) held between seven nations in the region,<sup>18</sup> the Special Forces Commanders Conference in October 2009,<sup>19</sup> and the Malacca Straits Patrols in place since 2005.<sup>20</sup> These activities will affect the diplomacy variable in the equation of readiness. As the SAF participates in more overseas operations, we also need to consider how best to harness its diplomatic ties to fulfill the strategic demands of tomorrow.

To date, the SAF has developed many of these ingredients. However, its doctrine should also encourage these fulfillment options to inter-operate with one another frequently. In the absence of war, the opportunities for planning military operations are few and far between, and the SAF must therefore continue to refine its methods to ensure continual readiness.



*Special Operations Task Force—Ready for action*

## THINKING STRATEGICALLY

This article has so far addressed the first challenge: the desired orientation of resources. The second is a thinking framework from which leaders can assess the readiness of their forces. The challenge is to teach today's operational commanders to be trend spotters as well as critical thinkers:

**Sharpen Command Focus.** The concept of full employment does not equate to 100% employment; in fact 100% employment is an unattainable goal. The same can be said of full readiness. Training eight out of ten units in a task force to be on high alert will not be productive if a situation calls only for the participation of the two units that were not trained. On the other hand, training all ten units will exhaust the resources allocated to the task force. The art of readiness is to figure out the demand for capabilities and meet it. To do so, the SAF will have to produce leaders that are able to provide quality command focus.

Command focus determines what tasks a unit is trained to perform. When planning an operational strategy, a commander takes into account the command focus of the forces he is deploying. In the absence of war, repeat exercises are the most important ingredient in sharpening command focus. The objective of each exercise should be to achieve a new fulfillment option or maintain currency in an existing one. The goal of readiness for tomorrow is therefore achieved when all units are current in all the mission-type capabilities they are required to deliver. In preparing the readiness

of their units, commanders must constantly assess the demand and supply of fulfillment options, and decide how to achieve full readiness.

**Develop Tactical Agility.** Success in force preparation can only be determined by tactical outcomes in real operations. In context, the operational commander has three levels of consideration. First is speed, constantly executing each engagement with the shortest OODA loop. Second is momentum, finding ways to remove friction points in the movement of his advance. Third is contingency, always having a back-up plan to every tactical disappointment. The commander's role in peacetime is therefore, through practice, to spot the factors that are inhibiting the tactical decision-making chain and improve on them, or identifying new ones that can complement the mission.

Frequent exercises will sharpen the commander's intuition and improve his tactical finesse. However, he must also remain adaptable. Suppose today's concern is terrorism but tomorrow's is disaster relief; commanders from top to bottom will have to gauge what level of sacrifice they are willing to make to switch from one type of competency to another, and make them fast. Not only must they achieve full readiness, they must also know how to maintain it in a rapidly changing environment. Simply put, the goal of peacetime training is to generate adaptability ahead of crises.

**Build Awareness Of Non-Military Forces.** Traditional force preparation focuses almost exclusively on military participation and excludes the effects of other agencies. 4GW, however, involves warfare fought in a military-civilian context.<sup>21</sup> Military exercises will achieve valuable realism by incorporating the participation of civilian agents. The Exercise Northstar series, which simulates terrorist attacks on public installations and involves collaboration between more than 20 civil and military agencies,<sup>22</sup> is a good example of how this can be done. Much like the integration of the three services in SAF, inter-agency networking with ministerial and regional agencies is essential for future operations, especially

against threats on the home front. Already, initiatives such as the Homeland Security Engineering Center (HSEC) and Homefront Crisis Management System (HCMS) serve as resource centers for various agencies, local and abroad, to prepare against future threats.<sup>23</sup> Meanwhile, commanders in the lower echelons must be continually trained to consider the effects of economic, diplomatic and political forces so that these considerations come naturally to them when devising an operational strategy.

**Share The Spirit.** The SAF has expanded its operational scope in recent years. Maintaining it will require men and women who understand the meaning of their work and the responsibility they carry. All commanders should actively engage their soldiers through formal and informal channels to develop their understanding of why readiness is vital to national security. At the same time, the system must also find ways to generate readiness amidst the changes that are taking place within the force.

Above all, the points discussed point to a convergence between readiness and force transformation. The factors involved in the Third Generation transformation of the SAF correspond to the ingredients for readiness: full spectrum operations, integration and networking, advanced technology, a focus on both people and values, and making holistic progress. Curiously, the SAF cannot strive for readiness without transformation, because such readiness will quickly become irrelevant in a rapidly changing world.

## READINESS NOT A SOLUTION TO EVERYTHING

Should the SAF expect every scenario it prepares for today to happen tomorrow? No. Should it expect to be up to the challenge when some of them do? Yes. This guarantee is the service the SAF provides to its citizens. No matter how prepared we are, there will be times when a threat will catch us unaware. Therefore it is not enough to be ready—we must also be spontaneous and adaptive. The SAF should condition soldiers to not only be conversant with the procedures they are prepared to execute, but also be up to the task even without the luxury of preparation. This requires changing how its people think operationally

and inventing a system that will encourage them to discover creative methods and achieve flexibility in any scenario.

## CONCLUSION

*"We must always make sure that our investments in defense, our investments in the SAF, give us the capabilities to respond swiftly and decisively against any threat to Singapore's peace and prosperity."*

– Excerpt from Minister of Defence Teo Chee Hean, now DPM, at Committee of Supply Debate on 4 March 2005.<sup>24</sup>

Readiness is not easy. However, looking at the organization as a whole, the SAF has done well so far. It has the confidence to carry out operations with immediate notice because it has developed a strong culture of readiness. Yet the security landscape is an unpredictable one. A potential risk today can become a potent threat tomorrow; today's exercise can become tomorrow's combat operation. It is thus necessary to invest in a robust readiness model and culture that will "respond swiftly and decisively." The SAF is ripe for an adaptive readiness strategy. It needs to play a bigger role in the team effort with its partners in Total Defense; to avoid pitfalls, its people will need to get on their feet faster and further than ever before. The key to achieving readiness tomorrow is to start preparing now. 🌐

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# Transformers Of The Third Generation SAF

by CPT Phua Chao Rong, Charles

## Abstract:

This essay will delve into the finer aspects of the Third Generation Singapore Armed Forces (SAF) transformation and suggest how the SAF, as an institution, can “change the culture, thinking and behaviour of our people about how they should work together.” Only then will SAF soldiers be empowered to be the owners and transformers (agents of change) of the Third Generation SAF.

*Keywords: Talent Management; One SAF; Future Systems Directorate*

## INTRODUCTION

Autobots, Transform! If only the Third Generation Singapore Armed Forces (SAF) transformation can be achieved by a mere command like in the movie “Transformers.” As one of the largest organisations in Singapore, the SAF cannot “Transform” instantaneously. Transformation takes time to proliferate through our large NSmen reserves. The SAF has hitherto been successful in hardware acquisition; the software and “heartware” aspects require more work. In fact, the Chief of Defence Force (CDF) 2007 Workplan objective for a ONE-SAF was skewed towards these aspects. Through the ONE-SAF vision, the SAF will Operationalise the first spiral of the the Third Generation SAF, Nurture first-class people and Engage our people towards stronger commitment and greater excellence.<sup>1</sup>

This ONE-SAF vision is ambitious, yet realistic, given the new age of intellectual activism and “make it happen” culture in Singapore. As the former CDF LG (NS) Desmond Kuek clarified further, “any kind of enduring change must begin in the hearts and minds of our people ... It sounds obvious, but it isn’t always easy. We will need to frame the issues, structure and organise ourselves systemically, have clear success models to follow, grow a new mindset, and lead from the front to show others how.”<sup>2</sup> This essay will delve into these finer aspects of Transformation and suggest how the SAF, as an institution, can “change the culture, thinking and behaviour of our people about how they should work together”;<sup>3</sup> only then will SAF soldiers be empowered to be the owners and transformers (agents of change) of the Third Generation SAF.

## THE THIRD GENERATION SAF: AN UNWRITTEN SOCIAL CONTRACT

Like all large entities, the SAF has a social contract with its people. Although social contract theory is a Western concept, it sufficiently covers the intangible transactions (expectations) between the management and its people in organisations and states. To a professional soldier, the SAF is its paymaster for his or her professional service. In order to execute his service professionally, the SAF needs to train, feed and provide for his holistic development adequately. In return, the soldier agrees to train and fight hard for his country, to the death if necessary.

However, factors such as work-life imbalance—a natural by-product of modern urban lifestyle aggravated by the current manpower crunch and a decreasing national birthrate—complicate matters. The resulting talent retention challenges further



*Whole Hearted Cooperation, Everyone is a Leader*



aggravate our manpower crunch and intensifies work-life imbalances for those who remain, perpetuating a vicious cycle.

The Third Generation SAF will win the hearts and minds of servicemen more easily if it cares for their needs and welfare. As Cicero professed, “the servicemen will work harder in reciprocity.”<sup>4</sup> Assuming a happy worker is a productive worker, their energies will be better focused towards achieving the ONE-SAF vision, making the SAF’s transformation effective. Hence, the Third Generation SAF requires new concepts, processes and policies to alleviate these concerns, nurturing first-class people and engaging them in working towards stronger commitment and greater excellence.

### **CONCEPTS: FROM “WORK HARD, WORK MORE” TO “WORK SMART, DEVELOP MORE, CONTRIBUTE MORE”**

The Third Generation SAF needs to transform the unwritten work philosophy from “Work Hard, Work More” to “Work Smart, Develop More, Contribute More.” In the global economy of the 20<sup>th</sup> century, the Second Generation SAF’s work processes were truly within the Western industrial-era paradigm, embracing the scientific method and predominantly utilitarian in measuring results. It believed in mass production and standardization as the sole yardstick of societal and organisational progress.<sup>5</sup> For top-down commands, discipline and order are important for the precise and orderly conduct of war. However, for a Third Generation SAF operating in the new global knowledge economy, the emphasis is on network-centric warfare and the knowledge warrior. Organisationally, de-layering (adopting a “flatter” organisation as suggested by Martin van Creveld in 1990) is an important goal which will probably not materialise any time soon in a military organisation due to command and control issues.<sup>6</sup> However, an acceptable amount of individual soldier empowerment can be expected at the tactical level due to the dispersed nature of the modern battlefield and information overload at the higher command levels.<sup>7</sup> Knowledge demands and work requirements on Third Generation SAF soldiers will only increase, further jeopardizing work-life balance. Hence, there is a need

to help our soldiers achieve self-realisation and job satisfaction in their career. The Third Generation SAF will be balanced between quantitative (efficiency) and qualitative growth (human welfare, inner development and multidimensional growth).<sup>8</sup> This entails allowing soldiers to “work smart” and “develop more,” thus empowering them to “contribute more” towards ONE-SAF.

### **WORK SMART FOR WORK-LIFE BALANCE**

The Third Generation SAF’s Organisational Excellence should emphasize “the technical quality of our work, but also the quality of our people and their life in the organization; the target is a matter of attitude and a state of mind.”<sup>9</sup> Work pace and load needs to balance efficiency (ratio between outputs and inputs) with effectiveness (actual versus desired output) so that more time can be spent on people development and work-life balance instead of chasing deadlines.<sup>10</sup> It takes enlightened leadership at all levels to blend efficiency (doing things right) and effectiveness (doing the right things) to achieve “doing the right things right.” Effectiveness is a direct reflection of a leader’s ability to plan, synchronise, coordinate and anticipate competing requirements and a leader must avoid the practice of working late or on off days due to poor planning.<sup>11</sup> Regular third-party managed objective feedback loops conducted amongst their subordinates will help our leadership better know the “ground truth” of the organisation’s work efficiency and its impact on work-life balance.<sup>12</sup> In addition, new accounting standards, such as Activity-Based Costing (ABC), can be adapted to account for externalities like informal “economic” activity and social costs, to provide an accurate measure of work effectiveness. For example, a work-effective project will ensure minimal ABC, or man-hour costs multiplied by time taken (number of meetings).<sup>13</sup> Random performance audit checks by Joint or Service-level Inspectorates, using Activity-Based Management (ABM) tool to distinguish value-added costs (necessary) and non value-added costs (unnecessary), will improve work effectiveness in the SAF.<sup>14</sup> In time, people will be working smarter, while people and organisational development can be achieved together with more family time.



Army Half Marathon

## DEVELOP MORE: FROM “OFFICER TRAINING” TO “JOINT OFFICER PROFESSIONAL DEVELOPMENT ARCHITECTURE”

In the Third Generation SAF, we anticipate smaller and more independent forces roaming the new digitised battlefield; hence the physical and mental capabilities and the skill competencies of the individual soldier will be paramount.<sup>15</sup> As Colonel Cone from the United States (US) Army remarked, “[future] battles are won at the platoon level.”<sup>16</sup> This entails commanders to encourage their subordinates to undertake actions on their own, depart from the plan and be creative (subordinate initiative).<sup>17</sup> Time is needed to build trust between leaders and subordinates; leaders must train their subordinates how to think, not just what to think, and to use their creativity to solve problems on their own.<sup>18</sup>

Initiative translates into renewed importance of leadership at all levels in the Third Generation SAF. Leadership is the art of influencing others in a manner that earns their respect, their confidence and their whole-hearted cooperation.<sup>19</sup> Our leaders need to be versatile, possessing the “capacity to be multi-functional, to operate across the full range of military operations, to perform at the tactical, operational and strategic levels,” and “to improvise solutions in uncertain and changing battlefield conditions.”<sup>20</sup> Both the initiative and versatility of leaders depend on the individual’s mastery of the discipline’s fundamentals (knowledge and competencies).<sup>21</sup>

Knowledge competency is thus the first requirement of a Third Generation SAF officer. To train our officers to put on the different hats of soldier-warrior; soldier-diplomat; soldier-scholar; or soldier-administrator is no simple feat and they should be holistically developed through education, training and hands-on experience.<sup>22</sup>

The Third Generation SAF officer needs to have adequate knowledge of joint operations, be well-networked within the SAF, be competent in the arts and sciences of the military profession and ultimately be an effective leader. Hence, in formal education, is it sufficient to only expose the officer to advanced joint operations topics during the Tri-Service War-Fighting Course? Is it right for officers to officially pick up Clausewitz’s “*On War*” or Sun Tzu’s “*Art of War*” only when they attend the Command and Staff College? These are important questions, as answering “yes” runs contrary to the knowledge-intensive armed force that the Third Generation SAF is working towards. In a knowledge-intensive “economy,” knowledge is power.<sup>23</sup> Formal education and training will not suffice. Perfect knowledge is impossible but a good working knowledge is essential.

*Creative juices are stimulated not just in less formal work settings, but also through wide reading.*

We need to nurture first-class people who have the passion to develop themselves professionally and the SAF must create

that favourable environment to encourage positive learning attitudes. The Joint Officer Informal Learning Network is a good complement to the formal education system. Using SAFTI MI and its resources as a base, study groups can embark on mutual peer-to-peer learning. It maximises the learning of every SAF officer and encourages each individual to think in terms of the joint war-fighting paradigm. Constant revision is essential to keep minds prepared for any eventuality. Hence, such additional avenues for continual military education, without the need for assessment, will improve and reinforce officers’ understanding of the less sensitive operational military knowledge.

The mutual learning should not be restricted to military topics. In order to cross-train soldiers as diplomats, scholars and policy makers, training

should include other subjects such as organisational psychology, finance, and anthropological or cultural studies which may be useful to the SAF. After all, Colonel John Boyd's oft-quoted OODA (Observe, Orient, Decide and Act) loop was developed after many years of informal research into strategy and seemingly non-military related literature. Creative juices are stimulated not just in less formal work settings, but also through wide reading. The SAF Professional Reading Programme is a good start.<sup>24</sup> Events such as thematic sharing sessions and public lectures by authors of new books will further reinforce the importance of reading to a knowledge-intensive Third Generation SAF. Only with professional competence and character can a Third Generation SAF leader make a lasting impact that naturally fosters independence, initiative and the ability in subordinates to excel even in his absence.<sup>25</sup>

### CONTRIBUTE MORE: FROM SERVICE-CENTRIC TO ONE-SAF CONTRIBUTIONS

With better work effectiveness and first-class development, our leaders are expected to contribute more towards our ONE-SAF vision as part of the Third Generation SAF social contract. The ONE-SAF requires strategies to work towards common political and cultural goals in the SAF. The following are some suggested intermediate goals that informal groups can work towards:

#### Beyond Formal Matrix Structures: Innovation Incubators

In the Third Generation SAF, we need to both do things differently (mainstream innovation) and do different things (radical reinvention) simultaneously.<sup>26</sup> Military entrepreneurs in Future Systems Directorate (FSD) already do the latter, but one need not belong such a unit before planning for the future: ONE-SAF requires all our people to be transformers and think for the SAF. After developing professional expertise, Third Generation SAF officers should exhibit the ability to improvise based on known concepts; this is where innovation incubators provide a platform to exercise such creativity and initiative for the SAF's transformation.<sup>27</sup>

Such innovation incubators can focus on conceptual experimentation. Their topics can vary from potential weapons systems to high-yield human

resource (HR) strategies to new war-fighting strategies for the SAF. These serve as a potential breeding ground for useful suggestions or proposals that may be further developed, either formally via FSD and other relevant agencies, or informally via SAF project grants such as the National Youth Achievement Award Nexus National Education grant. Boyd's fight to include his Energy-Manoeuvrability (EM) theory into the F-16 design, despite many organisational barriers, is a shining example of what the SAF needs to do to promote good initiatives and positive learning attitudes.<sup>28</sup> The SAF should encourage and harness such grassroots ideas and feedback in this "wrangler's club for the masses."

#### Asymmetric Strategies Towards "ONE-People"

ONE-SAF involves a joint culture, which takes time to build. Culture is defined as the norms, values and practices that define a people. The SAF has seven core values, but for any effective SAF culture to exist, we must also acknowledge the presence of sub-cultures and the cultivation of distinct service cultures. Servicemen must understand the "multiple identity" nature of culture: in a globalized, cosmopolitan environment like the SAF, a person can simultaneously belong to different cultures with varying loyalties.<sup>29</sup> In the ONE-SAF, services will increasingly be tasked to work as Joint Headquarters and Joint Task Forces.<sup>30</sup> The *modus operandi* for joint operations will then permeate across the SAF.

For the Third Generation SAF to practice initiative, leaders, peers and subordinates must not only believe in each other's skills and ethics, but also understand how they think. Networking across various levels is thus important.<sup>31</sup> A joint professional development architecture and innovation incubators are good ways to enhance networking across SAF, based on the unifying goals of learning and innovations respectively. The target audience should be officers up to the rank of Lieutenant Colonel since they will inherit the Third Generation SAF in three to five years' time: it is vital that they start to think, work and network as ONE-SAF. Senior commanders (Colonel and above) have already established networks through SAF social events, work conferences and years of experience. After sufficient confidence is established, learning and innovation opportunities should be opened up to all servicemen.

There are many interest groups that can unite our ONE-People, such as sports and community service. Sports bind people together through physically rewarding exertion and a sense of camaraderie. National level sports events like Army Half Marathons, runway cycling and biathlons build rapport between Singaporeans and National Servicemen. More informal sports events and pro-family activities can be organised at the national level by the SAF to contribute towards the goal set by the Ministry of Community, Youth and Sports (MCYS) of a pro-family and athletic Singapore. The more serious sportsmen and fitness enthusiasts may even contribute to the SAF Sports Association's (SAFSA) leagues and Army Fitness Centre's innovative fitness regimes respectively. If Singapore is to instil a strong sporting culture, the SAF, with its benign influence on many Singaporean fathers and fathers-to-be, plays a pivotal role. Through such sports-related networking, we engage One-People and strengthen their commitment to health and fitness—a win-win solution for the SAF and Singapore as a whole.

*For the Third Generation SAF to practice initiative, leaders, peers and subordinates must not only believe in each other's skills and ethics, but also understand how they think. Networking across various levels is thus important.*

Community service unites the compassionate and develops the spirit of ONE-People amongst them. At the strategic level, local community service projects improve civil-military relations (CMR) by portraying the SAF's goodwill, beyond the monetary contributions to the annual President's Challenge and periodic visits to SAF-adopted homes. At the individual level, it brings our soldiers (especially National Servicemen) back to the community they are fighting for, heightens their civic-consciousness and strengthens their commitment to defence. This strategic move is both timely and important as CMR is problematic even in some developed nations. In addition, overseas community service projects like the National Youth Council's (NYC) Youth Expeditionary

Project (YEP) help train our budding soldier-diplomats, a much needed asset for SAF's future peace support operations.<sup>32</sup> Strategically, diplomacy is a key pillar of our defence policy and these projects, when properly communicated and conducted, serve as diplomatic tools to spread Singapore's goodwill to the region.<sup>33</sup>

## **“METANOIA”: FROM CAREER TO CO-CAREER ACTIVITIES**

“Develop More” and “Contribute More” strategies engage and nurture people, but they are traditionally considered Co-Career Activities (CCAs): side activities that servicemen can engage in when they have time, *outside* work. In the Third Generation SAF, a mindset change is essential to transform these CCAs into vital building blocks of ONE-SAF. The SAF must have the “metanoia” (mindset change) and “discipline” to put these theoretical strategies into practice.<sup>34</sup> Some suggested policies are outlined below.

### **People Development**

People Development should be a key performance indicator (KPI) in the Third Generation SAF. The Second Generation SAF already recognises the importance of people development as evidenced in the Annual Feedback Form (AFF).<sup>35</sup> However, the unwritten organisational focus on Workplan KPIs effectively marginalizes people development; officers should instead be assessed on their achievement of both intangible people development and tangible work done. In war, it is the human element that turns opportunities into successes or failures; hence the importance of creating the “best crew.”<sup>36</sup> The quality of subordinates reflects the quality of their leader. Hence, a superior's personalised grooming, albeit time-consuming, adds value to learning in a personal manner that no SAF course can replicate; the whys and wherefores was expressed by Barzun, former provost of Columbia University who was a strong critic of mass-education without proper personalised instruction *vis-à-vis* Rousseau's one-child-one-tutor ideal.<sup>37</sup> Hence, besides churning out projects, papers and exercises, superiors should tutor their subordinates in the areas of military science, leadership and joint operational competencies. In addition, superiors must also provide space for

subordinates to develop themselves via CCAs and non-Route of Advancement (ROA) upgrading courses from the SAF or the Ministry of Defence (MINDEF) Centre for Management Development (MCMD). As CDF elucidated, people development should be considered an investment of time and resources in order to bring out the potential in each individual and team.<sup>38</sup> The return on investment will be seen in the quality of their contributions towards ONE-SAF.

### Failure: The Mother of All Success

Junior leaders will rarely take initiative unless they trust their senior leaders to have matured beyond a zero-defect mentality.<sup>39</sup> Hence, experimentation and risk-taking will not bloom unless the SAF accepts occasional personal and sub-organisational failure as a means to organisational excellence. Thomas Edison conducted countless experiments before finding the correct element for our light bulb. The SAF needs to embrace the Chinese axiom “failure is the mother of success” for peacetime personnel growth and gradual progression towards long-term excellence. Would-be Edisons and Boyds in the military often experience poor careers despite their transformational contributions; this must change if SAF wants more transformers.<sup>40</sup>

### Route of Contribution, Not Merely Route of Advancement

As US Military Academy Professor Kagan suggested, the training and promotion system must tie advancement to demonstration of initiative.<sup>41</sup> Similarly, a *POINTER* monograph on leadership also proposed the Route of Contribution (ROC) approach over the conventional Route of Advancement (ROA).<sup>42</sup> The author interprets ROC as valuing intellectual capital and balancing the assessment of capability (thinking soldier) with the heart to contribute beyond self (leadership with the heart).<sup>43</sup> Such people are promoted because the organisation values their capabilities and contributions, and welcomes them to contribute more at a higher level in a virtuous cycle. This can be extrapolated to suggest the possibility that career advancement can be based on a holistic assessment of one's routine work performance and additional contributions towards ONE-SAF. The contribution criterion assesses the peacetime civil servant, while the capabilities and performance



*People Development – Bringing out the qualities of individuals*

criterion assesses the operational readiness of the wartime soldier.<sup>44</sup> Such rethinking of HR policies will sustain the people development and engagement efforts of ONE-SAF.

### FROM TALENT MANAGEMENT TO TALENT DEVELOPMENT

Finally, the key to a successful knowledge-intensive Third Generation SAF is talent development. Organisational renewal is tied to the release of human energy and talent.<sup>45</sup> In the Second Generation SAF, we identified scholars as talents by nature, to be further nurtured. This is important for strategic leadership renewal but is insufficient when we need talented leaders at all levels in the Third Generation SAF. As LG (NS) Desmond Kuek propounded when he was Chief of Army, “everyone is a leader.” Similarly, everyone has some talent and the SAF should nurture all personnel who are willing to be groomed and harness their diverse talents for our purpose. Network-centric warfare has become so complex that multiple talents are needed and hence the power of the talented masses is vital. The individual's development becomes as valuable as the organisation's growth.<sup>46</sup> This new HR thinking will signal the SAF's benevolent concern for its members' well-being and development; our servicemen will feel valued and reciprocate with strengthened commitment to defence (heartware) and contribution to the organization. The “wrangler's club for the masses” is one such talent development policy for SAF regulars.

### National Service Transformers of ONE-SAF

The talent development policy for Full-Time (NSF) and Operationally-Ready (NSmen) National Servicemen

should not be overlooked. G1 Army and the National Service Affairs Department (NSAD) are already working on value-added national service to strengthen the heartware of servicemen. It is also useful to re-think how NSmen can add value to the SAF.

From the perspective of ownership, more national service commanders (Company Sergeant Majors and above) can be co-opted into key conceptual, experimentation and implementation processes to encourage active participation in the Transformation process. Regulars and NSFs flow pass the units; only the NSmen truly stay in their units for at least 10 years. These NSmen are integral to the unit and the SAF should let them develop their unit's transformation process; they will be more committed to the Third Generation SAF because the SAF values their input.

### *The Third Generation SAF is a knowledge-intensive and talent-based economy.*

From the perspective of functionality, the deployment of NSmen Warrant Officers and Specialists can be reconsidered. An easy way is to deploy NSmen according to their last NSF appointment and vocation. However, recalling a Corporal (NS) who is a software engineer with an annual income of \$100,000 to charge up hills and execute basic infantry drills for in-camp training does not do justice to his professional expertise or the SAF's defence budget. This soldier can be better employed designing new software or even troubleshooting the division's Command and Control Information Systems (CCIS). The SAF will better benefit from his skills and hopefully enhance his commitment to defence at the same time. With management centred on talent, NSmen will feel valued by the SAF and their heartware will be strengthened. In the long run, this administratively taxing policy signals the SAF's appreciation of talent and the responsibility is placed on NSmen to develop their talents.

## CONCLUSION

The Third Generation SAF is a knowledge-intensive and talent-based economy. The magic of great leaders

such as Alexander the Great lie not in their ability to exercise total, impersonal control, but in their ability to unleash the creative excellence of their subordinate leaders and channel that energy in the right direction.<sup>47</sup> The ONE-SAF vision clearly seeks to nurture and "align the hearts and minds of our people" towards the goals of the Third Generation SAF.<sup>48</sup> This article has suggested some strategies for people development and engagement. To jump start the process, our Third Generation SAF leaders need to be charismatic enough to care about our people, what they feel is important and the positive forces that motivate them to excel.<sup>49</sup> "Work Smart" tackles work-life imbalance; "Develop More" and "Contribute More" empower our regulars with private sector survival skills. These are useful by-products from achieving the goals of ONE-SAF, thus maximising return-on-investment. In the Third Generation SAF, both intangible and tangible assets should be valued; long-term efficiency, work environment and employee health should be recognised.<sup>50</sup> Only then can we harness our creative energies to proclaim with gusto, "Autobots, Transform!" 🌐

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# Identification Friend Or Foe: A Necessity On The Battlefield

by ME5 Calvin Seah and Malini T. Deepan

## Abstract:

“Fratricide is the employment of friendly weapons and munitions with the intent to kill the enemy or destroy his equipment or facilities, which results in unforeseen and unintentional death or injury to friendly personnel.” On the modern battlefield, technological advances have seen the influx of weapons of higher precision over longer distances as well as the reduction of the fog of war through better sensors, sensemaking and information systems. However, Identification of Friend or Foe (IFF) remains as an operational challenge and mistakes could lead to fratricide or “amicicide.”

*Keywords: Fratricide; Identification Friend or Foe; Modern Battlefield; Operational Challenges and Technology*

## INTRODUCTION

*“Fratricide is the employment of friendly weapons and munitions with the intent to kill the enemy or destroy his equipment or facilities, which results in unforeseen and unintentional death or injury to friendly personnel.”*

*– US Department of the Army<sup>1</sup>*

On the modern battlefield, technological advances have seen the influx of weapons of higher precision over longer distances as well as the reduction of the fog of war through better sensors, sensemaking and information systems. However, Identification of Friend or Foe (IFF) remains an operational challenge and mistakes can lead to fratricide or “amicicide.” Singapore has, as a responsible member of the world community, been constantly partaking in peacekeeping missions in coalition with multi-national forces. Even today, the Singapore Armed Forces (SAF) continues to take part in such missions. Indeed, CPT Stanley Chua writes in an earlier *POINTER* article that:<sup>2</sup>

“The nature of peacekeeping deployments has transformed significantly over the last decade. Whereas earlier operations entailed overseeing the implementation of peace agreements between formerly warring nations, many recent missions have taken the form of humanitarian intervention, often in circumstances where peace is yet to be established. Consequently, the

situations that confront deployed peacekeepers are increasingly volatile, often permeated by a climate of violence and intimidation.”

Such situations require multi-national forces to work together to mitigate any attacks faced. At that same time, there is also a need to ensure the forces are equipped to prevent any occurrences of fratricide. With our increasing role in peacekeeping missions, our current technological developments need to be supplemented with techniques to prevent fratricide.

## FRATRICIDE: CONCERNS, CAUSES AND EFFECTS

### Fratricide Concerns

The modern battlefield is now more urbanised and complex. With the interspersion of civilians, enemies and one's own forces, decisions to fire take on greater complexity as these could lead to fratricide or civilian deaths. IFF is a grave concern even for the US military, as seen in the Iraq war in which about a quarter of US military casualties was due to friendly fire incidents. A compilation of fratricide occurrences in 20<sup>th</sup> century conflicts is shown in Figure 1. A large portion of fratricide occurrences (46%) were due to encounters involving land units only.<sup>3</sup> According to LCDR William Ayers III, “in any conflict, there are losses imposed by the enemy and this is an accepted part of the process. What is difficult to accept are those losses that are inflicted by own or allied forces.”<sup>4</sup> In

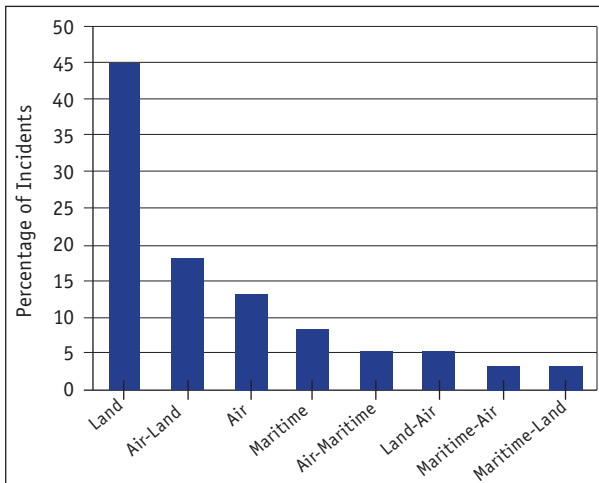


Figure 1: Fratricide Occurrences in 20<sup>th</sup> Century Conflicts

most cases, not only does fratricide affect the morale of the forces affected, it also affects the country. For every life lost in a conflict there is a family who must deal with that loss. Learning that their loved ones were killed by fratricide makes the loss even harder.<sup>4</sup> This could lead to people losing confidence in their armed forces. In 2003, Royal Marine Christopher Maddison was killed when his river patrol boat was mistakenly

fired upon by a Royal Engineers checkpoint in Iraq.<sup>6</sup> The coroner hearing his case mentioned that Maddison was let down by those in command and doubts were cast on the competence of the military leadership.

*“Human factor is probably the biggest reason for fratricide and it can be attributed to reasons such as combat stress, inadequate training, lack of experience or even negligence.”*

Fratricide is not a new problem and friendly fire occurs in all conflicts. US government reports show that friendly fire casualties as a percentage of total losses have increased from 15-20% in both World War Two and the Vietnam War to 24% in the First Gulf War, with little improvement since then in both Iraq and Afghanistan.<sup>7</sup> While precision weapons improve accuracy and somewhat mitigate the risk



Wreckage of Black Hawk helicopter shot down by friendly fire in the Northern Iraq No Fly Zone during Operation Provide Comfort, 1994.



*LAV-AT Destroyed by Friendly Anti-Tank Guided Missile*

of collateral damage, this advantage is of little use in cases of mistaken identity. Many fratricide cases remain unreported due to fear of the consequences.

In late 2011, Associated Press reported a recent engagement in Afghanistan where NATO helicopters responding to a joint US-Afghan special operations team under militant attack erroneously struck two Pakistani military posts, resulting in 24 deaths.<sup>8</sup> The report quoted US officials suggesting that “the Taliban may have deliberately tried to provoke a cross-border fire fight that would set back fragile partnerships between the US and NATO forces and Pakistani soldiers at the ill-defined border.”<sup>9</sup> This example clearly illustrates the far reaching consequences of fratricide from IFF mistakes.<sup>10</sup>

### Causes Of Fratricide

Fratricide is largely attributed to factors such as human error, environment and technology. “Human factor is probably the biggest reason for fratricide and it can be attributed to reasons such as combat stress, inadequate training, lack of experience or even negligence.”<sup>11</sup> During conflicts, one of the most uncontrollable factors is the environment. There are many aspects of the environment that can increase incidents of fratricide such as limited visibility due to nightfall or a heavy downpour, or even disorientation caused by featureless terrain. Advances in technology have led to the increase in the speed at which weapons operate, reducing the reaction time: “in some cases the effective range of the weapons is better than

the ability to identify friend or foe.”<sup>12</sup> The increased technology available in the battlefield also leads to an increase in potential for equipment malfunction. With the increased lethality of armament used, equipment malfunction can be deadly.

The “Fratricide Avoidance” handbook from the United States Army has also cited the following as primary causes of fratricide:<sup>13</sup>

**Inadequate Fire and Manoeuvre Control.** This is due to units that “fail to disseminate the minimum necessary manoeuvre and fire control measures to coordinate activities on the ground and in the air (air-ground integration).”<sup>14</sup> Inconsistent understanding of control measures also contributes to friendly fire: “situation clarity decreases as the density of forces increases, especially when units operate without proper dispersion and spatial separation.”<sup>15</sup>

**Direct-Fire Control Failures.** This is where “defensive and particularly offensive fire control plans are not developed or fail in execution. Some units do not designate target reference points, engagement areas, and priorities—or fail to adhere to them. Units fail to tie control measures to recognizable features. Weapons positioning can be poor and fire discipline can break down in contact.”<sup>16</sup>

**Land Navigation Failures.** In certain cases, land navigation failures can happen: “difficult terrain or weather and visibility can hamper navigation, which

may cause units to move out of sector, report wrong locations, become disoriented, or employ fire support weapons from wrong locations. As a result, friendly units may collide unexpectedly or be erroneously engaged."<sup>17</sup>

#### Reporting, Crosstalk and Battle-Tracking Failures.

Erroneous reporting, crosstalk and battle-tracking failures are other significant causes: "commanders, leaders, and their command posts at all levels often do not generate timely, accurate, and complete reports or track subordinate locations as the tactical situation changes. Commanders and staff are unable to maintain situational awareness, which distorts the picture at each level and can increase the risk of danger close."<sup>18</sup>

**Known Battlefield Hazards.** Ideally, battlefield hazards should be visibly marked. Unexploded ordnance, unmarked and unrecorded minefields, debris from rounds, improvised explosive devices, and "booby traps" will be on the battlefield. Failure to mark, record, remove, or otherwise anticipate these threats leads to casualties.

**Positive Identification.** In reality, positive identification is rarely obtained. Vehicle commanders, gunners and close air support pilots have difficulty distinguishing between friendly and enemy thermal and optical signatures at long range.<sup>19</sup> Also, "during limited visibility, or in restricted terrain, units in close proximity can mistake each other for the enemy when faced with short engagement windows and decision times."<sup>20</sup> This problem is compounded when the enemy and allies are similarly equipped. Visual recognition is often the only way to determine friend or foe.

**Other Causes.** "Lapses in unit and individual troop discipline or violations of Rules Of Engagement (ROE) procedures contribute to out of sector engagements, unauthorized discharges, mistakes with explosives and hand grenades, charge errors, incorrect gun data, and similar incidents."<sup>21</sup>

## EFFECTS OF FRATRICIDE

Fratricide has significant effects on the combat readiness and effectiveness of the personnel and units involved. It can also have a psychological impact

on the soldiers and stir public dissent. The public does not expect friendly fire casualties to occur and finds them hard to accept or understand.<sup>22</sup> With the increase in social media usage such unfortunate incidents can be speedily reported and even blown out of proportion. In the midst of a conflict, public demands for investigations and explanations could lead to unintended complications.<sup>23</sup>

There is little doubt about the psychological impact of friendly fire casualties. Some possible effects in soldiers are the loss of aggressiveness during fire and manoeuvre, loss of initiative, possible hesitation to use supporting combat systems, hesitation to conduct operations in limited visibility and self-doubt among the leadership.

In addition to the effects felt at the tactical level, effects felt at the strategic level may include disrupted operations, over-supervision of units as well as a general degradation of cohesion and morale.<sup>24</sup>

## ESTABLISHING IFF AND COMBAT IDENTIFICATION INITIATIVES

From the aforementioned, the detrimental effects of fratricide cannot be over-emphasised. Analysing the considerations, objectives and various IFF technologies are vital to overcoming fratricide. They are discussed in the following section.

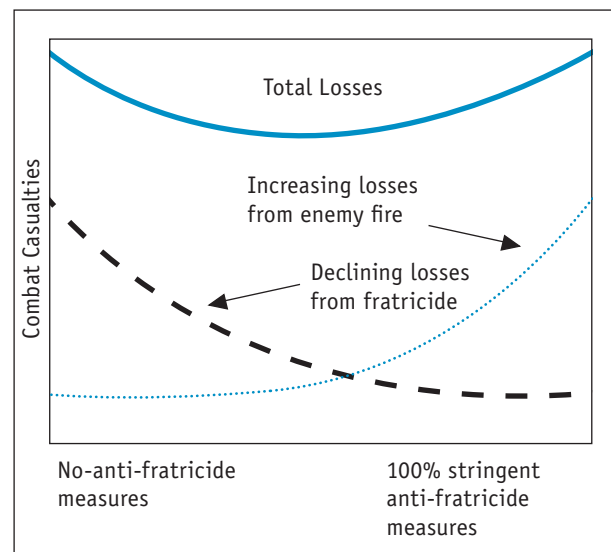


Figure 2: Combat Casualties vs. Anti-Fratricide Measures

## Considerations

To totally eliminate fratricide is unrealistic and counter-productive. There is a need to balance combat effectiveness versus anti-fratricide measures. Putting too much emphasis on anti-fratricide measures may reduce combat effectiveness to the point where casualties inflicted by the enemy become greater than reducing friendly fire losses, as shown in Figure 2. Therefore the objective should be on reducing fratricide through effective IFF capabilities, rather than total elimination of fratricide.

There are three main components as part of a system-of-systems approach that are pertinent to establishing IFF and combat identification issues which are further explained below:<sup>25</sup>

**Tactics, Techniques and Procedures (TTPs).** We can improve upon existing Tactics, Techniques and Procedures (TTPs). Doctrines and Standard Operating Procedures (SOPs) are part and parcel of IFF measures. These measures will have to evolve with new technical solutions. In addition, adherence to TTPs is critical for effective IFF. In fact, it has been described that fratricide prevention is like a three legged stool with TTPs forming the three supporting legs.<sup>26</sup> One such documented change in the procedures of the US Army includes After Action Reports (AARs) that address fratricide.<sup>27</sup>

**Target Identifications (TIDs).** Target Identification (TID) is another area which can be re-examined. This is a technical solution that aims to positively identify, with a high degree of confidence, any potential target in the battlefield. The primary objective for TID is to correlate and assign a foe, friend or neutral identification label to a “target.”<sup>28</sup>

**Situational Awareness.** Timely and better Situational Awareness in addition to “seeing” red, blue and grey icons will allow better understanding of the battlefield situation and hence make better decisions on actions and movement in the battlefield. This would reduce scenarios of being caught in a fratricidal situation. A study conducted by the RAND Corporation involving 83 direct fire battles and 15 task forces demonstrated that good situational awareness at the lowest level is the key to preventing the majority of fratricide.<sup>29</sup>

## Objectives

With the aforementioned considerations in mind, the objectives in establishing IFF/combat identification initiatives can be further elaborated. One of the main objectives would be situational awareness from the strategic level down to the tactical level to ensure positive identification among one's own forces. It is also important to secure the operational security of IFF technologies and SOPs as it would be extremely detrimental if such information were to fall into the hands of an adversary, enabling positive identification of all the blue forces.

Another important consideration is cost effective solutions. A pitfall in establishing IFF solutions is that they are being promulgated to only a section of the armed forces. Moreover, teams implementing various IFF solutions do not communicate with each other. Thus, cost is critical as you would need to promulgate it force-wide. Finally, another effect is the intangible effects of hesitation during operations that may be exhibited by blue forces.

Choosing an IFF solution is a complex problem involving trade-offs in performance, covertness, cost and many factors. Finding a single solution seems to be an insurmountable task.<sup>30</sup> IFF solutions should also be solutions for the long haul and quick fixes should be avoided. That being said, there is a need to consider the following in choosing an IFF solution:

- a. Simplicity (Size, Weight, Mountable, Hand-Held).
- b. Vulnerability (Exploitation, Countermeasures).
- c. Cost Effectiveness.
- d. Day/Night and All Weather capability.
- e. Identification level (Friend, Foe, Neutral).
- f. Interoperability (Joint level, Platform to Soldier).
- g. Extent of changes (TTPs, Training, Doctrine).
- h. Coverage (Maximum Distance Covered, Orientation).

## IFF TECHNOLOGY COMPARISON

There are several IFF technologies used by different armed forces in the world and for a range of one to ten kilometres. The common ones are listed below:

The interrogation/response system utilizes either Radio Frequency (RF), radar or laser signals to identify friend or foe over a long range of distance (five to ten kilometres) through the “process of query and response.” This can be classified as cooperative target identification technology. The technology requires special apparatus to send, respond to, and receive secured signals. The cost needed to deploy universal protection on each soldier using such an IFF system is high and the additional load on the soldier carrying the system may result in constraints during war fighting.

The passive signalling device is a non-cooperative identification technique where no action or response by the target is needed. This method utilizes materials that absorb or reflect Infrared Radiation (IR) that can be observed by optical devices such as night vision goggles, binoculars and thermal images as dark or bright spots respectively. Commercially available products include IR paints, tapes, and identification panels with unique signatures to ensure that the shooter can discriminate between friend and foe at a distance. This technique is an inexpensive enabler for target identification that does not require additional power to operate and can be easily implemented as no additional apparatus is needed other than the existing optical and thermal devices. However, this implies that it can also be viewed by enemy forces if they possess comparable sensing devices.

Otherwise, there is the active signalling device. This is also a non-cooperative identification technique. However, the device transmits electromagnetic signals (from the visible to IR range) that are usually coded to reduce the risk of compromise. Commercial products include IR beacons based on microelectromechanical (MEMS) technology which sends pulsed signals up to ten kilometres away. Another proposed technique uses chemicals to generate a variety of lights from the visual spectrum to IR wavelengths for visual identification when stimulated by ultraviolet lasers. The operational range of Visual-IR-based IFF is influenced by the atmosphere. The presence of moisture, fog or haze will affect the effective range of propagation of IR; visible signals and visual wavelengths are more affected by such factors than IR radiation. However, an advantage of the device which generates chemical lights is that it does not require power for operation, whereas

the IR beacon is battery operated. However, this group of IFF technique can be viewed by night vision equipment and is ineffective if the enemy carries night vision equipment.

## CONCLUSION

Fratricide continues to plague battlefields. The argument that modern warfare has increased the occurrences of fratricide is justified by the fact that significant number of incidents have occurred in the modern era. There is thus a need to pay attention to it and many militaries in the world are pressured to produce solutions.

Ultimately, friendly fire will probably never be eliminated. New technologies in situational awareness and combat identification play a part in a collective consensus to reduce the odds. However, more importantly, the interoperability between multi-nations has to be improved through better training, techniques and intelligence.

However, as shown, there are many trade-offs in establishing possible IFF and combat identification solutions which must be carefully balanced. There is no “silver bullet” solution to end all fratricide incidents and emphasis must be placed in marrying all the earlier mentioned areas to enable a holistic solution.<sup>30</sup> As aptly summed up, IFF and combat identification solutions should have the following in common: “... be simple, not easily exploited by enemy forces, cost effective, have a day or night all-weather capability and be deployable to coalition forces.”<sup>31</sup> This is a tall order but a necessary one.

In the SAF we need to ensure that IFF is taken seriously. Apart from SAF's increased participation in peacekeeping operations, the advancement in weaponry has made modern warfare more dangerous and has raised the requirement for integrated fighting strategies involving the Land, Sea and Air forces. Integrated fighting strategies could possibly increase the probability of friendly fires. As such, it may be necessary for the SAF to ensure non-fratricide through learning from past lessons experienced by other armies as well as harness IFF initiatives that may be relevant for use. 🌐

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# Operational Learning: The New Relevancy For Knowledge Management In The Singapore Armed Forces

by SLTC Karuna Ramanathan

## Abstract:

This paper conceptualises the issues involved and possible enhancements to shift existing systems, processes and practices in order to address operations learning within the Singapore Armed Forces (SAF). It will specifically discuss how the SAF's early investments in knowledge management, leadership development and organisational learning need to come together to harmonise the systems, process and practices in order to to systematise operations learning.

*Keywords: Operations Learning; Knowledge Management; Organisational Learning; Leadership Development; Third Generation SAF*

## INTRODUCTION

Most Knowledge Management (KM) initiatives in organisations do not take off because they are not situated within identified business drivers. The new relevancy for KM in the SAF is in operational learning. One of the identified challenges for the SAF is for Commanders to consciously establish rapid operations learning cycles and to inculcate operational imagination in their decisions and planning processes. At the leader level, operational learning is the capacity to make conscious decisions, arising from the ability to process information and sense make based on data and knowledge. Such decisions combine experience with observations, insights and lessons



*Learning as Individuals and Teams*

learnt within teams. At the system level, operational learning is about integrating lessons learnt into exercises in order to better prepare ourselves. This is the knowledge management problem facing the SAF. To realise operational learning, it is important to shift from a traditional training emphasis to training for operations. This requires training and exercises specifically designed to help us better prepare for operations.

This paper provides a discussion of the issues involved and the possible enhancements to shift existing systems, processes and practices in order to address operational learning. It will specifically discuss how the SAF's early investments in knowledge management, leadership development and organisational learning need to be harmonised to systematise operational learning.

## SHIFTING FRAMES

**From Perceptual to Perpetual.** Change is the new reality for the SAF. The ability to read and respond to changing environments and conditions is now a demand placed on command, leadership and management in the SAF. While our officers intellectually understand the need for change, the dynamic environment requires that we become increasingly comfortable with perpetual change. Here is where the intellectual,

the affective and the emotive need to be better balanced. While we understand the need for change, we might not see it as a fundamental effort requiring a commitment from us in shifting our consciousness to acquiring new skills and adopting new beliefs. To move from merely observing and discussing change, we need to participate and empower change on the ground. We need to move from the individual to the collective. In short, we need to start acting as leaders who steward change. Knowledge creation takes on a whole new meaning when we acknowledge that change drives knowledge, together with the traditional notion of knowledge driving change.

#### **From Surface to Depth.**

The training and education system in Singapore is built on academic excellence that promotes *just-in-time* knowledge. We develop capacities to be able to skim and superficially learn something for the moment, and this *just-in-time* assumption is valid only when knowledge is available. What is increasingly required are skills, actions and habits that enable learning in context, not just for content. Double and even triple loop learning, includes inculcating reflective practices within ourselves and in those whom we lead. Cultivating reflective learning will help Commanders harvest insights, and more importantly, underpin operational learning. Insight is the essence of lessons learnt as individuals, teams and ultimately the SAF.

**From Coping to Adapting.** What we regard as the *fight fire syndrome* is an ad-hoc coping mechanism; we consciously become better at the task as we gain experience. However, we sometimes trivialise issues in order to achieve the desired outcome without attending to the signals along the way that might provide opportunities for greater insight. In the old economy, this was acceptable, given the buffers and checks we could afford at various stages. In the new environment, characterised by complex systems, we are required to acquire a deeper understanding of system dynamics. In order to better manage uncertainties, the SAF training and education approaches must progressively address information processing and sense making skills.

*Change is the new reality for the SAF. The ability to read and respond to changing environments and conditions is now a demand placed on command, leadership and management in the SAF.*

## **EXISTING SYSTEM APPROACHES**

**Knowledge Management (KM).** We can spend countless hours debating over our knowledge management abilities, the merits of Web 2.0, their perceived distractions and security risks. However, the brutal truth is that we are nowhere nearer to knowledge management in the SAF than we were a decade ago with the virtual registry. If we still cannot find what we are looking for, and cannot identify who-knows-what within our organisation, the problem might not be with knowledge sharing, but with the design and implementation of KM transfer systems, processes and practices in the SAF. Only when we have confidence in a robust KM system will we be able to utilise it to create, transfer and integrate knowledge. The issue with operational learning is not with capturing and storing knowledge—but with creating new knowledge. Such knowledge also resides in the heads of those who experience it on the ground during operations. The ability of our KM systems to support us in knowledge creation, transfer and integration will promote a better attitude towards the management of uncertainties. However, we need to move out of the registry mindset and transfer the responsibility for KM systems design to operational communities, through lessons-learnt frames, and leverage on institutions such as the Army Center for Lessons Learnt (CALL) and SAF Center of Operational Learning (COL).

**Leadership Development (LD).** Military leaders inevitably shape opinions, attitudes, values and ideas in the people they lead. We have made considerable progress in raising the awareness and understanding of the SAF's leaders across all levels of the need to build individual skills such as coaching, facilitation and reflection. These skills enable us to better engage those whom we lead and to perceive issues from their perspective. Through its partnership efforts with the Services, the SAF Center for Leadership Development (CLD) is beginning to grow these skills into sustainable action on the ground. Such “practice fields”

are supported by processes such as the Individual Development Process (IDP) and the Action Learning Process (ALP), which convert skills into practice in training and exercises. When deployed into ops, these skills strengthen insight formulation and generate lessons learnt.<sup>1</sup> These skills form the true bedrock of operational learning.

## *The issue with operational learning is not with capturing and storing knowledge—but with creating new knowledge*

**Organisational Learning (OL).** The SAF has been at Organisational Learning for the last five years. Nominated senior officers are placed in change agent roles in order to foster new approaches to thinking and doing. These programmes have addressed fundamentals such as examining life's purposes, understanding mental models, building personal mastery and seeking system thinking. The programme builds individual capacities and provides a language for bringing about necessary changes for one to lead a life of purpose and significance in the SAF. However, based on anecdotal evidence from several graduates, the demands of the mainstream scuttles all well-intended initiatives that these graduates might deploy on the ground. In its current frame, the OL programme is limited in ground implementability. But it remains promising as a driver for understanding change with the potential to build enduring practices for learning. Hence, the overarching KM system needs to be positioned as an enabler, not as the source or the driver, for such learning to be transformed into knowledge. This means that the system cannot be built without first understanding the needs, styles and knowledge seeking behaviours of different learner groups.

## **SOLUTION SPACES**

**Management of Uncertainties.** The SAF's future leaders are adaptive leaders who are comfortable with complexity and uncertainty. Operational learning and KM should reflect this new mental model. Instead, we are caught today in a reality that often turns into dreary meetings, seeks agendas, minutes and action item tracking. In major exercises, most



*The Adaptive Leader: Psychological Resilience and Self-Confidence when facing uncertainties*

officers routinely engage in ops analysis and churn out numerous drawer plans. Generally, we are trained in risk minimisation. However, in our management of uncertainties, we should cultivate the necessary conditions for decision superiority. We must move our planning approaches away from linear and rationally structured, step-by-step time based iterations, to one that allows intuitively patterned frame-based actions capitalising on insight based information superiority. Operational learning and KM go hand-in-hand to ensure that the future leader is able to be adaptive, and has the requisite openness for deep self reflection.

**Rapid Operational learning Cycles.** We are not alone in the desire to learn rapidly. In the Vietnam War, the Americans realised that learning before, during and after any experience considerably shortened learning-cycles. CLD has started out with the ALP effort to design the Unit Training System (UTS) for learning outcomes in the Army Training Institutes. In the process, CLD and HQ Training and Doctrine Command (TRADOC) are attending to knowledge management at the Battalion level (Battalion KM). Over time, these seed efforts will allow CALL and COL to evolve into important institutions that will be key nodes in the systematisation of operational learning.

**Inculcating Operational Imagination.** This is probably the hardest to do because we train and educate our people to seek Commander guidance (CPG) and plan based on operational analysis and precedence. Therein lies the burgeoning worry: weak situational awareness detection capabilities. The Collective Appreciation of Situation (CAOS), deliberately designed to be logical,

is paradoxically limiting. Operational imagination tends to be subdued by rational objectivity. Such objectivity, while necessary from a time management point of view, is also responsible for goal fixation. In simple terms, we are restricting imagination by our very own processes. We need to attend to building the capacity for insight and apply this to our strategy, which in turn supports operational learning.

## SHIFTING THE SYSTEMS

**Knowledge Management (KM).** As the SAF starts to participate in more operations to gain experience and knowledge, we will need to design systems to support operational learning. This will involve building logic loops for knowledge search and transfer, and a search and retrieval logic based on user requirements rather than the current document-based system. Such a KM system will build confidence in our commanders and war fighting teams. It will also promote operational imagination and innovation in applying lessons learnt to new threat scenarios. If we know what went on before and what was learnt earlier, we will be able to position ourselves to face future challenges. Here there are two real problems on the ground. First, people cannot find what they are looking for, resulting in poor confidence in the current system, and second, our people's hesitance to share their thoughts openly. The second problem is due in part to the acute sense of hierarchy, which must be mitigated if our people are going to learn as individuals and teams. To manage such vertical stresses, there is an increasing need to find a useful way to build, tell, write, use, store and retrieve stories in the form of narrative knowledge. Such a KM system allows managing uncertainty to be accepted as a form of managing by discovery, akin to our "Google" experience. This experience needs to be based and built on operational learning logic loops that push and pull between lessons learnt, disseminate into curriculum and doctrine, and are supported by technology for better accessibility. This considerably shortens the learning loop and seeds the senior leader capacity for strategy formulation based on operational learning. As we mature in these efforts, we should develop narrative databases from which we can pattern references for strategy formulation.

*In the larger scheme of things, the SAF Battle Planning Process should be reviewed to better accommodate operational imagination.*

**Leadership Development (LD).** CLD is now at a stage where ground implementation requires clear partnering efforts in process design and continued system support for basic skill building, especially in reflective practice. There will be continued efforts to balance research with implementation—but the point of the matter is that the skills such as coaching, facilitation and reflection require specifically designed processes, such as the Individual Development Process (IDP), Action Learning Process (ALP) and Competency Based Learning (CBL), which in turn must sit within the larger mainstream entities such as Human Resource (HR), Operations and Training systems respectively. When we manage to do this, we arrive at practice fields, which includes habit forming actions. In the years ahead, CLD will be able to shift into a more mature frame of providing systematic feedback and assessment of effort to management on behavioural trends. In the larger scheme of things, the SAF Battle Planning Process should be reviewed to better accommodate operational imagination. Some of the conceptual models earlier experimented by Future Systems Directorate (FSD) (sense making), Joint Operations Department (JOD) (Effects Based Operations) and Training and Doctrine Command (TRADOC) (System Reframing) could provide input for an effective review effort. CLD has just completed an in-depth study on what would be required to build adaptive leaders. Some of these constructs provide useful input for the review ahead.



*Exercise Forging Sabre*

**Organisational Learning (OL).** Senior Officers who have had the benefit of attending previous programmes provide a critical mass with the capacity to bring about change in beliefs and attitudes. These officers should be stewarded at the SAF level through CLD as an extended network that will build awareness and understanding towards change, through the continued application of Organisational Learning (OL) tools and frameworks. The Joint Training Hub should leverage on this group of Senior Officers, while the current programme should extend to Warrant Officers and Senior MDES, allowing further contextualisation to be applied. This network of change agents should be supported by a web-based training and education system that will house OL tools and frameworks, enabling graduates with ready access to resource packages. CLD's development of the 31 LD and 24 OL packages on the LEARNET are a good start. However the effort must not just center on promoting tools and frameworks. It should instead use these tools and frameworks as a means to build stronger belief systems, self-awareness, self-management, and personal mastery. Doing this will take us several steps closer to building psychological resilience and self-confidence when facing uncertainties.

## CONCLUSION

Clearly, the more fundamental aspects of the transformation that the SAF requires are only starting to emerge. When we manage to address these issues on the ground, we will be in a more confident position to manage uncertainties, inculcate operational imagination and build capacities for rapid operational learning. This will require us to harmonise knowledge management, leadership development

and organisational learning to arrive at training for operations, thus allowing us to promote operational learning across all levels in the Third Generation SAF. 🌐

## ENDNOTES

1. The phrase "Practice Fields" is coined by Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (NY: Currency/Doubleday, 1990) and *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization* (NY: Currency/Doubleday, 1994).



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# Takeaways From Business School For The SAF

by COL Frederick Chew

## Abstract:

There are three areas of Business School insights we can apply. The first includes finance, economics and accounting. This is followed by strategy, marketing, organisational behavior and operations management. The third bucket includes human resource, leadership and organisational transformation. This article will go through some of the above areas and leverage the material from these disciplines to comment on some of the challenges we face in the Singapore Armed Forces (SAF).

*Keywords: Leadership and Organisational Development; Homophily; Performance, Experience, Learning (PEL) Model; Pareto Principle*

## INTRODUCTION

Imagine you are interviewed by the Chief Of Defence Force (CDF) and the Service Chiefs one day, and they ask you for your top priority change item in the Singapore Armed Forces (SAF); what would your answer be? Would it be an armed force structural change? A Leadership and Organisational Development (L&OD) change? A Human Resources (HR) change? A business process change? An organisational design change?

### Aim

I think that it is hard to answer the above question, for the simple reason that the SAF is a very complex system. The SAF is characterized by an intricate web of inter-relationships and inter-dependencies among its constituent parts. While there may not be a single winning answer to that question, there are various lines of inquiry that may yield useful insights for the SAF's ongoing transformation journey. I sincerely hope that this essay will illuminate some of the underlying challenges that the SAF is confronting, and that this essay will enrich the ongoing "generative conversation" (the first "leg" of Daniel Kim's 3-legged stool for Organisational Learning) on how to catapult the SAF from a good to great organisation (in the words of author Jim Collins), one that can sustain mission success well into the future.<sup>1</sup>

Let me say upfront that I cannot overemphasize the pride I feel in and the confidence that I have in the SAF. For its size, it is an impressive organisation. We have every right to be proud of our past, secure in the present, and confident about our future. That said, we must not rest on our laurels, and let *good* get in the way of *best*. To this end, it is important for servicemen and servicewomen in the SAF to have mature discussions on issues that affect us and the organisation, individually and collectively. When we care enough, we will inevitably discuss and debate. We do not always have to agree on everything. In fact, candid introspection and the ability to accommodate a variety of viewpoints can only make ONE-SAF stronger over the long run.

*It is not my intention to prescribe solutions, in part due to the space constraints in this essay.*

Given that I have just completed the Stanford Graduate School of Business' Sloan Programme, let me approach this inquiry through the lens of a business school. By way of background, let me first describe the core components of a business school program. Broadly speaking, there are three buckets of skills that we learn. The first includes finance, economics and accounting. This is followed by strategy, marketing, organisational behavior and operations management. The third bucket includes human resource, leadership and organisational transformation.

## Methodology

My methodology will be to go through some of the above disciplines and leverage the material from those disciplines to comment on some of the challenges we face in the SAF. It is not my intention to prescribe solutions, in part due to the space constraints in this essay. Rather, I would like to throw up questions for reflection. At this juncture, I should state categorically that I do not believe in blindly emulating management fads. In fact, I think that is something we will do well to guard against; the SAF is not a private company. Lessons from the corporate world should never be applied to the SAF in a sweeping fashion. However, there are clearly some gold nuggets in the world of management academia and corporate practice which can serve us well in the SAF if properly adapted. In addition, I should make a big caveat up front: it is nigh impossible to be utterly comprehensive and balanced, or to give the fullest treatment to each of the issues I address. What I will try to do is to address the nub of the issues in a generalised manner within the space constraints. Undoubtedly, one year of business school does not make me an organisational expert. I am well aware that there are many others in the SAF who have considerably more organisational leadership experiences and deeper understanding of the organisational complexities the SAF faces. As such, I ask readers to allow this author some latitude.

In terms of my background, I have held appointments in the Defence Policy Office and the Military Intelligence Organisation, besides Naval ones. My observations do not derive from any one posting or from any particular department or formation within the Ministry Of Defence (MINDEF) and SAF. They reflect impressions that have aggregated over my years of service.

## ORGANISATIONAL BEHAVIOUR

### How affected are we by personal and group cognitive biases?

Have you noticed how easy it is at times to fall into the trap of recruiting people who are *like us*, whether into our units or project teams? The bestselling book *Influence – Science And Practice* gives an account of how “customers were more likely to buy insurance

when the salesperson was like them in age, religion, politics, and cigarette-smoking habits.” Furthermore, a researcher significantly “increased the percentage of people who responded to a mailed survey” by changing one small feature of the request—the name of the survey-taker to closely match the name of the survey recipient. For example, Cindy Johanson (survey-taker) writing to Cynthia Johnson (survey recipient).<sup>2</sup> This phenomenon is known as **homophily** (“love of the same”).

Research in the field of cognitive psychology points to the strong existence of **confirmation bias** (skewed sampling of data points, or “situating the appreciation” in military parlance), **default bias** (maintaining a commitment to a previously announced position even when the situation has changed), **overconfidence** (supervisors in the top rungs thinking that their intuition is superior to workers on the ground who actually have the better picture), or **risk-seeking** behaviour induced by improper mission framing.<sup>3</sup> In the case of the latter, the National Aeronautics and Space Administration (NASA) stood to lose hefty contracts and worse still, disappoint an entire nation, if it did not launch the Challenger Space Shuttle in 1986. This internal pressure to achieve mission success led to the eventual failure of multiple layers of safety checks and balances, resulting in a tragic disaster.

Elaborating a little further on confirmation bias, humans tend to collect only small samples of information, one reason being that they believe they already have adequate information in their memory banks. Furthermore, humans tend to remember information that is easily available, which has come to our attention before and they also attach more weight to vivid evidence. On risk-seeking behavior, humans tend to make overly **optimistic assessments, especially when decision making is performed by a group**. For example, project timelines are usually busted.<sup>4</sup>

There appears to be many applications here for the SAF. For one, units within the SAF with their natural “can-do” spirit need to be aware of and actively guard against a natural tendency towards

risk-taking that manifests itself in large groups. Like it or not, there is a bias towards acting heroically and “macho” in a military environment. Moreover, there may be a perceived lack of incentives for our people to be the bearer of bad news. Another application is the need to put institutional safeguards, or “cognitive repairs,” in place to mitigate group-think at all levels of the SAF. I have worked with effective commanders who intentionally make it a point to solicit divergent views (to the extent of deliberately designating a devil’s advocate).<sup>5</sup> However, that is easier said than done. It takes strength of character for a superior to reverse his decision on the presentation of new facts. It takes patience and a non-threatening leadership style to encourage dissenting views to float up in the first place.

How can we apply the above learning in other fields like performance evaluation? Research indicates that managers are highly susceptible to the “halo effect,” where a subordinate who has scored a good impression with a superior at the outset is somehow perceived to generate high quality work years after, even when objectively speaking the work produced may not be of high quality. Separately, the homophily bias causes supervisors to rate subordinates who are similar to them more highly.<sup>6</sup>

Constantly asking probing questions is a very effective form of cognitive repair. One technique used by Toyota to identify root causes (as opposed to face-value ones) is known as the “Five Whys.”<sup>7</sup> It is vital for an organisation to institute procedures and routines that can perform as “auto-stabilisers” to keep the group decision-making process bias-free. I personally feel that the Learning and Organisation Development (L&OD) movement within the SAF has contributed significantly to furthering collective awareness of such biases and should continue to extend its reach within the SAF.

## On Making Mistakes And Its Correlation With Long-Run Success

*“A good research man failed every time but the last one.” “You must analyze each failure to find its cause ... You must learn how to fail intelligently. Failing is one of the greatest arts in the world. One fails forward towards success.”*

– Charles Kettering, Head of Research for General Motors, 1920-1947<sup>8</sup>

In my days as a junior officer, I vividly recall an encounter involving a senior commander who has since left the SAF, which has remain etched in my memory, even more than a decade after. My commanding officer and I were providing a brief on a recently concluded joint exercise. During a gunnery serial in that exercise, a foreign ship registered zero hits on the surface target. Republic Of Singapore Navy (RSN) ships involved in that same serial were diligent in scoring a decent number of hits on the target. I highlighted in my report that the gunnery officer of the foreign ship had explained during the debriefing that his ship was experimenting with different firing modes and distances during that serial, which accounted for the zero hits. The above senior commander exclaimed emphatically that that the gunnery officer’s explanation sounded like an excuse for poor performance. He then directed my commanding officer and I to spread the word that he expected RSN ships to continue turning in excellent results for gunnery serials at future exercises.

The twist in this story was that the foreign ship was actually firing at almost twice the range of the RSN ship. Of course, the closer to the target, the higher the probability of hitting it. Perhaps the foreign gunnery team was truly experimenting. Generalising from this example, the foreign ship exemplified one end of a performance philosophy spectrum, in which it was primarily concerned about experimenting and long-term learning. My ship exemplified the other end of the spectrum: immediate performance and a strong

*The question for us therefore is: what is the right Performance-Experience-Learning (PEL) balance point for SAF units in our various training exercises and operations?*



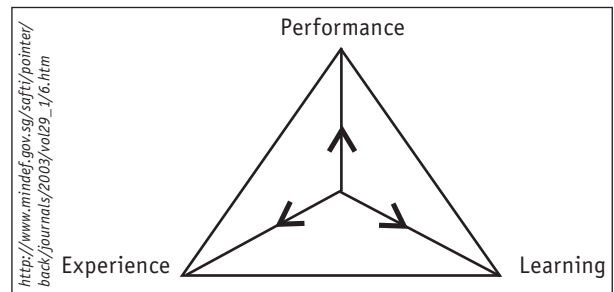
deterrence effect. **The question for us therefore is: what is the right Performance-Experience-Learning (PEL) balance point for SAF units in our various training exercises and operations?**

A second vignette. A few years ago, a very respected foreign officer was having a farewell dinner with some SAF officers following a very successful tenure in Singapore. When asked whether she had any frank advice for the SAF, she spoke about how she admired the SAF greatly. Having known her for a number of years already, I considered her a good friend of the SAF and one comfortable with speaking to us frankly. When pressed to identify at least one area for improvement, she observed that the SAF tended to be overly concerned about success and the avoidance of mistakes. She made the point that sometimes, one learns more through mistakes than through success.

Taking a leaf from the Silicon Valley Entrepreneurship 101 textbook: it is a Standard Operating Procedure (SOP) for Venture Capitalists (VCs), when assessing an entrepreneur that is requesting funding, to look at his track record. In particular, VCs focus on whether the entrepreneur has had past failures and how he rebounded from them. The rationale here is intriguing: entrepreneurs who have failed in the past are likely to have pushed the boundaries and stretched themselves in the process, as opposed to just taking the well-trodden path. VCs recognise that failing “positively” can yield a treasure trove of learning. Failure inculcates resilience too, in those who pick themselves up and press on.

There is an obvious conundrum here for the SAF. Can the SAF truly afford to fail in any of its endeavours? At first pass, that is quite unthinkable, bordering on being heretical. We are trained to get it right, first time, every time. I must emphasise that I am not suggesting that the SAF should relax its high performance standards. I, for one, demand very high standards from those serving under and alongside me. However, putting on an introspective hat here, are we sometimes guilty of letting the good (spectacular short-run performance) stand in the way of the best (solid long-run performance fuelled by thoughtful experimentation and learning)?

**The challenge therefore lies in finding the sweet spot that optimizes the PEL dimensions.** I think many in the SAF will agree with me that much as we would like to, it isn't always possible to maximise across all three dimensions. Some things must give in in a three-dimensional optimisation process. Of course, safety cannot be compromised—one life lost is simply one life too many.



*Performance, Experience and Learning (PEL) Model*

I strongly believe we can do better to find optimal balance points that will increase learning, and even *experience*, for the SAF and our people. That is where good leadership can make a huge difference. Rather than be stuck in a “1” or “0” binary *modus operandi*, we should work out what we cannot compromise on and identify areas where we can afford more latitude to experiment. Should our people fail periodically, we should aim to make “productive mistakes” and derive insights on how things could work better for us in the future.<sup>9</sup> **Just as importantly, we need to develop the habit of querying success the same way that we query failure.** Sometimes, given how busy we are, we may pop the champagne bottle a tad too quickly, and move on to the next pressing assignment. It is paradoxical, but sometimes having a missile that hits the target on its first try may not be that good for our longer-term learning.

## OPERATIONS MANAGEMENT

### Little Things Add Up To Make A BIG Difference

*“I could leave our strategic plan on a plane, and it won't make a difference. No one could execute it. Our success has nothing to do with strategy. It has everything to do with execution.”*

*– Richard Kovacevich, CEO of Wells Fargo, 1998-2005.<sup>10</sup>*



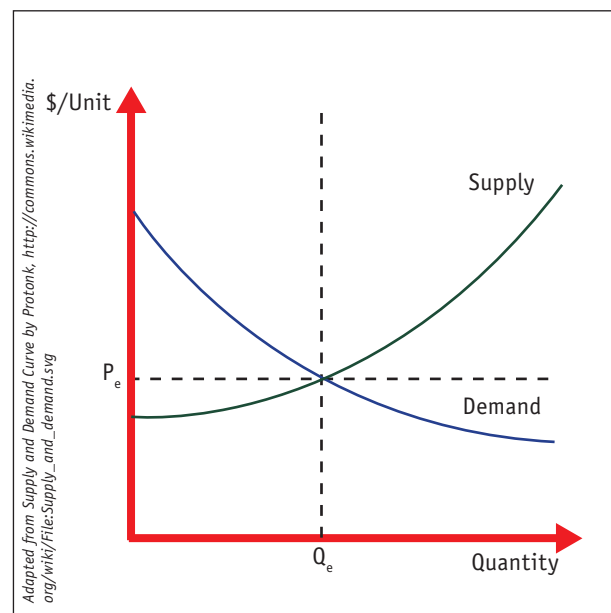
*Unlocking Brainwaves: Cultivating Insight and Critical Thinking*

During the Sloan programme's international study trip, my class had the privilege of meeting Mr. Koh Boon Hwee in person. Mr Koh had previously served as the Chairman of SingTel, Development Bank Of Singapore (DBS) and Singapore Airlines (SIA). His key takeaway for us was that **companies differentiated themselves not so much by big-picture strategising, but more so by nitty-gritty operational excellence.** He explained that in the airline industry, any strategic innovation that SIA introduced would be emulated by other airlines within a few months. That left operational excellence as the only sustainable source of competitive advantage for SIA. He cited the example of how newspapers onboard SIA planes do not contain the classified advertisements section. Although the weight savings for a single set of newspapers is insignificant, when that saving is multiplied by a few hundred copies on a plane, and further multiplied across the entire SIA fleet of a hundred or more planes, the annual fuel savings runs into the millions, just by trimming out classified ads.

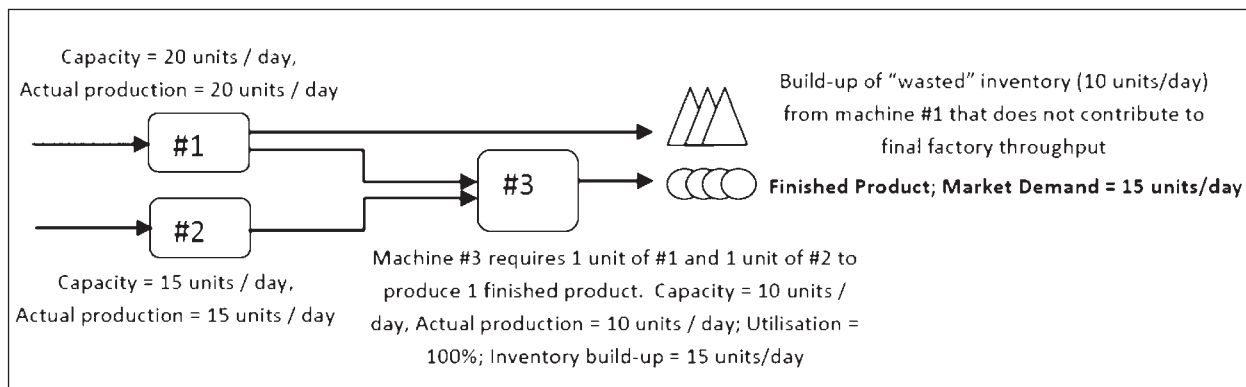
### A Powerful Concept – Matching Demand And Supply

Companies in the United States (US) regularly tap on expertise in academia for the latest operations research and management techniques, in their relentless pursuit of process improvement. Business school case studies are replete with real-world examples. For one, we studied how the layout in the restaurants of Japanese fast-food chain Benihana should be optimised, from the kitchen arrangement,

to how many seats there should be in the bar waiting area and main eating area, in order to achieve lowest overall waiting time for customers and maximal throughput for the restaurant. We also studied how distribution centres should be optimally set up for companies like Amazon (whether concentrated in one locality, or dispersed across various regions) in order to minimise the amount of total inventory Amazon has to carry, yet affording sufficient safety stock buffers at the same time. In addition, we studied the famous News Vendor model: if a magazine vendor had only one chance per month to make an order from his supplier, how many magazines should he order, given the likely monthly distribution (Gaussian Distribution) of customer orders? This model has myriad applications. For example, how many orders should an international ski jacket manufacturer like Sports Obermeyer place from its suppliers, and how far in advance? In this example, the tradeoff is between over-ordering too many pieces from sub-suppliers, which would leave Sports Obermeyer with left-over pieces that it would have to “dump” post-season, versus under-ordering, which might leave Sports Obermeyer with too few pieces to sell during the actual season, and thereby forfeit potential profits. As I was poring through these case studies, I realised there were many takeaways that would be useful for the SAF.



*Supply And Demand*



Factory Production Line

**The whole thrust of supply chain management is to match supply with demand.** This is an extremely powerful notion. If we look at the entire SAF as a production system (whether producing well-trained soldiers or well-maintained equipment), there are a lot of processes that ultimately simplify to "matching supply and demand," granted that characterising the SAF as a production system may be overly simplistic. A direct application of this principle would be to ask ourselves how often we should be ordering spares from OEMs (Original Equipment Manufacturer), and how much in each batch should we order, given the fixed costs associated with each order, and potential inventory holding costs if the order quantity is over-specified, as well as factor in potential opportunity costs if the order quantity is under-specified.

For a more sophisticated application of supply-demand matching, the central thesis of the best-selling operations management novel *The Goal: A Process Of Ongoing Improvement* by Eliyahu M. Goldratt is that

for a production plant to be successful, it needs to **maximise throughput, while minimizing inventory build-up and operational expense** (see below table for definitions). In addition, it should **balance its loading internally**, and not just have all its machines producing at their respective maximum work rates, in an uncoordinated pell-mell attempt to meet external demand. Consider the following simplified example of a factory production line.

You can easily see that the system bottleneck will be Machine 3, as it can only produce at 10 units/day. Let's assume that the external demand for a finished product is 15 units/day. The key question is whether the factory is better off if the machines in the system produce at their respective maximum capacity, or if the entire system produces at 10 units/hour (capacity of the bottle-neck). It turns out that if all the other machines were producing at their maximum capacity, there would be a tremendous build-up of inventory in front of Machine 3 due to excessive output from Machine 2, as well as excess inventory (depicted by the triangles) from Machine 1 that does not get converted into final throughput. Knock-on problems include inventory-holding costs as well as delayed diagnosis of machine failures. In the case of the latter, let us assume that a system monitoring station is placed just before Machine 3. If Machine 1 becomes defective and produces mal-formed output, the monitoring station will only discover this after the entire pile of excess inventory in front of Machine 3 is utilised to make the finished good. In the meantime, Machine 1 would hum along merrily producing even more malformed sub-units.

Term	Definition
Throughput	The rate at which the factory produces money through sales. If an inventory is produced but is <i>not</i> sold, that does not contribute to throughput.
Inventory	Money invested by factory in purchasing material to make things it intends to sell.
Operational Expense	Money spent by factory to turn inventory into throughput.

**While not immediately obvious, this outcome is actually worse off than having an internally-balanced factory system working at 10 units/day, with next to zero inventory build-up,** which is what Toyota's *Lean System* is all about. There is another drawback in the production system illustrated above: working a machine at maximum capacity is actually unsustainable. Rule of thumb: for a machine to produce maximally over the long-term, it should be operating at 90% capacity, not 100%.

Of course, that is not to say that the output of the entire factory is forever constrained by the bottleneck's capacity of 10 units/hour. Goldratt's famous *Theory of Constraints* calls for the management to constantly identify the bottleneck (the machine with the lowest work rate) and improve its capacity, through further infrastructural investments or robust maintenance. In our context, this could translate to boosting manning and promoting up-skilling at bottlenecks within the SAF. Goldratt argues against a factory spreading its resources thin trying to improve the capacity of every single machine all at the same time. The heuristic he advocates has proven empirically to be extremely powerful: the management should **focus its efforts on the (only one) current system bottleneck**. After clearing that one particular bottleneck, management should then move on to work on improving the capacity of the new bottleneck, which has just emerged.<sup>11</sup> (In the SAF's context, we probably do not have the luxury of working on one bottleneck at a time, sequentially. What we could do is to focus our resources on a handful of vital bottlenecks, and guard against spreading ourselves too thin trying to fix everything at the same time.)

Transposing this to the SAF, a few questions come to mind. Do we have a clear idea of where our overall system bottlenecks are? If so, are we resourcing those bottlenecks to increase their production capacity over the long term? Is the SAF matching the "market demand" of operations/exercises/high-profile events against its internal *supply* of resources? Or are there fundamental demand-supply mismatches, which require other solutions outside of the factory? Are there significant levels of "inventory" build-up in certain parts of the SAF? For example, do we see many workplan action items at the formation/department and sub-formation/department level, which consume a lot of time and energy, but do not lead to clear outputs and outcomes? Can we

say for certain that the intermediate work products of each and every department/formation are being systematically synthesised into the final desired "MINDEF/SAF factory throughput?" Are our resources (formations and departments across the SAF) working at  $\geq 100\%$  utilisation rates? If so, how sustainable is this over the long term?



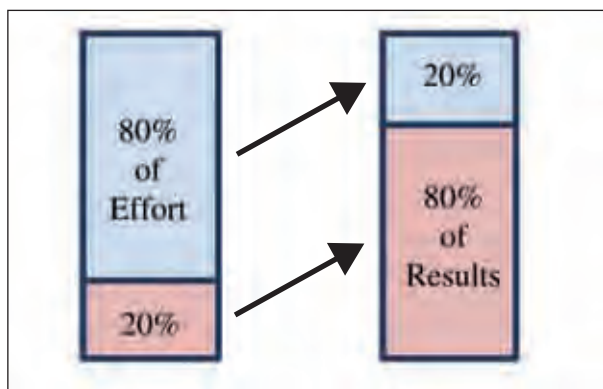
Assembly Line

Over the past few years, various breakthrough initiatives such as efforts at operations calibration and SAF recess windows have helped immeasurably in relieving pressure build-ups in the SAF's "production system." The question for us, going forward, is whether there are other bottlenecks, workflow unevenness and unwitting inventory build-up, that we have yet to address? Are there other perceived sacred cows that we have not put to slaughter?

### The 20-80 Pareto Principle

In many areas of life, it has been observed that 80% of the effects come from 20% of the causes. I think this applies to the SAF too. John Maxwell's *Developing the Leader Within You*,<sup>12</sup> gives various day-to-day examples:

Time	20% of our time produces 80% of the results
Products	20% of the products bring in 80% of the profit
Job	20% of our work gives us 80% of our satisfaction
Speech	20% of the presentation produces 80% of the impact



Pareto Principle

I would like to apply the Pareto Principle to the question of “when is enough effort, enough?” **There is a permanent tension between perfectionism and pragmatism.** Given our training to always produce excellent work in the SAF, we put in a lot of work doing rehearsal after rehearsal to get things functioning like clockwork. This is well and good and must be the case for major events like the National Day Parade (NDP), and major exercises and operations. **Notwithstanding those imperatives, leaders at all levels need to be aware of the extra effort incurred and be able to budget the concomitant costs in terms of time and physical resources.** The Pareto Principle stipulates that once past the 80% attainment level, there is diminishing returns to effort when trying to nudge the attainment level to 90%, or even 100%. Given that we all have a limited budget of daily time, energy and mental resource, this implies that leaders in the SAF need to be adept at assessing the *cost of effort* required to make an undertaking a knock-out success. My sense is that many of our initiatives are demand-driven—we like everything to be perfect; supply-side discipline does not always kick in. What do I mean? Once the order is issued, our people will obey as good soldiers and work overtime and burn weekends, even public holidays, to make things happen according to the standards stipulated actual or perceived. If these “full-throttle” occasions are well-spaced in time to allow sufficient re-generation, all is well and good. However, what happens in the hypothetical case where every department or formation across the SAF demands 100% attainment level for the myriad initiatives they are overseeing respectively? The serviceman on the

ground whose unit may be involved in multiple taskings by various formations, departments and services has to become a superman to fulfill all the demands placed on him or her but at what cost? At what cost to work-life balance? At what cost at times to leave schedules? At what cost to the passion our servicemen may feel for our flag and country? At what cost to our retention efforts?

I am by no means suggesting that we in the SAF should aim lower. What the Pareto Principle seems to suggest is that **there may need to be an ongoing rationalisation of the taskings and required attainment levels each of us metes out, in our respective spheres of influence.** Not only should we cross-check the “why” of the undertaking, but also examine the “how far to go” and “how much to put in,” and provide clarity for our subordinates, whose default mode may be to give 100% for every assigned task. Not every exercise or project requires our people to go for broke. Good leadership must be exercised to discern between the “need to have” and “nice to have,” between what requires *extra-ordinary* effort, and what requires only *ordinary* effort, between what appears urgent, and what is truly important. In fact, it is all the more important that we pace ourselves and conserve capacity, so that we can truly peak and give our 100% in critical missions and taskings. To the SAF’s credit, over the past few years, we’ve instituted the High Readiness Core (HRC) cum tiered readiness construct, as well as gone through several rounds of activity rationalisation, which have certainly been helpful in freeing up capacity for training, doctrine development, personal development and regeneration. We should keep this up.

## HUMAN RESOURCE MANAGEMENT

**HR policies for recruitment, retention and job satisfaction must be complementary for best results.**

SAS Institute, a North Carolina-based business analytics software company, is celebrating its 35th year since its founding in 1976.<sup>13</sup> Its track record is stellar: 35 years of consistent revenue growth. It is among the top few industry leaders. What makes this company’s performance eye-popping is that it has

one of the lowest turnover rates among Information Technology (IT) companies in the US – less than 5% a year over the past two decades, as compared to the 20% industry average. In 1999, Vice-president of HR David Russo said that “our perspective is that, although money is important, what people really want is recognition and a place they are proud to work ... if the work environment is somewhat toxic, pay holds people’s feet to the fire for only so long.”<sup>14</sup> **This statistic becomes all the more phenomenal, given that SAS pays significantly less than Silicon Valley competitors like Oracle.** It is the overall SAS package that is compelling: pursuit of creative ideas, strong emphasis on work-life balance, corporate social responsibility, childcare services, top-class recreation fitness centres that are open to employees and their families, on-site summer camps for employees’ children, comprehensive health insurance, comprehensive retirement benefits, enrichment classes, among other family-oriented benefits.

### *HR policies for recruitment, retention and job satisfaction must be complementary for best results*

Let’s look at another example: Silicon Valley company IDEO. IDEO is a leading global design and innovation consultancy. It provides creative and low-

cost designs for products, services, environments, and digital experiences. The firm distinguishes itself as an expert in the process of “design thinking.” This entails approaching innovation in a non-linear fashion and conducting problem-solving using a “Human-Centered Design Process.” IDEO leverages multi-disciplinary teams and a highly collaborative peer-to-peer approach, to derive breakthrough consulting solutions. Each design team comprises people with diverse specialisations, such as in art, industrial design, engineering, psychology, among other fields. A creative culture is built from the get-go: the hiring process is key. Job fit is a paramount screening consideration. The desire and disposition to be always innovating and creating, as well as the ability to work as part of a team, are *non-negotiable* criteria in IDEO’s selection process. For example, if a candidate is deemed to not be a team player, or there is doubt that the candidate will fit into the unique IDEO “culture,” the candidate does not get hired, regardless of how good the candidate’s technical skills may be. IDEO keeps its staff creative by operating with minimal hierarchy, and takes the idea of a flat organisation “almost to an extreme.” In my research, I discovered that IDEO pays middle-tier salaries, relative to its competitors. While IDEO does award spot bonuses for exceptional work, remunerations at IDEO comprise pre-dominantly fixed salaries. IDEO has a profit-sharing program, pegged to the company’s



*Innovation through product design*

performance over the preceding six months. The notable feature of the bonus payout is that each and every employee gets awarded the *same* quantum, regardless of his/her position in the company. There is no sliding scale, where better performers receive a higher quantum, while poorer performers receive a lower quantum. The philosophy here is that teamwork is so vital to IDEO's competitive advantage that IDEO eschews incentivising individual "stardom." A big talent draw is the opportunity to "work on cool projects in a cool environment." All these help to compensate for IDEO's mid-tier position in the salary market. In addition, IDEO makes it a point to create a "fun" environment, and one that involves the employee's family as far as possible, akin to the SAS model.<sup>15</sup>

There are different organisational HR models, each with their respective strengths and weaknesses. For example, organisations A & B represent radically different organisational archetypes. However, both organisations can succeed in the marketplace. **The key to success is complementarity in and consistency of HR practices, in relation to the organisation's business strategy.** In personnel economics terms, a set of HR practices are coherent when "making small changes in practices produces no tangible gain in output." This means that as a system, this **set of reinforcing practices already produce the effect of the whole being greater than the sum of the parts.**

Interestingly, in a massive survey of over half a million employees from more than 300 companies conducted by the Hay Group, a big HR consulting firm, it emerged that the single most important factor in employee retention was the *opportunity to learn new skills*. In a separate survey of 800 Master of Business Administration (MBA) students from more than ten leading American and European schools, *intellectual challenge* emerged as the most important attribute for MBAs in their job decision, *not financial remuneration*.<sup>16</sup>

I provide the above examples to illustrate an important point: there are **various approaches towards recruitment and retention**. This gives us considerable food for thought, as the SAF navigates an increasingly competitive talent marketplace.

**What should the SAF's value proposition be for today's and tomorrow's soldiers, sailors and airmen?** What sort of messages have we been sending to our public on what life in the SAF is like? Have we been consistent in the messages sent internally? What types of talent do we really want to attract to fill our ranks? Do we want a heterogeneous or homogeneous talent pool? Are we competing with the external marketplace on pay? If so, how much is enough? If not, what should be the central idea underpinning our HR policies? If we want to incentivise greater team and group performance, does our individual-biased rewards system support that?

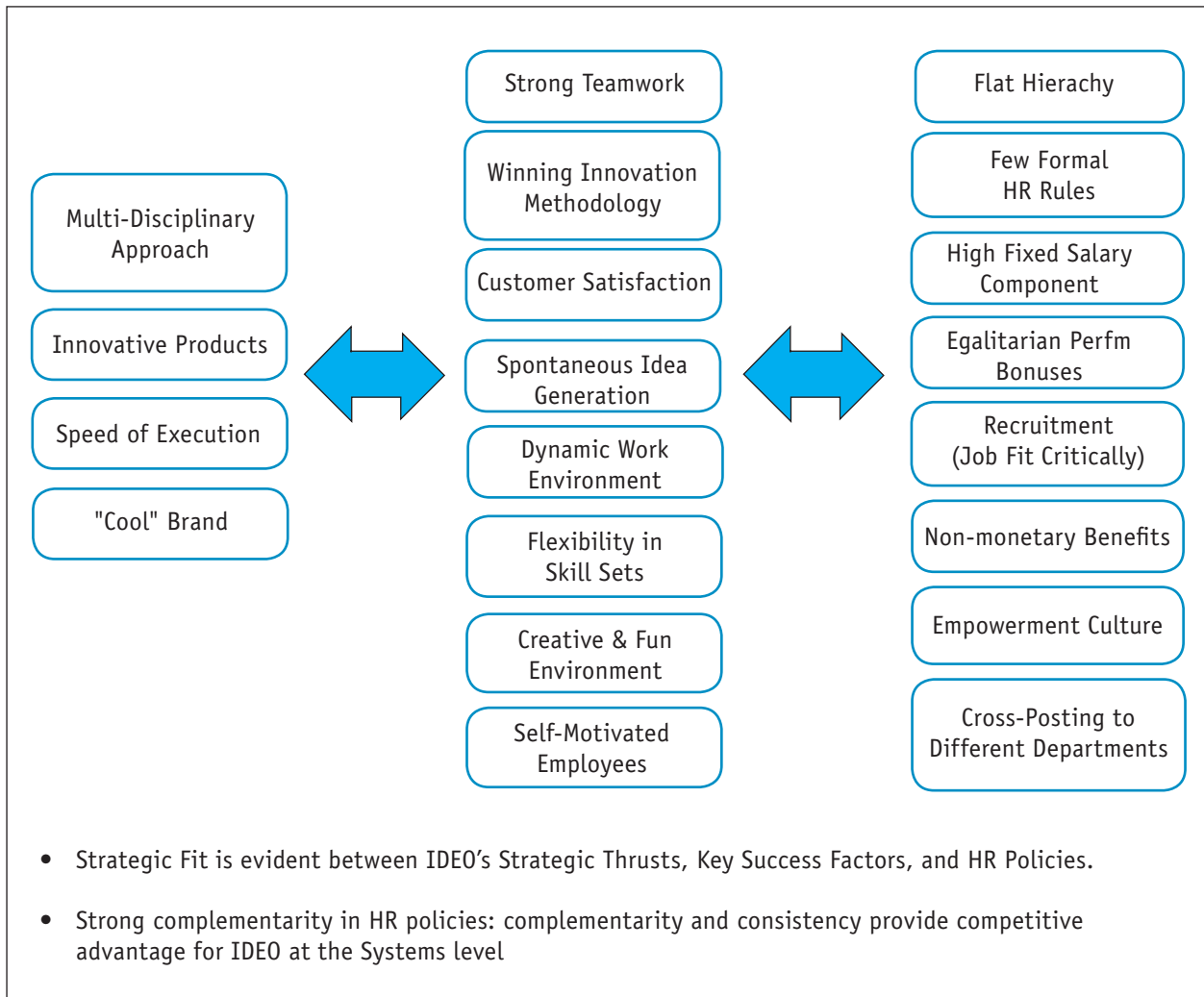
*The main takeaway from this section is the need to constantly review, critically and holistically, the SAF's "total compensation" package and make sure that our entire suite of HR policies are indeed complementary, and mutually re-inforcing.*

At the same time, I recognise that the SAF's HR operating space may be quite different from the commercial world. Our HR system is a function of desired outcomes, the profile of the population we draw upon and our own theories of what makes the organisation tick. However, I believe there are still useful insights we can derive from the above discussion. **The main takeaway from this section is the need to constantly review, critically and holistically, the SAF's "total compensation" package and make sure that our entire suite of HR policies are indeed complementary, and mutually re-inforcing.** Are there non-complementarities or inconsistencies that we may have somehow left uncovered, despite making herculean efforts to date to try to improve our HR policies?

I would like to round up this HR section by saying that there is a **growing field of study called "personnel economics"** in the US,<sup>17</sup> which has many relevant applications for the HR challenges we face in the SAF. For example, personnel economics studies the effect on workers of fixed salary versus

Organisation A – “One Happy Family”	Organisation B – “Dog Eat Dog”
Extrinsic rewards de-emphasised	Extrinsic rewards emphasised
Explicit guarantees of lifetime employment	Termination at will
Few obvious status differentials	Status differentials emphasised
Some compensation extended in the form of personalised gifts and benefits	Compensation solely on comparative performance
Less focus on measurable outputs	Extremely target-driven
Upper-level vacancies filled from within the organisation (everyone has a chance)	Incumbent employees enjoy no advantage over outsiders when filling a vacancy

Possible Organisation Archetypes<sup>18</sup>



Silicon Valley Design Consultancy IDEO: Achieving Alignment Between Business Strategy, Key Success Factors, and HR Policies



performance-based pay, to what extent individual performance pay undermines team and group performance, the role and effectiveness of non-monetary benefits, and whether an organisation should recruit for heterogeneity (diverse talent pool up-front) or homogeneity (target a certain profile type, and then train for diversity).

Another useful insight I gleaned from my programme was that workers look at the following equation: (perceived rewards) / (perceived effort), when deciding whether to stay on or leave an organisation. They also look at their peers' (perceived rewards) / (perceived effort). As such, it does not mean that a high level of rewards necessarily means that an individual will stay, if he perceives his outlay to be excessive, for example, lack of work-life balance. By the same token, it does not mean that a low level of rewards means that an individual will leave. It could be that he is willing to take the lower pay, as long as he does enjoy the work. What this equation reveals too is that a **worker's calculus is based to a large extent on perception**. This implies strong potential for an organisation like the SAF to influence its people's stay-or-leave calculations, by celebrating the positives (glass is half-full, versus half-empty), and by countering wrong perceptions. For example, I know a lot of servicemen who seem to always think that equivalent jobs outside are paying considerably more, or provide a better work-life balance. More often than not though, these servicemen are actually latching onto data points at the right hand edge of the bell curve. It will help if we in the middle management can have comparative data to prove to our servicemen the sobering realities of being in the middle or left hand edge.

## CONCLUSION

It is my ardent hope that this essay has been useful in adding to the level of generative conversations in the SAF, on some of the issues and challenges our organisation is facing. While this essay has deliberately been short on "solutions," I trust that it has provided some useful lines of inquiry and alternate frames of perspectives. As mentioned at the start, I believe that a candid reflection can only make the SAF stronger over the long run, and I trust

this essay will somehow contribute to that end-state. Finally, I hope that this essay will encourage many out there to migrate the piercing analysis of your canteen-break conversations to mainstream discussion fora, be they tea sessions with senior commanders or contributing think-pieces to *POINTER*. 🌐

## ENDNOTES

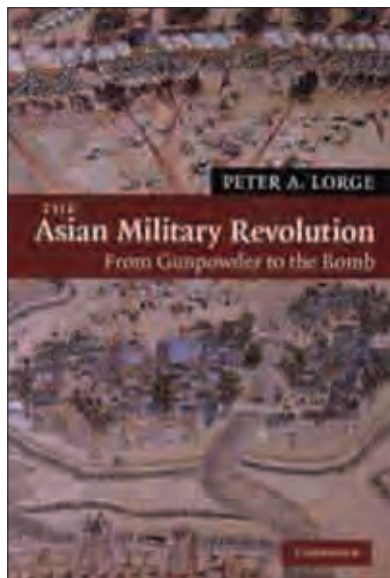
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## Book Review



**Peter A. Lorge, *The Asian Military Revolution: From Gunpowder to the Bomb*, New York: Cambridge University Press, 2008, 200 pages.**

by **Khan Zongheng, Amos**

Few inventions have been as far-reaching and influential in the history of warfare as that of gunpowder. Although development was slow and the resulting weapons far from perfect, gunpowder eventually came to dominate warfare. Indeed, historians such as Michael Roberts and Geoffrey Parker have proposed the concept of a “gunpowder revolution” in which the introduction of firearms and cannon caused a paradigm shift both on and off the battlefield, the prodigious logistical and administrative demands of their use precipitating the formation of modern, bureaucratic states.<sup>1</sup>

Such has been the impact of gunpowder on the economic, political and military development of Europe that its use has become something of a yardstick by which to measure other civilizations: the degree to which a culture follows the European model in adopting and employing gunpowder is taken as an indicator of its progressiveness and modernity. This preconception is especially pronounced in the study of Asian military history. Although gunpowder was invented in China,

Asian armies are usually dismissed as technologically backward and militarily ineffective due to the lack of a “gunpowder revolution” similar to that of Europe. This failure has been attributed to the innate conservatism and non-martial nature of Asian cultures, compared to the progressive, expansionist warrior culture of the West. As the common narrative runs, the Chinese may have invented gunpowder, but their narrow cultural mindset limited them to using it in fireworks.<sup>2</sup>

With *The Asian Military Revolution: From Gunpowder to the Bomb*, Peter Lorge, Senior Lecturer in the Department of History at Vanderbilt University and expert on pre-modern China, makes an excellent attempt to challenge this Eurocentric view and highlight the importance of gunpowder technology in Asian warfare. In a bold and comprehensive introduction, he summarizes the essentials of the military revolution debate and asserts that Asian civilizations were not only fully capable of appreciating and exploiting the potential of gunpowder technology, but had in effect undergone their own unique

“gunpowder revolutions” centuries before Europe. Indeed, particularly when discussing China, the author reverses the central argument of the “revolution”: instead of gunpowder driving modernization as in the West, Asian states already possessed modern characteristics that encouraged the rapid adoption of gunpowder technology.<sup>3</sup> He supports this interpretation by examining both the extensive development of gunpowder weapons in Asian warfare and active adaptation of the new technology to meet each society's military needs. Even the arrival of superior gunpowder technology from the West centuries later was quickly absorbed into existing and well-developed local patterns of warfare in which gunpowder already played a key role.<sup>4</sup>

Lorge devotes the body of his work to systematically examining the impact of gunpowder technology across Asia, demonstrating how distinctive and pre-existing trends in each state encouraged adoption of the new weapons both before and after contact with the West. He observes that most of the elements typically associated with the military revolution in Europe: disciplined infantry, raised and paid by the government; centralized state bureaucracies supporting enormous standing armies; and massive fortifications able to resist cannon fire, already existed in China before the Qin dynasty (221 BC): gunpowder did not turn China into a modern state because it already possessed the fundamentals of one. Similarly, the demands of large-scale

conflict in Warring States Japan and the limited supply of horses led to a preference for peasant infantry over samurai cavalry and improvements in recruitment and logistics over the course of the sixteenth century, conditions which suited the massed adoption of firearms when they arrived via Portuguese traders. In India, gunpowder technology diffused rapidly among the local rulers but was not by itself decisive: everybody had access to the new weapons. It was the skilful use of field artillery in combination with traditional horse archery and astute management of the Indian “military labour market” that allowed the Mughals to unify most of the sub-continent.

The author also successfully conveys the sophistication of the Asian military revolution by exploring how the various Asian powers adapted gunpowder technology in very different ways to meet their own strategic challenges. Faced with swift nomad cavalry on her northern frontier, China could not rely on powerful but relatively cumbersome early firearms and cannon for all her military needs. Instead, gunpowder weapons were used extensively in South China for siege and riverine operations, while a combination of artillery (along the Great Wall) and traditional cavalry remained necessary in North China. In Japan, the need to arm large numbers of commoners led to increasing use of firearms, while cannon were seldom used. By the end of the sixteenth century, musket-armed peasant

infantry had relegated the elite samurai cavalry to a supporting arm, only for this trend to reverse itself with the coming of peace under the Tokugawa Shogunate. In contrast, the invading Mughals successfully combined infantry musketeers and light field artillery to complement their cavalry superiority, particularly against the war elephants used by native Indian rulers. As an example of the importance of gunpowder in Asian warfare, Lorge also examines the Japanese invasions of Joseon Korea, where all three participants made effective use of it: the Japanese relying on musketry, Ming Chinese on field artillery and Koreans on cannon-armed warships.

Concluding his work, Lorge undercuts Western claims of military superiority by noting that when European traders finally arrived in Asia, their improved firearms and cannon were eagerly adopted by Asian rulers that had already been using similar weapons for centuries. China, India and Japan were able to copy and even improve on Western designs, those with less resources, like the Southeast Asian states, adopted the simple but effective approach of hiring European mercenaries to fight on their behalf. Subsequent European domination of the region was due less to superior Western military technology than to internal political developments, such as internal revolts and the decline of ruling dynasties, that prevented Asian states from responding effectively.<sup>5</sup>

Written as an introductory text for undergraduates, *The Asian Military Revolution* should prove both interesting and accessible to readers. This is also its main limitation, as it confines itself to a general overview of gunpowder warfare in Asian history and relies mostly on secondary sources. Certain chapters are more developed than others. In particular, those covering Chinese history benefit from the author's own research on the subject: much less source material is used in those dealing with Southeast Asia or the Japanese invasions of Korea. In addition, the chapter on the impact of Western imperialism, while not the main focus of the book, is very brief for such a complex and controversial subject. It can also be concluded that while gunpowder became an essential part of Asian warfare, its adoption was the result of earlier trends in centralization and organization that took place over centuries: evolution, rather than revolution (admittedly, this is also a common criticism of the military revolution in Europe). Nevertheless, these are minor criticisms of what is otherwise an excellent work. The book should provoke readers to re-examine their existing preconceptions about Asian military development, European military dominance, and military revolutions in general. 🌐

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3. *Ibid.*, 21.
4. *Ibid.*, 154.
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# Generalissimo Chiang Kai-Shek and the Second Sino-Japanese War (1937-1945)

by Ng Yi Ming



[http://commons.wikimedia.org/wiki/File:Chiang\\_Kai-shek\\_\(蔣中正\).jpg](http://commons.wikimedia.org/wiki/File:Chiang_Kai-shek_(蔣中正).jpg)

## INTRODUCTION

Generalissimo Chiang Kai-Shek (30 October 1887 to 5 April 1975) was a Chinese statesman, Director-General of the Chinese Nationalist Party, or Kuomintang (KMT), and served as President of the Republic of China (ROC) from 1948 to his death in 1975.<sup>1</sup> This article will relate Generalissimo Chiang's policies and actions as the leader of the KMT and China during the Second Sino-Japanese War.

## XI'AN INCIDENT AND SECOND UNITED FRONT

Through technically not part of the Second Sino-Japanese War, the Xi'an Incident of 1936 played an important part in establishing a truce that united both the KMT and the Chinese Communist Party (CCP) against increasing Japanese aggression in northern China throughout the early 1930s.

Despite the threat posed by Japan, Chiang had decided to focus on defeating the CCP first,<sup>2</sup> creating discontent among the Chinese populace.<sup>3</sup> He claimed that the Japanese "were a disease of the skin" and the communists "were a disease of the heart."<sup>4</sup> On the other hand, CCP rhetoric that "Chinese don't fight Chinese" won over many supporters who advocated active resistance against Japan

and were frustrated with Chiang's policy of appeasement towards the Japanese.<sup>5</sup>

Although warlords Zhang Xueliang of Manchuria and Yang Hucheng of Shaanxi province had been ordered by Chiang to suppress the communists in Xi'an, Zhang instead attempted to form an anti-Japanese coalition with the CCP.<sup>6</sup> Chiang was taken prisoner when he flew to Xi'an to investigate the activities of the warlords and was released only when he agreed to a ceasefire with the CCP and set up a United Front against the Japanese.

## MARCO POLO BRIDGE INCIDENT – WAR BREAKS OUT

The Marco Polo Bridge Incident, also known as the Lukouchiao Incident,<sup>7</sup> marked the outbreak of the Second Sino-Japanese War. The relatively minor skirmish between Japanese and Chinese soldiers quickly escalated to full scale war.<sup>8</sup> After capturing Peiping (Beijing) and Tianjin, the Japanese set their sights on Shanghai. Chiang decided to take a stand during the Battle Of Shanghai (August 1937), as he believed that this would trigger foreign intervention to expel the invaders.<sup>9</sup> The battle destroyed most of the elite KMT forces, built up with German assistance over the past decade.<sup>10</sup> However, foreign aid



*Chiang Kai Shek, leader of wartime China*

largely did not materialize: only the Union of Soviet Socialist Republics (USSR) provided assistance to the Chinese. Stalin did not want the Japanese government to conclude that the USSR was a military ally of the ROC, and thus stopped short of providing overt military aid.

As a result of the Second United Front, the CCP reorganised themselves as part of the National Revolutionary Army (NRA) and were assigned to the Eighth Route Army and the New Fourth Army.<sup>11</sup> These two units initially assisted KMT units in engagements such as the Battle of P'ingsing Pass, nominally under the command of Yen Hsi-shan.<sup>12</sup> After his defeat, both units focused on guerilla warfare against the Japanese primarily in northern China till the surrender of the Japanese in 1945.

### **CHUNGKING GOVERNMENT – TRADING SPACE FOR TIME**

After the fall of Shanghai and the subsequent “Rape Of Nanking,” Chiang ordered Yu

Dawei to oversee the evacuation of industrial technology, books, gold and other items to Chungking in Sichuan province and set up his military headquarters in the city of Wuhan in 1938.<sup>13</sup> He promulgated the strategy of “trading space for time,” which was to delay and exhaust the Japanese through numerous engagements, allowing China time to recover and regain the initiative.<sup>14</sup>

In June 1938, in order to delay the Japanese advance onwards to Wuhan via Zhengzhou, a plan to destroy the dikes of the Yellow River near Zhengzhou was proposed. It was hoped that the Japanese would be deterred from invading through northern China by the resulting floods. Though conscious of the fact that there would be many casualties and refugees, Chiang nevertheless ordered the proposal to proceed; deciding that the strategic benefits outweighed the costs. The waters ravaged numerous provinces and there were almost a million casualties as a result.<sup>15</sup> Despite the tremendous sacrifice, the Japanese were able to detour around the floods and captured Wuhan just a few months later in October 1938.<sup>16</sup>

Following the capture of Wuhan, the fall of Changsha, capital of Hunan province, seemed imminent as the governor of Hunan, Zhang Zhizhong, was told that “Japanese cavalry were within twenty miles” of the city.<sup>17</sup> This report probably contributed to the decision to set the whole city ablaze to deny its resources to the invaders. The official investigation by Chiang

resulted in the execution of three public officials and the sacking of the governor.<sup>18</sup> Ironically, the Japanese were forced to halt well short of the burning city due to logistical problems.<sup>19</sup> Furthermore, the defenders of the city were able to repel three Japanese assaults between 1937 to 1944, only succumbing in August 1944.<sup>20</sup>

After the fall of Wuhan, the ROC government moved to Chungking and the city served as its wartime capital from 1939 until the Japanese surrender in 1945. The wartime ROC government thus became known as the Chungking government.

### **AMERICAN AID TO CHUNGKING**

With the Japanese attack on Pearl Harbour in Hawaii in December 1941, America joined the war on the side of the Allies. The Americans promised aid to Chungking in the form of loans and matériel, although this was extremely limited since the Japanese had occupied most of China’s ports and land routes to Xinjiang from Soviet Central Asia were too remote.<sup>21</sup> The fall of British Burma in 1942 cut the only other land route into China and Chungking could only receive supplies flown in over the Himalayas from Assam, northeastern India, to Yunnan province.<sup>22</sup>

American aid also came with a price; General Joseph W. Stilwell was appointed the Chief of Staff of Chiang’s China Theatre, but also as “commander of American forces in the China-Burma-India theatres and supervisor of Lend-

Lease matériel" in 1942.<sup>23</sup> He spoke fluent Mandarin and was one of the United States (US) Army's China Experts, having served as a Military Attaché in the US Embassy to the ROC from 1935 to 1939.<sup>24</sup> He was known as "Vinegar Joe," for his caustic remarks and prided himself on giving "untarnished opinions."<sup>25</sup> This proved problematic for Chiang later on during the war.

Initially, the relationship between the two men was rather cordial; Chiang was in fact optimistic about the whole arrangement and actually pushed to let Stilwell have supreme command over both British and Chinese troops in Burma. Chiang lost faith in Stilwell's abilities due to the bungled First Burma Campaign in May 1942, which resulted in a general retreat of the Allies to Assam and Yunnan.<sup>26</sup> Stilwell's obstinate insistence on carrying out his own plans led to a deterioration of the relationship between the two men.<sup>27</sup> Chiang's brother-in-law T.V. Soong unsuccessfully attempted to relieve Stilwell of his duties from command in September 1943.<sup>28</sup> Stilwell was only removed in September 1944 after demanding full control of the China theatre; Chiang responded by asking Roosevelt to send a replacement.<sup>29</sup>

General Albert C. Wedemeyer was appointed by Roosevelt to relieve Stilwell. He was a "self-confident, tactful, and observant officer"<sup>30</sup> and was much less confrontational. He remained until the Japanese surrender in August 1945.

## CONCLUSION

The Second Sino-Japanese War had profound consequences for Chiang; it exposed the inadequacies of the KMT government and drove disaffected peasants and intellectuals into the CCP camp. The cost of eight years of war with the Japanese reversed most of the gains made by the KMT during the Nanking Decade (1928-1937). His policies and decisions must be viewed in light of the desperate circumstances at the time, as Chinese cities fell one after another to the Japanese.

The benefits, however, were that China obtained great power status by earning a seat with the great powers of the era such as Britain and the US. Chiang's international prestige rose during and after the war and he was recognised as the legitimate ruler of China until the US withdrew recognition of the ROC in 1979. 🌐

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## Quotable Quotes

*If your actions inspire others to dream more, learn more, do more and become more, you are a leader.*

– **John Quincy Adams** (1767-1848), US President.

*To do great things is difficult; but to command great things is more difficult.*

– **Friedrich Nietzsche** (1844-1900), 19<sup>th</sup> century German philosopher, poet and composer.

*Let him who would be moved to convince others, be first moved to convince himself.*

– **Thomas Carlyle** (1795-1881), 19<sup>th</sup> century writer, essayist and historian.

*Never doubt that a small group of thoughtful, concerned citizens can change the world. Indeed it is the only thing that ever has.*

– **Margaret Mead** (1901-1978), American cultural anthropologist.

*You are today where your thoughts have brought you; you will be tomorrow where your thoughts take you.*

– **James Allen** (1864-1912), British philosophical writer and pioneer of the self-help movement.

*The art of listening needs its highest development in listening to oneself; our most important task is to develop an ear that can really hear what we're saying.*

– **Sydney J. Harris** (1917-1986), US author and journalist.

*A return to first principles in a republic is sometimes caused by the simple virtues of one man. His good example has such an influence that the good men strive to imitate him, and the wicked are ashamed to lead a life so contrary to his example.*

– **Niccolo Machiavelli** (1469-1527), Italian historian and philosopher.

*Nearly all men can stand adversity, but if you want to test a man's character, give him power.*

– **Abraham Lincoln** (1809-1865), US president.

*Be fit for more than the thing you are now doing. Let everyone know that you have a reserve in yourself; that you have more power than you are now using. If you are not too large for the place you occupy, you are too small for it.*

– **James A. Garfield** (1831-1881), US president.

*If you fail to honour your people,*

*They will fail to honour you;*

*It is said of a good leader that*

*When the work is done, the aim fulfilled,*

*The people will say, "We did this ourselves."*

– **Lao Tzu** (604-531 B.C.), founder of Taoism. "Tao Te Ching."

*Innovation distinguishes between a leader and a follower.*

– **Steve Jobs** (1955-2011), US businessman, founder of Apple Inc. and pioneer of the personal computer revolution..

*All of the great leaders have had one characteristic in common: it was the willingness to confront unequivocally the major anxiety of their people in their time. This, and not much else, is the essence of leadership.*

– **John Kenneth Galbraith** (1908-2006), Canadian-American economist.

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For example:

Tim Huxley, *Defending the Lion City: The Armed Forces of Singapore* (St Leonard, Australia: Allen & Unwin, 2000), 4.

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Ibid., 4.

Edward Timperlake, William C. Triplett and William II Triplet, *Red Dragon Rising: Communist China's Military Threat to America* (Columbia: Regnery Publishing, 1999), 34.

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### Articles in Books or Compiled Works

Michael I. Handel, "Introduction," in *Clausewitz and Modern Strategy*, ed. Michael I. Handel (London: Frank Cass, 1986), 3.

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Donald Urquhart, "US Leaves it to Littoral States; Admiral Fallon Says Region Can Do Adequate Job in Securing Straits," *The Business Times Singapore*, 2 April 2004, 10.

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Liaquat Ali Khan, "Defeating the IDF," *Counterpunch*, 29 July 2006, <http://www.counterpunch.org/khan07292006.html>.

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International Committee of the Red Cross, "Direct participation in hostilities," 31 December 2005, <http://www.icrc.org/Web/eng/siteeng0.nsf/html/participation-hostilities-ihl-311205>.

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"Newly unveiled East Jerusalem plan put on hold," *BBC News*, 2 March 2010, [http://news.bbc.co.uk/2/hi/middle\\_east/8546276.stm](http://news.bbc.co.uk/2/hi/middle_east/8546276.stm).

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### ERRATA

In our last issue, Vol. 37 No. 3-4, Figure 3 on page 18 should read "Participation Command" and not "Publication Command."