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ESTABLISHING MARITIME POWER COMPETITIVENESS INDEX: BENCHMARKING INDONESIAN NAVY'S ASPIRATION TO BECOME WORLD-CLASS SEA POWER

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Abstrak

Sebagai negara kepulauan, Indonesia telah lama mendambakan untuk mengembangkan Tentara Nasional Indonesia Angkatan Laut (TNI-AL) menjadi kekuatan laut kelas dunia. Setelah pengembangannya dikesampingkan untuk waktu yang lama, Minimum Essential Force yang diterbitkan pada tahun 2010 mengamanatkan peningkatan yang signifikan dalam kekuatan TNI-AL. Doktrin Poros Maritim Dunia yang diumumkan pada tahun 2014 juga bertumpu pada pertahanan maritim sebagai salah satu pilarnya, yang mengamanatkan pengembangan kemampuan TNI-AL. Terlepas dari visi besarnya, tidak jelas sejauh mana TNI-AL telah dikembangkan untuk mencapai tujuan ini. Artikel ini bertujuan untuk menjawab pertanyaan tersebut dengan menetapkan Maritime Power Competitiveness Index sebagai indeks komposit untuk mengukur kekuatan laut suatu negara. Dengan menggunakan indeks tersebut, artikel ini kemudian mengukur kekuatan TNI-AL dari tahun ke tahun untuk melacak perkembangan kemampuannya dan membandingkannya dengan angkatan laut negara saingan lainnya.

***Kata Kunci**: angkatan laut; indeks daya saing kekuatan maritim; kekuatan maritim; TNI-AL*

Abstract

As an archipelagic country, Indonesia has long envisioned developing its Navy (TNI AL) to become a world-class sea power. After its development was ruled out for a long period, the Minimum Essential Force published in 2010 mandates significant improvement in the Navy's strength. The doctrine of Global Maritime Fulcrum announced in 2014 also rests on maritime defense as one of its pillars, mandating the development of the Navy's capability. Despite the grand vision, it is unclear to what extent the Navy has been developed to achieve this aim. This paper aims to answer this question by establishing a Maritime Power Competitiveness Index as a composite index for measuring the sea power of countries. Using the index, this paper then measures the Indonesian Navy's strength through the years to track the development of its capability and compares it with the navies of other rival countries.

Keywords: Indonesian Navy; maritime power; maritime power competitiveness index; navy

Introduction

As an archipelagic country, Indonesia has long envisioned developing its Navy (TNI AL) to become a world-class sea power. However, the development of the Navy was ruled out for a long period because of a continental-based defense strategy that put heavy emphasis on manpower and land operations. It was further impaired by the United States arms embargo imposed in 1999-2005. As a result, in 2005 the Navy's operational readiness was less than 50% on average (Bappenas, 2008).

Hence, the government began laying out the mandate for significant improvement in the Navy's strength. The Navy published a Green-Water Navy blueprint in 2005, calling for a 274-ship force structure by 2024, consisting of a striking force of 110 ships, a patrolling force of 66 ships, and a supporting force of 98 ships (Supriyanto, 2012; Nugent, 2012).

Then, the government published the Presidential Regulation No. 7 of 2008 on State Defense General Policy, authorizing the Minimum Essential Force (MEF) level defined as "a force level capable to guarantee the attainment of immediate strategic defense interests". The Ministry of Defense then published the MEF blueprint in 2010, laying out the modernization and build-up plan in 2010-2024. In the Navy, the MEF requirement is for around 300 ships of various classes and at least twelve submarines, compared to Indonesia's 2010 fleet standing around 115 ships of various classes and two submarines (Kemhan, 2010).

The doctrine of Global Maritime Fulcrum announced in 2014 also rests on maritime defense force as one of its main pillars, mandating the development of the Navy's capability (Setkab, 2014). Following up the doctrine, the government published the maritime policy in 2017, including defense, security, law enforcement, and safety at sea as one of its pillars, as well as maritime defense and security as one of its clusters of priority programs.

To achieve the grand vision of becoming world-class sea power, the Navy began modernizing its capabilities, both from foreign and local suppliers. Since 2005, it has imported four SIGMA-90 frigates and two SIGMA-105 frigates from Netherlands, three Brunei-class frigates from United Kingdom, four 122-meter landing platforms dock (LPDs) from South Korea, and two Waspada-class fast attack crafts (FACs) from Brunei in 2011. It is currently procuring three Chang Bogo-class submarines co-

produced by Indonesia and South Korea. Aside from ships, the Navy also received C-212 maritime patrol aircrafts from Spain, Bonanza aircrafts from the United States, AS565S Panther and EC-120 Colibri helicopters from France, as well as other naval weapon systems (SIPRI, n.d.). From the local industry, it has also received eight Clurit-class FACs, four Sampari-class FACs, three Teluk Bintuni-class landing ships tank (LSTs) with four more under construction, three medium landing ships, twelve 40-meter patrol boats, 85 small crafts, and a Tarakan-class tanker.

Despite the grand vision and modernization efforts, it is unclear to what extent the Navy has been developed to achieve this aim. Has the modernization built up the Navy's capabilities closer to becoming world-class sea power, or has it merely maintained the existing force level by replacing old, out-of-date naval weapon systems? Has the modernization significantly improved the Navy's strength relative to the navies of other rival countries, or has it paled into insignificance when compared with the naval build-up of other countries?

This paper aims to answer this question by establishing a Maritime Power Competitiveness (MPC) Index as a composite index for measuring the sea power of countries. Using the index, this paper then measures the Indonesian Navy's strength through the years to track the development of its capability. This paper then compares the Indonesian Navy's MPC Index with the navies of other rival countries to get a better context of the extent of its development. Aside from being a benchmark for military modernization, this index can be utilized to consider the Indonesian government's maritime policy and further development agenda. Specifically, when the government views itself as an important regional actor in the Asia-Pacific area. Thus, comparison with other navies is important to estimate and measure to what extent the Indonesian government has built up the Navy's capabilities.

Literature Review: Sea Power and Indonesian Navy

Since the writings of Mahan (1890; 1894) and Corbett (1911), there has been extensive literature on sea power. From the literature, the elements of a maritime strategy are to gain or exploit command of the sea, sea control, or sea denial, and/or to project power

from the sea[1]. The first three terms describe the different level of dominance a navy has over the opposing forces. A navy has command of the sea when it has complete control of naval warfare and sea power over the adversaries. It holds sea control when it is so strong that its enemies cannot attack it directly. Meanwhile, it pursues sea denial when it attempts to prevent its rivals' ability to use the sea.

From the level of power projection capability, a navy may be classified as a blue-water, green-water, or brown-water navy. A blue-water navy is "a navy with capability to operate across the deep waters". A green-water navy is "competent to operate in the regional sea". Meanwhile, a brown-water navy is only "capable of defending its coastal zones" (Till & Bratton, 2012).

There have been many attempts to classify world navies according to their sea power capabilities. Grove (1990) establishes nine ranks: the first three ranks are navies able to project forces at the global level, the fourth and fifth ranks limited to regional projection, the sixth and seventh ranks confined to a role of territorial defense, the eighth rank limited with only police and constabulary capabilities, while the ninth rank is token navies (navies without capability to fulfill any naval mission). Todd & Lindberg (1996) establishes ten ranks: the first four ranks are blue-water navies, while the last six are non-blue-water. In Todd-Lindberg's classification system, the Indonesian Navy falls in the fifth rank, a non-blue-water navy capable of regional offshore coastal defense.

Lindberg (1998) established five ranks: global power projection navy, regional power projection navy, coastal defense navy, constabulary navy, and token navy. Coutau-Bégarie (2002) establishes six ranks: the first two ranks are global navies, the third and fourth ranks are regional navies, the fifth is coastal navies, while the sixth is coast-guard navies. Barber & Sipos (2004) establishes five ranks: the first rank is capable to conduct major operations on a global scale without allied support; the second rank is capable to undertake one major "out-of-area" operation; the third rank is capable to conduct limited, independent global expeditionary operations; the fourth rank is capable to project limited force into adjacent ocean areas; while the fifth rank is all the rest.

[1] See, for example, the definition of the term "maritime forces" in the U.S. *DOD Dictionary of Military and Associated Terms as of June 2018*.

Haydon (2007) establishes three ranks: major naval powers, medium power navies, as well as small and coastal navies. Till (2009) does not establish any ranking, but merely provides the important elements of sea power: the range (geographical reach), the types of missions (functions), as well as the professional qualifications and skills. Lastly, updating Todd-Lindberg's system with data from 2013, Kirchberger (2015) ranks 28 navies into blue-water navies and 121 navies into non-blue-water navies. Same as in Todd-Lindberg's, in Kirchberger's system, the Indonesian Navy falls in the fifth rank, a non-blue-water navy capable of regional offshore coastal defense, along with Thailand, Malaysia, Bangladesh, Vietnam, Israel, and eleven more navies.

There have also been attempts to classify only small navies. Morris (1987) establishes six categories of Third World navies without any superior rank: the first rank is token navies; the second rank is navies performing only police and constabulary missions; the third and fourth ranks are navies able to perform defensive combat tasks, in coastal zones (third rank) or offshore (fourth rank); while the fifth and sixth ranks are navies possessing enough forces to operate beyond territorial defense, conducting projection operations beyond their EEZ (fifth rank) or in the regional theater (sixth rank). In Morris's system, the Indonesian Navy falls in the fourth rank, an offshore territorial defense navy, along with Colombia, Egypt, Libya, Mexico, Pakistan, Philippines, Taiwan, Thailand, and Venezuela.

Goldrick & McCaffrie (2012) establishes four ranks of Southeast Asian navies: the first rank is navies capable of adjacent shipping protection, the second rank is navies capable of offshore territorial defense, the third rank is navies capable of inshore territorial defense, while the fourth rank is navies only capable of constabulary mission. In Goldrick-McCaffrie's system, the Indonesian Navy falls in the second rank along with Vietnam.

Lastly, Germond (2014) establish six ranks: the first rank is symbolic navies, the second rank is navies able to conduct police and constabulary operations in their territorial waters, the third rank is navies able to perform coastal defense autonomously, the fourth rank is navies able to conduct limited projection operations autonomously, the fifth rank is navies able to participate in high intensity multinational projection operations assuming the role of leading partner, while the sixth rank is navies able to perform any type of missions that could be assigned to them.

Not all sea power ranks include the Indonesian Navy in their examples, but the ones that do are summarized in table 1. The four ranks agree that the Indonesian Navy is capable of performing coastal and regional offshore territorial defensive combat missions.

Table 1 – Sea Power Ranks and Indonesian Navy

Morris (1987)	**Todd-Lindberg (1996)**	**Goldrick-McCaffrie (2012)**	**Kirchberger (2015)**
Regional theater navies	Global-reach power-projection navies	Adjacent shipping protection navies	Global-reach power-projection navies
	Limited global-reach power projection navies		Limited global-reach power projection navies
	Multi-regional power projection navies		Multi-regional power projection navies
Beyond-EEZ navies	Regional power projection navies		Regional power projection navies
Offshore defensive combat navies - Indonesia	Regional offshore coastal defensive navies - Indonesia	Offshore territorial defensive navies - Indonesia	Regional offshore coastal defensive navies - Indonesia
Coastal defensive combat navies	Inshore coastal defensive navies	Inshore territorial defensive navies	Inshore coastal defensive navies
Police and constabulary navies	Regional offshore constabulary navies	Constabulary navies	Regional offshore constabulary navies
	Inshore constabulary navies		Inshore constabulary navies
	Inland waterway navies		Inland waterway navies
Token navies	Token navies		Token navies

From the literature, various classification criteria have been adopted, but the main emphasis is put on the order of battle[2], range/sustainability, and versatility/flexibility. The indicators for order of battle are number of vessels, tonnage and types of ships,

[2] Order of battle is "the manner in which military forces are organized, disposed, maneuvered, and supplied". See, for example, U.S. Department of the Army (1959), *Order of Battle Intelligence* (Field Manual No. 30-19).

power of weaponry, and state of modernity. The indicators for range are geographical reach, capacity for sustained operations, as well as logistics and afloat support. Meanwhile, the indicators for versatility are types and diversity of missions (Germond, 2014).

Other criteria summarized by Germond include autonomy and cooperation/interoperability – indicated by capacity to operate autonomously and within a coalition – as well as other qualitative and political adjustment variables: professional qualifications, sailors' moral dispositions, correlation between means and objectives, as well as voluntary limitations (Germond, 2014).

Methods: Maritime Power Competitiveness Index

This paper establishes the MPC Index from the variables of sea power as established by the existing literature. The variables included are chosen from their significance (the frequency of it cited in the literature on sea power) and availability of data. For a given country each year, every variable is converted to a mark between 0 and 10. All variables are then averaged to find the MPC Index of the country in the given year.

In terms of order of battle, this paper uses the variables of number of vessels, tonnage, and types of ships, as well as power of weaponry. The first three variables are measured from all listed naval vessels of a country in The Military Balance, the annual assessment of global military capabilities and defense economics published by the International Institute for Strategic Studies (IISS).

The variable number of vessels is then categorized based on the 500-vessel requirement of the United States Navy, with 0-100 vessels as the lowest category, topped by 101-150 vessels, 151-200 vessels, 201-250 vessels, up to 251 or more vessels. The variable of tonnage is measured from the combined displacement of all vessels, divided by 1.5 million tons to arrive at a mark between 0 and 10. The variable of types of ships is categorized based on the U.S. Navy classification of ships capable of being utilized for power projection, with 0-5 types of ships as the lowest category, topped by 6-10 types, 11-15 types, 16-20 types, up to 21 or more types.

Meanwhile, the power of weaponry is measured from the average of the mark of armament equipped on the naval vessels. The lowest mark is cannons, topped by

torpedoes, dual purpose guns/naval guns, anti-ship missiles (AshMs), up to land-attack cruise missiles (LACMs) or fixed-wing aircraft as the highest mark.

In terms of range, this paper uses the variables of geographical reach as well as logistics and afloat support. The geographical reach is measured by the naval fleet's power projection capability, defined by its vessel inventory as compiled by Kirchberger (2015). The lowest category, a token navy, often only has one or two small crafts. Then, a coastal navy has only patrol boats (PBs) and crafts (PCs); an offshore navy has only smaller ships such as corvettes (FSs) and fast attack crafts (FACs) with no underway replenishment; a regional navy has aviation-capable ships such as destroyers (DDs) and frigates (FFs), as well as submarines (SSs) and some support ships; while a global navy has all larger ship types such as cruisers (CGs), battleships (BBs), up to aircraft carriers (CVs), as well as larger submarines such as nuclear-powered attack submarines (SSNs) up to nuclear-powered ballistic-missile submarines (SSBNs).

Meanwhile, the logistics and afloat support is measured by the number of all listed auxiliary vessels supporting combat ships or operations in The Military Balance. The lowest category only has a combination of oiler, ammunition, and supply ships as a minimum amount. It is topped by navies with two or more sets of support ships.

Lastly, in terms of versatility, this paper uses the variable of types and diversity of missions. It is measured from the highest category of a navy's missions scripted in the given country's defense white paper or similar documents, with internal humanitarian assistance and disaster relief (HADR) as the lowest mark, topped by police and constabulary missions, external HADR, diplomacy, up to combat missions as the highest mark.

Of the seven variables, three variables are weighted double that of the others before they are averaged because they represent the main emphasis of the indicators for sea power in the literature: number of vessels for order of battle, geographical reach for range, and types and diversity of missions for versatility.

Table 2 – Variables, Measurement, Sources of Data, and Weight

Variables	Measurement	Sources of Data	Weight
Number of vessels	Number of all vessels of a given country each year, categorized as follows:	The Military Balance	0.2

	>251 vessels =10 201-250 = 8 151-200 = 6 101-150 = 4 0-100 = 2		
Tonnage of ships	Tonnage of all vessels of a given country each year, divided by 1.5 million tons	The Military Balance	0.1
Types of ships	Number of diverse types of vessels of a given country each year, categorized as follows: ≥21 types of ships = 10 16-20 = 8 11-15 = 6 6-10 = 4 0-5 = 2	The Military Balance	0.1
Power of weaponry	Average of the mark of naval weaponry of a given country each year, categorized as follows: LACM/fixed-wing aircrafts = 10 AshM = 8 dual purpose guns/naval guns = 6 torpedoes = 4 cannons = 2	The Military Balance	0.1
Geographical reach	Geographical reach of the navy of a given country each year, measured from its largest vessel inventory, categorized as follows: global (CV, BB, CG, SSN, SSBN) = 10 regional (DD, FF, SS) = 8 offshore (FS, FAC) = 6 coastal (PB, PC) = 4 token (small crafts) = 2	The Military Balance	0.2
Logistics and afloat support	Number of logistics and afloat support ships of a given country each year, categorized as follows: ≥5 sets = 10 4 sets = 8 3 sets = 6	The Military Balance	0.1

	2 sets = 4 general guideline of 3 combination of oiler, ammunition, and supply ships as minimum amount = 2		
Types and diversity of missions	Types and diversity of the roles of the navy of a given country each year, categorized as follows: combat = 10 diplomacy = 8 external HADR = 6 police and constabulary = 4 internal HADR = 2	Defense white papers and other official documents	0.2

The above variables are measured on the Indonesian Navy and the navies of nine other countries, chosen from the sea power ranks relatively equal to Indonesia's as well as availability of data. Aside from Indonesia, the countries include Australia, Brunei, China, Japan, Pakistan, Philippines, Singapore, Taiwan, and Vietnam. The paper chooses the period between 2008 and 2017 to identify patterns of change and continuity in the last ten year.

Results and Discussion

The MPC Index and Indonesian Navy

Using the above methodology, the MPC Index for the Indonesian Navy is as follows.

Table 3 – MPC Index for the Indonesian Navy, 2008-2017

Years	No. of Vessels	Tonnage of Ships	Types of Ships	Power of Weaponry	Geographical Reach	Logistics and Afloat Support	Types and Diversity of Missions	MPC Index
2008	6	1.32	10	3.16	8	2	6	5.65
2009	6	1.55	10	3.36	8	2	6	5.69
2010	6	1.45	10	3.36	8	2	6	5.68
2011	6	1.34	10	3.23	8	2	6	5.66
2012	6	1.63	10	3.29	8	2	6	5.69

2013	6	1.64	10	3.43	8	2	6	5.71
2014	6	1.49	10	3.23	8	2	6	5.67
2015	6	1.58	10	3.52	8	2	6	5.71
2016	6	1.57	10	3.42	8	2	6	5.70
2017	8	1.54	10	3.21	8	2	6	6.08

In 2008–2017, the Indonesian Navy's number of vessels increased from 169 vessels in 2008 to 207 vessels in 2017. Almost all types of vessels increased, including one submarine (from two to three), two frigates (from 11 to 13), two corvettes (from 18 to 20), 47 patrol boats and crafts (from 41 to 88), four LPDs (from one to five), and one landing craft (from 54 to 55). On the other hand, mine warfare vessels decreased by three (from 11 to eight), LSTs by seven (from 26 to 19), and logistics and support ships by four (from 28 to 24) (IISS, 2008; IISS, 2017). Thus, in terms of the variable number of vessels, the Indonesian Navy's mark increased from six to eight.

As such, the combined tonnage of all ships also increased from 199,426 tons in 2008 to 232,422.9 tons in 2017. Among the heaviest additional displacement were the four Makassar-class LPDs (each weighing 8,400 tons), one Teluk Bintuni-class LSTs (5,200 tons), three Bung Tomo-class corvettes (1,940 tons each), four Diponegoro -class frigates (1,692 tons each), and one Nala-class and two Fatahillah-class corvettes (1,450 tons each). Thus, in terms of the variable tonnage of ships, the Indonesian Navy's mark increased from 1.32 to 1.54. However, in terms of types of ships, the Indonesian Navy's mark had been steady at ten from the beginning, having already an inventory of 21 or more types of ships (IISS, 2008; IISS, 2017).

In terms of power of weaponry, the Indonesian Navy's mark increased from 3.16 in 2008 to 3.21 in 2017. In 2008, there were only 15 ships equipped with AShMs: Ahmad Yani-class and Fatahillah-class frigates (six and three ships respectively), Sigma-class corvettes (two ships), and Mandau-class fast patrol crafts (four ships). Meanwhile, in 2017, there were 35 ships equipped with AShMs: Ahmad Yani-class and Diponegoro-class frigates (six and four ships respectively); Bung Tomo-class, Nala-class, and Fatahillah-class corvettes (three, one, and two ships); Mandau-class and Sampari-class patrol crafts (four and three ships); Clurit-class patrol boats (eight ships); as well as Makassar-class LPDs (four ships). During the period, Indonesia had yet to equip its ships with LACM or fixed-wing aircrafts (IISS, 2008; IISS, 2017).

In terms of geographical reach, the Indonesian Navy's mark had been steady at eight from the beginning; its inventory of frigates and corvettes without larger ship types preventing it from rising to the highest mark. Meanwhile, in terms of logistics and afloat support, its mark had also been steady at two; its inventory of support ships only had a combination of auxiliary, oceanographic research and surveillance, hydrographic survey, survey, stores, oiler, transport, tug, as well as training ships (IISS, 2008; IISS, 2017).

Lastly, in terms of types and diversity of missions, the Indonesian Navy's mark had been steady at six from the beginning. Both 2008 and 2015 Indonesian Defense White Papers maintain that defense of the state is active and defensive, neither aggressive nor expansive. If national interests are not threatened, Indonesia is not bound nor participates in a defense pact with other countries (Dephan, 2008; Kemhan, 2015). Thus, the Navy is also active defensive in its outward missions.

Table 3 shows that the Indonesian Navy's MPC Index increased 0.43 points, from 5.65 in 2008 to 6.08 in 2017. Thus, it can be concluded that the Navy's modernization has built up its capabilities closer to becoming world-class sea power, not merely maintaining the existing force level. To answer the second question of whether the modernization has significantly improved the Navy's strength relative to the navies of other rival countries, the next section compares the Navy's index with those of other navies.

MPC Index Comparison

Using a similar formula, we can then calculate the MPC Indices for the other navies are follows.

Table 4 – Australia

Years	No. of Vessels	Tonnage of Ships	Types of Ships	Power of Weaponry	Geographical Reach	Logistics and Afloat Support	Types and Diversity of Missions	MPC Index
2008	2	1.14	6	3.43	8	4	10	5.457
2009	2	1.13	6	3.69	8	4	10	5.482

2010	2	1.13	6	3.07	8	4	10	5.42
2011	2	1.13	6	3.07	8	4	10	5.42
2012	2	1.13	6	2.6	8	4	10	5.373
2013	2	1.13	6	2.6	8	4	10	5.373
2014	2	1.08	6	3.6	8	4	10	5.468
2015	2	1.26	6	3.83	8	4	10	5.509
2016	2	1.23	6	3.69	8	4	10	5.492
2017	2	1.2	6	4	8	4	10	5.52

The MPC index for the Royal Australian Navy (RAN) only slightly increased in terms of power of weaponry and tonnage of ships between 2008 and 2017. Its number of vessels decreased from 69 vessels to 59 vessels, with the decommissioning of one Adelaide-class frigate, two Bandicoot-class minesweepers, two Kanimbla-class landing helicopters (LPHs), one Tobruk-class LST, three landing crafts, as well as nine logistics and support vessels; despite the procurement of four patrol crafts, two Canberra-class amphibious assault ships (LHDs), and one Choules-class landing ship dock (LSD) (IISS, 2008; Australian DoD, 2009; Australian DoD, 2013; IISS, 2017).

Table 5—Brunei

Years	No. of Vessels	Tonnage of Ships	Types of Ships	Power of Weaponry	Geographical Reach	Logistics and Afloat Support	Types and Diversity of Missions	MPC Index
2008	2	0.01	2	3.3	6	0	4	2.931
2009	2	0.01	2	2.8	6	0	4	2.881
2010	2	0.01	2	2.8	6	0	4	2.881
2011	2	0.03	2	4	6	0	4	3.003
2012	2	0.04	2	2.4	6	0	4	2.844
2013	2	0.04	2	2.3	6	0	4	2.834
2014	2	0.04	2	2.3	6	0	4	2.834
2015	2	0.05	2	2.3	6	0	4	2.835
2016	2	0.05	2	2.3	6	0	4	2.835
2017	2	0.05	2	2.3	6	0	4	2.835

The Royal Brunei Navy is a small navy comprised of ten vessels (six patrol crafts and four landing crafts) in 2008, which grew to 16 vessels (with the additional four corvettes and two patrol crafts) in 2017. Its only increase was in terms of tonnage – the four Darussalam-class corvettes weigh 1,625 tons each (IISS, 2008; IISS, 2017).

Table 6 - China

Years	No. of Vessels	Tonnage of Ships	Types of Ships	Power of Weaponry	Geographical Reach	Logistics and Afloat Support	Types and Diversity of Missions	MPC Index
2008	10	7.3	10	4.86	8	6	8	8.016
2009	10	7.6	10	4.87	8	6	8	8.047
2010	10	7.7	10	4.82	8	6	8	8.052
2011	10	7.5	10	4.75	8	6	8	8.025
2012	10	7.8	10	4.75	8	6	8	8.055
2013	10	8.5	10	4.86	8	6	8	8.136
2014	10	9	10	4.66	10	6	8	8.566
2015	10	9.4	10	4.73	10	6	8	8.613
2016	10	9	10	4.77	10	6	8	8.577
2017	10	9.8	10	4.82	10	6	8	8.662

The highest-ranking sea power in this study, the People's Liberation Army (PLA) Navy, increased in terms of tonnage and geographical reach between 2008 and 2017. Its number of vessels decreased from 699 vessels in 2008 to 591 vessels in 2017, yet the displacement of each of its ships grew. In 2008, the PLA Navy's heaviest ship was the 7,000-ton Yuting II-class LST; in 2017, it had 35 ships outweighing Yuting II, with the heaviest being the 67,500-ton Liaoning-class aircraft carrier. The Liaoning's first commission in 2012 also marked the shift of China from a regional to a global-reach navy (IISS, 2008; IISS, 2017).

Table 7 - Japan

Years	No. of Vessels	Tonnage of Ships	Types of Ships	Power of Weaponry	Geographical Reach	Logistics and Afloat Support	Types and Diversity of Missions	MPC Index
2008	4	3.27	10	5.09	8	4	8	6.236
2009	4	3.3	10	5	8	4	8	6.23
2010	4	3.45	10	5	8	4	8	6.245

2011	4	3.32	10	5	8	4	8	6.232
2012	4	3.45	10	4.8	8	4	8	6.225
2013	4	3.44	10	4.8	8	4	8	6.224
2014	4	3.49	10	4.7	8	4	8	6.219
2015	4	3.53	10	4.8	8	4	8	6.233
2016	4	3.64	10	5.31	10	4	8	6.695
2017	4	3.67	10	5.31	10	4	8	6.698

The Japan Maritime Self-Defense Force (JMSDF) increased in terms of geographical reach, from regional in 2008 to global reach in 2017, as well as tonnage and power of weaponry. Its number of vessels decreased, from 145 vessels in 2008 to 115 vessels in 2017, yet the combined tonnage of all ships increased from 490,840 tons in 2008 to 551,784 tons in 2017. This was due to the procurement of two Hyuga-class and an Izumo-class aircraft carrier (labeled as helicopter destroyer), which weigh 19,000 and 27,000 tons respectively. The procurement also contributed to the increased mark of the JMSDF's geographical reach. Meanwhile, its power of weaponry increased mostly because of incremental modernization of the JMSDF (IISS, 2008; IISS, 2017).

Table 8 - Pakistan

Years	No. of Vessels	Tonnage of Ships	Types of Ships	Power of Weaponry	Geographical Reach	Logistics and Afloat Support	Types and Diversity of Missions	MPC Index
2008	2	0.5	6	4.3	8	2	6	4.48
2009	2	0.5	6	4.3	8	2	6	4.48
2010	2	0.52	6	4.53	8	2	6	4.505
2011	2	0.57	8	4.82	8	2	6	4.739
2012	2	0.59	8	4.6	8	2	6	4.719
2013	2	0.59	8	4.6	8	2	6	4.719
2014	2	0.62	8	4.7	8	2	6	4.732
2015	2	0.59	8	4.84	8	2	6	4.743
2016	2	0.59	8	4.84	8	2	6	4.743
2017	2	0.59	10	4.27	8	2	6	4.886

The Pakistan Navy increased in terms of types and tonnage of ships. It operated a navy of 27 vessels in 2008, comprising merely eight types of ships, which grew to 50 vessels comprising 13 types of ships in 2017. Its tonnage grew because of the procurement of the 4,200-ton Alamgir-class frigate, four 3,144-ton Sword-class frigates, and others (IISS, 2008; IISS, 2017; Pakistan MoD, 2014).

Table 9 - Philippines

Years	No. of Vessels	Tonnage of Ships	Types of Ships	Power of Weaponry	Geographical Reach	Logistics and Afloat Support	Types and Diversity of Missions	MPC Index
2008	2	0.36	8	2.75	6	2	4	3.711
2009	4	0.38	8	2.31	6	2	4	4.069
2010	4	0.37	8	2.31	6	2	4	4.068
2011	2	0.37	8	2.75	6	2	4	3.712
2012	2	0.4	10	2.47	6	2	4	3.887
2013	2	0.37	10	2.47	6	2	4	3.884
2014	2	0.38	8	2.95	6	2	4	3.733
2015	4	0.38	10	2.52	6	2	4	4.29
2016	4	0.39	10	2.5	6	2	4	4.289
2017	4	0.47	10	2.72	6	2	4	4.319

The Philippine Navy increased in terms of number of vessels, tonnage, and types of ships between 2008 and 2017. It operated around 73 to 114 vessels during the respective years. In 2008, its heaviest ship was the 4,340-ton Yakal-class repair ship; however, the procurement of the 11,583-ton Tarlac-class LPD from Indonesia led to the increase of its tonnage. It also grew from nine types of ships in 2008 to 17 types in 2017; mostly either militarized coast guard vessels or patrol boats and were not equipped with any type of missiles, and also lacking auxiliary vessels (IISS, 2008; IISS, 2017).

Table 10 - Singapore

Years	No. of Vessels	Tonnage of Ships	Types of	Power of Weaponry	Geographical Reach	Logistics and	Types and	MPC Index

			Ships			Afloat Support	Diversity of Missions	
2008	2	0.42	4	4.6	8	0	8	4.502
2009	2	0.46	4	4.22	8	0	8	4.468
2010	2	0.54	4	4.2	8	0	8	4.474
2011	6	0.54	6	3.3	8	0	8	5.384
2012	6	0.54	6	3.3	8	0	8	5.384
2013	6	0.54	6	3.3	8	0	8	5.384
2014	6	0.54	6	3.3	8	0	8	5.384
2015	6	0.54	6	3.3	8	0	8	5.384
2016	6	0.54	6	3.3	8	0	8	5.384
2017	6	0.54	6	3.3	8	0	8	5.384

The Republic of Singapore Navy (RSN) increased in terms of number of vessels, from 88 in 2008 to 188 in 2017, as well as types and tonnage of ships. The increase in types and tonnage came in 2010 with the listing of utility and personnel landing crafts, as well as newer patrol boats in active service. However, it needs to be noted that this navy, while being sophisticated in terms of technology, does not exactly focus on overseas or power projection missions, shown in the lack of support and replenishment vessels (IISS, 2008; IISS, 2017).

Table 11 - Taiwan

Years	No. of Vessels	Tonnage of Ships	Types of Ships	Power of Weaponry	Geographical Reach	Logistics and Afloat Support	Types and Diversity of Missions	MPC Index
2008	4	1.8	10	4.76	8	2	6	5.456
2009	4	1.8	10	4.76	8	2	6	5.456
2010	4	1.81	10	4.76	8	2	6	5.457
2011	10	1.9	10	4.76	8	2	6	6.666
2012	10	1.91	10	4.76	8	2	6	6.667
2013	10	1.83	10	4.76	8	2	6	6.659
2014	10	1.81	10	4.76	8	2	6	6.657

2015	10	1.81	10	4.76	8	2	6	6.657
2016	10	1.82	10	4.76	8	2	6	6.658
2017	10	1.92	10	4.76	8	4	6	6.868

The main factor behind the Republic of China (ROC) Navy's highest rise was its number of vessels, which almost tripled from 137 vessels in 2008 to 394 vessels in 2017. Almost all types of ships increased, with the most being landing crafts (from 20 to 292). Thus, the tonnage also increased, from 270,960 tons in 2008 to 288,016 tons in 2017 The heaviest additional displacement was the Panshih-class oiler (15,000 tons), which also elevated its logistics and afloat support variable from mark two to four (IISS, 2008; IISS, 2017).

Table 12 - Vietnam

Years	No. of Vessels	Tonnage of Ships	Types of Ships	Power of Weaponry	Geographical Reach	Logistics and Afloat Support	Types and Diversity of Missions	MPC Index
2008	2	0.22	8	3.9	6	0	4	3.612
2009	2	0.23	10	3.82	6	0	4	3.805
2010	2	0.23	10	3.82	6	0	4	3.805
2011	4	0.17	10	4.09	6	0	4	4.226
2012	4	0.27	10	4.16	6	0	4	4.243
2013	4	0.31	10	4.14	6	0	4	4.245
2014	4	0.35	10	3.93	6	2	4	4.428
2015	4	0.34	10	3.93	6	2	4	4.427
2016	4	0.35	10	4	6	2	4	4.435
2017	4	0.35	10	4.06	6	2	4	4.441

Last but not least, the Vietnam People's Navy (VPN) shows an increase in many variables – number of vessels, tonnage and types of ships, power of weaponry, as well as logistics and afloat support – between 2008 and 2017. It grew from 80 vessels in 2008 to 132 vessels in 2017, increasing from 14 to 21 types of ships and from the total displacement of 34,096 tons to 53,540 tons during this period. Meanwhile, in 2008 only Tarantul-class and BPS-500-class corvettes as well as Osa II-class patrol boats were

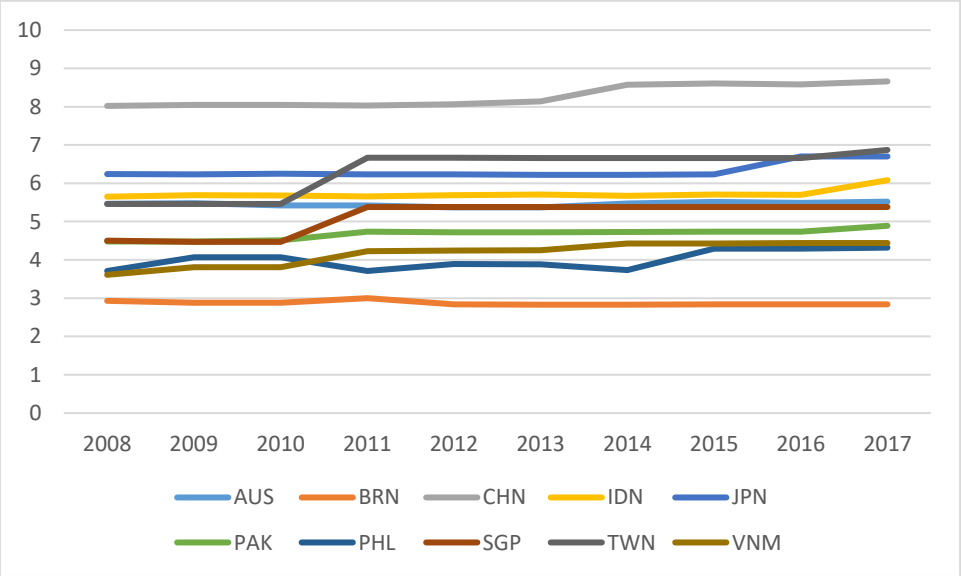
equipped with AShMs; but in 2017 the list grew to include Dinh Tien Hoang-class frigates and Tarantul V-class corvettes as well (IISS, 2008; IISS, 2017).

From the above MPC indices, the comparison with Indonesian result can be compiled in the following table:

Table 13 – MPC Index Comparison, 2008-2017

Years	AUS	BRN	CHN	IDN	JPN	PAK	PHL	SGP	TWN	VNM
2008	5.46	2.93	8.02	5.65	6.24	4.48	3.71	4.50	5.46	3.61
2009	5.48	2.88	8.05	5.69	6.23	4.48	4.07	4.47	5.46	3.81
2010	5.42	2.88	8.05	5.68	6.25	4.51	4.07	4.47	5.46	3.81
2011	5.42	3.00	8.03	5.66	6.23	4.74	3.71	5.38	6.67	4.23
2012	5.37	2.84	8.06	5.69	6.23	4.72	3.89	5.38	6.67	4.24
2013	5.37	2.83	8.14	5.71	6.22	4.72	3.88	5.38	6.66	4.25
2014	5.47	2.83	8.57	5.67	6.22	4.73	3.73	5.38	6.66	4.43
2015	5.51	2.84	8.61	5.71	6.23	4.74	4.29	5.38	6.66	4.43
2016	5.49	2.84	8.58	5.70	6.70	4.74	4.29	5.38	6.66	4.44
2017	5.52	2.84	8.66	6.08	6.70	4.89	4.32	5.38	6.87	4.44

Chart 1 – MPC Index Comparison, 2008-2017



Remarks: AUS = Australia, BRN = Brunei, CHN = China, IDN = Indonesia, JPN = Japan, PAK = Pakistan, PHL = Philippines, SGP = Singapore, TWN = Taiwan, VNM = Vietnam

Table 13 and Chart 1 show that between 2008 and 2017, most of the navies studied show increase in their MPC Indices – only the Royal Brunei Navy's index decreased 0.1 point, from 2.93 in 2008 to 2.84 in 2017. Taiwan's Republic of China Navy shows the highest increase of 1.41 point, from 5.46 in 2008 to 6.87 in 2017; followed by the Republic of Singapore Navy (0.88), Vietnam People's Navy (0.83), China's People's Liberation Army Navy (0.65), Philippine Navy (0.61), Japan Maritime Self-Defense Force (0.46), Indonesian Navy (0.43), Pakistan Navy (0.41), and lastly Royal Australian Navy (0.06).

Table 13 and Chart 1 also show that the Indonesian Navy's MPC Index 0.43-point increase is somewhat below the average of the index increase of other rival countries, with the ROC Navy, RSN, VPN, PLA Navy, Philippine Navy, and JMSDF showing higher points of increase, while only the Pakistan Navy, RAN, and Royal Brunei Navy performing lower increase. Thus, it can be concluded that the Navy's modernization has paled into insignificance when compared with the naval build-up of other countries. Considering Indonesia's interest in the Asia-Pacific and current maritime environment, the government must choose whether they want to improve the modernization effort, or supplement them by other means.

Conclusion

The MPC Index established in this paper shows that between 2008 and 2017, the Indonesian Navy's modernization has built up its capabilities closer to becoming world-class sea power, not merely maintaining the existing force level. However, its modernization has paled into insignificance when compared with the naval build-up of other countries. To change this stagnation, the elite decision-makers in the defense policy bureaucracy need to improve the modernization efforts in some of the lagging variables, e.g., increasing the number of logistics and afloat support ships as well as ships with heavy displacement, increasing the weapons equipped on the naval vessels, and increasing the roles of the Navy in more outward-looking missions. These are the requirements for the Navy to achieve the grand vision of becoming world-class sea power.

In terms of the MPC Index, it is established after a literature review on the variables of sea power using the most significant variables while considering the

availability of data. Thus, the variables included in this study may have been compromised by the lack of data for other variables of sea power, such as autonomy and cooperation/interoperability, professional qualifications, sailors' moral dispositions, correlation between means and objectives, as well as voluntary limitations. This study also finds it difficult to operationalize most of the unused variables. As such, it is recommended for further studies to enrich the findings of this paper by finding possible methods to operationalize those variables. Lastly, this paper limits the comparison only to the navies of nine other countries due to the availability of data, as well as the period between 2008 and 2017 to identify patterns of change and continuity in the last ten year. Further studies are recommended to expand the scope of research.

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