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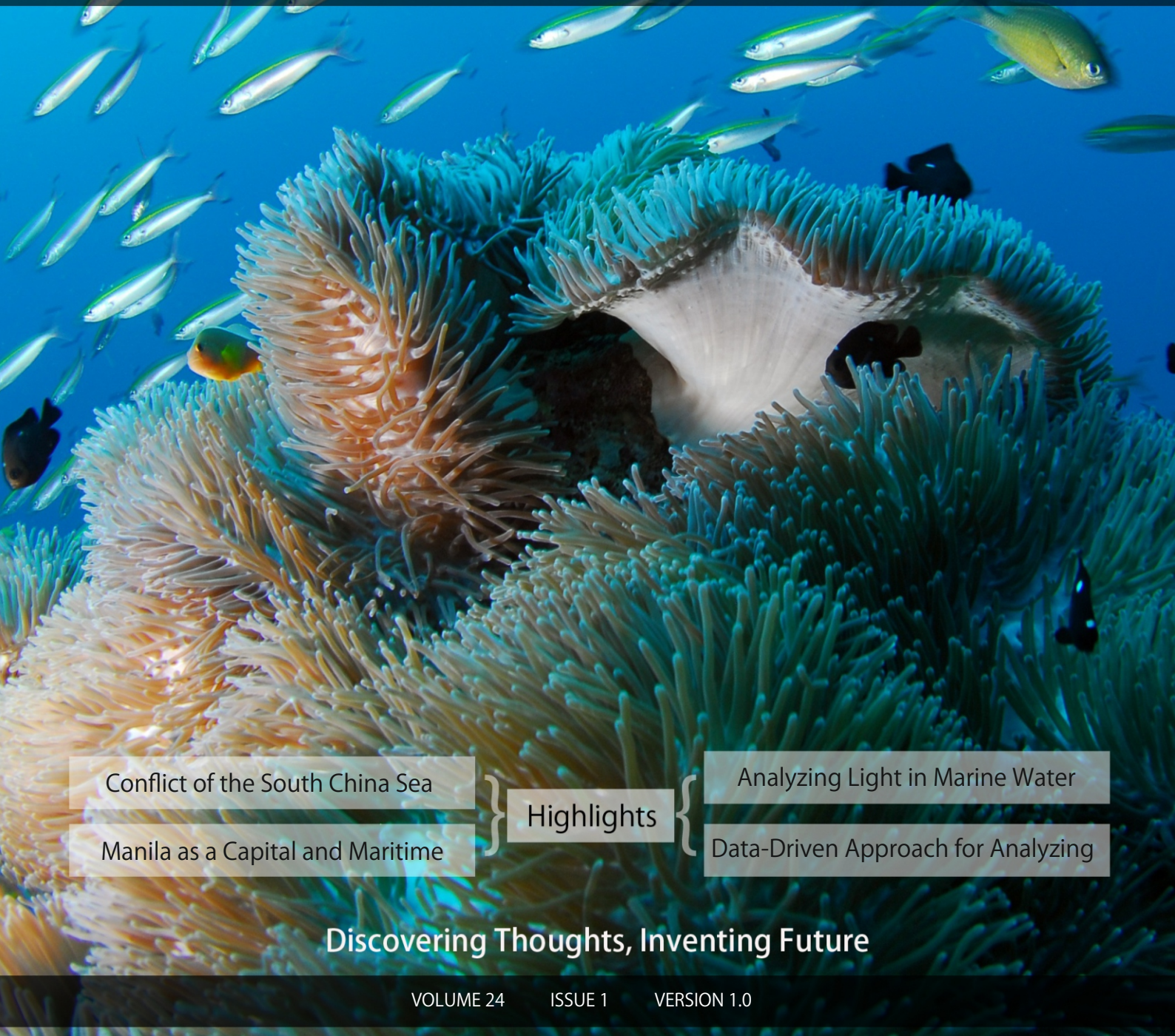

Conflict of the South China Sea

Manila as a Capital and Maritime

Highlights

Analyzing Light in Marine Water

Data-Driven Approach for Analyzing

Discovering Thoughts, Inventing Future

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ASEAN Legal Mechanism in Geopolitical Conflict of the South China Sea

By Saidatul Nadia Abd Aziz & Salawati Mat Basir
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Keywords: *ASEAN, centrality, cohesion, geopolitics, south china sea.*

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Saidatul Nadia Abd Aziz [α] & Salawati Mat Basir [σ]

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I. Introduction

ASEAN and South China Sea conflict has its own history and has dramatically intensified. Since the founding of the Association of Southeast Asian Nations (ASEAN) in 1967, ASEAN has consistently chosen to maintain peace and sovereignty among its member states without external interference.[1] Amid the conflict in the South China Sea, which is crucial to the flow of global maritime trade as it provides the vital maritime link between the Indian and Pacific oceans[2], ASEAN is in a difficult position to maintain its autonomy of purpose and avoid being swept up in the current of China-US competition, which could potentially divide it[3]. The Indo-Pacific has historically been the world's most prosperous area. A massive war there would devastate the world economy. [4]

Concerns have been expressed about ASEAN's capacity to reach an agreement among its member states considering their divergent positions and interests in this conflict.[5]

Neither the growing great power rivalry between the United States and China nor the actions of ASEAN's own members are within the organization's sphere of influence[6]. The members of ASEAN are split between those who have territorial claims in the South China Sea (the Philippines, Brunei, Malaysia, Vietnam, and Indonesia) and those who do not (Cambodia, Laos, Myanmar, and Thailand), with Singapore playing the role of mediator and most of the ASEAN member states (AMS) are heavily exposed to China's influence over land.[7] In 2012, Cambodia, who was chairman of the ASEAN Summit, failed to release a communiqué for the first time in the organization's history, highlighting the diversion of ASEAN, notably about the South China Sea. This demonstrated Cambodia's reliance on China and its willingness to function as a proxy for China, which ultimately prevented ASEAN from uniting against China in the South China Sea[8].

This dispute in the SCS threatens not just the interests of the AMS but also the peace and stability of the region[9]. ASEAN recognized that if the territorial dispute was not effectively addressed, the region will be

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[1] Winston, R. A., & Sachdeva, I. *Raging waters in the South China sea. What the battle for supremacy means For Southeast Asia*. Lizard Publishing, 2020). p

[2] Schofield, C. *Competing maritime claims and enduring disputes in the South China sea*. In Z. Keyuan (Ed.), Routledge handbook of the South China sea (Routledge, 2021). (pp. 104–122).

[3] Buszynski, L .Introduction: The development of the South China Sea dispute. In L. Buszynski & D. T. Hai (Eds.), *The South China Sea from a Regional Maritime Dispute to Geo- Strategic Competition* (pp. 1–8). (Routledge, 2020).

[4] Haddick, R. J. *Fire on the water, second edition: China, America, and the Future of the Pacific*. (Naval Institute Press, 2022).

[5] Hor, S. (2022). *ASEAN policy towards the South China Sea: A neoclassical realism and two-level games analysis* [Master's thesis, Linnaeus University]. http://urn.kb.se/resolve?urn=urn:nbn:se:lnu:diva-113923.

[6] Beeson, M. "Decentered? ASEAN's struggle to accommodate great power competition". *Global Studies Quarterly, 2*(1) (2022)., ksab044. https://doi.org/10.1093/isagsq/ksab044.

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[8] Corr, A. Introduction. In A. Corr (Ed.). *Great powers, grand strategies: The new game in the South China Sea* (pp. 1–40). (Naval Institute Press, 2018).

[9] S. Hor, (2022). *ASEAN policy towards the South China Sea: A neoclassical realism and two-level games analysis* [Master's thesis, Linnaeus University]. http://urn.kb.se/resolve?urn=urn:nbn:se:lnu:diva-113923.

unstable for all AMS[10]. The benefits of the Exclusive Economic Zone (EEZ) of 200 nautical miles from the territory baselines not only provide sovereignty, but also access to the scarce resources deep down such as oil, gas, and fishing resources[11]. These are the geopolitical and economic benefits. Additionally, the EEZ provides strategic locations for regional power projections.[12]. This clarifies the geopolitical tension, as the underlying issue is US-China relations. ASEAN as an organization should be able to make recommendations and resolutions regarding the SCS issue, but if the greater contest persists, it may become irrelevant. Maintaining unity is essential for ASEAN, but unless ASEAN demonstrates autonomy, its unity will be tenuous.[13]

The available mechanisms in ASEAN are notable. As an example, the ASEAN Regional Forum (ARF) had contributed to the region's security matters. The author argue that to manage the present geopolitical shift in the South China Sea, ASEAN must be open about its strengths and shortcomings. The issues faced by ASEAN now necessitate the development of a consistent, coordinated, and mutually supportive response. Though it was believed that cohesion and unity were unattainable due to the national interests and varied positions of AMS about the conflict, the current dynamics of regional dominance are more severe and challenging, and the complexity of time will compel ASEAN to operate in a central role. This article is to discuss: (i) the geopolitical conflict between major powers in Indo Pacific and the South China Sea (ii) ASEAN's existing mechanisms and policies in addressing the South China Sea Conflict; (iii) ASEAN's cohesion and centrality in the South China Sea conflict; and (iv) ASEAN's way forward to stand as a regional power in the South China Sea.

II. Geopolitical Conflict in Indo Pacific and the South China Sea

The concept of geopolitics has its roots in the decades between 1880 and 1910. As the title suggests, Captain Alfred Thayer Mahan's *The Influence of Sea Power on History* 1660-1783 (1890) argued that the source of Britain's rise to world power in the early modern world (and, by extension, the potential key to dominance of America as a rising world power in the 20th century) was control of the seas[14]. Maritime power is the capacity to employ maritime capabilities on and from the sea to affect the behaviour of policy executives and military commanders, as well as the path of international relations. Maritime diplomacy is the use of maritime power to promote, convince, discourage, or compel. Therefore, the nation holding the prestige of command in the South China Sea has frequently influenced the course of history in the Indo-Pacific[15]. What is a "great power"? A great power is a state that is able and recognized as able to exert influence around the world[16]. When one or two great commercial powers have been dominant or have achieved parity of power, the emphasis in practise has been placed on the freedom of navigation and the immunity of shipping from local control; in such instances, the seas have been viewed as strategic rather than economic areas of competition.[17] (Connell, 1982).

It is important who controls the Indo-Pacific. First, let us acknowledge the interests of both big powers here, the United States and China, and the necessity of the security competition. This article will then elaborate on why it matters who is in power and how ASEAN responded to the Indo pacific idea.

In 2010, geostrategic competition between great powers intensified in numerous ways, especially after China bolstered its regional footprint via the Belt and Road Initiatives (BRI). That was when the US and its allies sought to offset China's regional influence by inventing a new geographical notion of the "Indo-Pacific"[18]. The Indo-Pacific Strategy (IPS) is a relatively new maritime-related strategy being created and implemented by four pillar nations: the United States, Japan, Australia, and India. It was first officially stated by U.S. President Donald Trump during his Asia trip in November 2017 [19].

[10] Son, N. H.. ASEAN, China, and the code of conduct. In L. Buszynski & D. T. Hai (Eds.), *The South China sea: From a regional maritime dispute to geo- strategic competition* (pp. 24–42). (Routledge, 2020).

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[18] Yoshimatsu, H. ASEAN and great power rivalry in regionalism: From East Asia to the Indo-Pacific. *Journal of Current Southeast Asian Affairs.*(2022). https://doi.org/10.1177/18681034221139297.

[19] Shicun, W., & Colombage, J. *Indo-Pacific strategy and China's response*. Institute for South China Sea Studies. (2019). https://chinaus-icas.org/wp-content/uploads/2020/11/Indo-Pacific-Strategy-and-Chinas-Response-Report-FINAL.pdf

Changes in Xi Jinping's behaviour and objectives demonstrate that his assertiveness and nationalistic behaviour altered the game. China is cognisant of the "power dilemma" and that international relations are never static; hence, it has made substantial military advancements.[20]. While China believes that rapid military modernization and the acquisition of maritime "breathing space" in the western pacific is the best way to defend China's expanding interests and hedge against uncertainties, the United States and Indo-Pacific, which claim to have a strong interest in defending the rules-based international system, suggest that China's claims in the East and South China Sea are an attempt to rewrite international law and norms. The Chinese are attempting to resolve territorial issues by material strength and intimidation. If China continues to undermine the security framework in the Indo-Pacific, the United States' dependability will be questioned.[21] In official publications, the Indo-Pacific is described as a geopolitical and geo economic space essential to the defence of U. S. worldwide interests. Nevertheless, its geographical boundaries are not completely delineated [22]. Consequently, the stage is set for a security rivalry between both of these major powers.

The Sino-American rivalry for power and status has multiple dimensions. Principal among these are perceptions of military threat, trade policy tensions, political-ideological factors, and opposing concepts of regional order[23]. On one hand, the United States is still viewed as the stabilising power, but on the other, there are issues as to whether American hegemonic fall has made the Indo-Pacific more unstable and institutionally weaker.[24] The world's rising powers, particularly China, have begun to alter the structure of the global order with their “neighbourhood diplomacy” with the goal of turning China’s neighborhood areas into a “community of common destiny[25], while the historical winners of the initial development of capitalism and modernity, primarily North American and Western European nations, have struggled to achieve the high economic growth rates that lead to hegemony[26].

So why does it matter who controls the Indo Pacific? The United States has been extremely consistent. As the dominant power in the region since 1945, the United States has had a significant role in defining the Indo-Pacific system. Over the past century, the United States has sought to prevent any rival force from dominating the region, which would make it harder for the US to pursue specific political and economic goals in the region[27]. Nevertheless, the regional dynamics of the Indo-Pacific remain in flux. The hegemony of the United States is eroding as China's naval force grows in strength. China may be able to halt the U.S. navy's advancement to its shores during a maritime crisis, given its anti-access capabilities in the modern world.[28]. The already complex South China Sea issue has been further complicated by US-China geopolitical rivalry[29].

The sovereignty dispute over the Spartly islands in the South China Sea and the maritime boundary dispute over the surrounding seas are the most complicated territorial disputes in the region[30]. Historically, these islands and features were of minimal practical significance to regional states and colonial powers in the region. This changed in the late 1960s and early 1970s for a variety of reasons, including the "cold war" climate in the South China Sea, which led to military scenarios involving the South China Sea islets, intra-regional rivalry, and rising state nationalism [31].

China's nine-dash line of 1947, a U-shaped line used to map out major areas over which China claims ownership and complete sovereignty, forms the basis of its publicly nebulous "historic rights" claim in the South China Sea. However, China has been unable to precisely delineate the location of its claim[32]. China's claims of historic rights over most of the contentious waterway were rejected in a 2016 Hague ruling that was

[20] Forsyth, I. Old game plan, new game: China’s grand strategy in the South China Sea, In A. Corr (Ed.), *Great powers, grand strategies: The new game in the South China Sea* (pp.74–105). (Naval Institute Press, 2018).

[21] Haddick, R. *Fire on the water, second edition: China, America, and the Future of the Pacific*, p.

[22] Heiduk, F., & Wacker, G. *From Asia-Pacific to Indo-Pacific: Significance, implementation and challenges.* Stiftung Wissenschaft und Politik German Institute for International and Security Affairs,2020).

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[30] Manicom, J. Maritime security: Will Asia’s next war occur at sea? In J. Walllis & A. Carr (Eds.), *Asia Pacific security: An introduction* (pp. 147–162). Georgetown University Press,2016).

[31] McDorman, T. L. The territorial sovereignty disputes in the south China Sea. In Z. Keyuan (Ed.), *Routledge handbook of the South China Sea* (pp. 91–103). (Routledge, 2021).

[32] Winston, Raging waters in the South China sea. What the battle for supremacy means For Southeast Asia.

unanimously upheld and made clear that China had no basis under the UN Convention on the Law of the Sea (UNCLOS)[33]. Despite this, China has continued to disregard the award and ruling to the present day. China has been making investments and trying to rise as a maritime power. The man-made islands increased China's visibility and ability to project its air and maritime power throughout the South China Sea.[34]. Based on military observations, the Chinese have been strengthening their South China Sea coast guards ever since.[35] The tensions in the South China Sea involve the military actions of SCS claimant states and external powers led by the United States[36].

The United States, on the other hand, has steadfastly upheld the Freedom of Navigation (FONOP) concept through navigational transits and overflights, as well as the associated respect for the rule of law. Australia, Japan, the United Kingdom, and France, among others, soon followed.[37]. The United States appears to adhere to the concepts of "pivot" and "rebalance" during President Obama administration to shift their military forces to the Asia-Pacific region and enhance their position. Rising military activity by both great powers in the East and South China Sea have created a geopolitical and geostrategic battlefield[38].

To maintain its status as a great power, the United States must adopt a more balanced approach. Due to their frequent practice as the lone great power, at least before the emergence of China, this is not a straightforward process. On one hand, the United States can confront China's military strength; but, due to China's military force's growth and perseverance, a confrontation may escalate into a war. On the other hand, the United States can exercise military de-escalation and focus on institution building in the region, which will be less possible due to Asia's unresolved world war history. The United States should support ASEAN efforts to promote a regional vision based on inclusiveness, prosperity, and ASEAN centrality[39]. Aside from that, the United States can and probably should embrace equality with other nations, especially the medium and small powers in the Indo-Pacific, to avoid great power confrontation[40]. Obviously, different philosophies and objectives would likely create another conflict from this.

The current geostrategic landscape has influenced ASEAN, which had served as the key player in building multilateral architectures to discuss regional issues and challenges[41].Unsettled, this geopolitics conflict will directly give effect to ASEAN as a region, as both great powers are meddling in ASEAN matters as well. So how does ASEAN respond to the Indo Pacific idea depends on how ASEAN decides to face the great power. At this point of time, ASEAN had made many initiatives to deal with security issues in the region including security mechanisms that involved these great powers. Individual member states aim to hedge, balance, and bandwagon in a variety of ways in reaction to China's emergence and the increase of great power rivalry in the area, resulting in a variety of ASEAN responses[42]. Regional policy analysts share similar concerns that the U.S. Indo-Pacific strategy is not only anti-China, but also contemptuous of ASEAN, despite the Trump administration's repeated assertions of support for ASEAN Centrality. These issues have been heightened by the return of the Quad, which has sparked questions regarding ASEAN's position. The fundamental sentiment, however, as represented in the preceding economic discussion, is that "China is here", it is already Southeast Asia's most important economic partner, and this position is anticipated to grow over time.[43]

However, according to survey by ISEAS in its report The State of Southeast Asia: 2021 Survey Report, the idea of an Indo-Pacific region seems to have reached a turning point. According to the survey, in order for ASEAN to remain relevant, 40.3% of Southeast Asians believe that it "has to express its ASEAN Outlook on the Indo-Pacific (AOIP) more effectively." The second group, or 20.2% of respondents, believes that the Indo-Pacific strategy is "simply a tool for many countries to shape geo-politics." The strategy "should not be defined by one country, nor should it be utilised to contain a

[33] Borton, J. *Islands and rocks in the South China Sea: Post-hague ruling*. Xlibris. (2017).

[34] Son, N. H. ASEAN, China, and the code of conduct. In L. Buszynski & D. T. Hai (Eds.), *The South China sea: From a regional maritime dispute to geo- strategic competition* (pp. 24–42). (Routledge,2020)

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[36] George, M. Maritime security and demilitarisation of the South China Sea. In Z. Keyuan (Ed.), *Routledge handbook of the South China Sea* (pp. 65–88). (Routledge, 2021).

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[38] Son, N. H. (2020). ASEAN, China, and the code of conduct pp. 24–42.

[39] Stromseth, J. *Don't make us choose. Southeast Asia in the throes of US-China rivalry*. (Brookings, 2019). https://www.brookings.edu/research/dont-make-us-choose-southeast-asia-in-the-throes-of-us-china-rivalry/.

[40] White, H. *The China choice: Why America should share power*. (Black Inc, 2012).

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[43] Thu, H. L. *Southeast Asians hope for neutrality, prepare for a choice*. Australian Strategic Policy Institute. https://www.aspi.org.au/opinion/southeast-asians-hope-neutrality-prepare-choice; Singh, D.. Southeast Asia's uneasy position in America's Indo-Pacific strategy. *Perspective*, *76*(2018).

certain country," according to the third section (16.7%)."[44]

In addition, a recent 2022 ISEAS survey study stated that ASEAN's opinions and options in the region's developing power struggle, particularly the escalating rivalry between China and the United States, were "non-choice" oriented. To resist pressure from the two main powers, ASEAN member states continue to favor the option of strengthening ASEAN's resiliency and unity (46.1%). The notion of an engaged ASEAN appears to be more favored than its customary position of remaining neutral in the dispute between China and the US (26.6%). The preference for ASEAN to look for "third parties" to improve its strategic options has also increased slightly (16.2%), with Vietnam's increase being the largest[45].

III. Asean's Existing Mechanisms and Policies in Addressing the South China Sea Conflict

As a regional organization, ASEAN strives to maintain its identity and autonomy as the US-China rivalry over the South China Sea intensifies, but it can no longer suppress its disagreement and disintegration over this issue[46]. Acceptably, ASEAN has responded to the concept of the Indo-Pacific and its centrality [47](Beeson, 2022), but more effort is required to keep up with the constant changes and challenges in the region. ASEAN, which has been engaged in the development of an inclusive regional architecture for decades, must consistently demonstrate its collective leadership in forging and shaping the vision for closer cooperation in the Indo-Pacific and maintaining its position in the evolving regional architecture in Southeast Asia and its surrounding areas. ASEAN must also continue to act as an honest broker in the context of competing strategic interests.[48]

ASEAN is a regional organization that reaches consensus-based decisions.[49] On certain issues, all ASEAN member states share a common interest, but on others, their interests differ. The South China Sea is among the problems where member interests disagree. Vietnam and the Philippines have continuously demanded support for their claims in the South China Sea, while Cambodia and Laos have openly allied with China, dividing ASEAN[50]. While the South China Sea conflict directly concerned four of its members (Brunei, Malaysia, Philippines, and Vietnam), other countries such as Indonesia's Natuna Island, which bordered the South China Sea, had claims that overlapped with China's nine-dash line map. Thailand, on the other hand, has commercial interests in the commercial shipping route between the Gulf of Thailand and the South China Sea, so does Singapore, which is concerned about the major shipping routes between the Indian Ocean and East Asia via the Straits of Malacca and Singapore before entering the South China Sea.[51]

The major question is whether ASEAN can effectively manage its internal divisions. Based on consensus decision making in the South China Sea issue are the numerous failed attempts to even address the issue in ASEAN meetings, such as the ASEAN Ministerial meeting in 2012 in Phnom Penh, where a deadlock of wording regarding the South China Sea resulted in the first non-completion of a Joint Communiqué[52] In addition, the 2016 Arbitration award was favorable to the Philippines, however the ASEAN Foreign Ministers were unable to agree on a single language for their annual remarks on the South China Sea as mentioned by Marty Natalegwa,

"ASEAN has regretfully thus far been incapable or unwilling to collectively and explicitly make reference to the award […] the silence of ASEAN on the PCA Award is deafening. […] For an organization that has incessantly emphasized the primacy of the rule of law and efficacy of diplomacy, this is a position that is difficult to countenance".[53]

[44] Seah, S., Ha, H. T., Martinus, M., & Thao, P. T. P. *The state of Southeast Asia: 2021 survey report.* ASEAN Studies Center & ISEAS-Yusof Ishak Institute. https://www.iseas.edu.sg/wp-content/uploads/2021/01/The-State-of-SEA-2021-v2.pdf

[45] Seah, S., Lin, J., Sithanonxay, Suvannaphaky, Martinus, M., Thao, P. T. P., Seth, F. N., & Ha, H. T. *The state of Southeast Asia: 2022 survey report.* ASEAN Studies Center & ISEAS-Yusof Ishak Institute. https://www.iseas.edu.sg/wp-content/uploads/2022/02/The-State-of-SEA-2022_FA_Digital_FINAL.pdf

[46] Buszynski, L. ASEAN, grand strategy, and the South China Sea: Between China and the United States. In C. Anders (Ed.), *Great powers, grand strategies: The new game in the South China Sea* (pp. 122–146). (Naval Institute Press, 2018).

[47] Beeson, M.Decentered? ASEAN's struggle to accommodate great power competition. *Global Studies Quarterly, 2*(1) (2022)., ksab044. https://doi.org/10.1093/isagsq/ksab044.

[48] ASEAN. *ASEAN outlook on the Indo-Pacific*. ASEAN, (2019).. https://asean.org/speechandstatement/asean-outlook-on-the-indo-pacific/.

[49] Leelianou, S. *Does ASEAN consensus decision making remain relevant?* [Master's thesis, College of Business, Government and Law, Flinders University, 2021).] https://flex.flinders.edu.au/file/1b0b82bd-e5bf-4b49-9680-3e2524cbb0a6/1/Leelianou2021_Master Copy.pdf

[50] Buszynski, L. ASEAN, grand strategy, and the South China Sea: Between China and the United States. In C. Anders (Ed.), *Great powers, grand strategies: The new game in the South China Sea* (pp. 122–146). (Naval Institute Press, 2018).

[51] Beckman, R., & Dang, V. H. ASEAN and the South China Sea. In Z. Keyuan (Ed.), *Routledge handbook of the South China Sea* (pp. 336–356).(Routledge, 2021).

[52] Tonnesson, S. Four aspects of the crisis in the South China Sea. In L. Buszynski & D. T. Hai (Eds.), *The South China Sea from a Regional Maritime Dispute to Geo- Strategic Competition* (pp. 9–23). (Routledge, 2021).

[53] Natalegawa, M. *Does ASEAN Matter? A View from Within*. Institute for Southeast Asian Studies, 2018.

Since the 1990s, ASEAN has strived to play a proactive role in response to South China Sea developments. It was demonstrated by statements regarding regional developments, dialogue with China, and the ASEAN Regional Forum (ARF), which was first convened in 1994.[54] ARF's mission is to foster constructive dialogues and consultations on political and security issues of common interest and concern, and to make significant contributions to confidence-building and preventive diplomacy in the Asia-Pacific region[55].The ARF is viewed as a beneficial tool for dealing with China's rise. The regional grouping seeks to "socialize" China to the point where it acts as a "responsible regional power" through a cooperative security approach. In August 2022, at the 29th ARF meeting held in Phnom Penh, the ministers discussed the South China Sea Conflict. In particular, the necessity of maintaining and supporting peace, security, stability, safety, and freedom of navigation in and above the South China Sea was underlined, and the advantages of the South China Sea being a sea of peace, stability, and prosperity were acknowledged. The complete and effective implementation of the 2002 Declaration on the Conduct of Parties in the South China Sea (DOC) was also emphasised. The progress of substantive negotiations towards the early conclusion of an effective and substantive Code of Conduct in the South China Sea (COC) consistent with international law, including the 1982 United Nations Convention on the Law of the Sea (UNCLOS). However, the meeting emphasised the need to preserve an atmosphere conducive to COC negotiations, and thus supported steps that could lessen tensions and reduce the possibility of accidents, misunderstandings, and miscalculations[56].

The Meeting emphasised the significance of implementing confidence-building and preventive measures to increase, among other things, trust and confidence between the parties, and reaffirmed the significance of upholding international law, including the 1982 UNCLOS. The Meeting discussed the situation in the South China Sea and took note of the concerns voiced by some countries regarding land reclamations and activities, as well as serious incidents in the region, which have eroded trust and confidence, heightened tensions, and may threaten peace, security, and stability in the region. The Meeting reaffirmed the need to enhance mutual trust and confidence, exercise self-restraint in the conduct of activities and avoid actions that would exacerbate the situation, and pursue peaceful resolution of disputes in accordance with universally recognised principles of international law, including the UNCLOS of 1982. The Meeting emphasised the significance of non-militarization and self-restraint in the conduct of all activities by claimants and all other states, including those listed in the DOC, which could further complicate the situation and escalate tensions in the South China Sea[57].

ASEAN has been able to establish ASEAN-led security institutions based on the concept of "cooperative security" — an inclusive institutional arrangement designed to facilitate security dialogues, confidence building, and norm creation among members with the goal of politically taming regional great powers and influencing their behaviour[58]. In addition, ASEAN established its own ASEAN community, which consists of three pillars, one of which focuses on political and security cooperation-ASEAN Political and Security Community[59], with the goal of elevating ASEAN's political and security cooperation so that people in the region can live in peace with one another and with the rest of the world in a just, democratic, and harmonious environment[60]. On the other hand, the establishment of the ASEAN Political-Security Community is widely recognised as a significant achievement in fostering and maintaining peace in Southeast Asia. However, it has been criticised for its inability to resolve the extensive history of territorial disputes within the community. Critics questioned ASEAN's capacity to materialise the APSC as a complete security-based community. Numerous analysts assert that ASEAN has failed to realise its vision of a "comprehensive" security community as a result of the region's "endless" traditional and non-traditional security challenges[61].

In addition, ASEAN also has a platform called ASEAN Defense Ministers Meeting Plus (ADMM-Plus) for ASEAN and its dialogue partners to strengthen security and defense cooperation for peace, stability, and development in the region[62]. In the recent 9th ADMM Plus meeting held on November 23, 2022 in

[54] Amer, R. *The South China Sea: Challenge for ASEAN*. Institute for Security & Development Policy. (2014). https://www.files.ethz.ch/isn/185082/2014-amer-the-south-china-sea-challenge-for-asean.pdf

[55] ASEAN. *ASEAN Regional Forum*. ARF. (2022a). https://aseanregionalforum.asean.org/about-arf/

[56] Ibid

[57] Ibid

[58] Aziz, S. N. A., & Basir, S. M. South China Sea: ASEAN mechanism on maritime disputes and the rise of Indo Pacific region. *Journal of Territorial and Maritime Studies*, *9*(2) (2022). 65–82. https://www.jstor.org/stable/48684189.

[59] Karim, M. A. Should the ASEAN regional forum (ARF) revisit its core areas. *AEI Insights: An International Journal of Asia-Europe Relations*, *2*(1) (2016). 100–119.

[60] Beckman, R., & Dang, V. H. ASEAN and the South China Sea. In Z. Keyuan (Ed.), *Routledge handbook of the South China Sea* (pp. 336–356). (Routledge,2021).

[61] Huda, M. I. M., Muhammad, S. F. A. S., & Kamaruddin, N. Security community, ASEAN and its member states: Mutually reinforcing or a relationship of convenience? *Malaysian Journal of History, Politics & Strategic Studies, 47*(1) (2020), 78–97.

[62] ASEAN. "*About the ASEAN defence ministers' meeting plus"*. ADMM. (2017). https://admm.asean.org/index.php/about-admm/about-admm-plus.html.

Siem Reap, Kingdom of Cambodia, there was no specific mention of the South China Sea, but there are terms that indicate that security concerns in the South China Sea are being observed. For example, the meeting emphasized strengthening collective efforts and practical cooperation to reduce the impact of current and emerging traditional and nontraditional threats, including maritime security challenges. In addition, the summit reiterated respect for international law, notably UNCLOS 1982. Moreover, maintaining confidence between members by applying the Code for Unplanned Encounters at Sea is crucial (CUES)[63]. At the 16th ASEAN-China Summit in 2016, the leaders of both countries adopted a Joint Statement on the application of the CUES in the South China Sea and the guidelines for hotline communications between senior officials of the Ministers of Foreign Affairs of ASEAN member states and China in response to maritime emergencies in the implementation of the DOC[64]. In 2018, the CUES were employed in maritime exercises and were regarded as the initial step in advancing practical measures for establishing trust and marine safety in the South China Sea[65].

The 9th ADMM-Plus meeting also discussed the ASEAN Outlook on the Indo-Pacific (AOIP), where it was highlighted that the AOIP is meant to complement the ASEAN Community-building process and is not designed to create new mechanisms or replace current ones[66]. The AOIP is not a magic wand that will immediately persuade AMS to adopt the name "Indo-Pacific." [67].The AOIP is a response to the United States' "Free and Open Indo-Pacific" (FOIP) strategy, the rising competitiveness between the United States and China, and the establishment of multiple Indo-Pacific initiatives [68]. While many Asia-Pacific states began to demonstrate a greater interest in the Indo-Pacific, ASEAN maintained a cautious position on the notion and did not support the FOIP by merely saying in its 2018 Joint Communique that it "recognises" the FOIP.ASEAN agreed to explore opportunities for cooperation with the Indo-Pacific Initiative (headed by the United States and Japan), the Belt and Road Initiative (led by China), and the Expanded Partnership for Quality Infrastructure (Japan led). In other words, this demonstrates that ASEAN avoids taking sides between major powers and engages in impartial involvement[69]

ASEAN has consistently included a discussion of the South China Sea conflict at every ASEAN summit, as evidenced by the fact that the most recent ASEAN summit, held in October 2022, featured a discussion of the South China Sea conflict. In addition to the ongoing human rights situation in Myanmar, the subject of the South China Sea was regularly discussed at ASEAN meetings and summits. In light of this, it is necessary for ASEAN to take aggressive measures to ensure that the South China Sea issue is not merely a topic of discussion at every meeting or ASEAN summit[70]. The issue of land reclamations, activities that increased tensions, and the importance of non-militarization and self-restraint in the conduct of activities and pursuit of peaceful resolution in accordance with international law, including UNCLOS 1982, were discussed at the ASEAN summit attended by the heads of state or government of ASEAN member states while acknowledging the Declaration of Conduct and progress of Code of Conduct [71].

The first Code of Conduct on the South China Sea were adopted bilaterally between the Philippines and China and the Philippines and Vietnam in 1995[72]. The code established the parties' commitment to peacefully resolve territorial issues in conformity with international law, including UNCLOS. Then, during the 29th ASEAN Ministerial Meeting in the same year, a regional Code of Conduct was proposed, with the two prior COCs serving as a referral, and the document was presented at the 6th ARF meeting in 1999. China was initially hesitant but later interested in proposing its own

[63] ASEAN. "*Joint declaration by the ADMM-Plus defence ministers on defence cooperation to strengthen solidarity for a harmonised security*." ADMM-Plus. (2022b). https://s3.documentcloud.org/documents/23318686/joint-declaration-of-the-9th-admm-plus-jd-23-november-2022-siem-reap-cambodia-adopted-1.pdf

[64] ASEAN. "*19th ASEAN-China summit chairman's statement.* ASEAN." (2016). https://asean.org/wp-content/uploads/2016/09/Final-Chairmans-Statement-of-the-ASEAN-China-25th-Anniversary-Commemo....pdf

[65] Koh CSL, "ASEAN–China Maritime Exercise CUES greater SCS stability", East Asia Forum, August 18, 2018 https://www.eastasiaforum.org/2018/08/18/asean-china-maritime-exercise-cues-greater-scs-stability (Accessed on 20 December 2022).

[66] ASEAN. "*Joint declaration by the ADMM-Plus defence ministers on defence cooperation to strengthen solidarity for a harmonised security*." ADMM-Plus. (2022b). https://s3.documentcloud.org/documents/23318686/joint-declaration-of-the-9th-admm-plus-jd-23-november-2022-siem-reap-cambodia-adopted-1.pdf

[67] Aziz, S. N. A., & Basir, S. M. South China Sea: ASEAN mechanism on maritime disputes and the rise of Indo Pacific region. *Journal of Territorial and Maritime Studies*, *9*(2), (2022). 65–82. https://www.jstor.org/stable/48684189.

[68] Beckman, R., & Dang, V. H. ASEAN and the South China Sea. In Z. Keyuan (Ed.), *Routledge handbook of the South China Sea (*2021). (pp. 336–356). Routledge.

[69] Yoshimatsu, H. ASEAN and great power rivalry in regionalism: From East Asia to the Indo-Pacific. *Journal of Current Southeast Asian Affairs.*(2022).. https://doi.org/10.1177/18681034221139297.

[70] Aziz, S. N. A. "*ASEAN should opt for economic diplomacy"*. News Straits Times. (2022). https://www.nst.com.my/opinion/ columnists/2022/11/848475/asean-should-opt-economic-diplomacy.

[71] ASEAN. *Joint statement on the 20th anniversary of the declaration on the conduct of parties in the South China Sea*. (ASEAN. 2022c). https://asean.org/wp-content/uploads/2022/11/FINAL-Joint-Statement-on-the-20th-Anniversary-of-DOC-1.pdf

[72] Thao, H. Vietnam and the code of conduct for the South China Sea. *Ocean Development & International Law, 32*(2) (2001)., 105–130. https://doi.org/10.1080/00908320151100244.

version of COC. Throughout the years of discussions, there were numerous irreconcilable differences.[73]

Thus, in 2002, at the 35th ASEAN Ministerial Meeting (AMM), ASEAN member states signed a non-binding document titled the Declaration on the Conduct of Parties in the South China Sea (DOC)[74]. The purpose of this DOC was to foster confidence while ASEAN pursues the COC. Then, in 2012, ASEAN and China signed the document "ASEAN Proposed Elements of a Regional Code of Conduct in the South China Sea (COC)," which was followed by a declaration. China's reluctance to enforce the COC remains a challenge[75] despite an agreement reached in 2013 between China and a more unified and determined ASEAN, with Brunei as the ASEAN chair[76].

The code was designed to bind China to the status quo, but the difficulty was that the status quo was continuously changing as China took control of additional features in the South China Sea. Though the COC was not meant as a conflict resolution mechanism nor a treaty under international law[77], ASEAN had no other acceptable means of dealing with China that was acceptable by all AMS[78]. ASEAN prefers multilateral cooperation[79] to prevent bullying, but China seeks asymmetric bilateral negotiations to resolve conflicts[80]. However, ASEAN loses its credibility if it agrees to bilateral negotiations with China. Multilateral foundations are needed for ASEAN centrality[81] .The delay in implementing the COC is making the situation tough for ASEAN, particularly in the aftermath of Covid-19, when most ASEAN governments are experiencing economic difficulties; China has a significant advantage[82]. Therefore, ASEAN cohesion and centrality are crucial.

ASEAN has demonstrated the ability to manage the issue in the South China Sea. The majority, if not all, of the mechanisms discussed have referenced the conflict in the South China Sea and regularly urged ASEAN and other parties directly or indirectly involved in the issue to maintain peace and avoid military conflicts. Despite the clear impossibility of resolving the South China Sea conflict soon, ASEAN is at least keeping the issue on its regional agenda. Even though ASEAN is attempting to address the issue, its legitimacy remains in question. The struggle between the big powers, particularly China, and the delay in implementing the most important control mechanism in the South China Sea, the COC, have rendered ASEAN irrelevant in conflict resolution. The fact that China has personal relationships with each ASEAN member state and can break the consensus of ASEAN member states in the COC escalates the situation.

The author contend that ASEAN has both strengths and limitations in this regard. As the article explained from the very beginning, this South China Sea matter involved great powers that is meddling in ASEAN making it fairly difficult for ASEAN to build up and stand strong on its consensus decision making. However, the mechanisms that had been addressed here demonstrate that ASEAN has already made substantial efforts, and that numerous meetings and dialogues have assisted ASEAN in enduring and containing the conflict between great powers. ASEAN just need to develop a coherent, continuing and collective response in this regard.

IV. Asean's Cohesion and Centrality in the South China Sea Conflict

The concept of ASEAN centrality encompasses several interconnected factors. ASEAN must stay at the center of Asia (or Asia-Pacific) regional organizations, including the ASEAN Plus Three (APT), the ASEAN Regional Forum (ARF), and the East Asian Summit (EAS). ASEAN serves as the institutional "platform" upon which the Asia-Pacific and East Asian regional organizations are founded. Without ASEAN, it would have been impossible to establish these broader regional organizations[83]. As previously mentioned, ASEAN is founded on consensus decision-making, which proactively sought to keep ASEAN member states united and prevent intragroup conflict[84]. Consensus also indicates that ASEAN can play a leading role in regional

[73] Beckman, R., & Dang, V. H. ASEAN and the South China Sea. In Z. Keyuan (Ed.), *Routledge handbook of the South China Sea* (pp. 336–356). Routledge, (2021).

[74] Panda, A. *China, ASEAN come to agreement on a framework South China Sea code of conduct*. (2017). The Diplomat. https://thediplomat. com/2017/05/china-asean-come-to-agreement-on-a-framework-south-china-sea-code-of-conduct/.

[75] Winston, R. A., Raging waters in the South China sea.

[76] ASEAN. *Chairman's statement of the 23rd ASEAN summit: 'Our people, Our future together'*. Bandar Seri Begawan. (2013). https://asean.org/wp-content/uploads/images/archive/23rdASEAN S-ummit/chairmans%20statement%20-%2023rd%20asean%20summit%20-%20text%20-%20final.pdf

[77] Thayer, C. A. ASEAN, China, and the code of conduct. In L. Buszynski & D. T. Hai (Eds.), *The South China Sea from a regional maritime dispute to geo- strategic competition*. (Routledge,2020).

[78] Buszynski, L. ASEAN, grand strategy, (pp. 122–146).

[79] ASEAN. *ASEAN leaders' declaration on upholding multilateralism*. Brunei Darussalam. (2021). https://asean.org/wp-content/uploads/2021/10/3.-FINAL-ASEAN-Leaders-Declaration-on-Upholding-Multila-teralism.pdf

[80] Wardahana, R. S. South China Sea conflict and security cooperation in ASEAN waters. *Indonesian Journal of Peace and Security Studies, 3*(1) (2021)., 23–33. https://doi.org/10.29303/ijpss.v3i1.56.

[81] Li, J. J. ASEAN and the South China Sea: Approaches to resolving the conflict. *Independent Study Project (ISP) Collection*. 2752. (2017).

[82] Winston, R. A., Raging waters in the South China sea.

[83] Acharya, A. "The myth of ASEAN centrality". *Contemporary Southeast Asia: A Journal of International and Strategic Affairs*, *39*(2) (2017), 273–279.

[84] Emmerson, D. K. "ASEAN between China and America: Is it time to try horsing the cow?" *TRaNS: Trans-Regional and National Studies of Southeast Asia, 5*(1) (2017), 1–23. https://doi.org/10.1017/trn.2016.31.

agreements[85], which seem to be requirements for 'ASEAN Centrality' in the broader Asia-Pacific Region[86] and may strengthen the organization's diplomatic power on the international arena.[87]

To sustain the region's stability, uphold the concept of consensus and centrality, and prevent it from being destabilized by the competition of major powers, ASEAN must maintain its autonomy, particularly in the complicated geostrategic environment. Given the diversity within ASEAN, the organization has frequently been accused of failing to reach consensus on crucial issues[88]. However, if not accommodating the diversity of members, ASEAN would not be an impactful and inclusive regional organization[89]. Though being criticized, ASEAN has used socialization and persuasion to engage with all great powers. Acharya mentions boldly, *"what might be Asia's security order today had there been no ASEAN? At the very least, there would be a lot less opportunity for dialogue and diplomatic interactions among the major powers with an interest in Asia, and the prospects for a preemptive US containment of China would have been greater."*[90]. In the Asia-Pacific, ASEAN has been imperative in fostering positive development and serving as a model for responsible international behavior.[91]

Despite this, it is not accurate to say that achieving centrality for ASEAN does not come with any difficulties or that ASEAN has effectively accomplished this goal. On the one hand, the fact that immensely influential states are willing to embrace the concept of ASEAN centrality may appear like a vindication of ASEAN's continuing importance. On the other side, however, others may believe that the concept is essentially a myth.[92]The "ASEAN Way" of consensus-seeking, voluntarism, and face-saving is partly to blame for the issue; no state is required to do anything they do not want to, and the ASEAN Secretariat has no authority to force them to[93] The ASEAN Way incorporates and adapts global principles to Southeast Asia's regional setting[94].As a result, decision-making in the ASEAN-led forum is less effective because member states can exercise their veto power over policies that do not affect them or are inimical to their interests. As the ASEAN Chair in 2012, Cambodia, for instance, strengthened its economic connections with China to thwart the joint communiqué denouncing China's aggressive actions in the South China Sea[95]. ASEAN adopting no formal position on the SCS issue shows a lack of cohesion.[96] When ASEAN Foreign Ministers' Meeting gathered virtually in late June 2020, the Philippines' president was the first to "warn" of the SCS's growing danger but failed to make assertive comments in July 2016, as for that matter, about other claimant members and ASEAN's deafening silence. However, nothing has occurred to demonstrate ASEAN solidarity[97].

[85] Kim, M. H. "Why does a small power lead? ASEAN leadership in Asia-Pacific regionalism." *Pacific Focus: Inha Journal of International Studies, 27*(1) (2012)., 111–134. https://doi.org/10.1111/j.1976-5118. 2012.01078.x

[86] Natalegawa, R. M. "The expansion of ASEAN and the changing dynamics of Southeast Asia". *Contemporary Southeast Asia, 39*(2) (2017)., 232–238.

[87] Von Feigenblatt, O. F. "Avoidance and consensus building in the association of Southeast Asian States (ASEAN): The path towards a new 'ASEAN Way'." *Entelequia: Revista Interdisciplinar*, *13*(1), (2011). 121–138.

[88] Stubbs, R. "Debating ASEAN: A response to commentaries on 'ASEAN sceptics versus ASEAN proponents'". *Pacific Review, 33*(3–4) (2020)., 604–607. https://doi.org/10.1080/09512748.2020.1720270.

[89] Natalegawa, R. M. "The expansion of ASEAN and the changing dynamics of Southeast Asia." *Contemporary Southeast Asia, 39*(2) (2017)., 232–238.

[90] Acharya, A. The myth of ASEAN centrality. *Contemporary Southeast Asia: A Journal of International and Strategic Affairs*, *39*(2), (2017). 273–279; Leelianou, S. *Does ASEAN consensus decision making remain relevant?* (2021). [Master's thesis, College of Business, Government and Law, Flinders University] https://flex.flinders.edu.au/file/1b0b82bd-e5bf-4b49-9680-3e2524cbb0a6/1/Leelianou2021_MasterCopy.pdf

[91] Jayakumar, S. *Opening statement by His Excellency, professor S Jayakumar minister for foreign affairs and minister for law of the republic of Singapore at the 30th ASEAN ministerial meeting 24 July 1997, Kualalumpur* (Document No: 1997072507). Ministry of Information, Communication and the Arts. https://www.nas.gov.sg/archivesonline/ speeches/record-details/75735070-115d-11e3-83d5-0050568939ad; Li, J. J. ASEAN and the South China Sea: Approaches to resolving the conflict. *Independent Study Project (ISP) Collection*. 2017. 2752.

[92] Acharya, A. The myth of ASEAN centrality. *Contemporary Southeast Asia: A Journal of International and Strategic Affairs*, *39*(2)(2017), 273–279;.

[93] Emmers, R., & Tan, S. S. "The ASEAN regional forum and preventive diplomacy: Built to fail?" *Asian Security, 7*(1), (2011). 44–60. https://doi.org/10.1080/14799855.2011.548211; Beeson, M. Decentered? "ASEAN's struggle to accommodate great power competition." *Global Studies Quarterly, 2*(1), (2022). ksab044. https://doi.org/10.1093/isagsq/ksab044

[94] Acharya, A. *The making of Southeast Asia: International relations of a region*. (Cornell University Press,2012).

[95] Acharya, A. The myth of ASEAN centrality. *Contemporary Southeast Asia: A Journal of International and Strategic Affairs*, *39*(2) (2017)., 273–279 ; Sukma, R. The accidental driver: ASEAN in the ASEAN regional forum. In J. Haacke & N. Morada (Eds.), *Cooperative security in the Asia Pacific: The ASEAN regional forum* (pp. 111–123). (Routledge, 2009).; Leelianou, S. *Does ASEAN consensus decision making remain relevant?,* (2021). [Master's thesis, College of Business, Government and Law, Flinders University] https://flex.flinders.edu.au/file/1b0b82bd-e5bf-4b49-9680-3e2524cbb0a6/1/Leelianou2021_MasterCopy.pdf

[96] Mustaza, S. N., & Saidin, I. "ASEAN, China and the South China Sea territorial disputes: Analysis of conflict management strategies." *Intellectual Discourse, 28*(2) (2020)., 577–598.

[97] Beng, P. K. *ASEAN is failing on the South China Sea issue: As China continues its militarization of the vital seaway, most Southeast Asian nations remain mired in their own problems.* (2020). The Diplomat. https://thediplomat.com/2020/10/asean-is-failing-on-the-south-china-sea-issue/.

However, even though not all ASEAN member states are claimants to the South China Sea, it is evident that ASEAN as a regional body made significant efforts to control the issue. The DOC and COC are evidence that it is a work in progress and that no major powers directly threaten the South China Sea peace in ASEAN. ASEAN centrality in the South China Sea is demonstrated by its ability to engage China in the region's discourse.Amid the conflict, the discussions and meetings appear to place the South China Sea issue at the top of the priority list, with peace always being the top priority. Nonetheless, this does not imply that ASEAN should not be prepared for future events that could lead to greater conflict. ASEAN lacks dispute resolution mechanisms. This is because the cornerstone of ASEAN is "friendship," whereas in this era, it should be "peace and diplomacy," and ASEAN must confront the dispute and not allow it to pass without a resolution. To ensure this, each ASEAN member state's political will must be enhanced. The moment has come for ASEAN to be bold in its management of the South China Sea Conflict. Regardless of what critics assert, the concept of ASEAN cohesion and centrality should be refined.

To strengthen the coherence and centrality of ASEAN, the role of the ASEAN chairmanship must be emphasized and brought into greater focus each year. As stated in Article 32 of the ASEAN Charter, "*The Member State holding the Chairmanship of ASEAN shall actively promote and enhance the interests and well-being of ASEAN, including efforts to build an ASEAN Community through policy initiatives, coordination, consensus and cooperation; ensure the centrality of ASEAN; ensure an effective and timely response to urgent issues or crisis situations affecting ASEAN, including providing its good offices and such other arrangements to immediately address these concerns; represent ASEAN in strengthening and promoting closer relations with external partners; and carry out such other tasks and functions as may be mandated"*[98]. This demonstrates that each AMS has the responsibility to improve ASEAN annually. After the outset of each annual summit, it is made apparent on which concerns the chairman state would concentrate; however, at the conclusion of each chairmanship, there is no review to determine that the issue raised was made possible by that particular AMS that year. As long as ASEAN initiatives remained informal and non-binding, leadership was deemed unnecessary. However, given the current geopolitical climate, it may be essential to have a strong degree of leadership[99].

How the ASEAN chairman manages their leadership is evident. In the year 2022, for instance, Cambodia takes the lead and from the very beginning, when supposedly the stretch of Cambodian leadership in Chairmanship should be the focus [100], there are commentators who assert that the expectations for Cambodia's chairmanship are low, and that a failed or stagnant Cambodian chairmanship will accelerate ASEAN's decline and this includes Cambodia's decision to stand with China out of self-interest and relationship concerns, delaying the adoption of COC during their chairmanship in 2022[101]

The primary issue here is the structure; there are no clear guidelines for how chairmanship should be carried out. ASEAN, as we all know, has an ASEAN Secretariat, but it has no bearing on what the chairman should or should not do during their tenure as chairman. Under the current approach, the chairman has the discretion to determine whether they would lead unilaterally or through consensus. Nevertheless, consensus is frequently upheld unilaterally, and unilateral actions are rarely criticised for fear of disturbing the consensus, as is the case right now. This may have been feasible when ASEAN's primary objective was to make money, but not now, when severe geopolitical issues are at stake[102].

Indonesia will be the next ASEAN chairmanship in 2023.The chairmanship will adopt the theme ASEAN Matters: Epicentrum of Growth. Under its leadership, Indonesia wants to strengthen the institutional capacity and efficacy of ASEAN to ensure the region's accelerated growth, inclusiveness, and economic sustainability[103]. Moreover, President Widodo stressed that Indonesia would continue to handle challenges in accordance with the ASEAN Way and the ASEAN Charter's cooperation principles. Indonesia's management of the G20 in 2022 has created the impression that it is more than qualified to lead ASEAN in 2023. Nonetheless, Indonesia must stress diplomacy and mutual respect to prevent the Taiwan Strait and

[98] ASEAN. *ASEAN Charter*. ASEAN. (2007). https://asean.org/wp-content/uploads/images/archive/publications/ASEAN-Charter.pdf

[99] Espena, J. B. B., & Gill, D. M.. *Indonesia and Vietnam: The quest for ASEAN leadership*. Geopolitical monitor. (2020). https://www.geopoliticalmonitor.com/indonesia-and-vietnam-the-quest-for-asean-leadership/.

[100] Hutt, D. *Will domestic politics upend Cambodia's ASEAN chairmanship? The deteriorating rights situation in Cambodia will be a major distraction from ASEAN's agenda.* (2021). The Diplomat. https://thediplomat.com/2021/11/will-domestic-politics-upend-cambodias-asean-chairmanship/.

[101] Dunst, C. *What to expect of Cambodia as ASEAN chair*. CSIS: Center for Strategic & International Studies. (2021). https://www.csis.org/analysis/what-expect-cambodia-asean-chair.

[102] Hutt, D. "*Has the ASEAN chair become too powerful? Cambodian Prime Minister Hun Sen's visit to Myanmar has highlighted deep flaws in the bloc's modus operandi*." (2022). The Diplomat. https://thediplomat.com/2022/01/has-the-asean-chair-become-too-powerful/.

[103] Kurmala, A. "*Making ASEAN the epicentrum of growth*". (2022). Antara. https://en.antaranews.com/news/262265/making-asean-the-epicentrum-of-growth.

South China Sea from becoming a theatre of conflict and source of regional instability[104].

For ASEAN to become a relevant regional organisation, bold reforms are required. Though the ASEAN way has always been adopted by any chairmanship, we believe that Indonesia and the next incoming ASEAN chairman should consider upgrading the ASEAN way to make it relevant to contemporary trends and requirements. ASEAN should choose a course of action that can be legally weighted to some extent. Simply relying on consensus will have no effect on ASEAN, and the South China Sea issue will be treated as simply another annual item on the agenda for all ASEAN member states chairmanship period annually.

V. Asean's way Forward to Stand as a Regional Power in the South China Sea

The conflict in the South China Sea is inevitable for ASEAN. Being in the middle of a conflict and facing intense competition from major powers has left ASEAN with hardly any alternative but to address the matter and not remain silent to prevent further catastrophe. The fact that ASEAN has mechanisms to deal with the issue is an excellent beginning, but additional measures and actions are required.

a) To Improve the COC Implementation

Despite China's best efforts to delay the adoption of the Code. Here, ASEAN must be clear about the most important issue that has delayed the implementation of the COC and given China the upper hand to further delay the deal. Conflicts inside AMS are causing divisions within the organization[105]This undermines ASEAN cohesion because each AMS has resisted delegating sovereignty to the ASEAN decision-making body[106].Without COC, China can continue to operate irresponsibly in the conflict zone, and ASEAN will lack the strength to confront China's military and paramilitary forces. A senator from the Philippines proposed implementing a claimant-only COC[107]. As pertinent as this may sound, it will just bring this issue back to square one, scattered claims between the parties, and ASEAN will not be able to keep up with the major powers as a regional power.

It is impossible to assure that COC is implemented indefinitely. In this matter, it is essential to incorporate both the ASEAN way and multilateralism. First, the concerns inside ASEAN must be settled. In order to establish a common policy, it is necessary to reconcile the divergent relationships and perceptions of China with the opinions and interests of all AMS.[108] Second, the legal position of the COC must be clarified, as it is neither intended nor referred to as a treaty under international law. This could pose a significant difficulty in the future, as there will be disputes over the code's legitimacy. Therefore, Vietnam once recommended a legally based clause to include "having consented to be governed by the existing Code of Conduct" and "be subject to ratification in accordance with the various internal procedures of the signatory states." The ASEAN Secretary General "must register" the COC in accordance with Article 102 of the United Nations Charter[109] which states that " Every treaty and every international agreement entered into by any Member of the United Nations after the present Charter comes into force shall as soon as possible be registered with the Secretariat and published by it".

b) Clarify the Roles of the Asean Chair, the Asean Charter, the Asean Secretariat, and the Asean Secretary General.

In light of the challenging geopolitical dynamics of East Asia, leadership within ASEAN is regarded as a difficult hurdle[110]. The organisation of ASEAN must be made more transparent than ever before. In accordance with the geopolitical landscape, the roles of the *ASEAN Chair, ASEAN Charter, ASEAN Secretariat and ASEAN Secretary General* must be restructured so as to be relevant to contemporary trends and requirements. The best option appears to be to give the ASEAN Secretariat more authority, transforming it into something similar the European Commission, which does perform executive duties [111]

[104]Hutagalung, S. "*Indonesia takes 2023 Asean chair*." (2022). Bangkok Post. https://www.bangkokpost.com/opinion/opinion/2450387/indonesia-takes-2023-asean-chair.

[105]Winston, R. A.Raging waters in the South China sea.

[106]Tong, L..*The ASEAN crisis, part 2: Why can't ASEAN agree on the South China Sea.* (2016). The Diplomat. https://thediplomat.com/2016/12/the-asean-crisis-part-2-why-cant-asean-agree-on-the-south-chinasea/#:~:text=Because%20of%20historical%20inter%2Dstate,a%20united%20position%20toward%20China.

[107] Staff, R. F. A. "Philippine senator calls for a 'claimants only' code of conduct on South China Sea". (2022). Radio Free Asia. https://www.rfa.org/english/news/china/philippine-senator-schina-sea-09142022042826.html

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[109]Thayer, C. A. ASEAN, China, and the code of conduct. In L. Buszynski & D. T. Hai (Eds.), *The South China Sea from a regional maritime dispute to geo- strategic competition*. (Routledge, 2020).

[110] Espena, J. B. B., & Gill, D. M. "*Indonesia and Vietnam: The quest for ASEAN leadership"*.(2020) Geopolitical monitor. https://www.geopoliticalmonitor.com/indonesia-and-vietnam-the-quest-for-asean-leadership/.

[111]Hutt, D. "*Has the ASEAN chair become too powerful? Cambodian Prime Minister Hun Sen's visit to Myanmar has highlighted deep flaws in the bloc's modus operandi*." The Diplomat. https://thediplomat.com/2022/01/has-the-asean-chair-become-too-powerful/.

The concept of an ASEAN Charter devoid of an executive power renders it a weak document since it fails to transform ASEAN into a supranational organisation with a majority voting system[112]. However the concept of emulating the European Union was rejected by the majority of ASEAN member states[113], the concept of "ASEAN Minus X" was subsequently enshrined in the ASEAN Charter, though it was limited to economic issues with the approval of all AMS. Looking at the current needs, this should be extended to the application of other pressing regional issues such as the South China Sea[114].As a result of their non-claimant stance in the South China Sea issue, not all AMS desire a change in the charter, thus this must be carried out with great caution and with the support of political will and the resolve to change from all AMS.

Additionally, the ASEAN Secretary General plays a significant role in ASEAN leadership. Perhaps it is time to revise the method by which the Secretary General is elected and ensure that all AMS have the opportunity to vote on who should be the Secretary General for the specified period. This will dispel the notion that only the ASEAN Chair has the authority to elect the next Secretary General. Relevant would be a majority vote within AMS, and the nominated Secretary General must work closely with the ASEAN chair to ensure that regional matters are addressed effectively. Obviously, a clear set of Terms of Reference is required to distinguish between the roles of these two entities and to guarantee that no powers overlap. Strengthening the authority of the ASEAN secretary-general, who is currently Indonesian, Jim Lock Hoi, will enable Indonesia to play an extraordinary role as ASEAN chair. Given that both the chair and secretary general will be from Indonesia in the coming year, this will allow for improved coordination and administration in addressing the most pressing regional issues.[115]

The next ASEAN Chair must ensure that the South China Sea dispute, which has been on the agenda of ASEAN Summits for years, at least demonstrates relevant progress. The implementation of COC, which was intended to be finalized by 2022, is making little progress under Cambodia's ASEAN chairmanship, perhaps due to the relationship that Cambodia has with China. Hence, Indonesia must ensure that the South China Sea concerns are not merely "a work in progress." at least not during their chairmanship in 2023.

c) Opt for Economic Diplomacy

ASEAN has been instrumental in establishing regional trust and confidence, as well as the establishment of a regional identity through East Asian community building. ASEAN lacks the required funding and organisations to address these disputes. Therefore, the major objective of ASEAN is to maintain peace and promote trust. In addition to information sharing, capacity building, and defence diplomacy, ASEAN may also consider non-traditional security when creating cooperation, as it may offer alternative chances for maritime governance.

As there is a need to examine less politicised settings for the goal of creating trust, this may result in more tranquil dialogues and encounters between competing parties. Aside from that, it presents an opportunity for ASEAN to establish economic diplomacy between warring states in order to prevent the SCS military violent confrontation. As the majority of parties to the dispute have economic relations with China, it is essential to use economic diplomacy to reduce tensions in the South China Sea. All ASEAN member states can initiate economic diplomacy with China by cooperating or contributing to a shared economic cooperative project. This can include ministerial meetings, joint training sessions, commercial trade and activity agreements, as well as bilateral and international agreements[116].

VI. Conclusion

The geopolitical tensions in the South China Sea show no signs of abating. Daily, the conflict becomes more complicated. As a regional body that must confront this intricate geopolitical spectacle, ASEAN is in a precarious situation. ASEAN's collective and individual reactions and responses have evolved throughout time. Due to the fact that not all ASEAN member nations are claimants in the South China Sea conflict, it is sometimes impossible to reach a unified reaction and conclusion on any topic pertaining to the dispute. Despite its resolve to confront the world's greatest power as one and to defend the notion of ASEAN Centrality and cohesion, ASEAN is unable to exert influence over numerous events and powers. Internal disagreements within AMS, as well as personal relationships and history between specific AMS and the big powers, have contributed to several circumstances and unfavourable views that impede ASEAN's ability to act unanimously. However, this does not mean that ASEAN's management of the geopolitical crisis in the

[112]Desker, B. "*Is the ASEAN charter necessary?* "RSIS Commenttaries. (2008). https://www.rsis.edu.sg/wp-content/uploads/2014/07/CO08077.pdf

[113]Leviter, L. "The ASEAN charter: ASEAN failure or member failure?" *New York University Journal of International Law and Politics, 43*(2011)., 159–210.

[114]Leelianou, S. *Does ASEAN consensus decision making remain relevant?* [Master's thesis, College of Business, Government and Law, Flinders University] (2021). https://flex.flinders.edu.au/file/1b0b82bd-e5bf-4b49-9680-3e2524cbb0a6/1/Leelianou2021_MasterCopy.pdf

[115]Hutagalung, S. "*Indonesia takes 2023 Asean chair"*. (2022). Bangkok Post. https://www.bangkokpost.com/opinion/opinion/2450387/indonesia-takes-2023-asean-chair.

[116] Aziz, S. N. A., South China Sea: ASEAN mechanism 65–82.

South China Sea was a complete failure. The numerous ASEAN mechanisms, dialogues, and summits that had been made possible by ASEAN by inviting big countries to participate and address the issue are accomplishments that can be considered a milestone in ASEAN's success as a regional organisation, but it does not end there. The complication of the situation is exacerbated by the delayed implementation of COC and ASEAN consensus decision making, which contributes to numerous unresolved matters in the region. Regarding South China Sea, ASEAN still has much work to do. ASEAN should dismantle the South China Sea concerns into components and establish an ASEAN common vision and policy on each of these components, which ASEAN has already done, and formulate a common policy on some elements of the issue through the Indo-Pacific Outlook[117] ASEAN will continue to apply the ASEAN approach, and promote ASEAN centrality and cohesion, but in order to contribute to constructive resolutions, ASEAN needs to be more agile. ASEAN Centrality and cohesion will remain a concept if ASEAN chooses to continue developing in the same manner as they have for the past fifty years.

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Advancing Oceanic Studies with Hyper OCR Sensors and Non-Negative Matrix Factorization: A Cost-Effective, Data-Driven Approach for Analyzing Light in Marine Water Column

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Advancing Oceanic Studies with Hyper OCR Sensors and Non-Negative Matrix Factorization: A Cost-Effective, Data-Driven Approach for Analyzing Light in Marine Water Column

Mateo Sokač α & Staša Puškarić σ

Abstract- Understanding the intricate dynamics of ocean biogeochemistry is crucial for deciphering its role in climate change. Our study addresses this challenge by integrating advanced computational techniques and innovative sensor technology to enhance remote sensing capabilities. Drawing on recent insights into the vast carbon reservoirs within the ocean, particularly within the dissolved organic matter (DOM) pool, we highlight the pressing need for comprehensive spatial and temporal understanding facilitated by a combination of satellite and in situ data. However, existing remote sensing methods face limitations in capturing subsurface processes, hindering our ability to grasp carbon fluxes within the oceanic water column fully. Recent advancements in remote sensing offer promising avenues for addressing these challenges. Studies investigating polarized radiance distribution and Chromophoric Dissolved Organic Matter (CDOM) provide valuable insights into improving remote sensing capabilities. Building upon these advancements, we propose a novel data-driven approach utilizing HyperOCR sensors and non-negative matrix factorization (NMF). Non-negative matrix factorization (NMF) is a powerful tool for extracting meaningful biological signatures from hyperspectral data, offering a granular yet comprehensive view of spectral diversity. Our study showcases the potential of NMF in elucidating spatial and temporal variations in biogeochemical processes within the ocean. Leveraging HyperOCR sensors, our approach offers a cost-effective and efficient means of enhancing remote sensing capabilities, enabling the rapid deployment and identification of seasonal patterns in the water column. Through extensive validation against field data from the Adriatic Sea, we demonstrate the utility of our approach in refining satellite measurements and improving algorithms for analyzing ocean color data. Our findings underscore the importance of integrating multiple observational platforms and advanced computational techniques to enhance the accuracy and reliability of remote sensing in ocean biogeochemistry studies. In conclusion, our study contributes to a deeper understanding of marine ecosystems' responses to environmental changes and offers a new perspective on remote sensing capabilities, particularly in challenging coastal waters. By bridging the gap between satellite and in situ measurements, our approach exemplifies a promising pathway for advancing remote sensing of ocean biogeochemistry.

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I. Introduction

To understand the role of the ocean in climate change, it is important to interpret the biogeochemical fate of carbon in the ocean correctly. It has only recently become clear that the vast majority of the ocean carbon (662 Pg C) is found within the dissolved organic matter (DOM) pool, most of it in the reduced, refractory form [1]. Yet many questions about its role in climate feedback remain open, primarily regarding its potential remineralization by microbes or photo-oxidation (photoproduction of CO_2)[2]. To fully understand it, spatially and temporarily, on a global scale, we need a combination of remotely obtained (satellite) and measured *in situ* relevant data through the entire water column [3].

Currently, the main needs cluster around developing and enhancing satellite radiation products to better support various research and operational applications related to ocean biology and biogeochemistry [4]. The ongoing challenges focus primarily on understanding complex oceanic processes and the increasing demand for precise and reliable data to inform environmental policy and management strategies, particularly in the face of climate change. The requirements include additional satellite-derived products such as sub-surface planar and scalar irradiance, average cosine, spectral fluxes (from UV to visible), diurnal fluxes, absorbed fraction of PAR by live algae (APAR), surface albedo, vertical attenuation, and heating rate. These products would provide more detailed and comprehensive data for studying marine ecosystems and their responses to environmental changes [5].

Despite the tremendous effort undertaken, we still lack information about subsurface processes governing carbon fluxes within the oceanic water column. The main problem remains that subsurface processes can only be detected remotely if they have a surface signature. With that in mind, various research

approaches have been attempted to understand better and interpret satellite remote sensing capabilities.

Gleason et al. [6] detailed the measurement and modeling of the polarized upwelling radiance distribution in clear and coastal waters. The study successfully modeled and measured the Degree of Linear Polarization (DOLP) of the upwelling light field using a Monte Carlo-based radiative transfer code and fish-eye cameras equipped with linear polarizing filters. Field experiments in varying water conditions showed the model could predict the DOLP with an absolute error of ±0.05. This accuracy was achieved even with a fixed scattering Mueller matrix, which required precise *in situ* measurements of other optical properties [6]. The findings underscore the sensitivity of satellite sensors to polarization and the potential of using polarized radiance measurements for determining particle characteristics in oceanic waters [7,8]. The findings have significant implications for satellite remote sensing of the ocean floor by enhancing the accuracy and reliability of remote sensing data. Furthermore, Aurin et al. [9] demonstrate significant advancements in remote sensing of Chromophoric Dissolved Organic Matter (CDOM), CDOM spectral slope, and Dissolved Organic Carbon (DOC) in the global ocean. A comprehensive Global Ocean Carbon Algorithm Database (GOCAD) was developed using data from over 500 oceanographic field campaigns spanning three decades. This database incorporates a vast range of in situ reflectances, satellite imagery, and multispectral CDOM absorption coefficients, which facilitated the development, optimization, and validation of various semi-analytical, empirical, and machine learning algorithms for retrieving global DOC, CDOM, and CDOM slope. These algorithms have been optimized for global retrieval and exhibit a strong correlation with seasonal patterns of phytoplankton biomass and terrestrial runoff, highlighting their sensitivity and utility in understanding large-scale oceanic and atmospheric phenomena, such as the El Niño Southern Oscillation. Further validation of these algorithms, particularly in mid-ocean gyres and the Southern Oceans, is suggested to refine their application and increase accuracy. To address this problem, significant insights from a field intercomparison of radiometer measurements in the northern Adriatic Sea have been conducted to validate ocean color remote sensing data [10]. The study assessed the accuracy of in-water and above-water radiometer systems using multiple measurement systems under stable conditions. The results indicated generally good agreement among sensors for measuring downwelling irradiance, sky radiance, and above-water upwelling radiance, with differences typically less than 6% across visible wavelengths. The study further demonstrated the importance of accurate sensor calibration and highlighted the variability introduced by different measurement setups and environmental conditions. These findings are crucial for refining remote sensing methodologies, enhancing the reliability of ocean color data from satellite observations, and constraining the differences between in-water and satellite ocean color products. A similar study was conducted with the same goal, e.g. [11].

To tackle the disadvantages of remote sensing, comprehensive insights into the accuracy and challenges of *in situ* Ocean Color Radiometry (OCR) have been provided for the Southern Atlantic and Southeastern Pacific [12]. The research identified significant variability in remote sensing reflectance measurements obtained using different techniques, with relative percent differences ranging from 12% to 26% for ocean-color bands. This variability underscores the difficulties in obtaining precise *in situ* OCR measurements, particularly in regions with complex water properties and variable environmental conditions. The study also highlighted the critical impact of these uncertainties on the retrieval of *chlorophyll* concentrations and inherent optical properties using operational bio-optical algorithms. These findings have important implications for satellite remote sensing, particularly in calibrating and validating satellite sensors and improving bio-optical models for interpreting satellite data. The research emphasizes the need for refined measurement techniques and algorithms to enhance the accuracy of satellite-derived ocean color data, which is crucial for understanding global biogeochemical cycles and assessing climate change impacts on marine ecosystems. Finally, the advent of cutting-edge technology has paved the way for advancements in artificial intelligence and sensor systems. As these sensors become increasingly affordable, they are becoming more accessible to a wider range of applications. One such application is the aforementioned radiance in water columns, a task traditionally performed using satellite imagery. However, satellite data collection is fraught with challenges, including cloud cover, resolution limitations, orbit speed, and a lack of precision. Moreover, satellites fail to provide information about the entire water column, leaving a significant gap in our understanding.

To address these issues, we propose a data-driven approach that leverages HyperOCR sensors and artificial intelligence, specifically non-negative matrix factorization (NMF) (Figure 1A), as an alternative to previous approaches. NMF is a dimensionality reduction and data representation method that decomposes a given non-negative matrix into two lower-dimensional matrices, where all elements are constrained to be non-negative, enabling intuitive and interpretable parts-based representations of the original data [13](Figure 1B). NMF has been employed across various scientific fields and has demonstrated significant results in numerous studies [14–18]. Moreover, in recent studies on understanding the ocean's carbon cycle, NMF-

extracted signatures have shown an association between the abundance of microorganisms, providing further evidence of its potential utility [19]. Our approach is cost-effective and quick to deploy, offering a promising alternative to current methods revealing seasonal patterns in the water column (Figure 1C).

II. Methods

a) Data Collection

We employed a custom-built profiler for our data collection, incorporating four sensors and a custom-built data logger (water-column profiler). Within this system, three sensors and a data logger were integrated into the profiler frame, while the fourth was positioned vertically on the vessel. Among the custom-built sensor system, two Hyperspectral Ocean Color Radiometers (Seabird HOCR) were deployed to capture both upwelling (UW) and downwelling (DW) irradiance. This arrangement facilitated irradiance measurement from both the upward and downward directions. Additionally, a Seabird SBE 39plus sensor was utilized to monitor pressure and temperature (Figure 1A). The fourth sensor, an Apogee PS-200 (Apogee Instruments, Inc., North Logan, UT, USA), served as a reference, capturing reference curves positioned atop the vessel. These sensors provided comprehensive data acquisition capabilities, enabling detailed monitoring and analysis throughout our study.

b) Experiment Location and Sampling

The experiment was conducted near the islands of Mljet (42º 45′ 15″ N; 17º 23′ 12″ E, depth 128 m) and Vis (43º 03’ 32.8’’ N, 16º 17’ 19.7’’ E, depth 102.9 m) in Croatia. As island of Mljet is moreaccessible, comparable to island of Vis, more data was collected at Mljet location. Moreover, the vessel used for conducting experiments is located at Mljet. All measurements were taken in the middle of the day, at the sun's culmination. The profiler's descending speed was 0.22 m/s. A total of 22 profiles were analyzed, resulting in the collection of 11,653 hyperspectral curves (Figure 2A). These measurements were conducted intermittently across May, June, July, August, and December to capture data potentially influenced by seasonal patterns (Figure 2B).

c) Data Preprocessing And Normalization

The data underwent preprocessing and normalization through the following steps. Each sensor has a different sampling rate, resulting in small mismatch in time stamp. In order to solve this, all sensor data were merged based on timestamps, allowing a tolerance of up to 2 seconds to accommodate variations in sampling rates among sensors. Next, the Apogee sensor served as a reference and was utilized for normalization purposes. The Apogee sensor measured direct radiance on the surface representing the maximum radiance at given time stamp. Next, hyperspectral curves from the upwelling (UW) and downwelling (DW) sensors were normalized by dividing them by the reference curve (Figure 1A). This normalization step resulted in range of numbers between 0 and 1, representing percentage of maximum radiance. Furthermore, the dataset was filtered to include only curves measured at a depth of 1 meter or greater, as sensors require time to auto-calibrate when submerged in the water column.

d) Application of Non-Negative Matrix Factorization

The Non-Negative Matrix Factorization (NMF) algorithm decomposes an input matrix into two non-negative matrices, W and H, such that their product approximates the input matrix (Supplementary Figure 1). The matrix W represents the basis or dictionary elements, often interpreted as unique patterns or features present in the data, such as hyperspectral ocean color radiometer (h-OCR) curves, which we refer to as “signatures”. The matrix H represents the coefficients or weights that determine the contribution of each basis element to reconstruct the original data curves. In our implementation of the NMF algorithm, we utilized the 'nndsvdar' initialization method to compute the initial state of the factorization. This initialization approach is based on the Non-negative Double Singular Value Decomposition with Alternating Rectification (NNDSVDar) method, which initializes the factor matrices with small random values, allowing for faster convergence. The NMF solver employed multiplicative updates iteratively to optimize the factor matrices while minimizing the Frobenius norm as the loss function. We set the maximum number of iterations for the NMF algorithm to 1000 to ensure convergence to a satisfactory solution. This comprehensive approach enabled us to effectively decompose the input matrix into meaningful basis patterns and their corresponding coefficients, facilitating the extraction of interpretable features from the data.

e) Code Availability

The code for analysis and plotting is accessible via the public GitHub repository at https://github.com/mxs3203/svjetloPaper. The repository contains code for the NMF model, HOCR data processing, and figure generation, which are included in the manuscript. Additionally, the data matrices are available for download as Supplementary Material.

f) Computational Requirements

Computational modeling was performed using a standard desktop computer with average performance. As the modeling process did not utilize a GPU and did not require extensive computational resources, a regular computer sufficed for our purposes.

III. Results

a) Temperature Measurements Show Patterns of Water Column Stratification

The temperature-depth profile depicted in Figure 2B illustrates temperature distribution across the water column during sampling intervals (Supplementary Figure 2). Results indicate gradual stratification of the water column from May to August. In December, the water column was vertically homogeneous with a temperature of 16°C as a consequence of wind Bora mixing. Measurements conducted on the 19th of May 2023 (Figure 2B, Supplementary Figure 3) show an inflow of Ionian Surface Water (ISW) via the Otranto Strait to the depth of 95m, which is characteristic for autumn [20]. However, circulation in the Adriatic Sea exhibits high spatial and temporal variability, with a general cyclonic circulation pattern [21]. The mixing of different water masses significantly affects the hyperspectral data in the sea column, revealing unique optical signatures.

b) Fitting the NMF Model to Hyperspectral Data

In this study, we employed Non-Negative Matrix Factorization (NMF) to uncover underlying patterns within the normalized hyper-OCR curves dataset. The NMF algorithm decomposes the input data matrix into two non-negative matrices: a basis matrix (or signature matrix) and a coefficient matrix (Supplementary Figure 1). The basis matrix represents distinct signatures or patterns inherent in the data, while the coefficient matrix indicates the contribution of each signature to the original samples. Through the training process, our NMF model generated a set of signatures, each represented as a unique hyperspectral curve, encapsulating unique patterns within the dataset. This method is robust enough to not be affected by temperature variations and their effect on hyperspectral patterns, but it captures unique patterns in the data. These signatures serve as interpretable representations of the underlying structure of the data. To determine the optimal number of signatures (k) for our model, we employed the "elbow method", a common approach for selecting the appropriate number of clusters or components in unsupervised learning tasks. Our analysis revealed that k=5 emerged as the optimal number of signatures (Figure 3A). Beyond this value, the reconstruction error did not exhibit substantial changes, suggesting that additional signatures did not capture significantly more variance in the data. Thus, we proceeded with k=5 to extract the most salient patterns from the hyper-OCR curves dataset. NMF analysis yielded five distinct signatures (S1 to S5), each representing unique spectral patterns within the dataset (Figure 3B). Signature 1 (S1) is characterized by a high-intensity peak centered around 440nm. Signature 2 (S2) exhibits a high-intensity peak starting at 350 nm and rapidly decreasing towards 450nm, with an additional small peak between 500 nm and 600 nm, reaching its highest intensity at 580 nm. Signature 3 (S3) presents a broad spectral curve with medium intensity spanning from 500 nm to 700 nm, with its peak intensity observed at approximately 585 nm. Signature 4 (S4) is defined by a medium-intensity peak around 460nm and shows a small enrichment in the spectral range of 800 nm to 850nm. Finally, Signature 5 (S5) displays a medium-intensity peak resembling a bimodal function, with peaks at 495 nm and 520nm (Figure 3B).

c) Comparing UW and DW Sensor Signatures Across Months

We divided the signatures obtained from the upwelling (UW) and downwelling (DW) sensors for separate analyses. The UW sensor exhibited the lowest values in signatures S1, S3, and S5, while the DW sensors demonstrated the highest values in S1 and S4 (Figure 4A-B). Upon examining the UW sensor signatures from May to December, we observed a gradual increase in S2, S3, and S4, with peaks occurring in July and August before returning to lower values in December. Notably, S1 started with the highest values in May and gradually decreased towards December. Additionally, S5 showed minor enrichment in the UW sensor, with small peaks observed in May and December (Figure 4A). The downwelling (DW) sensor generally exhibited the highest enrichment values in S1, with peaks observed in May and August. S2 demonstrated comparable values in May and June, gradually increasing towards August and December. S3 exhibited the highest values in December and May, displaying a U-shaped pattern with a minimum observed in July and August. High enrichment in S4 was consistently observed in the DW sensor, peaking in June, July, and August. Lastly, S5 displayed comparable enrichment levels in May, June, and July, with a noticeable increase observed in August and December (Figure 4B).

d) Exploring Depth and Monthly Variations in Sensor Signatures

In this analysis, we categorized depth measurements into bins spanning intervals of 10 meters each, starting from 0 to 10 meters and extending onwards in increments of 10 meters. Our objective was to identify any trends in signature enrichment across different depths and months. In the upwelling (UW) sensor data, we observed consistent patterns across most months for signature S1, except in May, where it exhibited the highest average enrichment (Figure 4C, Supplementary Figure 4). However, this enrichment decreased as depth increased. For S2, similar patterns were noted in July and August, with noticeable differences between depths of 50 meters and 90 meters, where July showed higher enrichment (Figure 4C). Notably, S2 did not exhibit the same rapid decrease with depth in July and August as observed in other months

as signature enrichment stayed stable. Conversely, S3 and S5 displayed minimal enrichment and exhibited minor variations across the study months. Nonetheless, it is noteworthy that S5 displayed the highest enrichment in December within depths of 0 to 10 meters, gradually decreasing with increasing depth. In S4, comparable patterns were observed in July and August, while May, June, and December displayed distinct decreasing patterns. December exhibited the steepest decrease in S4 enrichment. In the downwelling (DW) sensor data, distinct patterns emerged, particularly in the downward trend of signature enrichment with increasing depth, observed across all signatures except S4 (Figure 4D, Supplementary Figure 4). S1 exhibited a consistent downward trend in enrichment across all months except for December, when the downward pattern was a bit steeper. S3 displayed comparable trends in December-May and July-August, with June standing out as having a distinct pattern. The pattern observed in S4 is particularly interesting, where enrichment initially began with values close to zero near the surface, except for December. Subsequently, the enrichment of S4 gradually increased, peaking between 30 and 40 meters depth before declining as depth increased(Figure 4D). S5 demonstrated an almost linear downward pattern, starting with the highest enrichment near the surface and gradually decreasing with depth, with notable differences observed in December and August. In December, S5 exhibited higher values around 10 and 20 meters than the average values at 0 to 10 meters.

e) Daily Patterns Of Sensor Enrichment

To assess daily patterns, we categorized sampling time into three distinct periods. "Morning" was defined as the time frame between 6:00 AM and 11:00 AM, "Noon" encompassed the period from 11:00 AM to 5:00 PM, and "Dusk" extended from 5:00 PM to 9:00 PM. These categories were employed to group sensor enrichment data and calculate the average enrichment of signatures across each designated time period for both sensors. In the UW sensor data, signatures S1, S3, and S5 exhibited minimal changes across the three defined time frames and months. However, S2 displayed distinct patterns, particularly in August, indicating that enrichment was highest in the morning and lowest at dusk. In May, S2 showed an upward pattern, with increased values observed at dusk. Notably, in July, S2 displayed the lowest values at noon but experienced a drastic increase in signature enrichment at dusk. Similarly, S4 demonstrated similar patterns in July, with the highest enrichment observed at dusk. In June, S4 exhibited identical enrichment levels in the morning and noon but showed zero enrichment at dusk, while December showed the highest enrichment of S4 at noon (Figure 5A). In the DW sensor data, distinct patterns emerged, with notable differences observed between the months and time frames used for analysis. S1 exhibited the highest enrichment at dusk in May and July, while S2 showed the highest enrichment in the morning in August and July. Interestingly, S2 in July also displayed the highest enrichment at dusk. S3 did not demonstrate any significant patterns or major changes across months or time frames. On the other hand, S4 exhibited the highest and similar enrichment levels in the morning and noon in June, July, and August, with differences observed at dusk. In July, S4 maintained high enrichment levels at dusk, whereas in June and July, enrichment levels diminished to almost zero. Additionally, S4 displayed notable results for December, with the highest enrichment observed at noon. Similarly, S5 also showed the highest average enrichment at noon in December. August and June exhibited similar patterns, with the highest enrichment observed in the morning, gradually decreasing towards dusk (Figure 5B).

IV. Discussion

Our study utilized a custom-built sensor system to collect comprehensive data, resulting in a dataset comprising 11,653 hyperspectral curves paired with temperature and depth measurements. While conducting the sampling and comparing the data afterward, we observed differences in the quality of measurements during specific time frames and depth ranges. Particularly, measurements taken in the late afternoon, approximately 1-2 hours before dusk, exhibited a notable amount of noise. Additionally, we observed the influence of wave activity on the quality of measurements, particularly in the surface layer. Waves induced significant noise in the measurements due to light scatter, resulting in inconsistencies and inaccuracies (Supplementary Figure 5). However, we found that as depth increased, typically between 10-20 meters, the influence of wave-induced noise decreased, leading to more stable and reliable measurements. Both problems were addressed at the data filtering step, where noisy data was removed. The temperature data revealed intriguing patterns, particularly observed on the 19th of May, 2023, wherein a homogeneous temperature distribution was observed with decreasing depth. This event relates to the inflow of Ionian Surface Water (ISW) via the Otranto Strait to a depth of 95m, which is normally characteristic of autumn [20].

Employing a Non-Negative Matrix Factorization (NMF) model on the entire dataset yielded five distinct signatures. These signatures were instrumental in characterizing both seasonal and daily patterns within our data. The differentiation in spectral signatures between upwelling (UW) and downwelling (DW) sensors, especially their distinct seasonal dynamics, can be partially explained by the variations in phytoplankton community composition and its biogeochemical implications. For instance, the highest

enrichment in signature S1 during the peak of light upwelling values and its gradual decrease could be indicative of phytoplankton dynamics where certain taxa like diatoms dominate due to nutrient influxes, consistent with findings that growth conditions can decouple diatom populations from grazing pressure, leading to significant bloom events [22]. This hypothesis is supported by our observation of spectral signature shifts that coincide with known nutrient dynamics and light conditions, which are critical drivers of phytoplankton community structure [22,23]. Interestingly, the variation in signatures across different depths and months, particularly the observed depth-wise attenuation of signature enrichment in DW sensor data, underscores the stratification effects on light availability and nutrient distribution, aligning with observations that certain cyanobacteria and smaller phytoplankton are adapted to low-nutrient, high-light conditions in stratified waters [24]. The consistent patterns seen in certain signatures during specific months could also reflect the physiological adaptations of phytoplankton to seasonal light variations, potentially impacting their backscattering properties as suggested by the taxonomic variability in particle backscattering (BBP)-to-phytoplankton carbon (Cphyto) scaling [25]. Moreover, our findings add a nuanced layer to understanding phytoplankton dynamics by linking spectral data with ecological patterns. For example, the enrichment peaks in signatures from the UW sensor during early summer might indicate rapid growth phases or succession events within the phytoplankton community, which are critical for predicting carbon export potential during these periods. This aligns with the discourse on the impact of community composition on carbon cycling and the necessity of considering taxonomic variability in modeling biogeochemical cycles [22,26]. Future work should focus on integrating these spectral signatures with direct taxonomic identification and physiological state assessments to validate the inferred patterns and enhance the predictive power of hyperspectral analyses in marine ecosystems. Additionally, adopting newer, absorption-based methods for estimating phytoplankton biomass and carbon content could refine the interpretation of spectral data, especially in relation to community composition changes and their biogeochemical roles [27]. Our study underscores the variability and complexity of phytoplankton dynamics in marine ecosystems and highlights the potential of sophisticated analytical techniques like NMF in unraveling these complexities. By advancing our understanding of how different phytoplankton communities contribute to and are influenced by environmental factors, we can better predict and manage the impacts of global changes on marine ecosystems. As global oceanic and atmospheric conditions continue to evolve, significant shifts in phytoplankton community structure are anticipated, particularly with respect to picophytoplankton and cyanobacteria. These groups, characterized by their small size and adaptability, are poised to dominate increasingly stratified and oligotrophic waters driven by rising sea surface temperatures and reduced nutrient inputs from deep waters [23,28]. Cyanobacteria, in particular, are known for their efficiency in low-nutrient environments and could outcompete larger phytoplankton taxa under such conditions, potentially leading to a higher prevalence of cyanobacteria in future marine ecosystems [29]. This shift could have profound implications for marine food webs and biogeochemical cycles, as cyanobacteria and other picophytoplankton typically have different nutritional contents, sinking rates, and interactions with higher trophic levels compared to larger phytoplankton like diatoms. Moreover, the increase in cyanobacteria may also influence the biogeochemical properties of marine environments, such as nitrogen fixation rates and carbon sequestration capabilities. Predictive models need to account for these changes to accurately forecast the impacts of climate change on marine ecosystems, particularly the potential feedback mechanisms involving picophytoplankton that could alter oceanic carbon cycling dynamics and nutrient fluxes significantly. We believe that our approach to studying light in the water column, as presented in this study, could significantly add to a better understanding of these changes.

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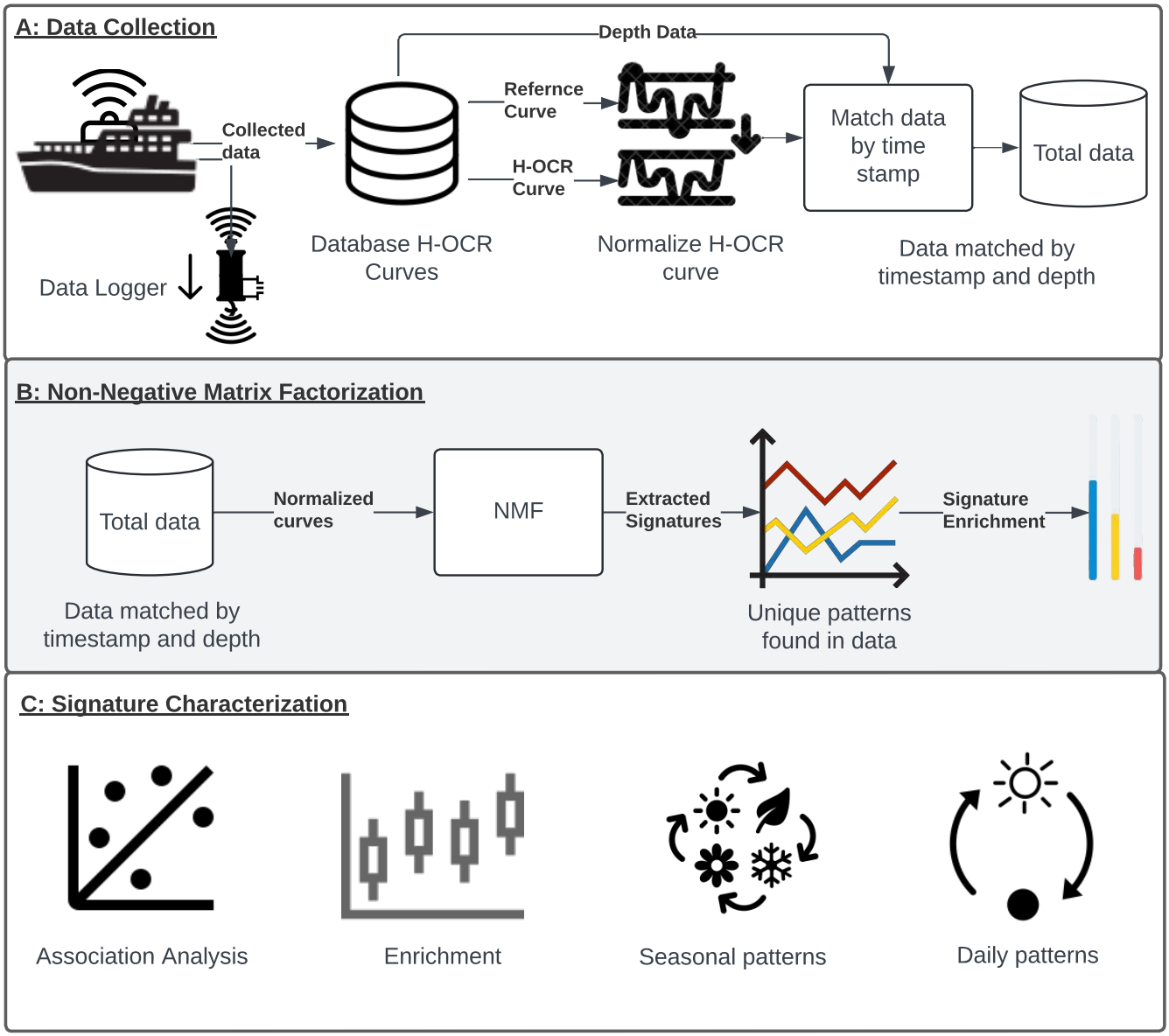


Figure 1: Study overview. A) Data collection process: Vessel equipped with sensor system was collecting data which consisted of H-OCR curves (UW and DW), temperature, pressure and reference curve(used for normalization). Finally the data was matched by the timestamp in order to have total dataset. B) NMF application: Normalized H-OCR curves were used in NMF with focus on extraction of unique patterns in data. C) Signature characterization: After signatures were disccovered by the NMF method, they were used in multiple downstream analyses

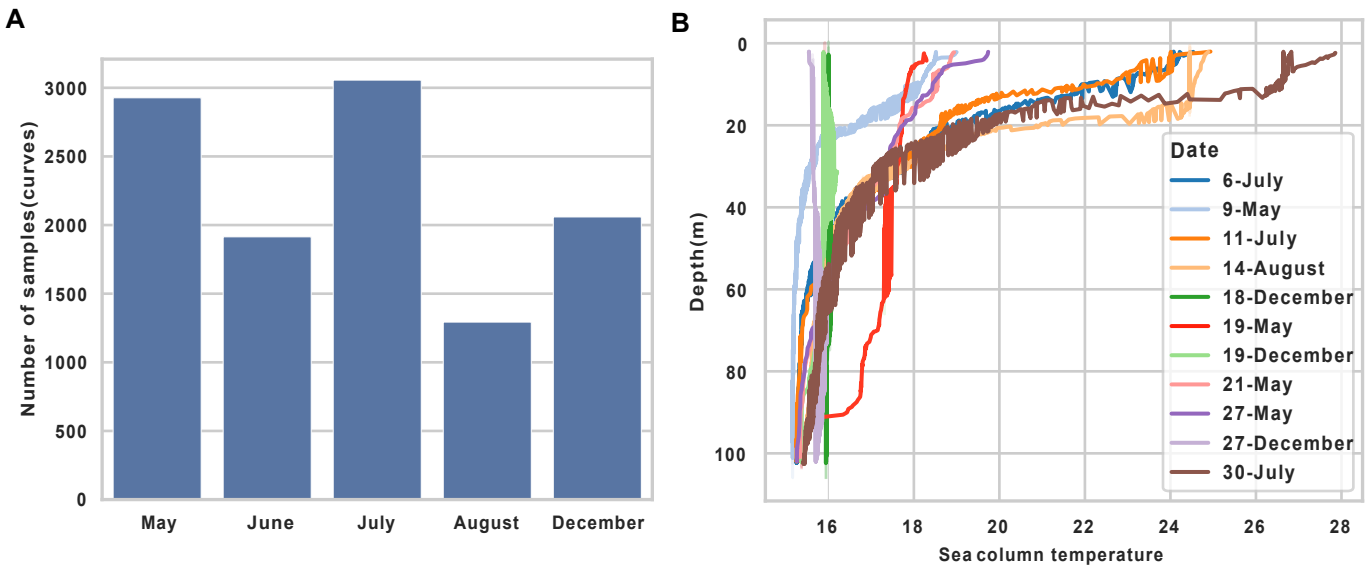


Figure 2: Description of data A) Barplot shows number of H-OCR curves collected per month. B) Line plot shows association between depth (y-axis) and sea column temperature in Celsius (x-axis) for every day in this study. Red line indicating the measurement conducted on 19th of May shows consistent temperature across almost entire water column

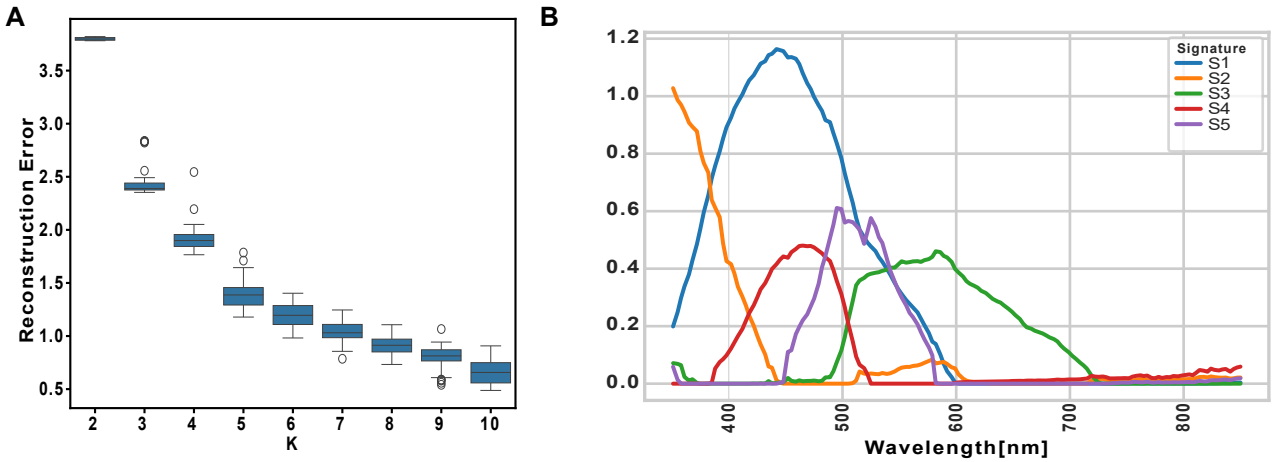


Figure 3: NMF Application. A) Reconstruction error for each number of signatures (K). Boxplot indicates that error decreases rapidly until reading K=5, indicating optimal K. B) Visualization of extracted signatures

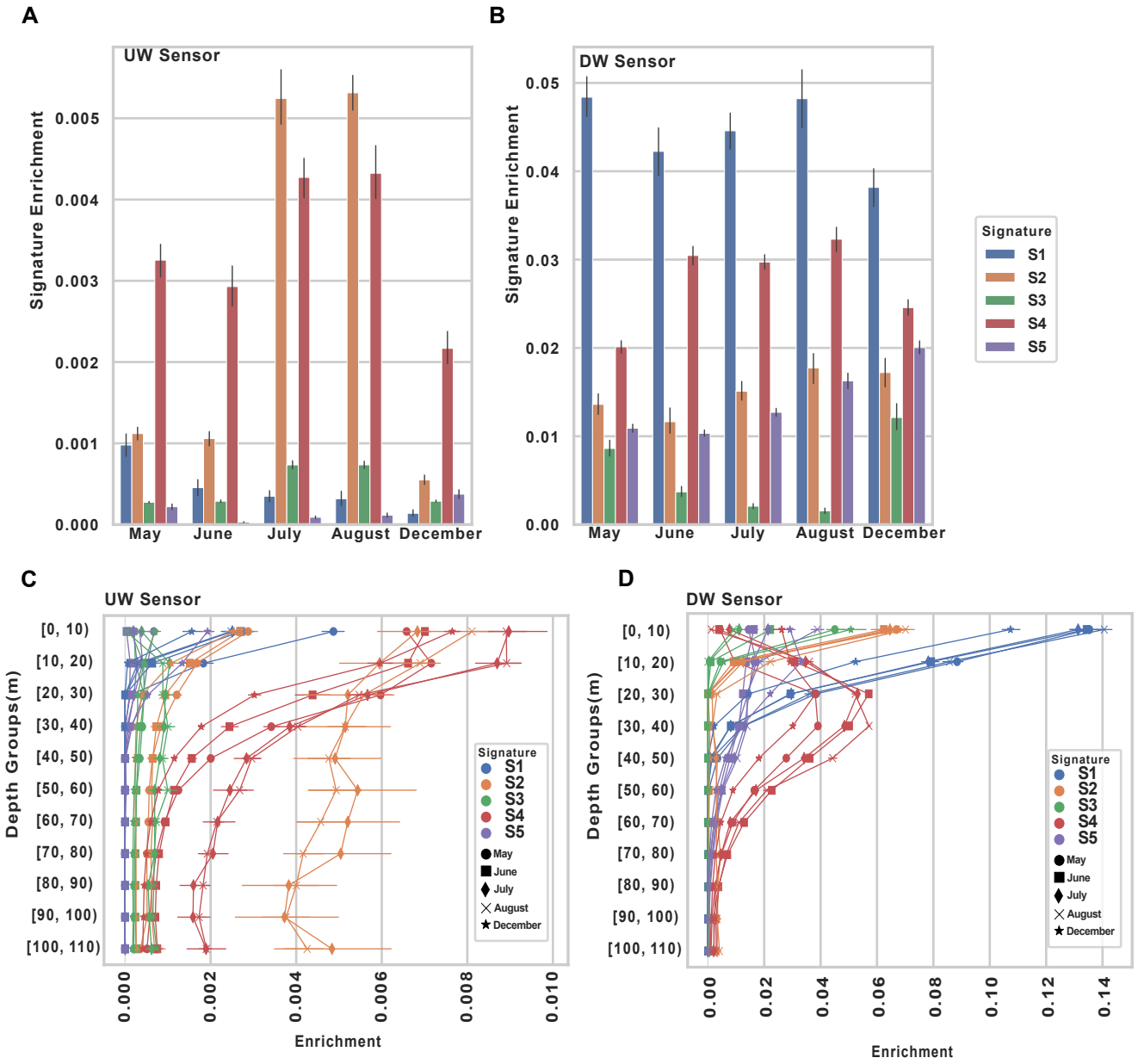


Figure 4: Signature characterization. A) Barplot indicating signature enrichment for UW sensors for each month. B) Bar plot indicating signature enrichment for DW sensor for each month. C) Line plot indicating average enrichment of signatures from UW sensor for specific depth bin and month. D) Line plot indicating average enrichment of signatures from DW sensor for specific depth bin and month

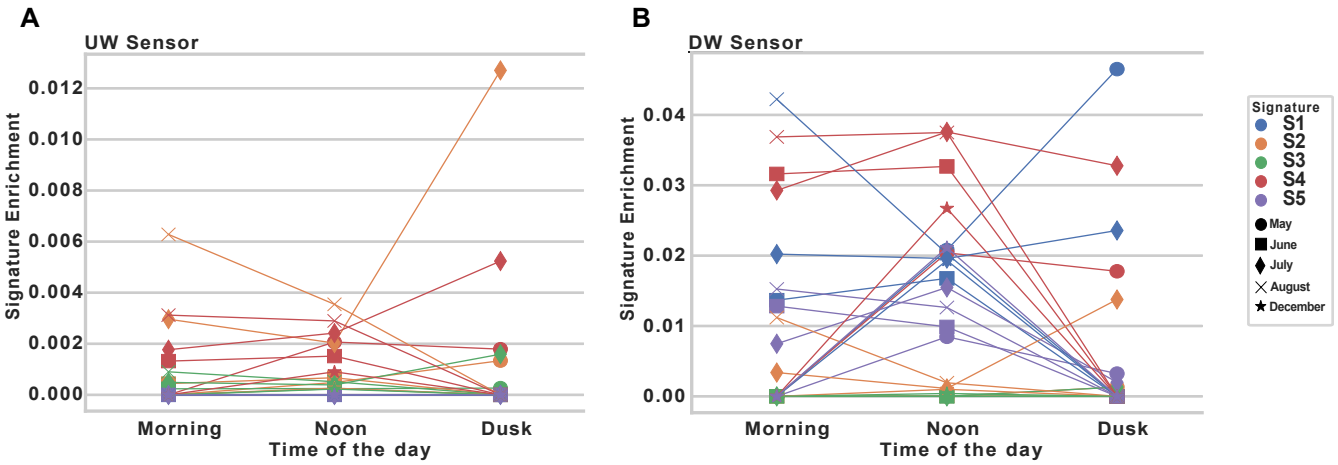
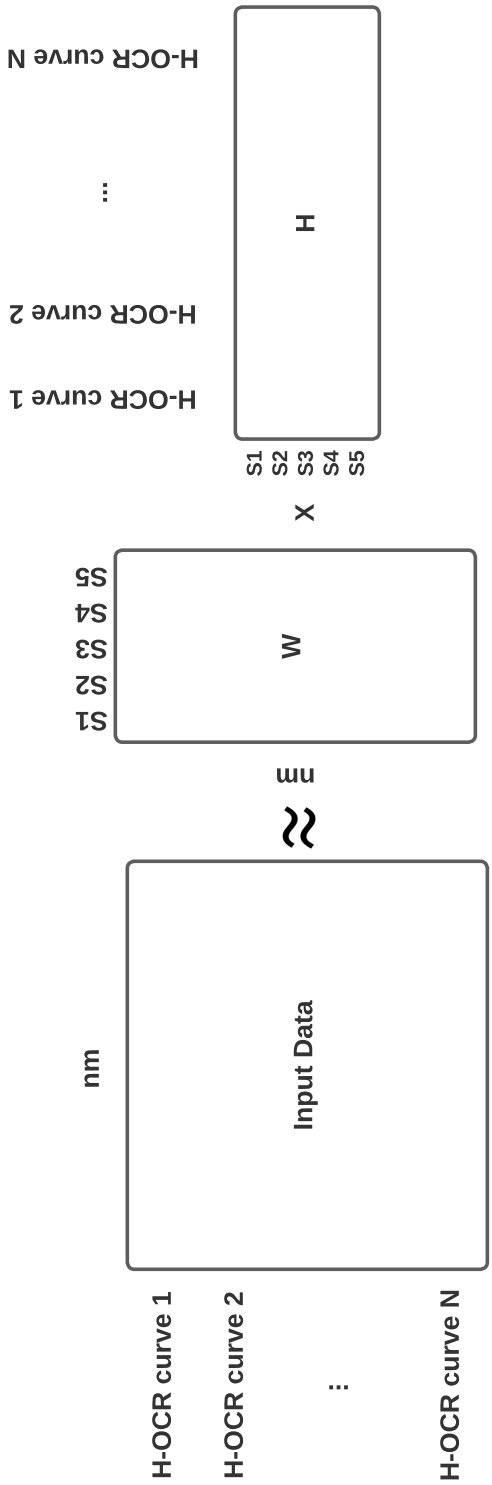
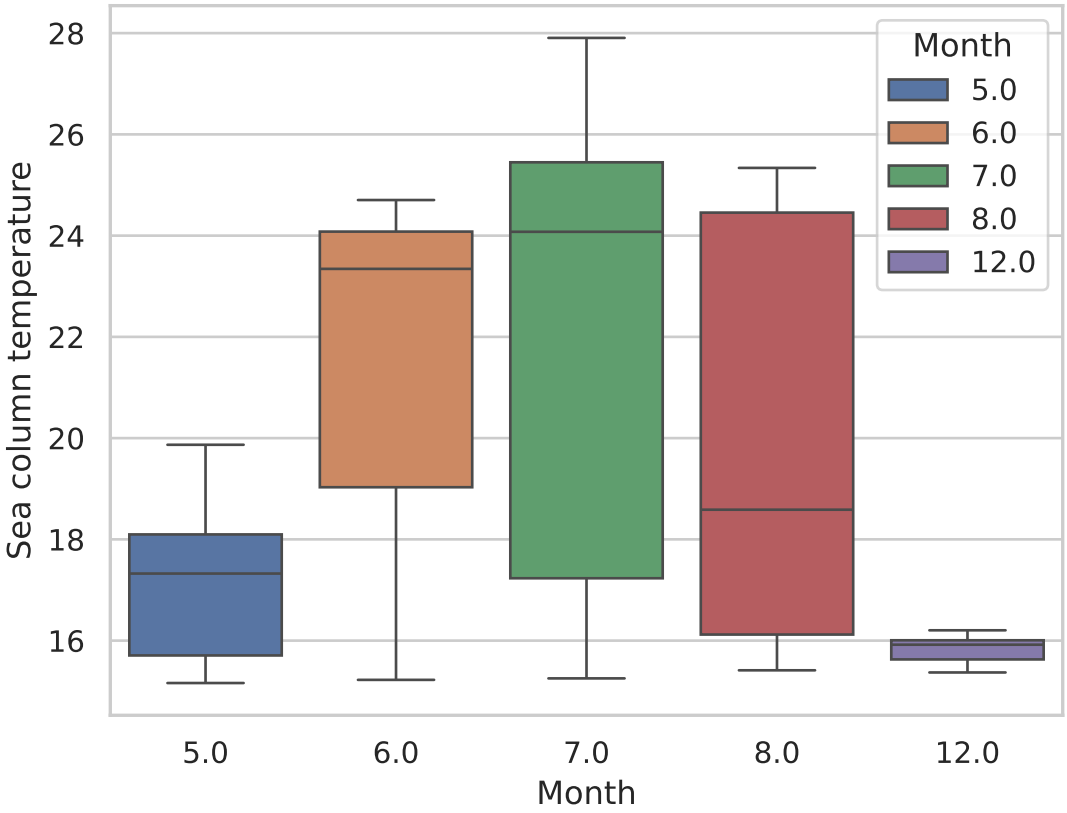


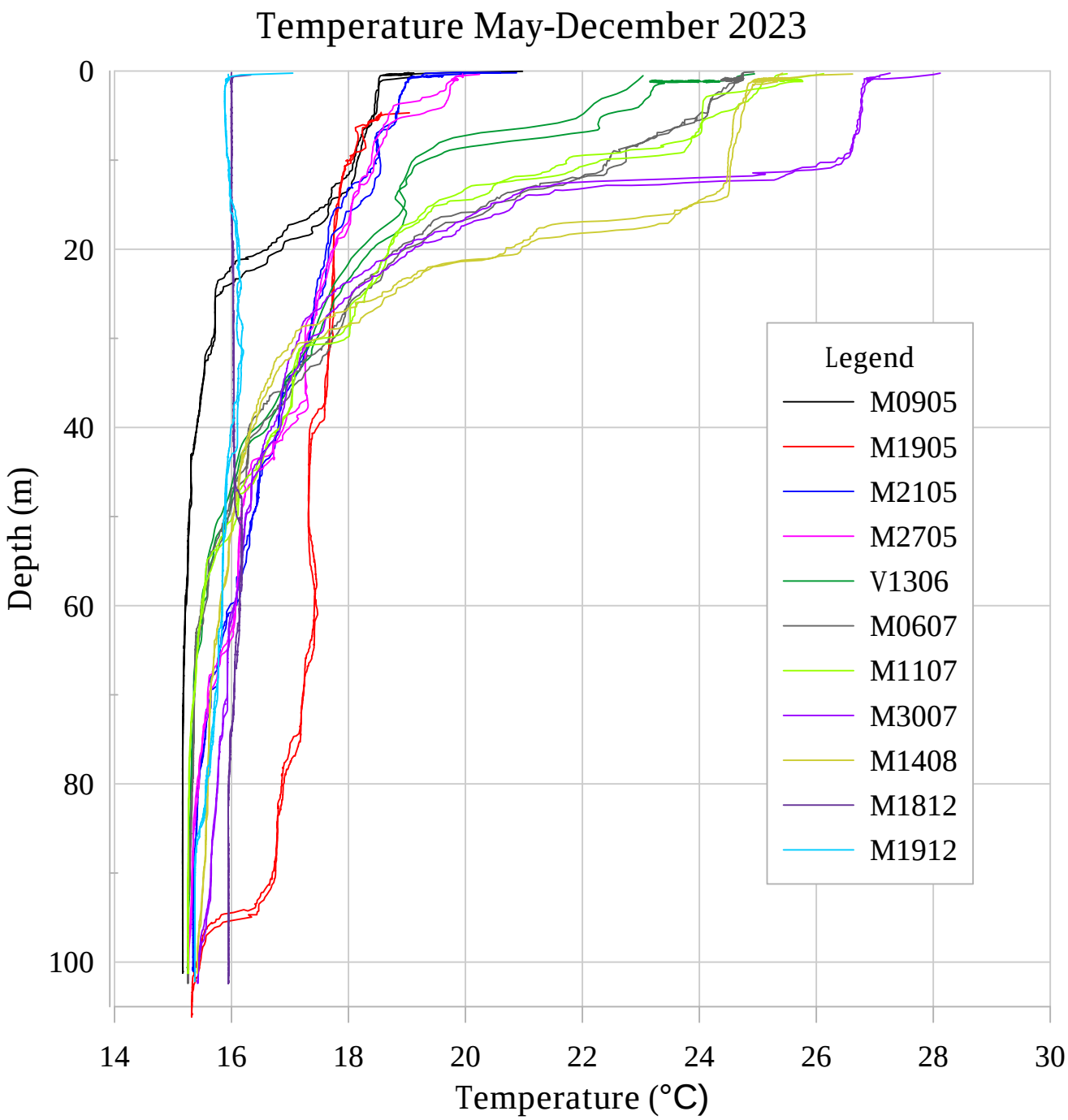
Figure 5: Signature enrichment by time intervals A) Line plot indicating how enrichment of signatures in UW sensor, changes during the time of day and month. B) Line plot indicating how enrichment of signatures in DW sensor, changes during the time of day and month



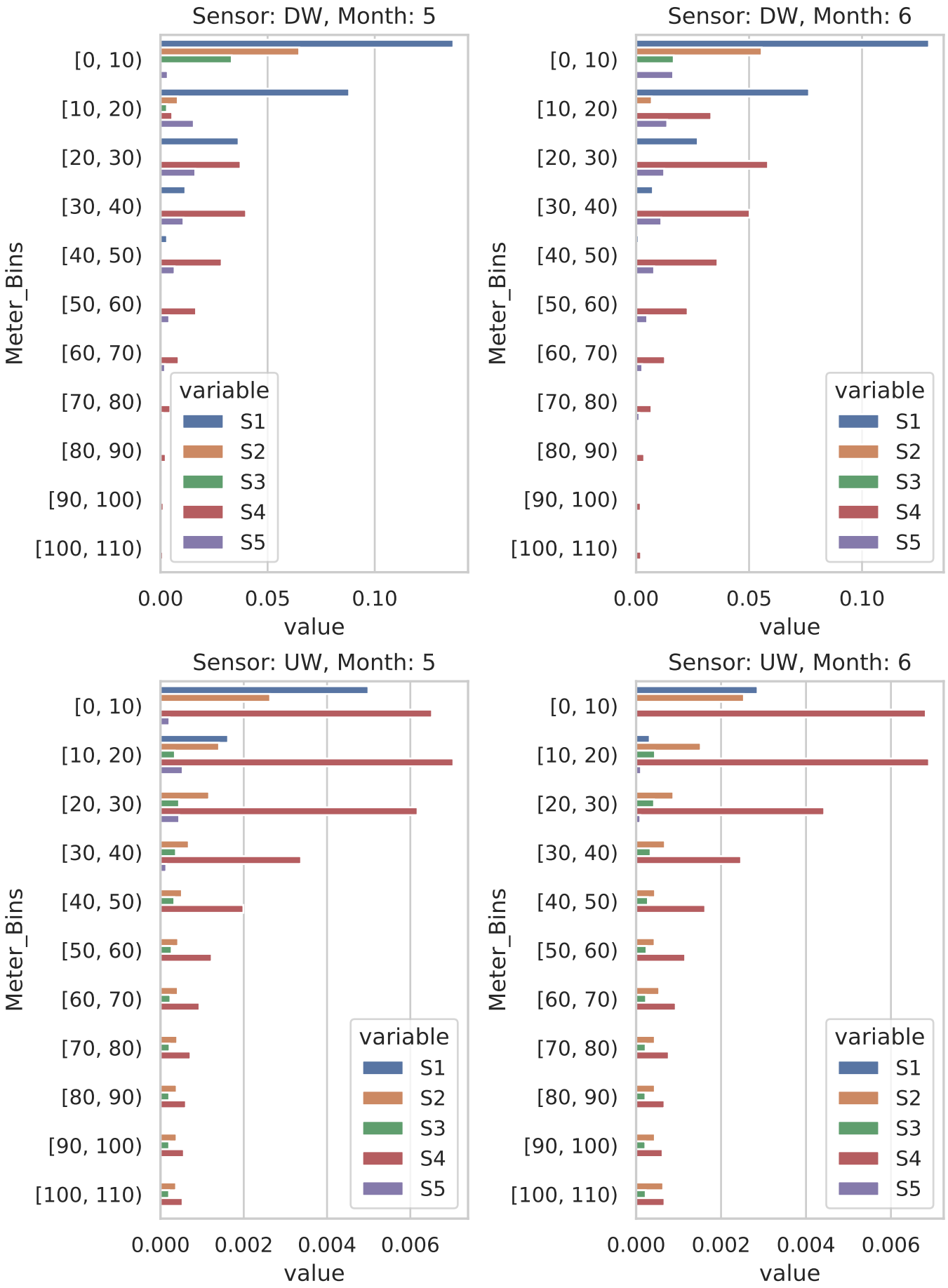
Supplementary Figure 1: Visalization of NMF factorization process for using our data

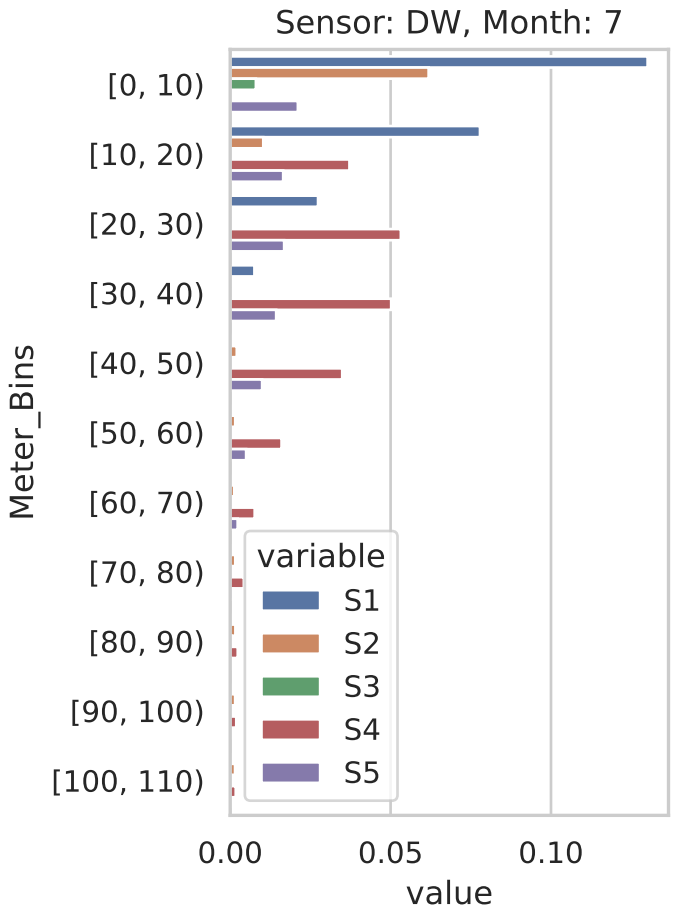


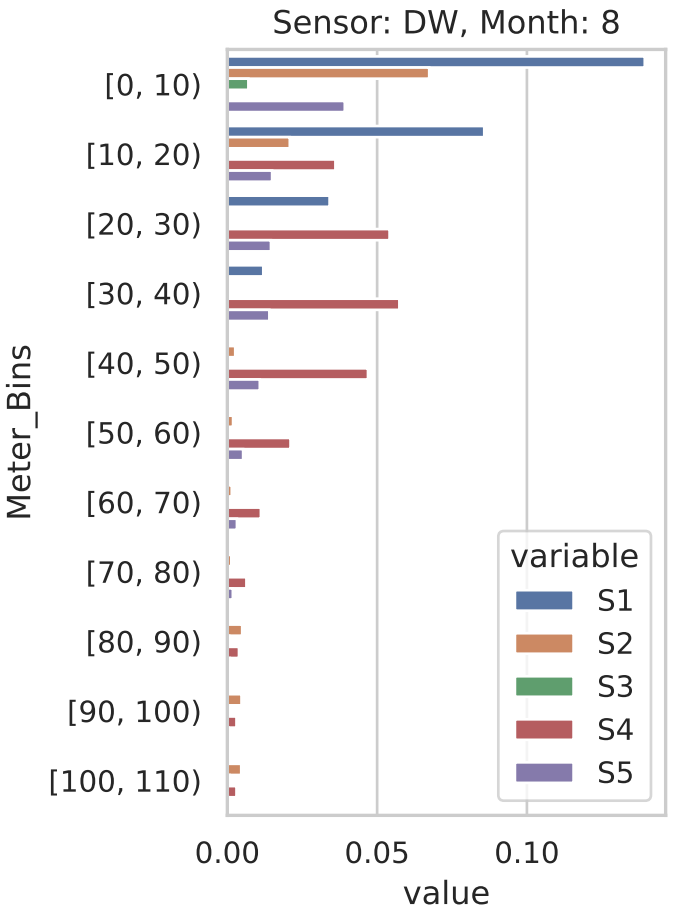
Supplementary Figure 2: Distribution of temperature measurements for each month

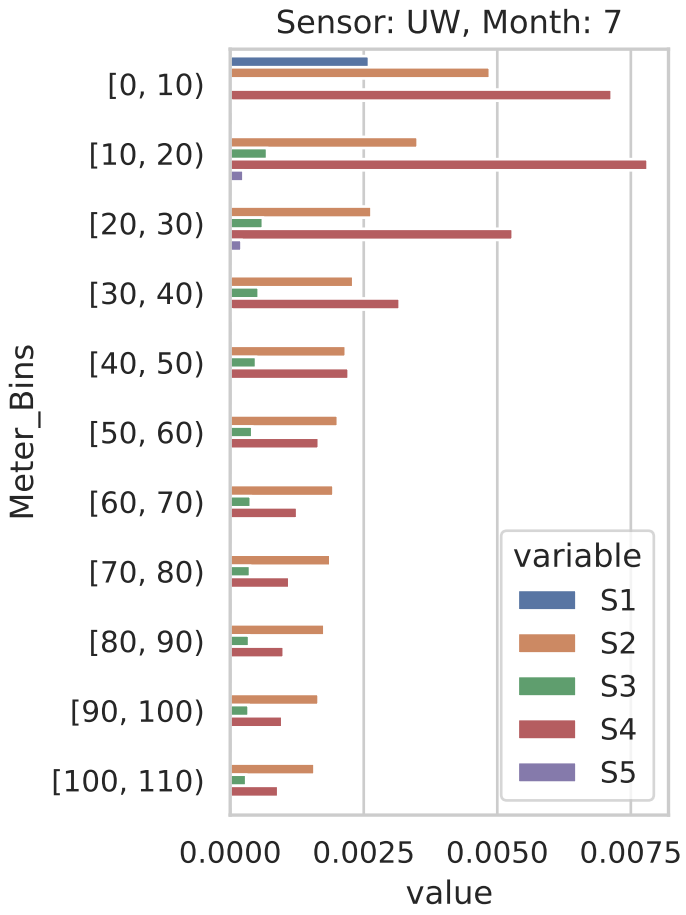


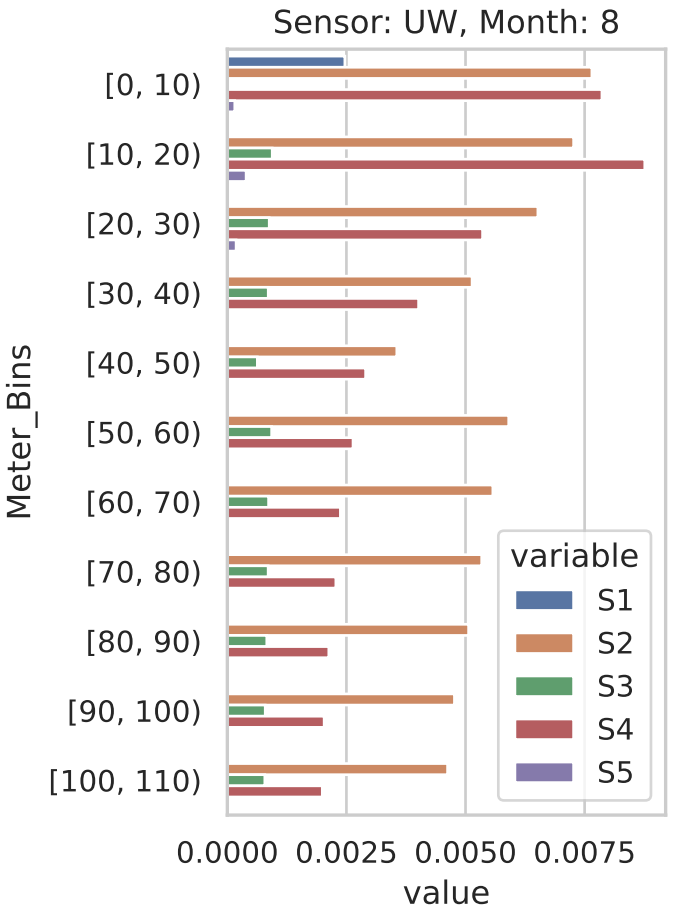
Supplementary Figure 3: Line plot showing temperature distribution across water column (depth)

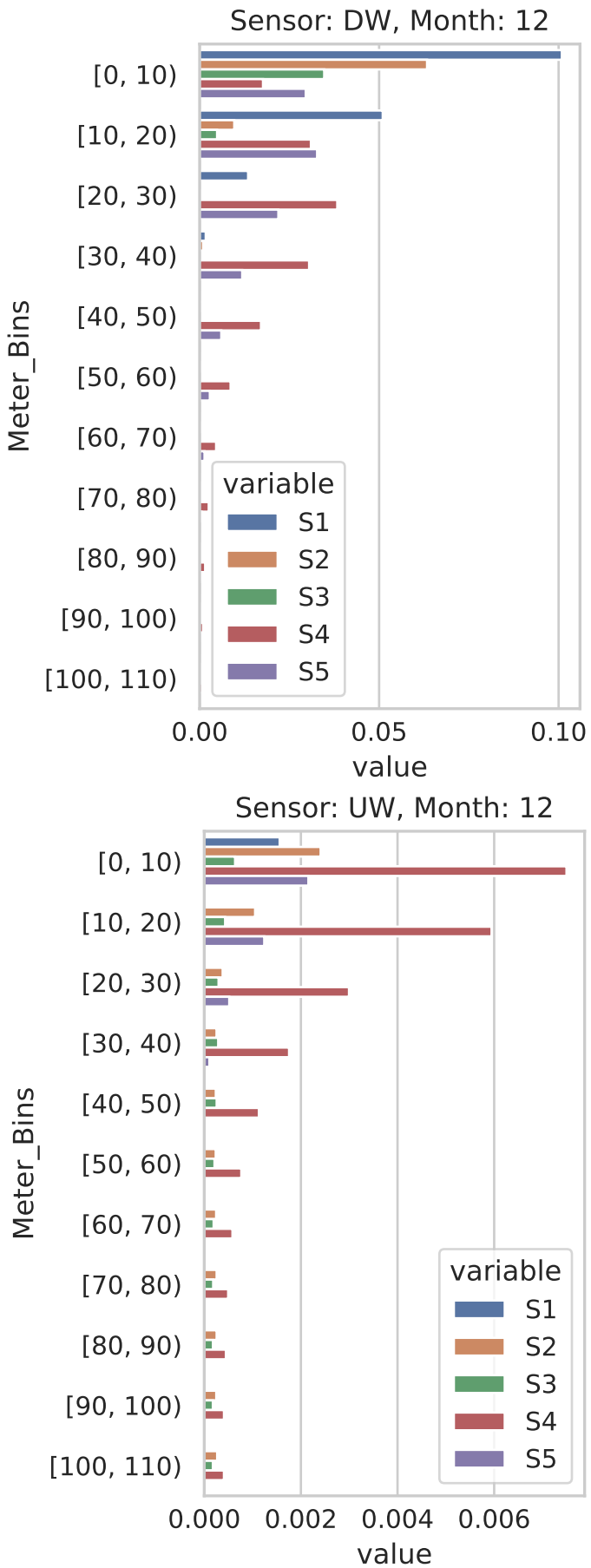




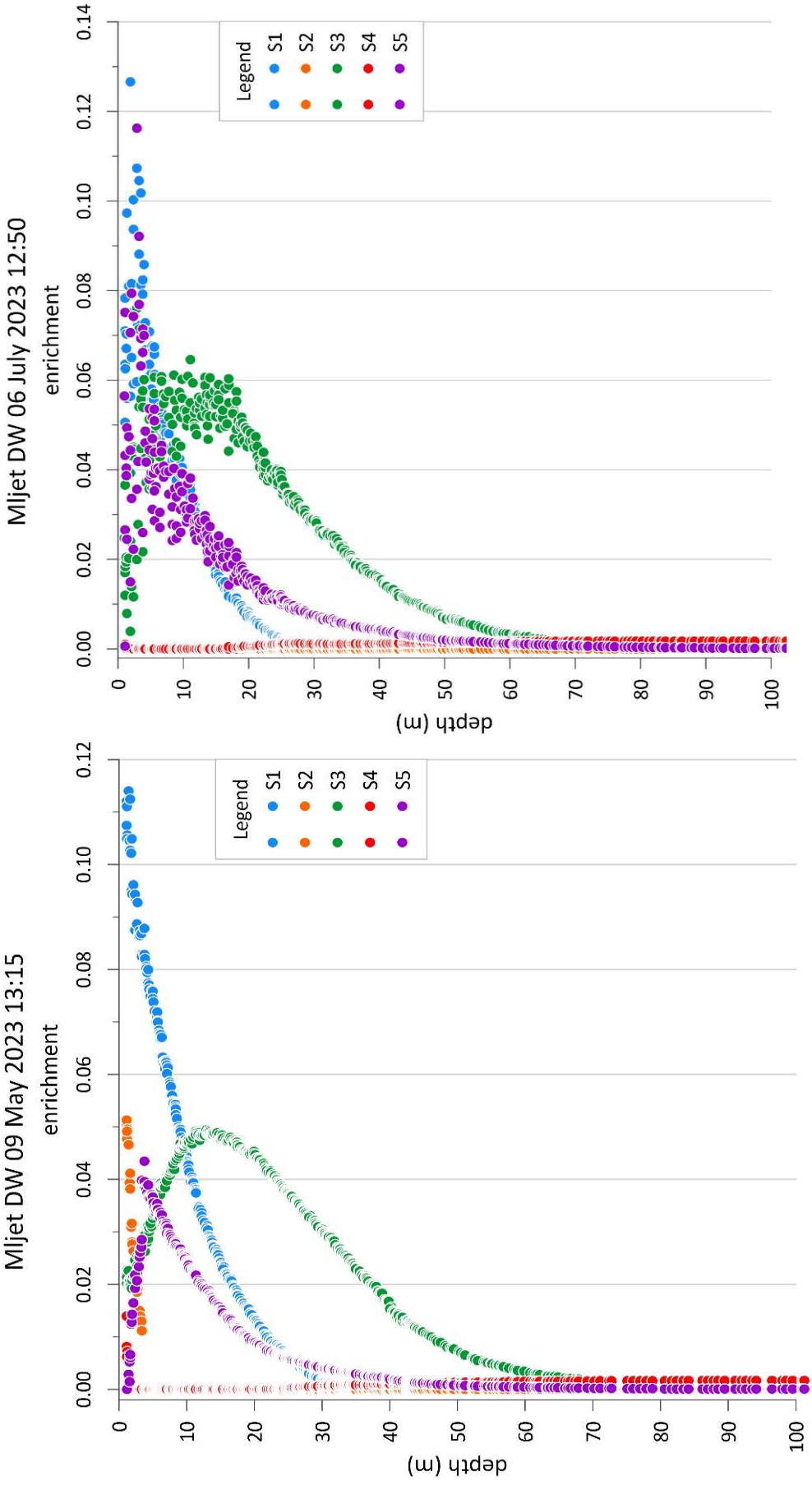








Supplementary Figure 4: Barplots showing average enrichment of signatures per sensor, month and depth-bin



Supplementary Figure 5: Example of tidy signature extraction due stable sea(left) vs. signature extraction when light was scattered due waves (right)

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Beyond Inevitability: Manila As A Capital and Maritime Hub in the Contemporary Period

By Ivan Kaye Bantigue

Manila in the Contemporary Period- It is in a strategic location in the Far East and Southeast Asia, a maritime route, making it a center for trade, commerce, finance, education, and government; thus, it is a commercial and industrial port site. Like during the Philippine Commonwealth, the North Harbor was now developed for inter-island maritime shipping, while the South Harbor was made for foreign trade. There was limited use of the shipping vessels for berth and Anchorage, the domestic vessels in the f Luneta.

The improvement of the port facilities in Manila was strengthened with the Reclamation Law in 1957 and theLocal Autonomy Law in 1959, which allowed local governments to initiate public enhancements, especially in the port cities in Manila (e.g., foreshore lands). The Americans' territorial coastline of Manila in 1901 only provided 4.5 kilometers south of Pasig to Vito Cruz. Seven kilometers were a concern for the South and North Port Harbor areas. The reclamation had considered the Manila Port and Harbor Development one of the programs.

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Beyond Inevitability: Manila as a Capital and Maritime Hub in the Contemporary Period

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I. Manila in the Contemporary Period

It is in a strategic location in the Far East and Southeast Asia, a maritime route, making it a center for trade, commerce, finance, education, and government; thus, it is a commercial and industrial port site. Like during the Philippine Commonwealth, the North Harbor was now developed for inter-island maritime shipping, while the South Harbor was made for foreign trade. There was limited use of the shipping vessels for berth and Anchorage, the domestic vessels in the f Luneta.

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The location of Tondo, Manila, begins at a point in the boundary between monuments forty-two and forty-three, where the center line of Avenida Rizal intersects it; southerly along the center line of Avenida Rizal to the center of the province of Antipolo branch of Manila Bay; western along the center of intersection with Estero de San Lazaro and western of Calle Azcarraga, to the high water line on the shore of Manila Bay[1].

The City of Manila is divided into four representative districts for national representation, each district to be represented by one member in the House of Representatives[2]: First District of Tondo, Second Districts of San Nicolas, Binondo, Quiapo, and Sta. Cruz, Third District of Sampaloc and San Miguel, Fourth District of Intramuros, Port Area, Ermita, Malate, Paco, Pandacan, and Sta. Ana.

A total of 40 percent of the maritime transport accounts for the coastal countries, while 46 percent would be the entire transport coast in the Philippines. In 2000, the Philippinesranked third in the five-port based on its efficiency in terms of services and global competitiveness.

Table 1: Port efficiency is from the Global Competitiveness Report, 7 being the best score; Median Clearance time is the median number of days to clear customs; Data for the year 2000. Competition Policy and Regulation in Ports and Shipping, February 5, 2005, p. 8

Country	Port Efficiency Index (1-7)	Median Clearance Time (Days)
Hong Kong	6.38	Na
Malaysia	4.95	7
Philipines	2.79	7
Singapore	6.76	2
Taiwan	5.18	n/a

Based on this chart, the ports of Manila have the least efficient index at 2.79 compared to Singapore at 6.75. Clearance time for cargo in Manila was seven days compared to only two days in Singapore in 2000.

The port efficiency includes physical infrastructure, industry structure, and regulation. Cargo handling services and even tariffs, as well as the behavior of the firms involved in the port industry, are part of this data. Like most infrastructures, ports also undergo rapid changes; the government identifies that buildings, infrastructures within the ports, cargo operations, and other port services must improve. However, the unsatisfactory performance of the port is also reflected in the number of countries. The

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[1] Republic Act No. 409 An Act to Revise the Charter of the City of Manila, and for Other Purposes. *Official Gazette,* vol. 45, No, 10, p. 4249 in October 1949. *See* Official Gazette of the Republic of the Philippines. https://www.officialgazette.gov.ph/1949/06/18/republic-act-no-409/

management planning brought financial losses to the state, businesses, and consumers[3].

In terms of privatization in south east Asia, Malaysia was the first country to be involved in the private sector, which managed the port facilities, because of the leasing of containers to Port Kelang to a private association in 1986. It continued to become a private sector by 1995, and port productivity increased by 15 to 20%.[4]

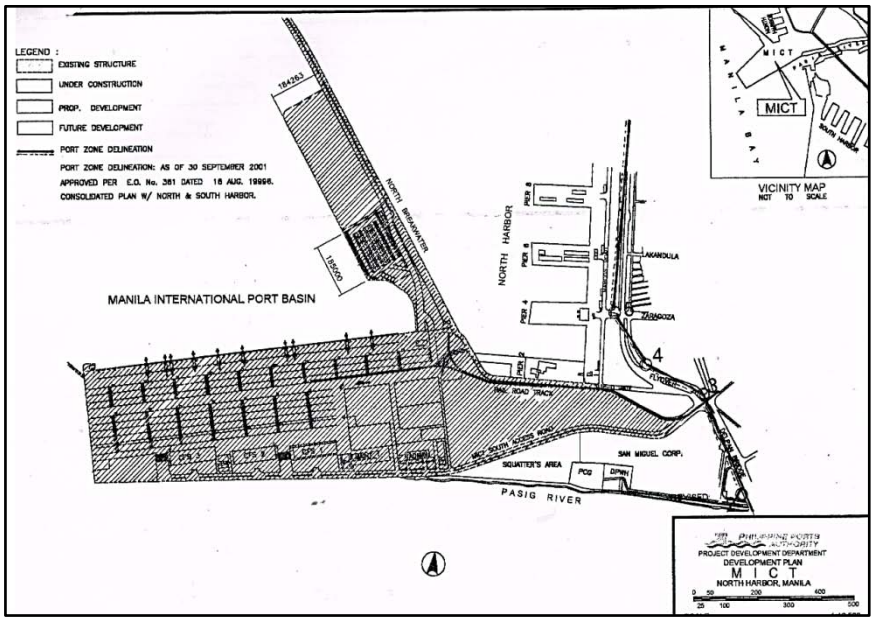

Figure 1: Manila International Container Terminal Layout. Profile of Philippine Ports Third Edition

The Manila International Container Terminal (MICT), operated by the International Container Terminal Services, Inc. (ICTSI), is located between the North and South Harbors in Manila and the westward of Manila. The southern end is the mouth of the Pasig River, a container-dedicated terminal, and is one of the three terminals in the Port of Manila.

These remaining two terminals, the North Harbor, were for domestic bulk, break bulk, passenger, and containerized cargo, and the South Harbor was for international bulk, break bulk passenger, and containerized cargo. The MICT has a total of 1,300 sq. in length and comprises six berths with the exact dimensions.

Table 2: The number of berths and their measurement. — profile of the Philippine Ports Third Edition

Berth	Length	Depth
1	250m	12.50m
2	250m	12.50m
3	250m	12.50m
4	250m	12.50m
5	300m	14.50m

[3]Competition Policy and Regulation in Ports and Shipping

[4]http://www.ppa.com.ph/content/ppa -organizational -structure

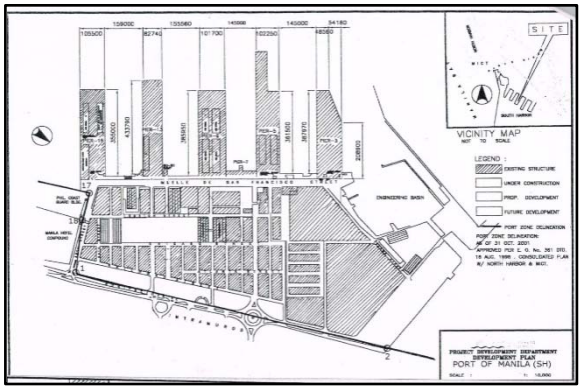

Figure 2: Port of Manila, South Harbor. Profile of Philippine Ports Third Edition

The PMO- South Harbor is one of the 123 government-owned ports the Philippine Ports Authority administers. It is a multi-cargo port with five-fingerpiers that handle all types of cargo, including container, bulk cargo, break-bulk, general cargo, and vehicles.

Bulk cargoes are handled at berth and their designated anchorages. The South Harbor handles at berth and its designated anchorage. South Harbor also handles much international shipping in the country, and its annual capacity was 820,000 more or less in its container vans. The South Harbor handles bulk cargo services.

In 2000, the total number of containers was 3,130,656 TEUs; the Cagayan de Oro and Davao had the highest container traffic in the base port, with 148 482 TEUs and 145,372 TEUs. The Manila South Harbor had the highest total of the base port, 576 592 TEUs; MICT, 951,289 TEUs; and Manila North Harbor, 763 823 TEUs.[5]

There was no documented domestic total number of cargo throughput in MICT, but the international cargo has a total of 11,242 870 metric tons—a total of 10,621,321 metric tons of international cargo for at berth and 621,549 m.t.[6]

Table 3: Shipping cargo and passenger statistics in Manila International Container Terminal. Philippine Ports Authority, 2000

		M.I.C.T		
PARTICULARS		AT BERTH	AT ANCH.	TOTAL
B. CARGO AND PASSENGER				
1. Total Cargo Throughput (m.t.)		10,633,153	621,549	11,254,702
	a. Domestic	0	0	0
	Inbound	0	0	0
	Breakbulk	0	0	0
	Bulk	0	0	0
	Containerized	0	0	0
	Outbound	0	0	0
	Breakbulk	0	0	0
	Bulk	0	0	0
	Containerized	0	0	0
	b. Foreign	10,621,321	621,549	11,242,870
	Import	6,527,425	621,549	7,148,974
	Breakbulk	21,404	0	21,404
	Bulk	0	621,549	621,549
	Containerized	6,506,021	0	6,506,021
	Export	4,093,896	0	4,093,896
	Breakbulk	0	0	0
	Bulk	0	0	0
	Containerized	4,093,896	0	4,093,896
	c. Transit Cargo	11,832	0	11,832
	Domestic	11,832	0	11,832
	Inward	5,395	0	5,395
	Outward	6,437	0	6,437
	Foreign	0	0	0
	Inward	0	0	0
	Outward	0	0	0
	d. Foreign (Transhipment)	249,221	0	249,221
2. Total Passengers		0	0	0
	Disembarking	0	0	0
	Embarking	0	0	0

The Manila North Harbor had 6,394 shipping vessels for both berth and anchorage; the domestic vessels in the base port had 5,908, and 467 were private ports.

[5]Manila International Container Terminal. Philippine Ports Authority,

[6]*ibid*

Table 4: Shipping cargo and passenger statistics in Manila North Harbor, 2000 Terminal. Philippine Ports Authority

PARTICULARS	AT BERTH		AT ANCHORAGE	TOTAL
	Base Port	Private Ports	Base Port	
A. SHIPPING				
1. Number of Vessels	5,908	467	19	6,394
Domestic	5,908	347	19	6,274
Foreign	0	120	0	120
2. Gross Registered Tonnage	30,998,941	1,404,961	28,473	32,432,375
Domestic	30,998,941	226,037	28,473	31,253,451
Foreign	0	1,178,924	0	1,178,924
3. Net Registered Tonnage	14,656,160	679,701	17,889	15,353,750
Domestic	14,656,160	166,016	17,889	14,840,065
Foreign	0	513,685	0	513,685
4. Deadweight Tonnage	20,642,793	2,180,506	53,480	22,876,779
Domestic	20,642,793	407,879	53,480	21,104,152
Foreign	0	1,772,627	0	1,772,627
5. Length of Vessels (m.)	604,442	34,455	1,386	640,283
Domestic	604,442	18,066	1,386	623,894
Foreign	0	16,389	0	16,389
6. Beam of Vessels (m.)	98,279	6,321	234	104,834
Domestic	98,279	3,695	234	102,208
Foreign	0	2,626	0	2,626
7. Draft of Vessels (m.)	29,405	2,121	84	31,610
Domestic	29,405	1,347	84	30,836
Foreign	0	774	0	774
8. Waiting Time (hrs.)	557	0	0	557
Domestic	557	0	0	557
Foreign	0	0	0	0
9. Service Time (hrs.)	299,093	61,928	1,264	362,285
Domestic	299,093	54,845	1,264	355,202
Foreign	0	7,083	0	7,083

The Manila North Harbor had a total of 17,267,863 m.t. as of the year 2000 of total cargo throughput, 15,599 033 m.t. for the base port at berth and 1,633,516 private ports at berth while 32,314 m.t. The base port at anchorage. The domestic cargo had a total of 15,257,591 m.t, higher than the international shipment of 1,318,437m.t. The total number of passengers was 3,801,58, the same for the number of passengers at base ports; moreover, no documented passengers were at individual ports. [7]

[7]Manila North Harbor, 2000 Terminal. Philippine Ports Authority.

Table 5: Shipping cargo and passenger statistics in Manila North Harbor. Philippine Ports Authority.2000

PARTICULARS	AT BERTH		AT ANCHORAGE	TOTAL
	Base Port	Private Ports	Base Port	
B. CARGO AND PASSENGER				
1. Total Cargo Throughput (m.t.)	15,599,033	1,633,516	32,314	17,264,863
a. Domestic	14,910,198	315,079	32,314	15,257,591
Inbound	6,630,749	209,034	31,034	6,870,817
Breakbulk	1,023,709	161,944	0	1,185,653
Bulk	161,418	46,172	31,034	238,624
Containerized	5,445,622	918	0	5,446,540
Outbound	8,279,449	106,045	1,280	8,386,774
Breakbulk	889,499	106,045	0	995,544
Bulk	89	0	1,280	1,369
Containerized	7,389,861	0	0	7,389,861
b. Foreign	0	1,318,437	0	1,318,437
Import	0	1,318,437	0	1,318,437
Breakbulk	0	0	0	0
Bulk	0	1,318,437	0	1,318,437
Containerized	0	0	0	0
Export	0	0	0	0
Breakbulk	0	0	0	0
Bulk	0	0	0	0
Containerized	0	0	0	0
c. Transit Cargo	688,835	0	0	688,835
Domestic	688,835	0	0	688,835
Inward	367,393	0	0	367,393
Outward	321,442	0	0	321,442
Foreign	0	0	0	0
Import	0	0	0	0
Export	0	0	0	0
d. Foreign (Transhipment)	0	0	0	0
2. Total Passengers	3,801,583	0	0	3,801,583
Disembarking	2,084,134	0	0	2,084,134
Embarking	1,717,449	0	0	1,717,449

The Manila International Container Terminal had a total number of 1,1991 vessels both for berth and anchorage. Specifically, domestic cargo had 30 vessels, and foreign cargoes had 1,961. A total of 10,041 hours was the accumulated time for berth and anchorage, while the service time from MICT had a total of 43,112.

The total cargo was 11,254,702 m.t. There were no documented domestic vessels for MICT, but the total number of foreign cargo was 11,242. In 2000, import values were much higher than the export value, with 7,148,974 m.t. cargo vessels and 4,093,896 export vessels.

Table 6: Shipping cargo and passenger statistics in Manila International Container Terminal. Philippine Ports Authority. 2000

PARTICULARS	M.I.C.T AT BERTH	M.I.C.T AT ANCH.	M.I.C.T TOTAL
A. SHIPPING			
1. Number of Vessels	1,941	50	1,991
Domestic	30	0	30
Foreign	1,911	50	1,961
2. Gross Registered Tonnage	25,822,353	689,171	26,511,524
Domestic	85,620	0	85,620
Foreign	25,736,733	689,171	26,425,904
3. Net Registered Tonnage	12,106,607	389,578	12,496,185
Domestic	33,210	0	33,210
Foreign	12,073,397	389,578	12,462,975
4. Deadweight Tonnage	31,966,242	1,131,828	33,098,070
Domestic	96,000	0	96,000
Foreign	31,870,242	1,131,828	33,002,070
5. Length of Vessels (m.)	304,866	7,277	312,143
Domestic	2,730	0	2,730
Foreign	302,136	7,277	309,413
6. Beam of Vessels (m.)	45,055	1,318	46,373
Domestic	441	0	441
Foreign	44,614	1,318	45,932
7. Draft of Vessels (m.)	16,065	393	16,458
Domestic	150	0	150
Foreign	15,915	393	16,308
8. Waiting Time (hrs.)	10,041	0	10,041
Domestic	64	0	64
Foreign	9,977	0	9,977
9. Service Time (hrs.)	26,829	16,283	43,112
Domestic	83	0	83
Foreign	26,746	16,283	43,029

PARTICULARS	AT BERTH	AT ANCH.	TOTAL
B. CARGO AND PASSENGER			
1. Total Cargo Throughput (m.t.)	10,633,153	621,549	11,254,702
a. Domestic	0	0	0
Inbound	0	0	0
Breakbulk	0	0	0
Bulk	0	0	0
Containerized	0	0	0
Outbound	0	0	0
Breakbulk	0	0	0
Bulk	0	0	0
Containerized	0	0	0
b. Foreign	10,621,321	621,549	11,242,870
Import	6,527,425	621,549	7,148,974
Breakbulk	21,404	0	21,404
Bulk	0	621,549	621,549
Containerized	6,506,021	0	6,506,021
Export	4,093,896	0	4,093,896
Breakbulk	0	0	0
Bulk	0	0	0
Containerized	4,093,896	0	4,093,896
c. Transit Cargo	11,832	0	11,832
Domestic	11,832	0	11,832
Inward	5,395	0	5,395
Outward	6,437	0	6,437
Foreign	0	0	0
Inward	0	0	0
Outward	0	0	0
d. Foreign (Transhipment)	249,221	0	249,221
2. Total Passengers	0	0	0
Disembarking	0	0	0
Embarking	0	0	0

In 2001, the Manila International Container Terminal had 1,938 vessels for berth and anchorage. The total number of domestic was 19; foreign, 1,919. The total number of domestic cargoes is 10,904,546 m.t. Moreover, there were 10,914,386, but no documented number of passengers was in MICT. The total service time of MICT for domestic was 52 hours; for foreign, 34,837 and 34,889 hours service time. The total waiting time of MICT for domestic was 65 hours; for foreign, 7,591 hours and a total of 7,656 hours waiting time[8].

The total domestic cargo commodity in 2001 for the Manila International Container Terminal was 9,840: 9840 for Containerized and no documented number of cargoes for breakbulk and bulk. The total foreign cargo commodity for the Manila International Container Terminal was 10,904,546, 28,730 for breakbulk, 695,486 for Bulk, and 10,180,330 for containerized. The total of cargo for the Manila International Container Terminal was 10,914,386. The highest number of cargos for the MICT was from the other general cargo, with a total of 10,421,340 cargoes. The inbound domestic cargo had a total of 3750; 3,750 for containerized and no documented number of cargoes for breakbulk and bulk. The inbound foreign cargo had 8,914,717, 28,730 for breakbulk, 695,486 for bulk, and 6,190,501 for containerized. The total of cargo was 6,918,467. Most cargo was from the other general cargo, comprising 6,425,421 cargoes. The outbound domestic cargo had a total of 6,090; 6,090 are containerized, and there is no documented number of cargo for breakbulk and bulk. The outbound foreign cargo had 3,989,829, 3,989,829 for containerization, and no documented number of

[8]http://www.ppa.com.ph/?q=content/statistics-1 (Quarterly Statistical Report, 2001)

cargos for breakbulk and bulk. The total of cargo was 3,995,919. The highest amount of cargo was from other general sources, with a total of 3,995,919[9].

The PMO- Manila North Harbor had a total 6,226 number of vessels for berth and Anchorage; the total number of domestic was 6,115; foreign, 111. The total number of cargo passengers for domestic was 15,644,494 m.t; foreign, 1,540,943 m.t. Moreover, a total of 17,857,437 m.t. The total number of passengers in Manila North Harbor was 3,420,855. The total service time of Manila North Harbor for domestic was 316,473 hours; for foreign, 8,411 hours and 324,884 hours service time. The total waiting time at Manila North Harbor for domestics was 41 hours; there were no documented hours for foreigners, and there was a total of 41 hours waiting time[10].

The total domestic cargo commodity for the PMO- Manila North Harbor was 6,723,507, 1,630,632 for Breakbulk, 541,256 for Bulk, and 4,551,619 for Containerized. The total international cargo commodity for the Manila North Harbor was1,540,943, 1,540,943 for Bulk, and no documented number of cargoes for Breakbulk and Containerized. The total of cargo for the Manila North Harbor was 8,264,450. The highest number of Cargo for the Manilla North Harbor was from the other general Cargo, with a total of 2,912,219 cargoes, and the lowest number of cargoes was from Molasses, with a total of 44 cargoes. The inbound domestic cargo had a total of 3,179,692: 959,514 for Breakbulk, 496,593 for Bulk, and 1,723,585 for Containerized. The inbound foreign cargo had 1,540,943, 1,540,943 for Bulk, and no documented number of cargo for Breakbulk and Containerized. The total of cargo was 4,720,635. The highest number of cargoes was from Cement, with a total of 1,322,693 cargoes, and the lowest number of cargoes was from Molasses, with a total number of 18 cargoes. The outbound domestic cargo had a total 3,543,815: 671,118 for Breakbulk,44,663 for Bulk, and 2,828,034 for Containerized. The outbound foreign cargo had no documented number of cargo. The total of cargo was 3,543,815. The highest number of cargoes was from the other general cargo, with a total of 2,014,145, and the lowest number of cargoes was from Logs with no documented number of cargoes.[11]

The PMO- Manila South Harbor had a total 10.532 number of vessels for berth and Anchorage; the total number of domestic was 8,356; foreign, 2,176. The total number of cargo passengers for domestic was 6,267,698 m.t; foreign, 6,784,721 m.t. Moreover, a total of 13,090,784 m.t. Also, the total number of passengers for foreign in Manila South Harbor was 14,808. The total service time of Manila South Harbor for domestic was 591,553 hours; for foreign, 90,590, and a total of 682,143 service time. The total waiting time at Manila South Harbor for domestic workers was 30 hours; for foreign workers, it was 2,271 hours, and for foreigners, it was 2,301 hours[12].

The total domestic Cargo commodity for the PMO- Manila South Harbor was 6,267,698, 1,845,380 for Breakbulk, 4,422,318 for Bulk, and no documented number of cargoes for Containerized. The total foreign Cargo commodity was 6,823,086: 3,175,141 for Breakbulk, 676,259 for Bulk, and 2,971,686 for Containerized. The total of cargo for the Manila South Harbor was 13,090,784. The highest number of Cargo for the Manila South Harbor was from the Iron and Steel, with a total of 4,169,173 cargoes, and the lowest number of cargoes was from Abaca, with a total of 907 cargoes. The inbound domestic cargo had a total of 6,203,211, while for Breakbulk, 1,803,515; 4,399,696 for Bulk and no documented number of cargo for Containerized. The inbound foreign cargo had 6,348,106, 3,149,129 for Breakbulk, 650,017 for Bulk, and 2,548,960 for Containerized. The total of cargo was 12,551,317. The highest number of cargoes was from Iron and Steel, with a total of 4,156,115, and the lowest number of cargos was from the Abaca, with no documented number of cargos. The outbound domestic cargo had a total of 64,487, 41,865 for Breakbulk, 22,622 for Bulk, and no documented number of cargo for Containerized. The outbound foreign cargo had a total of 474,980: 26,012 for Breakbulk, 26,242 for Bulk, and 422,726 for Containerized. The total of cargo was 539,467. The highest number of cargoes was from the other general cargo, with a total of 271,43, and the lowest number of cargo was from the Copra, Logs, Live animals, and Molasses, which had no documented number of cargoes[13].

In 2002, the PMO – Manila Harbor had 6,381 vessels for a berth and no documented vessels for anchorage. The total number of cargo passengers for domestic is 16,887,607 m.t.; foreign is 791,262 m.t. Moreover, a total of 17,954,848 m.t. There was a total number of passengers in Manila North Harbor of 3,977,851[14].

[9]*ibid*
[10]*ibid*
[11]http://www.ppa.com.ph/?q=content/statistics-1 (Quarterly Statistical Report, 2001)
[12]*ibid*
[13]http://www.ppa.com.ph/?q=content/statistics-1 (Quarterly Statistical Report, 2001)
[14]PPA Annual Reporrt, Philippine Port Authority vol. 1, 2002.

Table 7: Summary of Shipping Statistics by Port Classification; PMO: North Harbor at Berth and Anchorage. Philippine Port Authority vol. 1, 2002

2002

PARTICULARS	AT BERTH		TOTAL
	Base Port	Private Ports	
A. SHIPPING			
1. Number of Vessels	5,891	490	6,381
Domestic	5,891	421	6,312
Foreign	0	69	69
2. Gross Registered Tonnage	26,914,689	1,202,215	28,116,904
Domestic	26,914,689	351,893	27,266,582
Foreign	0	850,322	850,322
3. Net Registered Tonnage	14,443,243	716,737	15,159,980
Domestic	14,443,243	252,701	14,695,944
Foreign	0	464,036	464,036
4. Deadweight Tonnage	18,720,740	1,418,998	20,139,738
Domestic	18,720,740	530,792	19,251,532
Foreign	0	888,206	888,206
5. Length of Vessels (m.)	586,116	31,541	617,657
Domestic	586,116	22,627	608,743
Foreign	0	8,914	8,914
6. Beam of Vessels (m.)	96,264	5,990	102,254
Domestic	96,264	4,487	100,751
Foreign	0	1,503	1,503
7. Draft of Vessels (m.)	28,231	1,593	29,824
Domestic	28,231	1,203	29,434
Foreign	0	390	390
8. Waiting Time (hrs.)	0	0	0
Domestic	0	0	0
Foreign	0	0	0
9. Service Time (hrs.)	305,663	56,990	362,653
Domestic	305,663	49,590	355,253
Foreign	0	7,400	7,400

Table 8: Summary of Cargo Passenger by Port Classification; PMO: North Harbor at Berth and Anchorage. Philippine Port Authority vol. 1, 2002

PARTICULARS	AT BERTH		TOTAL
	Base Port	Private Ports	
B. CARGO AND PASSENGER			
1. Total Cargo Throughput (m.t.	16,775,690	1,179,158	17,954,848
a. Domestic	16,499,711	387,896	16,887,607
Inbound	7,265,007	172,324	7,437,331
Breakbulk	986,882	127,157	1,114,039
Bulk	297,730	2,244	299,974
Containerized	5,980,395	42,923	6,023,318
Outbound	9,234,704	215,572	9,450,276
Breakbulk	1,049,362	114,065	1,163,427
Bulk	8,901	54,667	63,568
Containerized	8,176,441	46,840	8,223,281
b. Foreign	0	791,262	791,262
Import	0	791,262	791,262
Breakbulk	0	72,515	72,515
Bulk	0	718,747	718,747
Containerized	0	0	0
Export	0	0	0
Breakbulk	0	0	0
Bulk	0	0	0
Containerized	0	0	0
c. Transit Cargo	275,979	0	275,979
Domestic (Cont.)	275,979	0	275,979
Inward	188,621	0	188,621
Outward	87,358	0	87,358
Foreign	0	0	0
Import	0	0	0
Export	0	0	0
d. Foreign (Transhipment	0	0	0
2. Total Passengers	3,977,851	0	3,977,851
Disembarking	2,149,271	0	2,149,271
Embarking	1,828,580	0	1,828,580

The PMO- Manila South Harbor had a total of 10,880 vessels both for berth and anchorage. There was no number of passengers for domestic.; foreign, 3,016,510 m.t. Moreover, a total of 3,016,510 m.t. Moreover, there wasno documented number of passengers for Manila South Harbor.[15]

[15]PPA Annual Report. Philippine Port Authority vol. 1,

Table 9: Summary of Shipping Statistics by Port Classification; PMO: South Harbor at Berth and Anchorage. Philippine Port Authority vol. 1, 2002

2002						
PARTICULARS	AT BERTH			AT ANCHORAGE	TOTAL
	Base Port	Terminal Port - Pasig		Base Port	
	South Harbor	Government	Private	South Harbor	
A. SHIPPING					
1. Number of Vessels	1,774	2,777	5,885	444	10,880
Domestic	113	2,777	5,885	0	8,775
Foreign	1,661	0	0	444	2,105
2. Gross Registered Tonnage	20,666,123	1,279,984	2,635,376	5,713,707	30,295,190
Domestic	334,871	1,279,984	2,635,376	0	4,250,231
Foreign	20,331,252	0	0	5,713,707	26,044,959
3. Net Registered Tonnage	9,629,968	1,231,048	2,117,435	3,241,939	16,220,390
Domestic	133,843	1,231,048	2,117,435	0	3,482,326
Foreign	9,496,125	0	0	3,241,939	12,738,064
4. Deadweight Tonnage	24,926,090	2,385,036	5,022,501	9,553,190	41,886,817
Domestic	363,409	2,385,036	5,022,501	0	7,770,946
Foreign	24,562,681	0	0	9,553,190	34,115,871
5. Length of Vessels (m.)	254,953	105,509	278,833	60,917	700,212
Domestic	10,365	105,509	278,833	0	394,707
Foreign	244,588	0	0	60,917	305,505
6. Beam of Vessels (m.)	39,439	40,219	63,896	9,537	153,091
Domestic	1,672	40,219	63,896	0	105,787
Foreign	37,767	0	0	9,537	47,304
7. Draft of Vessels (m.)	12,465	5,777	12,514	3,095	33,851
Domestic	522	5,777	12,514	0	18,813
Foreign	11,943	0	0	3,095	15,038
8. Waiting Time (hrs.)	2,657	0	0	0	2,657
Domestic	45	0	0	0	45
Foreign	2,612	0	0	0	2,612
9. Service Time (hrs.)	49,839	195,413	456,681	42,514	744,447
Domestic	677	195,413	456,681	0	652,771
Foreign	49,162	0	0	42,514	91,676

Table 10: Summary of Cargo and Passenger by Port Classification; PMO: South Harbor at Berth and Anchorage. Philippine Port Authority vol. 1, 2002

PARTICULARS	AT BERTH			AT ANCHORAGE	TOTAL
	Base Port	Terminal Port - Pasig		Base Port	
	South Harbor	Government	Private	South Harbor	
B. CARGO AND PASSENGER					
1. Total Cargo Throughput (m.t.	4,281,891	2,034,987	4,287,807	3,016,510	13,621,195
a. Domestic	0	2,034,987	4,287,807	0	6,322,794
Inbound	0	2,008,357	4,253,311	0	6,261,668
Breakbulk	0	1,711,949	42,191	0	1,754,140
Bulk	0	296,408	4,211,120	0	4,507,528
Containerized	0	0	0	0	0
Outbound	0	26,630	34,496	0	61,126
Breakbulk	0	26,630	2,064	0	28,694
Bulk	0	0	32,432	0	32,432
Containerized	0	0	0	0	0
b. Foreign	4,228,345	0	0	3,016,510	7,244,855
Import	3,757,841	0	0	3,016,510	6,774,351
Breakbulk	1,113,328	0	0	2,392,468	3,505,796
Bulk	26,449	0	0	624,042	650,491
Containerized	2,618,064	0	0	0	2,618,064
Export	470,504	0	0	0	470,504
Breakbulk	32,904	0	0	0	32,904
Bulk	0	0	0	0	0
Containerized	437,600	0	0	0	437,600
c. Transit Cargo	53,546	0	0	0	53,546
Domestic	0	0	0	0	0
Inward	0	0	0	0	0
Outward	0	0	0	0	0
Foreign (Cont.)	53,546	0	0	0	53,546
Import	35,117	0	0	0	35,117
Export	18,429	0	0	0	18,429
d. Foreign (Transhipment	17,337	0	0	0	17,337
2. Total Passengers (Foreign)	8,646	0	0	0	8,646
Disembarking	4,323	0	0	0	4,323
Embarking	4,323	0	0	0	4,323

The Manila International Container Terminal had a total of 1,997 vessels both for berth and anchorage. There was no documented number of domestic and foreign cargo, 12,236,383 m.t., which had a total of 12,243,861 m.t. There was no documented number of passengers for MICT[16].

[16]PPA Annual Report,. Philippine Port Authority vol. 1, 2002.

Table 11: Summary of Berth and Anchorage by Port Classification; Field Office. Philippine Port Authority vol. 1, 2002

PARTICULARS	M.I.C.T		
	AT BERTH	AT ANCH.	TOTAL
A. SHIPPING			
1. Number of Vessels	1,962	35	1,997
Domestic	11	0	11
Foreign	1,951	35	1,986
2. Gross Registered Tonnage	28,006,484	562,536	28,569,020
Domestic	32,568	0	32,568
Foreign	27,973,916	562,536	28,536,452
3. Net Registered Tonnage	13,069,339	325,030	13,394,369
Domestic	13,561	0	13,561
Foreign	13,055,778	325,030	13,380,808
4. Deadweight Tonnage	34,177,447	955,390	35,132,837
Domestic	38,503	0	38,503
Foreign	34,138,944	955,390	35,094,334
5. Length of Vessels (m.)	317,773	5,475	323,248
Domestic	1,019	0	1,019
Foreign	316,754	5,475	322,229
6. Beam of Vessels (m.)	48,849	897	49,746
Domestic	161	0	161
Foreign	48,688	897	49,585
7. Draft of Vessels (m.)	16,628	322	16,950
Domestic	59	0	59
Foreign	16,569	322	16,891
8. Waiting Time (hrs.)	7,239	0	7,239
Domestic	33	0	33
Foreign	7,206	0	7,206
9. Service Time (hrs.)	22,240	8,714	30,954
Domestic	35	0	35
Foreign	22,205	8,714	30,919

Table 12: Summary of Cargo and Passenger by Port Classification; MICT Field Office. Philippine Port Authority vol. 1, 2002

PARTICULARS	M.I.C.T		
	AT BERTH	AT ANCH.	TOTAL
B. CARGO AND PASSENGER			
1. Total Cargo Throughput (m.t.	11,723,988	519,873	12,243,861
a. Domestic	0	0	0
Inbound	0	0	0
Breakbulk	0	0	0
Bulk	0	0	0
Containerized	0	0	0
Outbound	0	0	0
Breakbulk	0	0	0
Bulk	0	0	0
Containerized	0	0	0
b. Foreign	11,716,510	519,873	12,236,383
Import	7,100,543	519,873	7,620,416
Breakbulk	16,520	0	16,520
Bulk	0	519,873	519,873
Containerized	7,084,023	0	7,084,023
Export	4,615,967	0	4,615,967
Breakbulk	0	0	0
Bulk	0	0	0
Containerized	4,615,967	0	4,615,967
c. Transit Cargo	7,478	0	7,478
Domestic (Cont.)	7,478	0	7,478
Inward	3,490	0	3,490
Outward	3,988	0	3,988
Foreign	0	0	0
Inward	0	0	0
Outward	0	0	0
d. Foreign (Transhipment	475,676	0	475,676
2. Total Passengers	0	0	0
Disembarking	0	0	0
Embarking	0	0	0

In 2002, a total of 3,463,629 containers in 20-foot equivalent units (TEU) was collected by the Philippine Ports Authority; the domestic container traffic contained an amount of 1,672,118 and 1,791 511 different container traffic. As for the base port, a total of 3,270,796 TEU. The province of Cagayan de Oro had the highest accumulated total of 182,169 base port, and Surigao had the lowest total of 5,624 TEU; the Manila South Harbor, 612,487 TEU; MICT, 1,040,910 TEU; Manila North Harbor, 808,772 TEU[17].

There were no documented Containerized Cargo in Metric tons as per the available data.

The total domestic cargo commodity in 2002 for PMO North Harbor was 7,612,919: 1,596,000 for breakbulk, 329,608 for bulk, and 4,896,049 for containerized cargo. The inbound had 3,862,954,

[17]2002 Domestic Cargo for PMO North Harbor, *Philippine Ports Authority*

917,485 for breakbulk, 985,407 for Bulk, and 1,960,062 for containerized. The outbound had 3,749,965, 751,030 for breakbulk, 62,948 for Bulk, and 2,935,987 for containerized.[18]

In 2002, PMO South Harbor was one of the country's gateways, especially to international shipping and trade; the management of the Port Management Office of the South Harbor or PMO- South Harbor, which is an organization part of and under the Port District of Manila/Northern Luzon or PDO Manila/Northern Luzon. The PMO South Harbor included some jurisdictions around the Terminal Management Office of Pasig or TMO–Pasig in Manila Bay.

The PMO South Harbor has five piers numbered 3,5,9,13, and 15; these are massive piers measuring from 83m to 103m wide by 380m to 614m long. Massive piers were used for international purposes, and as part of the development of the South Harbor is the continuous rehabilitation of the ports, especially the piers used for the number of operations, such as piers 3 and 5, generally used for container operations, which are being served to number container operations. At the same time, the Berth1 for Pier 15 is a passenger line for foreign military vessels. Asian Terminals Inc. (ATI) is one of the cargo handling services responsible for handling services such as truck scale, lighterage, trucking, brokerage, cargo checking, and import and export services[19].

Because of the increased number of services and passengers in port, Berths 1, 2 and 4 of Pier 15 were used as accommodation in cruise andtourist vessels. The accommodation for the passengers and parking areas were also established for vehicle use other vehicles such as visiting ships foreign and navy vessels.

Located at the shoreline of the Tondo District, which is regarded to be the leading domestic port, North Harbor can accommodate all inter-island vessels. Six central piers catered to coastwise cargo and passenger ships. North Harbor also includes Isla Puting Bato, Vitas, Pier 2, Terminal 16, and Marine Slipway. These are used for daily living, such as fishing boats,battles, and smaller ships. The total number of areas is 52.47 hectares; the quality length is about 5,200 m, including Marine Slipway and Isla Puting Bato. North Harbor is identified as a catalyst, especially in Domestic Commerce.

The facilities used in North Harbor were extensively for passenger accommodation. The services of Manila North Harbor were not only in Metro Manila but also in the provinces of Bulacan, Tarlac, Nueva Ecija, and Nueva Vizcaya in the Northern part of the Philippines. Rizal, Cavite, Laguna, Batangas, and Quezon were also under the PMO- North Harbor of facilities used for handling coastwise general cargoes and passenger accommodation. Along the piers were 41 berths with water ranging from 4.5 to 6.0 m. In 1978, it experienced several containers used for transporting goods within and outside Metro Manila. 1996 the port also underwent rehabilitation under the North Harbor Rehabilitation and Development of Domestic Port Project. This project was financed by the Asian Development Bank and Philippine Ports Authority Local Fund and cost Php 879,750,08. It included marine works, pavement works, building facilities, utility works, and electrical works.[20]

[18] *ibid*

[19] 2002 Annual Report, Philippine Ports Authority

[20] Profile of the Philippine Ports, 2002

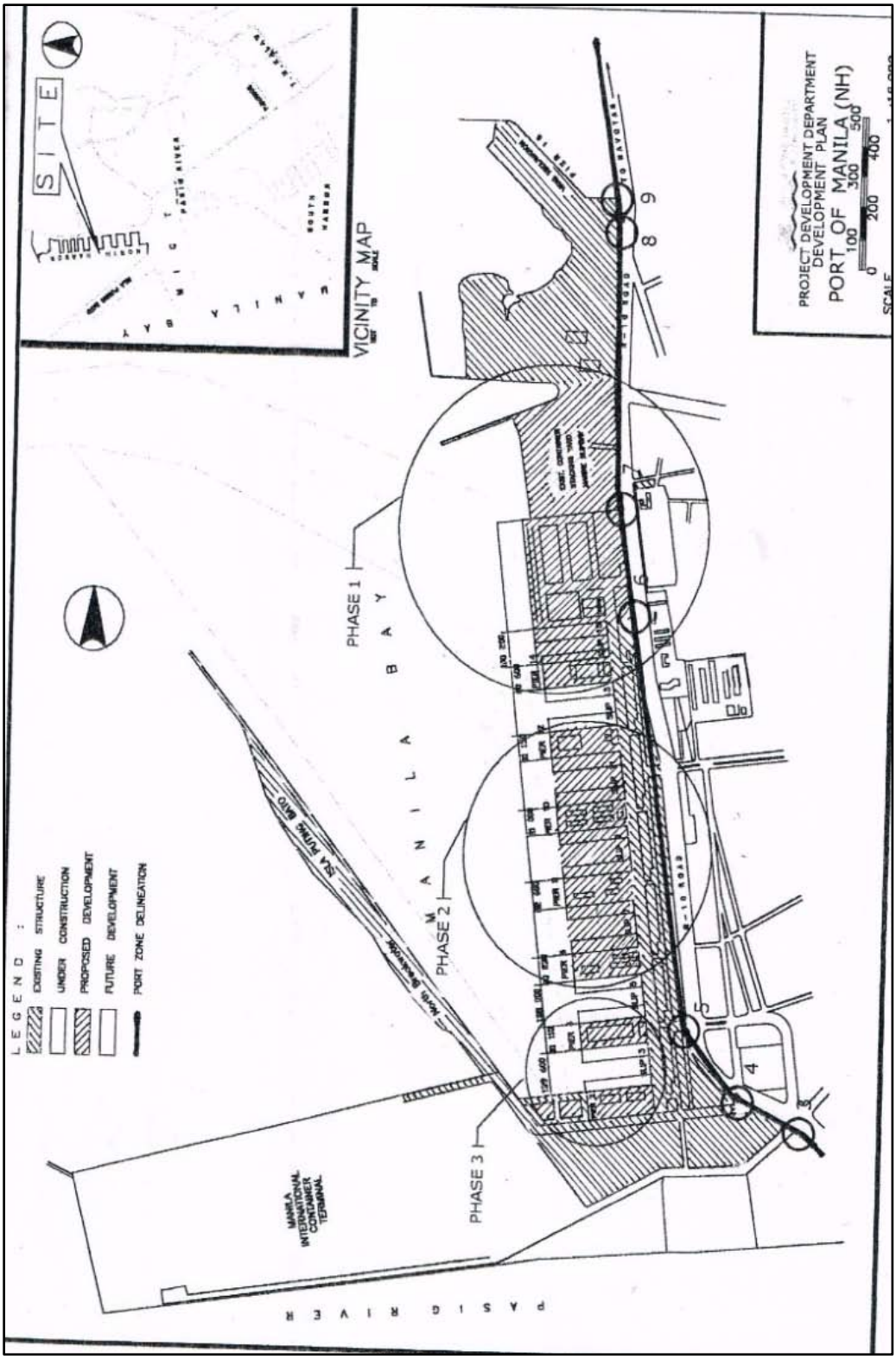

Figure 3: Port of Manila, North Harbor. *Profile of Philippine Ports Third Edition*

In 2003, the Manila International Container Terminal had a total of 1976 vessels for berth and anchorage, of which only two were domestic and 1,938 were foreign. The number of domestic waiting hours was 8 hours and 5,158 hours for foreign for a total of 5,166 for both berth and anchorage, while the domestic service time was 5 hours and 30,012 hours for foreign for a total of 30,017 hours for both berth and anchorage. There was no documented total number of domestic cargo, while there was 13,193,668 international cargo for

both berth and anchorage. Moreover, there was no documented total number of passengers for MICT[21].

In the year 2003, the North Manila Harbor had a total of 6,364 vessels, of which 6,266 vessels were domestic and 98 vessels were foreign; the service time for the domestic vessels was 379,916 hours, while the domestic service time was 11,412 hours. During the waiting time, there was no documented data about the said data. The cargo circulated within the North Manila Harbor had a total of 16,449,814. The domestic vessels had 15,683,819 cargo and 514,427 cargo for the foreign; the remaining cargo was for transit cargo. Moreover, 3,367,936 passengers went to the North Manila Harbor in 2003[22].

On the aspect of commodities in the North Manila Harbor, it was shown that the highest inbound commodity got a total of 4,196,948, and the other general cargo was the highest inbound commodity, which yielded 954,857, and its lowest inbound commodity was molasses, showed a total of 13. In the scene of outbound commodity, it was examined that the total commodity was 4,057,349 and that the highest outbound commodity was the other general cargos, which yielded 2,269,034. Moreover, the lowest outbound commodity was the copra. Moreover, the total cargo for the commodities was 8,254,297;the highest total commodity was the other general cargo, which displayed 3,223,891 cargos, and the lowest was the molasses, which had a total of only 86[23].

At PMO-South Harbor Manila, there were a total of 9,617 number of vessels for both berth and anchorage. A total of 3,609 hours was for waiting time, where 15 hours was for domestic and 3,594 hours were foreign, while there were 582,356 hours for domestic and 69,991 hours for Foreign Service time for a total of 652,347 hours for both berth and anchorage. The total number of cargoes embarked at the South Harbor was13,381,951, 6,292,847 domestic and 7,051,209 foreign. Also, 617,855 foreign passengers were documented for both embarking and disembarking[24].

In South Manila Harbor, the inbound commodity got a total of 12,020,175, and its highest commodity was iron and steel, which showed 4,035,161 cargos. In the aspect of its outbound commodity, it totaled 1,361,776 cargos, and the highest commodity of the outbound was the other general cargo, which showed 758,409 cargos. Moreover, the least outbound commodities were the logs and copra, which had no cargo. The total of the commodity of the South Manila Harbor was 13,381,951, and the total peak commodity was iron and steel, which displayed 4,069,334 cargos, and the smallest amount of commodity in the South Manila Harbor was the copra,which had a total of 1,793 cargos[25].

In 2004, the PMO- Manila North Harbor had 6,292 vessels for a berth and no documented vessels for anchorage. The total number of Cargo passengers for domestic was 14,777,296 m.t; foreign, 1,443,722 m.t., which yielded a total of 16,324,756 m.t. The total number of passengers in Manila North Harbor was 2,539,668[26].

[21]http://www.ppa.com.ph/?q=content/statistics-1 (Quarterly Statistical Report, 2003)
[22]*ibid*
[23]http://www.ppa.com.ph/?q=content/statistics-1 (Quarterly Statistical Report, 2003)
[24]*ibid*
[25]http://www.ppa.com.ph/?q=content/statistics-1 (Quarterly Statistical Report, 2003)
[26]http://www.ppa.com.ph/?q=content/statistics-1 (Quarterly Statistical Report, 2004)

Table 13: Summary of Shipping Statistics by Port Classification; PMO: North Harbor at Berth and Anchorage. Philippine Port Authority vol. 1, 2004

PARTICULARS	AT BERTH		TOTAL
	Bare Port	Private Ports	
A. SHIPPING			
1. Number of Vessels	5,398	894	6,292
Domestic	5,398	628	6,026
Foreign	0	266	266
2. Gross Registered Tonnage	20,894,745	2,113,007	23,013,752
Domestic	20,894,745	391,494	21,286,239
Foreign	0	1,727,513	1,727,513
3. Net Registered Tonnage	10,912,056	1,229,159	12,141,215
Domestic	10,912,056	295,360	11,207,416
Foreign	0	933,799	933,799
4. Deadweight Tonnage	15,587,450	3,499,513	19,086,963
Domestic	15,587,450	757,383	16,344,833
Foreign	0	2,742,124	2,742,124
5. Length of Vessels (m.)	502,260	57,298	559,558
Domestic	502,260	31,824	534,084
Foreign	0	25,474	25,474
6. Beam of Vessels (m.)	84,336	11,332	95,668
Domestic	84,336	6,690	91,026
Foreign	0	4,642	4,642
7. Draft of Vessels (m.)	24,059	3,218	27,277
Domestic	24,059	1,865	25,924
Foreign	0	1,353	1,353
8. Waiting Time (hrs.)	0	0	0
Domestic	0	0	0
Foreign	0	0	0
9. Service Time (hrs.)	306,976	77,448	384,424
Domestic	306,976	50,760	357,736
Foreign	0	26,688	26,688

The PMO- Manila South Harbor had a total of 10,135 vessels both for berth and anchorage. The total number of cargo passengers was 8,082,175 m.t.; foreign passengers, 6,439,140 m.t., which yields a total of 14,555,481 m.t. The total number of passengers in Manila South Harbor was 1,327,379 m.t.

Table 14: Summary of Shipping Statistics by Port Classification; PMO: South Harbor at Berth and Anchorage. Philippine Port Authority vol. 1, 2004

PARTICULARS	AT BERTH		TOTAL
	Bare Port	Private Ports	
B. CARGO AND PASSENGER			
1. Total Cargo Throughput (m.t.)	14,449,889	1,874,869	16,324,758
a. Domestic	14,346,149	431,147	14,777,296
Inbound	6,255,559	378,030	6,634,589
Breakbulk	1,073,742	114,508	1,188,250
Bulk	100,958	261,309	362,267
Containerized	5,080,859	3,213	5,084,072
Outbound	8,090,590	52,117	8,142,707
Breakbulk	1,171,075	32,098	1,203,173
Bulk	2,299	19,551	21,850
Containerized	6,917,216	468	6,917,684
b. Foreign	0	1,443,722	1,443,722
Import	0	1,413,725	1,413,725
Breakbulk	0	706,504	706,504
Bulk	0	707,221	707,221
Containerized	0	0	0
Export	0	29,997	29,997
Breakbulk	0	23,657	23,657
Bulk	0	6,340	6,340
Containerized	0	0	0
c. Transit Cargo	103,740	0	103,740
Domestic (Cont.)	103,740	0	103,740
Inward	58,557	0	58,557
Outward	45,183	0	45,183
Foreign	0	0	0
Import	0	0	0
Export	0	0	0
d. Foreign (Transhipment)	0	0	0
2. Total Passengers	2,539,668	0	2,539,668
Disembarking	1,335,704	0	1,335,704
Embarking	1,203,964	0	1,203,964

PARTICULARS	AT BERTH			AT ANCHORAGE	TOTAL
	Base Port	Terminal Port - Pasig		Base Port	
	South Harbor	Government	Private	South Harbor	
A. SHIPPING					
1. Number of Vessels	2,175	883	6,638	439	10,135
Domestic	808	883	6,638	0	8,329
Foreign	1,367	0	0	439	1,806
2. Gross Registered Tonnage	25,989,779	368,394	3,091,922	4,195,508	33,645,603
Domestic	8,838,351	368,394	3,091,922	0	12,298,667
Foreign	17,151,428	0	0	4,195,508	21,346,936
3. Net Registered Tonnage	12,532,493	347,934	2,502,727	2,250,363	17,633,517
Domestic	4,752,972	347,934	2,502,727	0	7,603,633
Foreign	7,779,521	0	0	2,250,363	10,029,884
4. Deadweight Tonnage	24,948,559	639,653	5,821,874	6,703,379	38,113,465
Domestic	4,422,883	639,653	5,821,874	0	10,884,410
Foreign	20,525,676	0	0	6,703,379	27,229,055
5. Length of Vessels (m.)	324,838	34,507	315,012	54,017	728,374
Domestic	118,993	34,507	315,012	0	468,512
Foreign	205,845	0	0	54,017	259,862
6. Beam of Vessels (m.)	49,880	11,839	73,449	8,673	143,841
Domestic	18,320	11,839	73,449	0	103,608
Foreign	31,560	0	0	8,673	40,233
7. Draft of Vessels (m.)	15,346	1,623	14,068	3,040	34,077
Domestic	5,079	1,623	14,068	0	20,770
Foreign	10,267	0	0	3,040	13,307
8. Waiting Time (hrs.)	1,492	0	0	0	1,492
Domestic	0	0	0	0	0
Foreign	1,492	0	0	0	1,492
9. Service Time (hrs.)	43,513	118,581	453,531	32,986	648,611
Domestic	10,171	118,581	453,531	0	582,283
Foreign	33,342	0	0	32,986	66,328

Table 15: Summary of Cargo and Passenger by Port Classification; PMO: South Harbor at Berth and Anchorage. Philippine Port Authority vol. 1, 2004

PARTICULARS	AT BERTH			AT ANCHORAGE	TOTAL
	Base Port	Terminal Port - Pasig		Base Port	
	South Harbor	Government	Private	South Harbor	
B. CARGO AND PASSENGER					
1. Total Cargo Throughput (m.t	7,226,250	592,515	4,967,497	1,769,219	14,555,481
a. Domestic	2,522,163	592,515	4,967,497	0	8,082,175
Inbound	970,474	570,430	4,937,601	0	6,478,505
Breakbulk	1,579	461,538	959,033	0	1,422,150
Bulk	0	108,892	3,978,568	0	4,087,460
Containerized	968,895	0	0	0	968,895
Outbound	1,551,689	22,085	29,896	0	1,603,670
Breakbulk	2,055	20,331	1,086	0	23,472
Bulk	0	1,754	28,810	0	30,564
Containerized	1,549,634	0	0	0	1,549,634
b. Foreign	4,669,921	0	0	1,769,219	6,439,140
Import	4,233,258	0	0	1,769,179	6,002,437
Breakbulk	587,560	0	0	1,390,049	1,977,609
Bulk	0	0	0	379,130	379,130
Containerized	3,645,698	0	0	0	3,645,698
Export	436,663	0	0	40	436,703
Breakbulk	23,638	0	0	40	23,678
Bulk	0	0	0	0	0
Containerized	413,025	0	0	0	413,025
c. Transit Cargo	34,166	0	0	0	34,166
Domestic	0	0	0	0	0
Inward	0	0	0	0	0
Outward	0	0	0	0	0
Foreign (Cont.)	34,166	0	0	0	34,166
Import	33,127	0	0	0	33,127
Export	1,039	0	0	0	1,039
d. Foreign (Transhipmen	97,991	0	0	0	97,991
2. Total Passengers (Foreign)	1,327,379	0	0	0	1,327,379
Disembarking	668,965	0	0	0	668,965
Embarking	658,414	0	0	0	658,414

The Manila International Container Terminal had a total of 2,061 vessels both for berth and anchorage. There is no documentationof the total number of domestic cargo.; foreign, 14,392,524 m.t. moreover, a total of 14,398,032 m.t., and no documented total number of passengers for MICT[27].

[27]http://www.ppa.com.ph/?q=content/statistics-1 (Quarterly Statistical Report, 2004)

Table 16: Summary of Berth and Anchorage by Port Classification; Field Office. Philippine Port Authority vol. 1, 2004

PARTICULARS	M.I.C.T		
	AT BERTH	AT ANCH.	TOTAL
A. SHIPPING			
1. Number of Vessels	2,015	46	2,061
Domestic	4	0	4
Foreign	2,011	46	2,057
2. Gross Registered Tonnage	28,378,266	723,774	29,102,040
Domestic	11,416	0	11,416
Foreign	28,366,850	723,774	29,090,624
3. Net Registered Tonnage	13,360,096	413,070	13,773,166
Domestic	4,428	0	4,428
Foreign	13,355,668	413,070	13,768,738
4. Deadweight Tonnage	35,517,617	1,178,534	36,696,151
Domestic	12,800	0	12,800
Foreign	35,504,817	1,178,534	36,683,351
5. Length of Vessels (m.)	324,341	6,871	331,212
Domestic	364	0	364
Foreign	323,977	6,871	330,848
6. Beam of Vessels (m.)	49,952	1,079	51,031
Domestic	57	0	57
Foreign	49,895	1,079	50,974
7. Draft of Vessels (m.)	17,656	431	18,087
Domestic	20	0	20
Foreign	17,636	431	18,067
8. Waiting Time (hrs.)	7,512	0	7,512
Domestic	35	0	35
Foreign	7,477	0	7,477
9. Service Time (hrs.)	27,905	7,746	35,651
Domestic	18	0	18
Foreign	27,887	7,746	35,633

Table 17: Summary of Cargo and Passenger by Port Classification; MICT Field Office. Philippine Port Authority vol. 1, 2004

PARTICULARS	M.I.C.T		
	AT BERTH	AT ANCH.	TOTAL
B. CARGO AND PASSENGER			
1. Total Cargo Throughput (m.	13,769,586	628,446	14,398,032
a. Domestic	0	0	0
Inbound	0	0	0
Breakbulk	0	0	0
Bulk	0	0	0
Containerized	0	0	0
Outbound	0	0	0
Breakbulk	0	0	0
Bulk	0	0	0
Containerized	0	0	0
b. Foreign	13,764,148	628,446	14,392,594
Import	7,586,302	628,446	8,214,748
Breakbulk	3,314	0	3,314
Bulk	0	628,446	628,446
Containerized	7,582,988	0	7,582,988
Export	6,177,846	0	6,177,846
Breakbulk	2,389	0	2,389
Bulk	0	0	0
Containerized	6,175,457	0	6,175,457
c. Transit Cargo	5,438	0	5,438
Domestic (Cont.)	5,438	0	5,438
Inward	5,438	0	5,438
Outward	0	0	0
Foreign	0	0	0
Inward	0	0	0
Outward	0	0	0
d. Foreign (Transhipmen	628,968	0	628,968
2. Total Passengers	0	0	0
Disembarking	0	0	0
Embarking	0	0	0

In 2004, the Philippine Ports Authority collected a total of 3,785,466 numbers of the container in twenty equivalent units (TEU); the domestic container traffic contained an amount of 1,761,967 and 2,023,499 different container traffic. As for the base port, there was a total of 3,602,668 TEU. Davao (Sasa) had the highest accumulates with a total of 226,018 base port, and Calapan with the lowest total of 72 TEU; the Manila South Harbor, 827,754 TEU; MICT, 1,205,199 TEU; Manila North Harbor, 665,509 TEU[28].

The Containerized Cargo in metric tons accumulated a total of 45,083,340 and a scale of 25,474,430 for domestic and 19,608,910 for foreign containerized cargo. The base port in containerized cargo had a total of 42,430,941 metric tons. The province of Cagayan de Oro had the highest total number of containerized cargo of 12,480,911 M.T. and

[28]http://www.ppa.com.ph/?q=content/statistics-1 (Quarterly Statistical Report, 2004)

Calapanhad the lowest total of 280 M.T.; Manila South Harbor, 6,611,418 M.T.; MICT, 13,763,883 M.T.; Manila North Harbor, 12,101,815 M.T. [29]

The total domestic cargo commodity in 1999 for PMO North Harbor was 2,315,387: 630,876 for breakbulk, 172,770 for bulk, and 1,511,741 for containerized cargo. The inbound had a total 1,656,780; 597,406 for breakbulk, 476,928 for Bulk, and 616,094 for containerized. The outbound totaled 1,298,359, 353,505 for breakbulk, 15,505 for Bulk, and 929,349 for containerized.[30]

The total domestic cargo commodity in 1999 for PMO South Harbor was 8,082,175: 1,445,622 for breakbulk, 4,118,024 for bulk, and 2,518,529 for containerized cargo. The inbound had 12,514,069, 3,399,759 for breakbulk, 4,466,590 for Bulk, and 4,647,720 for containerized. The outbound totaled 2,041,412, 47,150 for breakbulk, 30,564 for bulk, and 1,963,698 for containerized.[31]

The generally enhanced business and economic climate characterized by the significant improvement in foreign trade and favorable ratings and a market assessment made by various international credit rating organizations generated an upbeat prognosis for the Philippine economy in 2006. The PPA policy that strongly advocated measures on financial discipline and prudent fund management enabled it to weather complex challenges and kept its overall financial performance relatively stable for 2006.

The relatively stable financial performance of the Revenue continued in 2006 when it generated gross revenues of Php 6,018 million, up by 1.65% or Php 97.85 million from Php 5,920 million posted in 2005. Port operations earned Php 5,772 million, a 2.05% rise from the previous year's earnings of P5,862 million.

The PPA generated a share amount of P2.10 billion, composed of these shares were the fixed and variable fees from its authorized port operators, the Manila International Container Terminals followed by revenues from wharfage at Php 1.20 billion or 20%t; government share on Arrastre and stevedoring at Php 1.04 billion or 17%; port dues and dockage at Php 811 million or 13% and other income at Php 425 million.

The revenue by tariff items increased on the following foreign vessel charges: wharfage (foreign), share in Arrastre/ Stevedoring, and other income, including revenue from non-traditional income and individual take-over units.

Expenditures, on the other hand, were expense side; actual spending for 2006 stood at Php 3,232 million, which was 3.57% higher than the previous year's expenditures of Php 3,117 million, notwithstanding austerity measures in place, due notably to higher actual spending on repair and maintenance of ports nationwide, which soared by 127%, because of the increasing number of ports and facilities maintain along with the rise in the cost of utilities and other services.

Table 18: Cargo Throughput in metric tons for berth and anchorage from the Port District/Port Management Office. Philippine Ports Authority, 2006 Annual Report p.26

PDO/PMO	2006			2005		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila/Northern Luzon	65,261,422	26,975,428	8,2285,994	65,861,349	28224,922	37,636,427
North Harbor	16,731,148	13,766,511	2,956,637	16,192,794	13,191,003	3,001,791
South Harbor	12,940,052	6,885,423	6,054,629	13,696,464	7,931,814	5,764,650
MICT	14,489,198	924	14,488,274	14,851,220	2,894	14,848,326

[29]2004 Container Traffic, *Philippine Ports Authority.*
[30]2004 Domestic Cargo for PMO North Harbor, *Philippine Ports Authority*
[31] 2004 Domestic Cargo for PMO South Harbor, *Philippine Ports Authority*

Table 19: Number of Ship calls metric tons for berth and anchorage from Port District/Port Management Office. Philippine Ports Authority, 2006 Annual Report p.27

PDO/PMO	2006			2005		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila/Northern Luzon	24,406	19,326	5,080	27,049	21,740	5,309
North Harbor	5,559	5,054	505	5,403	4,932	471
South Harbor	8,006	6,252	1,754	8,977	7,172	1,805
MICT	2,031	1	2,030	2,046	4	2,042

Table 20: Number of containers handled in the Twenty Foot Equivalent Unit or T.E.U. from Port District/Port Management Office. Philippine Ports Authority, 2006 Annual Report p.28

PDO/PMO	2006			2005		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila/Northern Luzon	2,722,168	810,324	1,911,844	2,662,725	813,604	1,849,121
North Harbor	608,017	608,017	0	578,621	578,621	0
South Harbor	916,277	199,970	716,307	873,284	232,222	641,062
MICT	1,195,023	42	1,194,981	1,208,232	216	1,208,016

Table 21: As for Berth and Anchorage, the number of passenger traffic by Port District/ Port Management Office. Philippine Ports Authority, 2006 Annual Report p.29

	PDO/PMO	2006			2005			
		Total	Domestic	Foreign	Total	Domestic	Foreign	
	PDO-Manila/Northern Luzon	3,197,927	1,653,960	1,543,967	4,058,822	2,087,630	1,971,192	
	North Harbor	1,357,882	701,174	656,708	1,770,937,	941,758	829,179	
	South Harbor	1,776,429	919,868	856,561	1,988,593	996,532	992,061	
	MICT	0	0	0	0	0	0	

In 2007, the Philippine Ports Authority's results with port operations saw moderate growth of 3.97% in gross revenue at Php 6.246 billion 2007. Specifically, revenues from the port operations reached Php 6.094 billion, or a 5.59% rise from the previous year's port earnings of Php 5.772 billion. The PDO Manila/Northern Luzon, PDO Southern Luzon, PDO Northern Mindanao, and PDO Visayas retained a top earner; meanwhile the PDO Visayas also retained the status of posting a higher percentage of revenue among the number of PDO[32].

The PPA's capital expenditures reached its highest level in 2007 at Php 6.003 billion. Some capital investment consisted of several projects for the priority gateways ports, entailing revenues from the wharfages accounted for the revenue sources, including Arrastre and Stevedoring, Vessels, Fees, Fund Management Income, and Other Income.

In 2007, total cargo rose to 157.44 MMT from 154.4 MMT in 2006, a modest growth of 2.01% in general export cargo and foreign containerized cargo overload. The growth of containerized cargoprovided overall growth despite the performance in domestic traffic and the decline of the different import volumes. The total of foreign export cargo was 33..38 Million Metric Tons in 2007, while for the previous year, it was 15.38%. Total foreign conventional cargo increased only 1.66% compared to domestic cargo, which was 2.40%[33].

[32]Philippine Ports Authority, 2006 Annual Report

[33]*ibid*

There was growth in exports; import cargo suffered and dropped to 5.51%. The top five ports in terms of foreign cargo are MICT with 15.60 Million Metric Tons; PMO Batangas, 13.12 Million Metric Tons; PMO Limay, 11.54 Million Metric Tons; PMO Surigao, 8.33 Million Metric Tons and South Harbor, 6.49 Million Metric Tons.[34]

The involvement of the container traffic had 5.6% growth in 2007, and its growth was above the 10% of the foreign containerized traffic. Moreover, exports were 13.08%, and imports rose 12.28%.

For 2007, 35 port operators were issued special permits to operate some ports nationwide. These private port operators handled bulk solid and liquid cargoes. Thecargo handling service depends on the amount of cargo and its trading classification, whether foreign or domestic and containerized or non-containerized[35].

In 2007, the Philippine Ports Authority completed 60 locally-funded projects or LFP with a total cost of Php 2,675 billion and 78 ongoing projects, which would be completed in the next few years. A total of Php 5,795.38 million for the major gateways and the Super Region pier components composed of Strong Republic Nautical Highway (SRNH) and Ro-Ro ports[36].

The Philippine Ports Authority regularly sets aside several budgets for repair and maintenance. In 2007, Php 492 million pesos were allocated to over a hundred ports nationwide. Some repair projects were also included in 200 programs; 50 of 68 projects were inaugurated this year, while 8 out of 10 were under the procurement stage.

In 2007, the PPA's gross revenue grew by 3.79%, higher than the previous year—a total of Php 6,246 billion from last year's Php 6,018 billion. The revenue from the port operations reached Php 6,094 billion from the previous total revenue of Php 5,72 billion. ICTSI still held the most significant contributor to Philippine Ports Authority revenue; it contributed Php 2,164 billion[37].

The second largest revenue source from the wharfage fees at P1,314 billion covered 21% of the total revenue in the said year. It was followed by arrastre and stevedoring at P1,106 billion, while other sources also led to the increase of the revenue of PPA in 2007: vessel charges at P881 million, other income at P427 million, Storage Fees at P196 million, Fund Management Income at P151 million and lastly Pilotage Fees at P3 million.[38]

The following contributors to the Philippine Ports Authority are public and private ports under the PDO Manila/North Luzon with about P2,036 billion (excluding ICTSI) and PDO South Luzon, a total of P622.01 million, PDO Northern Mindanao with P489.46 million, PDO Southern Mindanao with P450. Moreover, PDO Visayas with P354.07 million. [39]

Table 22: Cargo Throughput by Port District/ Port Management Office at Berth and Anchorage, In Metric Tons. Philippine Ports Authority, 2007 Annual Report p.28

PDO/PMO	2007			2006		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila/Northern Luzon	66,914,078	27,975,751	38,938,327	65,261,442	26,975,428	38,285,994
North Harbor	18,291,789	15,543,183	2,748,601	16,723,148	13,766,511	2,956,637
South Harbor	12,094,491	5,603,583	6,490,908	12,940,052	6,885,423	6,054,629
MICT	15,761,302	155,498	15,605,804	14,489,198	924	14,488,274

Table 23: Number of Ship calls by Port District/Port Manager Office at Berth and Anchorage. Philippine Ports Authority, 2007 Annual Report p.29

PDO/PMO	2007			2006		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila/Northern Luzon	24,210	18,918	5,292	24,406	19,326	5,080
North Harbor	5,368	4,899	469	5,559	5,054	505
South Harbor	8,177	6,272	1,905	8,006	6,252	1,754
MICT	2,168	27	2,141	2.031	1	2,030

[34]*ibid*
[35]Philippine Ports Authority, 2007 Annual Report
[36]Linking the Philippine Island Through highways of the Sea, Center for Research and Communication
[37]Philippine Ports Authority, 2007 Annual Report
[38]*ibid*
[39]*ibid*

Table 24: Number of containers handled in T.E.U. By Port District/Port Management Office. Philippine Ports Authority, 2007 Annual Report p.30

PDO/PMO	2007			2006		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila/Northern Luzon	2,945,828	819,097	2,126,731	2,722,168	810,324	1,911,844
North Harbor	690,531	690,531	0	608,017	608,017	0
South Harbor	880,789	112,157	768,632	916,277	199,970	716,307
MICT	1,371,731	14,291	1,357,440	1,195,023	42	1,194,981

PDO/PMO	2007			2006		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila/Northern Luzon	2,793,341	1,460,576	1,322,765	,197,9227	1,653,460	1,543,467
North Harbor	1,381,584	734,225	647,359	1,357,882	701,174	656,708
South Harbor	1,401,648	721,435	680,21	1,776,429	919,868	856,561
MICT	0	0	0	0	0	0

The Philippine Ports Authority managed to sustain a healthy pace in revenue, especially in 2006, with Php 6,626 billion earnings. Top revenue sources came from ICTSI fees, wharfages, and arrastre/ stevedoring alone, contributing nearly 75% to its gross revenue. Other revenue sources such as Dockage Fees, Port Dues, Storage Fees, Port Usage Fees, Terminal Fees, Other Income, and Fund Management Income were the remaining 25% of the PPA revenues.

The global recession in the Philippine economy was profoundly affected by the cargo volume, especially in port businesses. The accumulated total number of cargo in 2008 was 11.53 Million Metric Tons; Domestic Cargoes accumulate a total of 2.58 Million Metric Tons, and Foreign Cargo was 8.95 Million Metric Tons while products such as mineral ores, lime cold rolled coils, and coconut oils were an evident product which declines into the market and also led to the decline of foreign cargoes in the following Port Management Offices namely: Cagayan de Oro- 4,.03 MMT; Surigao – 4.14 MMT; Dumaguete – 0.18 MMT; Nasipit 0.61 MMT; and Tagbilaran – 0..046 MMT. Meanwhile, Domestic Cargoes were also affected by the global turnover: Cagayan de Oro – 0.96 MMT, Batangas – 0.7 MMT, and Davao – 0.40 MMT[40].

The Manila International Container Terminal Services Inc., or MICT, recorded its value of 1.49 MMT. Containerized cargo reached a total of 4.09 MMT while domestic cargo reached a total of 4.09 MMT. Foreign cargoes that passed through the Philippine Ports and passed in MICT and South Harbor consisted of 2.37 MMT. Other Port Management Offices also showed growth: Puerto Princesa, Batangas Tagbilaran, Davao, General Santos, Iloilo, Nasipit, Zamboanga, and Pulupandan.

An increase in transport competition between airline carriers and shipping companies also happened in 2008. Airline carriers used to offer to reduce domestic fairs and passenger traffic, while in major ports, it became visible. General Santos had the highest passenger traffic, followed by North Harbor, Surigao, and Nasipit. Another factor that led to constant competition in transportation is the improvement of the North Luzon Expressway and the opening of the Subic-Clark- Tarlac Expressway. On the other hand, Puerto Princesa increased its passengers because of the increased demand for its tourist destination.

Philippine Ports Authority offered services in 2008 that had a total of 311,834 vessels compared to 2007.

[40]Philippine Ports Authority, 2008 Annual Report

Table 25: Cargo Throughput, Container, Passenger and Ship Calls, 2008 Philippine Ports Authority, 2008 Annual Report p. 6

	2008	Volume	% Inc/Dec from 2007
Cargo M.T.	**145,898,911**	**(11,58,809)**	**(7.33)**
Domestic	72,001,421	(2,589,857)	(3.47)
Foreign	73,897,490	(8,948,952)	(10.80)
Import	47,409,937	(2,049,930)	(4.14)
Export	26,487,553	(6,899,022)	(20.66)
Container (in TEUs)	**4,091,925**	**93,506**	**2.34**
Domestic	1,567,370	(46,061)	(2.85)
Foreign	2,524,555	139,567	5.85
Import	1,253,272	43,825	3.62
Export	1,271,283	95,742	8.14
Passenger	**43,866,270**	**(602,657)**	**(1.36)**
Disembarked	43,819,359	(608,961)	(1.37)
Embarked	46,911	6,304	15.52
Ship calls	**311,834**	**(2,667)**	**(0.85)**
Domestic	302,102	(2,117)	(0.70)
Foreign	9,732	(550)	(5.32)

As observed in the table above, Domestic ship calls are profoundly affected by the alien ship; thus, the economic activity of the Philippines experienced a decline due to the passengers as well, especially during the transportation competition between the airline and shipping companies.

The Philippine Ports Authority also developed its application, which covered the Wireless Area Network of WAN services of the Philippine Ports Authority. The Oracle Software replaced the old Portrade Solution, which deployed staff training and technical support personnel. Following the application, the system was completed, which covered the Accounting and Financial Management System (AFMS), Front End Invoicing and Receipting System (FIRST), Port Engineering Management System (PEMS), and e-Procurement System (e-PROC). Mentioned activities that prepared started to set the remaining works for 2009, including application development, user's acceptance testing, end-user training, pilot implementation, and nationwide roll-out.

The Philippine Ports Authority also developed its port operation and facilities. Construction of private ports in different parts of the country: four permits in PDO Manila/Northern Luzon, one in PDO Southern Luzon, and four in PDO Visayas. These physical infrastructure development and maintenance, which the Philippine Ports Authority Capital Expenditures for 2008 supports and continued the National Government's priorities, especially the fast-tracking of projects for the development of the Super Regions (SONA Ports), port links especially to the Strong Republic Nautical Highway (SRNH) and ports under the President's Accelerated Hunger Mitigation Program (AHMP[41]).

A total of Php 3.16 billion was utilized to implement port projects, including utilization for completion/implementation of the port project identified and determined by the Philippine Ports Authority, together with government offices and local government units or LGUs.

The dredging maintenance operation for the year covered 22 ports nationwide, completed during the dredging project involving a combined number of volumes of 2.68 cubic meters removed from the port area. The bulk volume dredged from the channels, berths, basin, and anchorage of North Harbor, South Harbor, and MICT varied from 6.10 meters to 12.00 meters.

Repair and maintenance programs with Php 404.85 to repair and maintain existing port facilities nationwide were done to keep the ports functional. Repair projects amount to Php 294.63 million, while Php 109.13 million are provided for maintenance works. Somepost offices that underwent development, such as PDO Southern Luzon, had the most significant budget for repair and maintenance at Php 169.09 million pesos, followed by PDO Manila/Northern Luzon, Php 95.14 million; PDO Northern Mindanao, Php 52.57 million; PDO Visayas, Php 47.18 million; and PDO Southern Mindanao, Php 39.81 million.

The Philippines, as one of the member states of the International Maritime Organization or IMO, had integrated its maritime and port administrator policies with its compliance with safety and security requirements under the International Ship and Port Facility Security or ISPS Code, which started in 2002[42].

[41]Linking the Philippine Island Through highways of the Sea, Center for Research and Communication

[42]The code aims to detect security threats to security as well as introduce measures to prevent incidents especially in ships and port facilities. This ISPS Code adopted by the Philippines in 2004, all regulated ships especially in the impact on the country's economy and trade, it also requires security assessment especially in threats and risks. All Philippine regulated ships, ports, port facilities and port

The government-run port policy has been regularly formulating new and updated Port Security Assessment and Port Facility Security Plan or SCPF through the Office of Transportation or PST and the Department of Transportation and Communication or DOTC, which approve the port security plan.

Maritime security and safety are one of the targets of the Philippine Ports Authority in protecting the marine environment and facilitating law enforcement against piracy and other crimes. The Vessel Traffic Management System of VTMS managed and operated by the Vessel Traffic Services Division of the PDO Manila/ Northern Luzon, monitors vessel traffic within the designated areas of Philippine Waters and aid ships. Control Centers provide continuous operating systems that provide continuous assistance to vessels. In the overall assessment, the VTMS monitored a total of 10,751 vessels in 2008, with the foreign ships having 4,138 vessels.

The Philippine Ports Authority's financial performance affected the improvement of the Philippine economy in the latter part of 2008. A PPA gross revenue of Php 6.626 billion was recorded that year versus the projected target revenue of Php 6.511 billion. Thus, that year's revenue improved because the following Port District Offices also had a high total revenue for this year. The ICTSI contributed a total port revenue of Php 2.412 billion, while the wharfage fees generated the second most significant contribution: the PPA reserves a total of Php 1.357 billion. Contribution from Arrastre/Stevedoring fees of P 1.169 billion and other revenues from other sources such as other Income – Php 339.46 million; Dockage fees – Php 326.43 million; Port Dues- Php 285.56 million; Storage Fees – Php 231.01 million; Port Usage Fees – Php 202.72 million; Terminal Fees – Php 173.76 million and Fund Management Income – Php 99.91 million. Port District Offices' combined revenues werePhp 6.535 billion in 2008. PDO Manila/Northern Luzon was the traditional performer and host of the county's essential ports of North Harbor, South Harbor, and MICT, which posted a total of P 4.544 billion percent of gross revenue for this year. While, PDO- Southern Luzon – Php 676.22 million; Southern Mindanao – Php 527. 92 million; Northern Mindanao - Php 400.40 million; and the Visayas – Php 375. 75 million. [43]

Table 26: Cargo Throughout in Metric Tons. By Port District/Port Management Office at Berth and Anchorage. Philippine Ports Authority, 2008 Annual Report p. 28

PDO/PMO	2008			2007		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila	66.066.668	27,166,612	38,900,056	66.914,078	27,975,751	38,938,327
North Harbor	16,741,867	14,592,375	2,149,492	18,291.789	15,543,188	2,748,601
South Harbor	11,235,172	5,432,490	5,802,682	12,094,491	5,603,583	6,490,908
MICT	17,252,345	685,929	16,566,426	15,761,302	155,498	15,605,804

PDO/PMO	2008			2007		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila	2,316,941	1,219,792	1,097,149	2,793,341	1,460,576	1,332,765
North Harbor	1,045,502	561,933	483,569	1,381,584	734,225	647,359
South Harbor	1,270,950	657,592	613,358	1,401,648	721,435	680,213
MICT	0	0	0	0	0	0

service providers that is covered under the ISPS Code which approved security assessments and plans by June 30, 2004.

[43]Philippine Ports Authority, 2008 Annual Report

Table 27: Number of containers handled by Port District/Port Management Office Philippine Ports Authority, 2008 Annual Report p. 30

PDO/PMO	2008			2007		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila	2,999,314	802,660	2,196,654	2,945,828	819,097	2,126,731
North Harbor	631,467	631,467	0	690,531	690,531	0
South Harbor	846,478	103,494	742,984	880,789	112,157	768,632
MICT	1,519,077	65,792	1,453,285	1,371,731	14,291	1,357,440

Table 28: Passenger Traffic by Port District/Port Management at Berth and Anchorage. Office Philippine Ports Authority, 2008 Annual Report p. 31

PDO/PMO	2008			2007		
	Total	Domestic	Foreign	Total	Domestic	Foreign
PDO-Manila	2,316,941	2,295,769	21,172	2,793,341	2,772,499	20,842
North Harbor	1,045,502	1.045.502	0	1,381,584	1,381,584	0
South Harbor	1,270,950	1,249,778	21,172	1,401,648	1,380,806	20,842
MICT	0	0	0	0	0	0

The Philippine Ports Authority experienced a change in the economic climate devastation scenario in 2009, especially when typhoons "Ondoy" and "Pepeng" hit the country.Some ship calls, passenger traffic barely moved, and domestic and foreign containerized cargo volumes declined, directly affecting the port's economic stability. However, the Philippine Ports Authority still managed the condition, especially in the total cargo value handled at ports. There were 149.90 million metric tons in 2009 compared to 145.90 million tons[44].

The growth of the passengers using the port as a source of transportation, as compared to the previous year, showed an increase of 0.01 percent. A total of 44.31 million passenger traffic was noticed, and only eight PMOs posted a passenger growth, namely: Calapan – 13.30%; Zamboanga – 3.79%; Ozamis- 5.32%; Dumaguete- 3.83%; Tagbilaran – 2.56%; Legazpi- 1.96%; Ormoc – 1.85% and Dapitan – 4.39%.

As a result of the volume of cargo and passengers, the volume of ship calls also increased in 2009 compared to the previous year, which rose from 312,094 to 313,430 for domestic and foreign ship calls.

Table 29: 2009 TOP 10 PMOs, Traffic Volumes Philippine Ports Authority, 2009 Annual Report p. 7

	Cargo		Container		Passenger		Ship call
1	Batangas	1	MICT	1	Batangas	1	Batangas
2	North Harbor	2	South Harbor	2	Calapan	2	Dumaguete
3	MICT	3	North Harbor	3	Zamboanga	3	Pulupandan
4	Limay	4	Davao	4	Tagbilaran	4	Davao
5	Surigao	5	Cagayan de Oro	5	Pulupandan	5	Calapan
6	South Harbor	6	Gen. Santos	6	Dumaguete	6	Legazpi
7	Davao	7	Pulupandan	7	Legazpi	7	Iloilo
8	Pulupandan	8	Iloilo	8	Ozamis	8	Tagbilaran
9	Iloilo	9	Zamboanga	9	Iloilo	9	Iligan
10	Cagayan de Oro	10	Nasipit	10	Iligan	10	Ozamis

In 2009, the Philippine Ports Authority's revenue reached P7,129 billion, higher than the previous year. The generated income for 2009 amounted to P6,987 billion compared to 2008. Likewise, the Philippine Ports Authority delivers its port revenue from some port services; of this amount, a total of P2.53 billion was contributed by Manila

[44]Philippine Ports Authority, 2009 Annual Report

International Container Terminal, whose operator was the ICTSI, andthe ATI contributed P840.25 million in South Harbor[45].

Table 30: PPA Comparative Port Revenue in 2009 and 2008, Philippine Ports Authority, 2009 Annual Report p. 18

Comparative Port Revenue 2009 vs. 2008				
Account	2009	2008	Increase/(Decrease)	
Port Dues	347.51	285.56	21.69%	4.9%
Dockage (Berthing)	292.25	253.15	15.45%	4.18%
Dockage (Anchorage)	151.09	73.27	106.21%	2.16%
Usage Fees	239.81	202.73	18.29%	3.43%
Lay-up Fees	1.90	0.75	153.33%	0.03%
Wharfage Dues	1,349.00	1,357.00	2.73%	19.95%
Storage	200.50	231.01	-13.21%	2.87%
Arrastre/Stevedoring	1,230.97	1,169.75	5.23%	17.62%
Terminal Fees	211.17	173.76	21.53%	3.02%
VTMS Fees	15.13	10.48	44.37%	0.22%
Other Income	352.20	354.55	-0.66%	5.04%
Pilotage	23.34	1.97	1084.77%	0.33%
ICTSI Fees	2,526.89	2,411.85	4.77%	36.1%
Total	6,986.76	6,525.84	7.06%	100%

Table 31: Cargo Throughput in Metric Tons in 2009 and 2008 By Port District/Port Management Office at Berth/Anchorage, Philippine Ports Authority, 2009 Annual Report p. 40

PDO/PMO	Grand Total	2009		Grand Total	2008	
		Domestic	Foreign		Domestic	Foreign
PDO MNL. NORTHERN LUZON	61, 687, 825	26, 667,432	35,020,393	66, 066, 668	27, 166, 612	38, 900, 056
Manila – North Harbor	17, 406, 085	14, 183, 402	3, 222,683	16, 741, 867	14, 592, 375	2, 149, 492
Manila- South Harbor	10, 734, 949	5,385, 457	5,349,492	11, 235, 172	5,432, 490	5, 802, 682
MICT	15, 639, 479	822, 314	14, 817, 165	17,252,345	685,929	16, 566,416

Table 32: Passenger Traffic in 2009 and 2008 By Port District/Port Management Office at Berth/Anchorage, Philippine Ports Authority, 2009 Annual Report p. 41

PDO/PMO	Grand Total	2009		Grand Total	2008	
		Disemb.	Embarked		Disemb.	Embarked
PDO MNL. NORTHERN LUZON	1,938,251	1,003,890	934,361	2,316,941	1,219,792	1,097,149
Manila – North Harbor	821,565	420,222	401,343	1,045, 502	561,933	483,569
Manila- South Harbor	1,116,662	583,644	533,018	1,270,950	657,592	613,358
MICT	0	0	0	0	0	0

[45]Philippine Ports Authority, 2009 Annual Report

Table 33: Number of Ship calls in 2009 and 2008 By Port District/Port Management Office at Berth/Anchorage,Philippine Ports Authority, 2009 Annual Report p. 42

PDO/PMO	Grand Total	2009		Grand Total	2008	
		Domestic	Foreign		Domestic	Foreign
PDO MNL. NORTHERN LUZON	22,341	17,368	4,973	22,797	17,685	5,112
Manila – North Harbor	5,043	4,602	441	5,068	4,690	398
Manila- South Harbor	7,650	5,822	1,828	7,889	6,034	1,855
MICT	2,042	105	1,937	2,148	87	2,061

Table 34: Number of Containers handled in Twenty Equivalent Units in 2009 and 2008 By Port District/Port Management Office at Berth/Anchorage, Philippine Ports Authority, 2009 Annual Report p. 43

PDO/PMO	Grand Total	2009		Grand Total	2008	
		Domestic	Foreign		Domestic	Foreign
PDO MNL. NORTHERN LUZON	2,877,638	810,118	2,067,520	2,999,314	802,660	2,196,654
Manila – North Harbor	638,263	638,263	0	631,467	631,467	0
Manila- South Harbor	838,950	86,608	754,342	846,478	103,494	742,984
MICT	1,397,597	82,932	1,314,662	1,519,077	65,792	1,453,285

PPA stands for the benefit of the technology-based system, which would facilitate data entry for ports, storage, and passengers—implementing a Passenger Boarding Monitoring and Control System or E-Ticketing System, especially in ports with a high volume of passengers. Implementing the E-Ticketing System would address the number of passengers and provide travel safety at every destination.

The ship and cargo performance for 2010, the volume of cargo handled in ports nationwide, increased by 11.01 percent.

Table 35: Trade performance of Cargo, Passenger and Ship Traffic in 2010, Philippine Ports Authority Annual Report 2010 p. 9

	2010	2009	Volume	%
Cargo m.t.	**166,395,680**	**146,895,054**	**16,500,626**	**11.01**
Domestic	69,796,900	71,936,419	(2,139,519)	(2.97)
Foreign	96,598,780	77,958,635	18,640,145	23.91
Import	55,131,588	47,593,576	7,548,012	15.86
Export	41,467,192	30,375,059	11,092,133	36.52
Container (in TEUs)	**4,497,634**	**4,011,531**	**486,103**	**12.12**
Domestic	1,639,859	1,593,039	46,820	2.94
Foreign	2,857,775	2,418,492	439,283	18.16
Import	1,443,501	1,221,914	221,581	18.13
Export	1,414,274	1,196,578	217,696	18.19
Passenger	**52,701,645**	**43,872,565**	**8,829,080**	**20.12**
Domestic	52,638,664	43,820,426	8,818,238	20.12
Foreign	62,981	52,139	10,842	20.79
Ship calls	**346,000**	**314,421**	**31,579**	**10.04**
Domestic	333,202	304,643	30,559	10.03
Foreign	10,798	9,778	1,020	10.43

In 2010, the number of cargoes, especially foreign cargo, increased compared to the previous year because of the technology-based system that enhanced the services of the trade industry in Manila's port. Thus, the number of passengers also increased in 2010 compared to the previous years because of the lower air travel price, though the number of maritime disasters happened in Manila's port.

The total cargo throughout 2010 was 16.5 million metric tons (MMT), signifying the number of goods that passed through the country's port. Foreign cargo also increased by 18.64 MMT and domestic cargo decreased to 2.97 percent or 2.14 MMT[46].

The services of the port of Manila in 2010 had a total of 346.000 vessels for 2010, and the increase in the domestic and foreign ships grew by 10.03 percent and 10.43 percent, an excellent indication of the improvement in the global and domestic economy.

The ongoing projects are projected to be completed in 2010; 40 locally funded projects amounted to P1.74 billion pesos and were invested by the Philippine Ports Authority. Furthermore, a total of P3.42 billion for 74 Locally- funded projects in PDO Manila/Northern Luzon, 31 in PDO Southern Luzon, 14 in PDO Visayas, 9 in PDO Northern Mindanao, and 10 in PDO Southern Mindanao. As of the end of the year, a total of 34 projects with an amount of Php 1.68 billion. From the previous year, the PDO Southern Luzon captured a total number of shares of Php 1.20 billion, followed by PDO Visayas- Php 1.17 billion; PDO Manila/Northern Luzon-Php 446.10 million; PDO-Northern Mindanao and PDO Southern Mindanao-5.68%[47].

PPA allotted Php 546.64 million for the 2010 Dredging program in line with the port projects. A total of 1.84 million cubic meters of silts from 9 ports nationwide were privatized with a private contractor, F.F. Cruz and Company. Areas which is covered by 2010 Dredging are the following: North Harbor Entrance Channel; South Harbor Fairway Channel leading to Piers 9 and 13; South Harbor Fairway Channel leading to Piers 3 and 5; South Harbor Anchorage; Batangas Base port Phase II, Brooke's Point; Puerto Princesa; Cajidocan Romblon; Matnog Sorsogon; Iloilo River (Phase 1), Base port, Iloilo; MICT (carry-over, completed in 2010) and Dumaguete (carry-over, completed in 2010[48])

Port maintenance and services in the existing port in PPA also allocated Php 1 billion for its repair and maintenance program for 2010. A total of Php 795.58 million was allotted for repair projects, Php 189.66 million for the maintenance projects in the port, Php 3.50 million for Head Office engineering projects, Php 10.00 million for GAD-related projects, and lastly, P1.26 million for the unprogrammed projects. PDO South Luzon received the highest budget for repair and maintenance with a total of P383.11 million, followed by PDO Visayas, which had a budget of Php 207.34 million, while PDO Manila/Northern Luzon had P129.03 million, and lastly, PDO Southern Mindanao had Php 88.32 million.

The continuous development of the port also increased the revenue of the PPA for 2010, a total of P8,295.62 million, higher than the previous total revenue. ICTSI was still the highest contributor to the Philippine Ports Authority revenue, amounting to Php 2,760.14 million; Php 1,671.02 million for wharfage fees; and vessel charges at P1,190.93 million, Asian Terminal Inc. Fees, which has a total of Php 923.57 million, Arrastre/Stevedoring income has a total of Php 678.07 million; other sources of income of Php 423.50 million, pilotage and storage fees at Php 320.49 million and VTMS and Terminal Fees at Php 226.30 million.

The growth of port performances, especially in revenue generation for 2010,was spearheaded by Manila/Northern Luzon, followed by Southern Luzon and Southern Mindanao. The PPA is also included in the total port revenue from wharfage, dockages, port dues, usage fees, storage, pilotage, terminal fees, rental, share in arrastre/stevedoring, management fees, and other ancillary services.

Table 36: Overall improvement of the 5 PPA ports between 2009 and 2010 reflected the economic activity during this year. Philippine Ports Authority 2010. P. 2

Port by PDO CY 2010, in Million Pesos			
PDO	2010	2009	DEVIATION
Manila/Southern Luzon	5,455.28	4,711.11	15.80%
Southern Luzon	904.00	769.66	17.56%
Visayas	499.75	437.29	14.28%
Northern Mindanao	534.08	466.61	14.46%
Southern Mindanao	724.17	597.31	21.24%
TOTAL	8,117.28	6,981.98	16.26%

[46]Philippine Ports Authority, 2010 Annual Report
[47]Philippine Ports Authority, 2010 Annual Report
[48]*ibid*

Table 37: Port Revenue by Source, 2010 in Million Pesos

Comparative Port Revenue 2010 vs. 2009				
Account	2010	% of Total income	2009	Increase/ (Decrease)
Port Dues	383.87	4.73%	347.51	10.46%
Dockages	521.29	6.42%	443.3s4	17.58%
Usage Fees	273.47	3.37%	239.81	14.04%
Lay-up Fees	12.30	0.15%	1.91	543.98%
Wharfage Dues	1,671.02	20.05%	1,394.00	19.87%
Storage	289.42	3.56%	200.05	44.25%
Arrastre/Stevedoring	678.07	8.35%	461.21	47.02%
Other Income	423.50	5.21%	352.19	20.25%
Pilotage	31.07	0.38%	23.34	33.12%
ICTSI Fees	2,760.14	33.98%	2,526.89	9.23%
ATI Fees	923.57	11.37%	769.76	19.98%
VTMS Fees	16.23	0.20%	15.13	7.27%
Terminal Fees	139.94	1.72%	211.17	-34.02%
TOTAL	8,123.29	100.00%	6,986.77	16.27%

The accumulated total expenses of the PPA for 2010 reached its total amount of Php 6,327.22 million, which was higher than the previous year based on port expenditures. An increase in Repairs and Maintenance, Personal Services from the implementation of the Salary Standardization, and Dredging costs in ports increased the port's Operating Expenses because of the port revenue and port development from the different PMO, PPA Net Income to P1,968 billion, which is lower than the previous income.

In 2010, PPA officials attended 12 meetings/conferences in Thailand, Malaysia, and the Philippines East Asia Growing Association (BIMP-EAGA) participated in other policies related to port facility standards/ benchmarking, anti-terrorism, and Anti-human trafficking, environmental protection, port security, and safety. In 2010, the PPA also conducted conferences in Thailand, Malaysia, Vietnam, Cambodia, Singapore, Japan, and London that dealt with global maritime trends and developments[49].

The total performance of PPA for 2010 increased to the previous year; Cargo throughout had a total of 166.40 million metric tons, which was higher than the previous year. The increase in cargo for that year was reflected in the container traffic, in which the PPA had a total of 4.50 million TEUs for passengers, an increase of 52.70 million more than the previous year. There was also an increase in gross income by Php 8.295 billion, while expenses totaled Php 6.33 billion, and net income wasPhp 1.491 billion[50].

Table 38: Cargo Throughput in Metric Tons by Port District/Port Management Office at Berth/Anchorage

PDO/PMO	Grand Total	2010		Grand Total	2009	
		Domestic	Foreign		Domestic	Foreign
PDO MNL/NORTHERN LUZON	70,316,061	24,861,197	45,454,864	61,687,825	26,667,432	35,020,393
Manila-N. Harbor	16,146,329	11,929,164	4,217,165	17,406,085	14,183,402	3,222,683
Manila-S. Harbor	12,958,525	5,374,364	7,584,161	10,734,949	5,385,457	5,349,492
MICT	18,266,554	913,378	17,353,176	15,639,479	822,314	14,817,165

[49]Philippine Ports Authority, 2010 Annual Report
[50]Philippine Ports Authority, 2010 Annual Report

Table 39: Passenger Traffic by Port District/Port Management Office at Berth/Anchorage

PDO/PMO	Grand Total	2010		Grand Total	2009	
		Domestic	Foreign		Domestic	Foreign
PDO MNL/NORTHERN LUZON	1,863,037	913,921	949,116	1,938,251	1,003,890	934,361
Manila-N. Harbor	821,983	375,750	446,233	821,565	420,222	401,343
Manila-S. Harbor	1,004,780	522,028	482,752	1,116,662	583,644	533,018
MICT	0	0	0	0	0	0

Table 40: Number of Ship calls by Port District/Port Management Office at Berth/Anchorage

PDO/PMO	Grand Total	2010		Grand Total	2009	
		Domestic	Foreign		Domestic	Foreign
PDO MNL/NORTHERN LUZON	23,093	17,645	5,448	22,341	17,368	4,973
Manila-N. Harbor	4,967	4,436	531	5,043	4,602	441
Manila-S. Harbor	7,810	5,709	2,101	7,650	5,822	1,828
MICT	1,942	103	1,839	2,042	105	1,937

Table 41: Number of Containers Handled in TEUs by Port District/Port Management Office at Berth/Anchorage

PDO/PMO	Grand Total	2010		Grand Total	2009	
		Domestic	Foreign		Domestic	Foreign
PDO MNL/NORTHERN LUZON	3,158,023	747,649	2,410,374	2,877,638	810,118	2,067,520
Manila-N. Harbor	553,548	553,348	0	638,263	638,263	0
Manila-S. Harbor	988,268	101,764	886,504	838,950	86,608	752,342
MICT	1,612,886	89,542	1,523,344	1,397,549	82,932	1,314,662

II. Charges on Vessels

The Philippine Ports Authority also engaged in the following trade that included charges, especially on its vessels. The vessels engaged in foreign trade include those engaged in barter trade that berths at any point of the port would charge dockage at berth per gross registered tonnage (GRT), a total of US $0.081.

Vessels that now engage in foreign trade include dockage at berth at any point of port of call, would be charged at gross registered tonnage per calendar day, and have a maximum computation of 50,000 gross registered tonnage. It would be used in the following government port worth US$0.039/GRT and at Private Por Gross Registered Tonnage (GRT), officially registered at PPA with US $0.20/GRT.

Vessels occupied with a remote exchange that did not compartment at either an administration or privileged port, regardless of whether worked only or financially, were likewise charged dockage at the anchorage of one-portion of the relating dockage at billet at an administration port, subject to a similar most extreme 50,000 GRT as follows a US$20.[51]

From 2007 to 2009, vessels that occupied with a household exchange that tied up at any administration port would be charged a domestic dockage fee (usage fees) as in the following:

Table 42: Domestic Dockage Fee

	January 1, 2007	January 1, 2008	January 1, 2009
6 to 100 GRT per calendar day or fraction thereof	Php 61.00	Php 72.00	Php 82.00
Over 100 GRT per GRT per calendar day or fraction thereof	Php 0.60	Php 0.70	Php 0.80

[51]http://www.ppa.com.ph/?q=content/charges-vessel

The registered bay and trade vessels shall also be charged one-half of the required Domestic Dockage Fee at a given government port at the following charges on a given day. [52]

Table 43: Bay and river trade vessels,

	January 1, 2007	January 1, 2008	January 1, 2009
Not less than	Php 61.00	Php 72.00	Php 82.00
Not more than	Php 308.00	Php 360.00	Php 413.00

Idle vessels occupy side berths associated with government ports despite a shifting order from the port manager or approved representative to administer operations to an incoming operative vessel. It was assessed a charge of three-hundredth of the applicable dockage fee for foreign vessels and five-hundredths of the applicable domestic dockage fee (Usage Fee) for domestic vessels, provided that the house owners created the payment of such assessed fees, agents or representatives before actual departure from the berth.

III. Charges on Cargoes

Charges on cargoes, especially in non-containerized foreign cargoes imported, exported and transshipped through-owned, were charged a wharfage fee for the use of the port facilities based on the total metric or revenue tonnage.

Domestic cargo containerized or not discharged at anchor without government registration, especially in private ports, would be charged half the usual Domestic Wharfage fee.

The containerized foreign and domestic cargoes were loaded with more than one shipper/consignee (LCL); the wharfage, which was non-containerized cargo, would apply. The wharfage for all the containerized foreign and domestic cargoes that were not loaded for a discharge without using any government would be officially registered for the single port and equally pay a one-half government-owned port. [53]

a) Managerial and Operational expansion in Port of Manila

The Philippine Port Authority dominated several ports, becoming the country's leading developer, operator, and regulator of ports. It has four categories: (1) the PPA port system consisting of public and private ports; (2) ports under the jurisdiction of independent port authorities (IPA); (3) municipal ports developed for the local government units (LGU) and the Road RORO terminal system (RRTS).

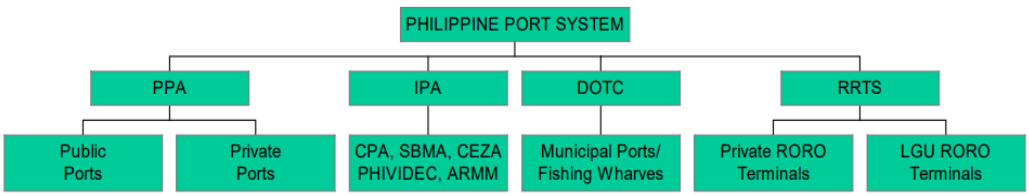

Figure 4: The Philippine Port System, Basilio, E. et al. (2005)

The Philippine Ports Authority is the premier authority in the Philippines, which develops, maintains, and operates public and private ports. The implementation of rates or changes in cargo handling tariffs is affected because of the privatization program of the government that handles the Terminal Operations in the International Container Terminal Services for Manila International Container Terminal and Asia Terminal Incorporation for South Harbor; Cargo Handling services for each port.

[52]http://www.ppa.com.ph/?q=content/charges-vessel

[53]http://www.ppa.com.ph/?q=content/charges-cargoes

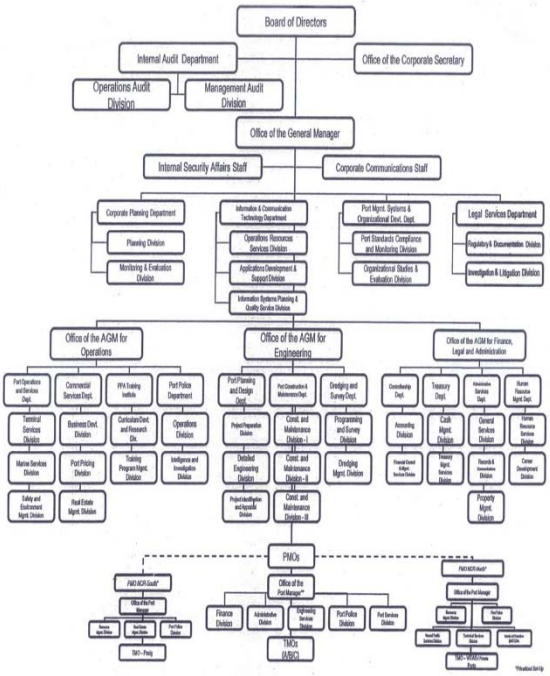

Figure 5: The present organization of the Philippine Ports Authority [54]

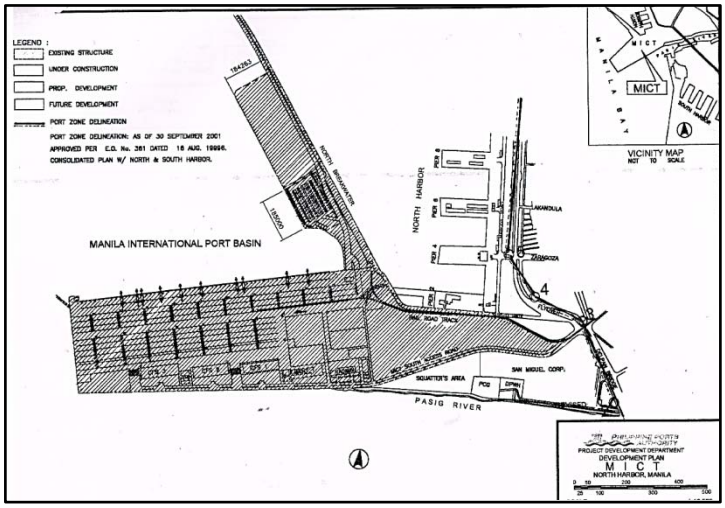

Figure 6: Manila International Container Terminal Layout. Profile of Philippine Ports Third Edition

The Manila International Container Terminal (MICT), operated by the International Container Terminal Services, Inc. (ICTSI), is located between the North and South Harbors in Manila and the westward of Manila. The southern end is the mouth of the Pasig River, a container-dedicated terminal, and is one of the three terminals in the Port of Manila.

These remaining two terminals, the North Harbor, were for domestic bulk, breakbulk, passenger, and containerized cargo, and the South Harbor was for international bulk, breakbulk passenger, and containerized cargo. The MICT has a total of 1,300 sq. in length and comprises six berths with the exact dimensions.

[54]http://www.ppa.com.ph/content/ppa-organizational-structure

Number of berths and their measurement. — profile of the Philippine Ports Third Edition

Berth	Length	Depth
1	250m	12.50m
2	250m	12.50m
3	250m	12.50m
4	250m	12.50m
5	300m	14.50m

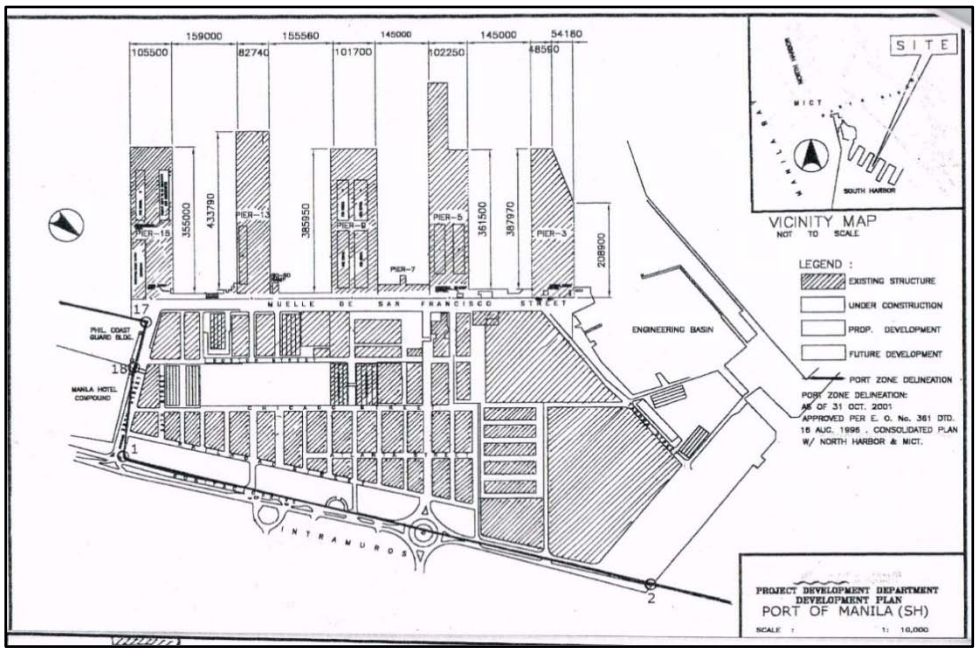

Figure 7: Port of Manila, South Harbor. Profile of Philippine Ports Third Edition

The PMO- South Harbor is one of the 123 government-owned ports the Philippine Ports Authority administers. It is a multi-cargo port with five-fingerpiers that handle all types of cargo, including container, bulk cargo, break-bulk, general cargo, and vehicles.

Bulk cargoes are handled at berth and their designated anchorages. The South Harbor handles at berth and its designated anchorage. South Harbor also handles much international shipping in the country; its annual capacity was 820,000 more or less in its container vans. The South Harbor handles bulk cargo services.

b) Port of Manila towards advancement

The government providessome development and operation of public works with mixed results: competition, privatization, transparency, and greater private ports, which match the government's policy objectives.

IV. Privatization of Mict and South Harbor

The privatization of the terminal operation of the MICT in 1987, a 25-year contract awarded to the International Container Terminal Services or ICTSI[55], a private terminal operator. In 1988, MICT was awarded to a private firm as part of the PPA's pilot project in privatizing ports. Another is implementing the "landlord" port model, in which the publicly governed port authority acts as a regulatory body and as a landlord while private companies carry out port operations, mainly cargo-handling activities. In this model, the port authority maintains the ownership of the port while its infrastructures are in lease to provide firms with maintain their structure and install their equipment to handle cargoes; in return, the landlord gets a share of the revenue from the private entity[56].

In 1992, the government's Memorandum Order No. 415 directed the National Housing Authority or NHA

[55]ICTSI Factbook
[56]http://www.ombudsman.gov.ph/UNDP4/wpcontent/uploads/2013/01/PhilPortSector_Basilio.pdf

to implement the "Smokey Mountain Development Plan" and reclaim the area across Road 10. The Philippine Ports Authority addressed the issue in the said reclaimed area. However, in 1993, Memorandum Circular No. 45 directed all concerned government agencies to provide an environmental agency to manage the support service sector, particularly in land, air, sea transportation, communication, energy, insurance, and port services.

In 1996, the Philippine Ports Authority constructed a 15-hectare private port facility in the reclaimed area in the Smokey Mountain Development Plan, which turned into a port facility, namely Harbor Center Port Terminal or HCPT, which is a private commercial port and directly with the port of Manila.[57]

Under Executive Order No. 212, which is "accelerating the demonopolization and privatization program for government ports in the country," it was a good action for the port of Manila to privatize the different sectors in the port to maintain its development not only in facilities but as well as the services. However, the labor unions opposed the implementation because of the displacement of port workers in the process and argued that port privatization would result in the inability of some cargo handling companies, especially to the benefit of the port workers.

In 1997, the government issued Executive Order 410, "Repealing the EO 212 series of 1994," which recognized the Power of the Philippine Ports Authority under Presidential Decree No. 857, stating the implementation of the policy accelerating the De-monopolization and Privatization of Government Ports in the Country.

V. Change in policy

In 1998, the government issued Executive Order No. 59, which directed the Philippine Ports Authority to adopt and implement a program for further rationalization, modernization, and improvement of port services and facilities in government ports"[58]. Thus, EO 59 was issued to promote and encourage the private sector by requiring all existing facility operators and service providers, such as cargo handling operators, shipping companies, and port workers, to unify into one corporation. The objective of port modernization is the following: First is the creation of the private monopoly, in line with the association composed of terminal operators, cargo handling companies, and some big shipping lines. Second, port services using all port services include ancillary services, and the private port monopolist would manage them.

Third, a negotiated contract that develops the port operations which are awarded to port monopolist but without the benefit of the public bidding as contrary to the principle of transparency and competition which the government governs and lastly, nationwide coverage, which is the monopoly of one port will affect the entire ports system.

VI. Greater Private Sector

The Memorandum Order, No. 47 series of 2001 directed the Philippine Ports Authority or PA to assist in the technical evaluation of the port-related land use, which permits the private and commercial ports.[59] The PPA would have a permanent commercial permit to operate and handle the following: (a) all domestic vessels and the locators will rent cargo, and (b) foreign vessels and cargo at the Harbor Centre.

However, in 2003, the PPA expanded the permit to handle international break-bulk traffic. The RO-RO Ferry Terminal System (RRTS) would also promote a Private Sector Investment with the private sectors and the LGU's for the establishment of the RO-RO links as part of the national highway network.

VII. Port Innovation in Terms of Safety Measures

To continue the reliable and reputable services the Philippine Ports Authority provides its community, PPA has a specific mandate under PD857 that ensures smooth, safe, and secure water flow as commerce passes through the country's port. The PPA is guided by the International Ship and Port Facility Security Code or ISPS and other members of the International Maritime Organization or IMO, which also provides a commitment to keep the country's gateway for the safety of the ports in the rest of the world especially in terrorism, human trafficking, and other similar illegal activities in the ports. The ISPS becomes the PPA's defining guidelines, parameters, and protocol, especially in port security and safety.

VIII. Safety Improvements

Another development that the PPA puts forward for the continuity of its vision is to establish technologically advanced monitoring of vessels for safer navigation when entering the Philippine waters. The PPA started the Vessel Traffic Management or VTMS, installed in Manila North Harbor and Corregidor Island in Bataan and Batangas and are now in full swing. This is supervised by the Vessel Traffic Services Division or VTSD of PDO Manila/ Northern Luzon and the Port Services Division or PSD of PMO Batangas. The VTMS would regularly track the vessels, especially in emergencies, piracy, typhoons, and other calamities.

[57]The Philippine Port Sector; PPA: A Case of Regulatory Capture
[58]https://www.officialgazette.gov.ph/1998/12/28/executive-order-no-59-s-1998/
[59]http://www.ppa.com.ph/issuances?page=5

The VTMS operations were generally adequate in 2007; VTMS monitored 10,965 total vessels; 6,787 were domestic, and 3,908 were foreign ships. Other government agencies involved marine vessels through the VTMS. The coordination between the PPA and Philippine Coast Guard or PCG Action Center and other concerned agencies provided prompt assistance and responses to emergency incidents occurring during the year.

Lastly, to ensure the efficiency of port personnel and the security forces, performance evaluation and inspection of contracted agencies were done. Seventeen base ports, including the major gateways such as South Harbor, North Harbor, Cagayan de Oro, General Santos, and Iloilo, undertake a review of the proposed guidelines with the supervision of the private security agencies that also operate within the area under the PPA jurisdiction started. Training for security and anti-terrorism, port police officials and personnel, attended different local and international meetings, conferences, and trainingprovided for the port personnel.

Port safety, Security, and Environmental Protection form part of the development of the Philippine Ports Authority. Five PPA ports issued a *Statement of Compliance Issue to a Port Facility* from the Office of Transportation Security in 2010: Balanacan Marinduque, Cagayan de Oro, Iloilo, Lamao, and Lucena.

Philippine Ports Authority released its memorandum order in 2007, which implemented an initiative project at the South Harbor and MICT for the detection and prevention of trafficking of Nuclear and other Radioactive Materials, which safeguard and strengthen the security vessels, cargoes, port facilities, and general public transacting businesses in the ports; identify the illegal trafficking through the ports of unique nuclear materials and the radioactive materials and lastly, and protect the health and safety of the public against the accidental or intentional exposure, especially to radiation.

The system would screen containers and cargoes for nuclear and radiological weapons. Together with the Megaports Initiative Projects, radiations, detection monitors, and related equipment and devices are necessary to operate the alarm and detection system effectively in South Harbour and Manila International container terminals.

IX. Modernization Effort

Facility management and operation systems were also being developed this year. The Vessel Traffic Management System (VTMS) Control Center, which is a state-of-the-art vessel monitoring facility, is managed and operated by the PPA to focus on the round-the-clock assistance as well as the different information that comes from the government agencies primarily in the cases of vessels distress and piracy and other incidents in port. The VTMS was installed at North Harbor, Corregidor, in Bataan, and the port of Batangas. In 2010, 33,980 vessels were monitored from the VTMS Control Center in Bataan with 8,533 and 25,447 foreign and domestic ships.

The PPA MIS Computerization Projects are also continuing to resolve the problems encountered, especially in the Accounting and Financial Management System or AFMS, an application developed for the PPA that was implemented at the end of 2010.

Another development from the PPA conceptual master plan for Phase 1 of Terminal 1 of North Harbor Modernization from Manila North Harbor Modernization Project (MNHMP) was expected to be completed by April 2011. Upon the changes' approval, engineering design, especially in the container terminal, followed by Phase 1, covered Pier 14 until the Marine Slipway.

The Port Management Office of Batangas was chosen as the pilot port for implementing the Quality Management System or QMS to secure the issuance of ISO Certification for the entrance and exit of vessels and clearance in the Port of Batangas. The PPA mandates to institutionalize structures, mechanisms, and standards of the Government Quality Management Program. The PPA Quality Policy was crafted to consistently provide port operation quality and services, mainly in employment procedure entrance and clearance, to satisfy the needs of its clients and comply with international and national constitutional and regulatory requirements. Batangas Port also conducted a second Internal Audit last December 13-16, 2010 leading to the improvement of the Batangas Port which also paved the way for the issuance of the ISO-QMS by early 2011. Meanwhile, the same activities were done to the other ports, such as Cagayan de Oro, Davao, Gen. Santos, Iloilo, Ozamis, and Zamboanga.

The PPA developed the Port Safety Health Environment Management System or PSHEMS; this code was developed by a collaboration between the Global Environment Facility (GEF), the United Nations Development Program (UNDP), and the International Maritime Organizations (IMO). Regional Program of Partnership in Environmental Management for the Seas of East Asia and various International non-governmental organizations were usedto represent the port industry. The voluntary standards measure the port performance, especially the quality management, safety and health of port workers and the environment.

The PSHEM Code requires the Port Safety, Health, and Environmental Management System (SHEMS) to enable an organization to develop and implement policies and objectives, especially in hazardous activities that may impact safety, health, and the environment. Because of the advocacy forenvironmental safety, the PPA adapted the system for

maritime safety, protection of the marine environment, and sustainable development of the country.

The DOTC spearheaded ticketing systems in the port as an Inter-Agency Committee, while the PPA, PCG, MARINA, the Shipping Lines, and other stakeholders in the port also participated in another development in the port system. The E-Ticketing system provides accurate data or information as well as statistics on the passengers and the limit of each vessel for the capacity of the passengers. It has been implemented at the Passenger Terminal Building 2 of Batangas port since 2008, and for the following year, testing was done at the port of Calapan.

The continuous practice of the PPA along with other various international maritime associations such as the International Maritime Organization (IMO), Asia-Pacific Economic Cooperation (APEC), ASEAN Port Authorities (APA), and (Brunei-Indonesia-Malaysia-Philippines East Asia Growth Association (BIMP- EAGA) is actively participating in the policy-making capacity and dialogues on the universal port facilities standards, anti-terrorism, anti-human trafficking, environmental protection, port security and safety.

During the Presidency of Gloria Macapagal Arroyo, the RO-RO policy focused on the enhancements to the expansion of the Strong Republic Nautical Highway or SRNH, the number of recommendations raised last April 4, 2008.

First was the enhancement in the policy, which included the chassis-RORO or CHA-RO operation as part of the RO-RO service. This intervention was designed for the domestic operations' transshipment of export and import cargo. It also provided some discounts, especially on the wharfage and scanning fees, that would increase exports and the port's competitiveness in the market.

Second, the Department of Trade and Commerce (DOTC) and the Philippine Ports Authority (PPA) upgraded the RO-RO ports and terminals, especially east-west connections. The participation of the Department of Public Works and Highways would provide inter-modal connectivity, and finally, DOTC and PPA would work together for the effectiveness and immediate privatization of the RO-RO ports and terminals.

The Philippine Ports Authority and Cebu Port Authority mandated a privatized RO-RO port to the private sectors of the local government units. In 2009, USAID, The Asia Foundation, and the implementing partner, The REID Foundation, began a three-year project called Economic Growth Hubs to improve air, land, and sea. The project sought to decentralize trade flows and lower transport costs by expanding the Ro-Ro network for maritime transportation in the Philippines. The then President Aquino's agenda was to continue the former President Arroyo's agenda, especially in the maritime industry. Two significant policies were the adaptation of regional Ro-Ro as one of the 15 flagship projects approved at the October 2010 ASEAN Leaders Summit and regional Ro-Ro.

Figure 8: Comparative System of Shipping Goods

The help of Ro-Ro commodities from the provinces would easily transport commodities and passengers, especially those on the interisland route. Thus, the problem of port congestion night decreased following the operational plan of Ro-Ro that directs the goods into the warehouse after the customer picks them up, loads the vessels, and unloads them directly to the customers.

President Arroyo was the first ASEAN leader to introduce the regional Ro-Ro concept, building on the success of the Ro-Ro in the Philippines. During the ASEAN Leader Summit in February 2009, the former President proposed establishing an ASEAN Ro-Ro system and during the sixth Summit of Brunei-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP-EAGA). She called for the implementation of a roll-on roll-off transportation system. In October 2009, an ASEAN High-Level Task Force was established to develop an ASEAN Master Plan on regional connectivity,

and in March 2010, the first High-Level Task Force on ASEAN Connectivity. In May 2010, during the presidency of Benigni Aquino, he continued to influence the ASEAN process to incorporate Ro-Ro; during the first meeting, Ambassador Bautista invited the REID team headed by Enrico Basilio provided a briefing on the regional Ro-Ro initiative.

In October 2010, ASEAN leaders adopted a new Master Plan on ASEAN Connectivity that includes Ro-Ro as the flagship project called "Study on the Roll-on/Roll-off (RORO) Network and Short-Sea Shipping." Moreover, the REID RO-RO Team supported the Asia Foundation and United States Agency for International Development or USAID the following years, which would conduct a proposed Ro-Ro study to enhance the commercial, financial, policy, and regulatory steps, especially in establishing a Ro-Ro network.

X. International Container Terminal Services, Inc.

The International Container Terminal Services, Inc. is identified as a pioneering innovator in container ports' acquisition, development, management, and operation. The ICTSI vision is to provide long-term shareholder value in the Port Industry with Manila International Container Terminal or MICT. MICT strengthened the specific port management that focused on the quality of the services in specific areas in which global potentials were recognized. Today, the ICTSI is involved in developing its operation and managing the number of ports and terminals in Asia-Pacific, the Americas, Europe, the Middle East, and Africa.

Established in 1987 and with headquarters in the Philippines, the ICSI established a solid local and international portfolio of the continuous and successful privatization in partnership with the government.

Thus, the ICTSI continues to seek port privatization and opportunities and port assets around the globe, particularly with the government. Because of the demand for aggressive technological investments and overall modernization, the National Government continues to finance developments and projects. Regardless of the privatization model employed, ICTSI's operation continues to flourish where the government ensures a conducive environment, privatization plans, and activating monitoring of private entities.

The continuous privatization across all industries and sectors, such as transportation and port sectors, is done as the ICTSI is considered one of the early adopters of port privatization and the formalization between the Philippine Ports Authority and ICTSI for the Manila International Container Terminal.

An expansion program in 1994 gained experience in developing, managing, and operating several container terminals in the Philippines, Asia, and other global markets. Its corporate headquarters is in Manila, with regional representatives in Dubai for Europe, the Middle East, Africa, and Panama City for America. The Manila International Container Terminal was the enterprise and remains a flagship operation, continuing to benchmark in other countries. Thus, Manila and other Philippine ports are preparing for expansion through a continuous benchmark that enriches the best practices in the port system and procedures that can be adapted and developed in port locations.

The management has proven successful in port development and management in several ports worldwide. State-of-the-art information technology consistsof leading hardware and software that provide continuous market monitoring and deployment into the strategic area for operations. Enhancement was done from communication to maintaining its monitoring from the control to billing, automated operations (gates and yard), and technologies in the port area.

The International Container Terminal Service (ICTSI) had also bought controlling stakes in the two terminal ports, one in India's Tamil Nadu and one in Croatia.In June of the following year,the ICTSI began to offer 69% of the shares in a Singaporean port manager, namely Portek International, which has concessions in Jakarta and West Java, Algeria, Gabon, and Malta.

In 2010, the volume at Port of Manila, which is ICTSI's flagship, increased its TEUs with a total of 1.6 million, far below the Shanghai International, considered the busiest port in the world, containing 29.1 million TEUs. However, ICTSI also manages other container ports in the Philippines, considered the leading competitor, Asian-Terminals bought by DP World of Dubai, which handles only 820,000 TEUs.

Concessionaires like ICTSI are usually into long contracts that handle shipments, services for inspection and storage, and modern equipment. The headquarters office was adjacent to Manila cranes in the Tondo area. According to Razon, it is considered the port that has emerged as a growth market in the industry. The privatization in the Philippines that started in the 1990s revived the business. ICTSI came to Argentina in 1994, followed by other ports in Mexico, Tanzania, Thailand, and Pakistan; this investment of joint ventures later became unprofitable, especially in the financial crisis the Philippines encountered and the company's debt to $320 million. Razon disposed of overseas port assets, which he sold to giant port manager Hutchison, who is owned by a Hong Kong tycoon, Li Ka-Shing.

XI. Manila International Container Terminal

Manila has been the center of interregional and international commerce since the start of trade between Manila-Acapulco Galleon trade. Now, the port remains a

vital part of the vibrant activity in Manila and is also the central hub of Philippine trade.

The MICT is one of the three terminals in the Port of Manila in the Philippine Port system. The MICT is between the two prominent harbors, namely The North and the South Harbor, located westward of Manila Bay and the mouth of Pasig River; both bodies of water are the city's major waterways.

In 1988, ICTSI continued to operate the MICT in an international tender. This privatization was the Philippine government's first port to undergo a privatization effort with seven local and international institutions. The ICTSI increased the annual terminal capacity, expanding the cargo handling fleet, which is considered the largest and most modern in the country today. For the MICT, the flagship operation had a strategic development program that provides for continuing growth, especially in international, regional, and domestic trade.

It was in operation starting June 12, 1988, and today, the MICT is the Philippines' largest and busiest international container terminal and the 25th largest non-transshipment port in the world. The MICT can handle an annual capacity of 2.75 million twenty-foot equivalent units of containerized, bulk, and non-containerized cargo. Identified as the most modern terminal, the MICT offers extensive facilities, including the country's first and most massive cranes, rubbing tired gantry cranes deployed in container yard operations.

The MICT is the flagship of ICTSI, which operates the strategic development program that provides continuing growth on international, regional, and domestic trade demands. Port operations enhanced the Terminal Operations Management system, security systems primarily in the installation of security cameras that automatically capture the container and track data as well as the boxes transported to the vessels or trucks.

For the customers to secure and update the status of containers, the MICT launched an online search called Tracks & Trace (T&T), which contains an SMS notification option. Another development was that it was compatible with Android and Apple mobiles; the MICT Mobile App gave customers a personalized account with Track & Trace functionality, billing transactions, and other matters.

Someprivate and public agencies, such as the Philippine Ports Authority, Bureau of Internal Revenues, Bureau of Customs, and several ICTSI partner banks, fully support the port industry's and customers' convenience. Lastly, the Bureau of Customs secures the overall process from electronic to mobile.

There is a 70% market share in the Port of Manila, and it was awarded ISO certification in 2004 and 2008.

XII. Container Handling

Under its charter, the PPA, as administrator of all ports, is vested with police powers and authorized to exact fines for specific violations of its rules and regulations. Subsequently, by advantage of Executive Order (EO) 159, the PPA can now undertake all port development projects, relieving the Department of Public Works and Highways (DPWH) of this responsibility. As the phase of its regulatory function, the PPA issued new regulations and reviewed and updated some of its existing insurance policies to preserve its operation aligned with the thrusts and priorities of the country-wide authorities and cutting-edge business developments and first-ratepractices in the water transport industry. It also issued a range of circulars and interior guidelines to better organizational and financial management.

On port services, the PPA also pursued streamlining and reducing documentary requirements to ease the value of doing business, consistent with the government's security thrust. It also facilitated the privatization of four premier ports, which now boast world-class capabilities and amenities — Manila International Container Port, Manila South Harbor, Manila North Harbor, and Batangas Port.

The PPA adopted software for non-stop sustained and considerable development, starting with the country's predominant gateways, and poured investments into secondary ports and roll-on, roll-off (RORO) facilities. Since 2010, the Philippine Ports Authority has completed 498 repairs and maintenance projects amounting to Php 6.57 billion for port facilities and has been identified as the top operating condition, ensuring an unhampered port operation. [60]

XIII. Roll on/Roll off System

In 2003, a policy was made to improve connectivity, especially on a small island in the Philippines, called the Ro-Ro or Roll-on/Roll-off port system, which ensures the needs of the trade and tourism sectors. It established an inter-island connectivity between Luzon, Visayas, and Mindanao. The concept of the RoRo system is that load-on and load-off shipping goods are delivered from the point of origin, unloaded, then loaded onto ships, carried to the next port, unloaded once more, and then loaded into other trucks for another journey. Moreover, as a result, load-on and load-off economic activity favors small and regional markets. The establishment of the RRTS links together the country through the Ro-Ro ships, and it also borrows links from the pre-existing Maharlika or

[60] *ICTSI Factbook,* International Container Terminal Services Inc. p. 28

Pan-Philippine Highway, which is also designed to reduce the cost of the inter-island transfer of a country and serves as an alternative option for the Load-on/Load-off or Lo-Lo system. Before 2003, the Lo-Lo system was dominant in the mode of shipping. However, the small-scale shippers involvedsome shippers which are involved in cargo handling and wharfage.

The Ro-Ro policy was the government's attempt to expand the country's transport system with minimal investment. Thus, the island-to-island cargo shipment was called the Ro-Ro ferry terminal system or RRTS to other port infrastructures; the authorities allowed the conversion of the existing ports into R0-Ro and the private sector participation.

The collaboration between the PA and Manila Sports Car Club of MSCC, the Western Nautical Highway composed of the ports of Batangas, Mindoro, Caticlan Iloilo, Bacolod Dumaguete, and Dapitan in Zamboanga which sustains the growth of the Ro-Ro network. It also covers the Central and Eastern Seaboard Highways. The Central Nautical Highways comprises Pilar, Sorsogon, and Balingoan in Cagayan de Oro, while the Eastern Nautical Highways links the province of Biliran in Western Leyte to Surigao City.

Moreover, the foundation to its local partners affects sea transport: The Department of Agriculture, the Development Bank of the Philippines, the National Economic Development Authority, the Mindanao Business Council, the Philippine Chamber of Commerce and Industry, and the Supply Chain Management Association of the Philippines. Other agencies that directly assist the Philippine government are the Research, Educational, and Institutional Development Foundation (REID), the Asia Foundation, and USAID. (November 2010 Roll-on Roll-off Transport. (n.d.).

The pattern of development in the port of Manila was identified from the biographical location of the port that lies in the bodies of the Pasig River, which leads to local and international trade opportunities that highlight the Philippine products from raw to processed. The tool of exchanging goods also increased the port productivity from its establishment until the contemporary period and the economic productivity of each port and the Philippines.

Natural forces bring about the rise and fall of the port of Manila, which is the longer durée the long-term human factors such as the government and administrations, and finally, the decision and policy of the government of officials, which is the short term—the commensurate after the growth of the country as an engine of economic growth. Millions of pesos were generated by the use of ports and the value of goods and services as well as the passengers, and they are affected by human and natural factors.

The Port of Manila is strategic. During colonization, it was also an asset that served as collateral for 20 million pesos between Spain and the American government for the Philippines' independence. During World War II, it became a strategic value for the Japanese to conquer Manila and different provinces.

In the modern period, the Port of Manila is an asset to the Philippine economy; millions of pesos come in and out, which signifies vast earnings for the government, the crown jewel of the Philippines, which is a key for economic growth.

The opening of other ports in the Philippines contributes to the development of the Philippine economy, especially in the import and export of commodities. However, the expansion led to additional services and equipment and increased port productivity.

The increase in productivity also leads to changes in the port industry, such as location, piers, machinery used, and policies. The expansion of the port area led to some ships/piers that cater to dock at the area; the number of piers that load and unload their goods, passengers who used ships instead of air travel, Ro-Ro buses also become the mode of passenger and goods transportation from island to island. Improvements in port machinery become the concern of the port industries, especially to the number of products that need to be shipped from island to island, the demand of the passengers both locally and internationally, and lastly, the competition from the ports in the Philippines and the world.

The port of Manila's geographical location provides excellent wealth to the Philippine economy. The location of Manila Bay, which is close to other neighboring Asian countries, the Pasig River continued even after the end of the galleon trade until the Americans came and expanded the port. It also directly involves establishments, shipping, mining, food, and supplies. At present, it contributes billions of pesos and is connected to other businesses, but it is also a victim of its success because it is a space subject to expansion and problems such as smuggling and maritime disasters.

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Tips for Writing a Good Quality Science Frontier Research Paper

Techniques for writing a good quality Science Frontier Research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of science frontier then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.

6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

Criterion for Grading a Research Paper (Compilation) by Global Journals

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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