

Security Challenges and Risks in The Strait of Malacca: A Critical Analysis

Muhammad Awais Khalid^{*1}, Adnan Nawaz², Imran Wakil³, Javeria Kanwal⁴

^{1*}BS Scholar, Department of International Relations, Government College University Faisalabad, Punjab, Pakistan.

²Assistant Professor, Department of International Relations, Government College University, Faisalabad, Punjab, Pakistan.

³Assistant Professor, Department of International Relations, Government College University, Faisalabad, Punjab, Pakistan.

⁴M.Phil. Scholar, Department of International Relations, Government College University Faisalabad, Punjab, Pakistan.

Corresponding author: awaiskhalid.info@gmail.com

Keywords: Strait of Malacca, Maritime Security, Piracy, Geopolitical Tensions, Terrorism, Environmental Hazards, Illicit Trade, Regional Cooperation

DOI No:

<https://doi.org/10.56976/jsom.v4i2.256>

A major global shipping chokepoint, the Strait of Malacca is threatened by several security problems that could disrupt stability, trade and political relations in the region. Eighteen incidents were recorded last year due to piracy and armed robbery, with pirates and armed criminals now resorting to complicated attacks that include cyber support. Kidnappings and demands for ransom over \$1.5 million prove the financial and operational threats to vessels using the strait. The region's security is also affected by geopolitical problems, with unresolved border conflicts and China and the U.S. each hoping to take a bigger role as strategic powers in the area. Disputes about seaward limits, the search for resources and military activity raise tension in the region. Besides, terrorism and attacks by non-state actors have increased, with a 35% jump in ocean terrorism events (2018–2022) and cyber-physical attacks on shipping facilities. Risks to the economy and the environment from oil pollution, crowded shipping waters and vessels running too low are a big concern for many industries, resulting in millions of dollars in expenses each year. At the same time, illegal business involving narcotics, weapons and wildlife exploits problems with security at ports and borders. Even though both sides conduct patrols and use technology, there are still many worries that need to be addressed through further regional action, greater monitoring and single legal policies. Should there be no action, both the safety and health of the waterway could reach such a level that trade and the safety of the seas would be seriously disrupted.

1. Introduction

The Strait of Malacca, among the world's top shipping routes, supports about 30% of all shipped products and 40% of all oil ships that pass annually (World Bank, 2022). Since it lies between the Indian Ocean and the South China Sea, the region greatly helps with commerce but also raises risks about security, politics and the environment (Storey, 2021). However, the Strait faces ongoing problems such as piracy, land disputes, terrorism, smuggling and navigational dangers, together posing a challenge to local security and stability at sea.

Lately, escorts have to deal with attackers who now use technology, fake GPS and organize kidnapping ransoms. With joint patrols and regional cooperation lowering the number of attacks since 2000, modern pirates still take advantage of any gaps in enforcement in and around Indonesia's Riau Islands and the Phillip Channel of Singapore. Meanwhile, competition among coastline states (Indonesia, Malaysia and Singapore) and foreign superpowers (China, the U.S. and India) has a negative impact on security (Sun et al., 2024). Issues with maritime borders, increased Chinese and foreign military deployments and infrastructure projects like the Melaka Gateway add to the tensions and American FONOPs usually spark diplomatic challenges (Velencia, 2023).

Besides normal security concerns, shipping in the strait is now endangered by maritime terrorism, thanks to Jemaah Islamiyah and Abu Sayyaf using stolen data and shipjacking to disrupt vessels. Ongoing incidents such as spills, dumping and accidents which harm the environment, make things worse for the environment and fishing and upset coastal communities (Storey, 2021). Moreover, the strait helps drug traders, arms smugglers and wildlife partners take advantage of its weak security and complicated authority to conduct their illegal actions. It examines the different security dangers found in the Strait of Malacca by looking at how piracy, geopolitical issues, terrorism, risky conditions and smuggling influence one another (Velencia, 2023). It examines current methods being used such as MSP and modern surveillance, pointing out continued hazards. Difficulties in regionally collaborating, advancing in technologies and laws could expose the strait to continuous risks to its security and economy and harm world maritime shipping greatly.

1.1 Research Question

Q.1 What are the security challenges and risks linked with increased maritime traffic and Chinese involvement in the Strait of Malacca and how regional countries dealing with them?

2. Literature Review

The article "Chinese Investment and Elite Sentiment in Southeast Asia" published by Yining Sun, Ethan Kapstein, and Jake in the journal *Research and Politics* during January-March 2024. The research tracks political messages on social media to determine whether BRI investments affect how politicians view China. The research indicates BRI investments fail to produce sustained influence on the political beliefs of leaders. The brief sentiment rise that occurred after BRI investments was short-lived because it failed to produce lasting effects within political environments (Storey, 2021). Research indicates BRI investments from China do not deliver the envisioned power to align Southeast Asian political views. Research lacks insights regarding alternative Chinese political impact mechanisms which could include cultural

programs as well as Chinese communities in target countries. The study of nationwide politics should provide more clarity about BRI's prolonged influence on foreign policy (Sun et al., 2024).

“Addressing Maritime Security Threats in the Malacca Strait: A Malaysian Perspective” authored by Arifin Setiawan and Agustin Maciel Padilla, appeared in Open Journal of Social Sciences during February 2025 while investigating maritime security threats within the Malacca Strait through a traditional and non-traditional perspective. The article stresses the need to develop Malaysia-Indonesia bilateral partnerships for urgent issues concerning piracy as well as armed robbery and smuggling despite existing territorial tensions. The article recommends boosting maritime cooperation through combined patrolling along with exercise coordination and establishing an Intelligence Fusion Center (IFC) for improving intelligence exchange. The paper declares that the strategic importance of global trade and energy supply through the Strait demands implementation of a full security approach to handle active threats along with future threats to regional stability (Setiawan & Padilla, 2025).

“Chinese Investments in Malaysia: Synthesizing the Evidence Ten Years into the BRI” by Tham Siew Yean presents evidence about Chinese investments in Malaysia during the tenth year of the Belt and Road Initiative (BRI). This paper disproves the belief that Chinese foreign direct investment holdings in Malaysia exist solely for political purposes since they extend through various manufacturing industries and service-related sectors along with infrastructure ventures. The author focuses on two essential projects the East Coast Rail Link (ECRL) and the Malaysia-China Kuantan Industrial Park (MCKIP) to demonstrate their economic foundation through market expansion and efficiency-seeking initiatives. The research reveals that Chinese investments support Malaysian growth but they need better connection to local development objectives to drive more sustainable long-term local effects. The author concludes that future investments should concentrate on developing high-quality projects which achieve sustainable development with inclusive growth (Siew Yean, 2023).

3. Research Methodology

All the data gathered for this research comes from secondary sources, including the analysis of reports, databases, research articles and official papers. Adding together data on piracy, smuggling and how the environment is harmed with bring-overed expertise from case studies and political research, the study comprehensively examines security trouble spots in the Strait of Malacca. Secondary data usage allows for comprehensive research without field visits which makes the analysis accessible and effortlessly repeatable, while true to ethical standards due to the reliability and neutrality of sources discussing controversial politics.

3.1 Piracy & Armed Robbery

The International Maritime Bureau shows in their annual report that 38 piracy incidents out of 135 globally took place in the Strait of Malacca which remains globally second only to Gulf of Guinea in piracy activity (International Maritime Bureau, 2023). Worldwide maritime pirates conducted 38% of all incidents in 2022 focused on territorial seas surrounding Indonesia 55% and Malaysia 30% as well as Singapore 15% (ISC, ReCAAP Information Sharing Centre, 2023). From 2000-2004 the annual piracy attacks totaled more than 150 but the current

situation indicates significant improvement yet the threat patterns have adopted worrying directions (Bateman, 2022). According to the ReCAAP Information Sharing Centre inspection results show modern pirates use hybrid methods since 65% of 2022 attacks featured armed criminals who used knives in 75% of cases and firearms in 40% (ISC, ReCAAP Information Sharing Centre, 2023).

High-profile cases have shown the advancement of this trend. Pirates kidnapped 39 crew members aboard MT Bunga Melati Dua off Pulau Batam during 2008 for 58 days until the cargo vessel operator paid ransom totaling US 2 million (International Maritime Bureau, 2009). In 2015 the Orkim Harmony attack demonstrated the advanced capabilities of pirates who sabotaged tanker communications before draining away 3,000 metric tons of gasoline worth US 2 million ransom payments.

The pirate mission on Orkim Harmony showcased their advancing capabilities when they cut off maritime communications and stole gasoline worth US 2.1 million through siphoning 3,000 metric tonnes before Malaysia captured the vessel (Bateman, 2022). The 2020 Jahan 1 incident showcased a 3-month-long kidnapping of 13 crew members that required a US \$450,000 ransom payment. In the same year the Jaya Sri 18 robbery demonstrated how armed pirates targeted anchored tankers around Bintan Island to raid equipment and valuables.

Geographically, attacks cluster in three primary hotspots: the eastern strait near Indonesia's Riau Islands 45% of incidents, the Phillip Channel near Singapore 30%, and the Tanjung Piai area off Malaysia 25%. Lloyd's Market Association demonstrates that Malacca transits have insurance rates 15-20% higher than alternative safer routes as the World Bank asserts US 1.5 billion is spent annually on security measures together with shipment reroutes and ransom pay-outs. The crime of crew kidnapping has become increasingly profitable by showing a significant increase in average ransom requests which now reach between US\$50,000 to US\$1.5 measures and surpass US\$350,000 during 2022 (World Bank, 2022). The value of crew kidnappings in the maritime industry rose substantially from US\$50,000 in 2010 to US\$350,000 in 2022. The 1999 hijacking of Alondra Rainbow resulted in pirates maintaining control of a vessel for two months while rebranding it completely which led to the development of regional Naval forces that cut down pirate attacks by 60% from 2004-2010. The recent pirate incidents showcase the fact that piracy continues to evolve as an active threat that demands ongoing alertness from safety authorities (International Maritime Bureau, 2023).

4. Geopolitical Tensions and Territorial Disputes in the Strait of Malacca

4.1 Littoral State Disputes

The Strait of Malacca continues to involve multiple ownership conflicts between regional states and Indonesia and Malaysia are the countries whose ownership disputes remain the most heated. Since 2005, both Malaysia and Indonesia have repeatedly deployed naval forces near the Ambalat block in the Celebes Sea although it is outside the strait area because these competing claims affect regional maritime security cooperation (Schofield, 2022). Frequent tensions between patrol ships and fishermen occur because both Indonesia and Malaysia dispute the border region around the Riau Islands. The eastern strait entrance between Singapore and Malaysia brings ongoing disputes about Singaporean territorial boundaries near

Pedra Branca/Pulau Batu Puteh Island since the 2008 International Court of Justice awarded ownership yet failed to specify maritime limits (Beckman, 2022). Onset of disputes required Malaysia to suspend its active participation in anti-piracy joint operations with other countries during the 2017 Naval incident near the Natuna Islands (Storey, 2021).

4.2 Extended Territorial Conflicts

Strategic positioning of the Strait of Malacca leads neighboring states to peripheral disputes which affect maritime security conditions. Thailand and Malaysia maintain a maritime boundary dispute in Andaman Sea waters surrounding their northern entrance which contains valuable energy resources because both countries issued overlapping exploration agreements (Velencia, 2023). Differing exclusive economic zone claims by Indonesia around the Riau Islands generate sporadic diplomatic tensions with Singapore because of their conflicting plans to expand maritime ports and manage shipping operation. The Indian-Myanmar dispute regarding ownership of the Coco Islands has escalated because Myanmar allowed Chinese surveillance facilities on those islands to monitor Malacca traffic. Long-running military disputes result in intricate security conditions that frequently trigger conflicts between nations in their maritime cooperation networks.

4.3 Great Power Competition

The strategic worth of the strait attracts intense interest from worldwide powers which has produced additional geopolitical tensions between them. The massive Chinese funding through the \$10.5 billion Melaka Gateway construction has prompted anxiety about military usage of commercial harbor facilities (Zhang, 2023). Data from U.S. defense reports reveal that China's naval patrols throughout the area have risen by 40% since 2018 until 2022. Littoral states repeatedly protest to the United States when it executes its annual 8-10 strategic Freedom of Navigation Operations but the US continues with these operations (U.S. Department of Defence, 2022). India establishes strategic control of the Andaman and Nicobar Islands to oversee more than 60% of Malacca maritime traffic thus countering Chinese regional influence.

4.4 Legal and Regulatory Conflicts

The application of international maritime rules within this straituously confronts coastal states and the user states in their permanent dispute. Indonesia and Malaysia enforce the STRAITREP reporting system which maritime powers see as an infringement of navigational freedoms in the international transit passage. The 2021 heavy fuel oil ban enacted by littoral states has sparked a new set of disputes because it limits about 30% of shipping traffic yet shipping nations claim it violates their coastal state authority. International Maritime Organization conferences show regular appearance of legal disputes between littoral states along with user nations that debate environmental protection versus freedom of ocean navigation.

4.5 Terrorism and Non-State Actor Threats in the Strait of Malacca

The security environment in the Strait of Malacca continues to become more intricate because terrorist organizations as well as non-state actors show growing capabilities to disrupt maritime commerce. The International Maritime Bureau through its 2023 Annual Report shows the strait experienced a 35% increase in maritime terrorism-related incidents from 2018-2022

to reach 42 confirmed occurrences (International Maritime Bureau, 2023). Maritime terrorist activities have increased dramatically because regional terrorism organizations ASG and JI became more advanced by changing their operations to attack coastal targets. Since 2019 the ReCAAP Information Sharing Centre has recorded 14 successful kidnappings for ransom involving commercial vessels in the eastern regions of the strait along with notable ransom payment increases from 150,000 per victim in 2019 to 420,000 in 2023.

The modus operandi of these groups has evolved significantly in recent years. Where previously they relied on brute force attacks, contemporary operations demonstrate concerning sophistication. The 2021 hijacking of the MT Orkim Harmony revealed a new pattern: attackers used encrypted satellite communications to coordinate their assault and employed GPS spoofing technology to mask the tanker's location for 36 hours (Malaysian Maritime Enforcement Agency, 2022). Similarly, the 2022 attempted attack on the Singapore-bound container vessel APL Le Havre involved cyber infiltration of the ship's navigation systems prior to the physical boarding attempt. These incidents underscore what the UN Office on Drugs and Crime has termed "the digital transformation of maritime terrorism (United Nations Office on Drugs and Crime, 2022).

These criminal organizations now use new operational strategies throughout recent years. Forces are now increasingly more complex than the old brute force attack methods from past operations. Attacker groups employed encrypted satellite communication to launch their assault and deployed GPS spoofing technology which prevented tracking the MT Orkim Harmony for 36 hours according to Malaysian Maritime Enforcement Agency. Cyber Security Agency of Singapore documented how the predators targeted APL Le Havre by breaking into its navigation systems before their unsuccessful attempt to board in 2022 en route to Singapore. The incidents highlight "the digital transformation of maritime terrorism" as described by the UN Office of Drugs and Crime.

Port installations within the maritime strait constitute especially easy-to-attack targets. A review of security systems at Port Klang, Tanjung Pelepas, Singapore, Belawan, and Penang discovered that Singaporean facilities assured complete compliance with the ISPS Code but other ports demonstrated critical weaknesses in their access management and cameras (International Maritime Organization, 2022). The Port Klang 2020 incident showed JI operatives' ability to run explosives through security at Port Klang and later face interception by Singaporean authorities as reported by Royal Malaysian Police in 2021. Such security weaknesses produce extensive economic impacts. According to the World Bank the total annual shipping costs run up by terrorism-related risks amount to \$1.2 billion in the region.

Different threat distribution patterns appear through geographic assessment. The eastern approaches near the Singapore Strait account for 62% of incidents, particularly around the Phillip Channel and Horsburgh Lighthouse (ISC, ReCAAP Information Sharing Centre, 2023). Free Aceh Movement splinter groups enhanced their operations in the western sector close to Aceh since 2022 and they carried out three attempted attacks against LNG tankers Indonesian Navy. Two successful attempts by Rohingya militants targeting cruise ships were thwarted in 2023 in the northern sea approaches around Phuket (Thai Maritime Enforcement Command, 2023).

Terrorism countermeasures have obtained certain victories even while navigating multiple major obstacles. Joint patrols under the Malacca Strait Patrols together with Indonesia Malaysia Singapore and Thailand have successfully stopped 17 potential terror attacks after 2020. The program needs improvement due to its limited resources as it has twelve patrol vessels to monitor 550 miles of high-risk waters. The AI-powered surveillance at Singapore's ports has cut down port intrusions by 40% starting from 2021, while other regional ports still need these advanced systems. The INTERPOL Maritime Terrorism Unit forecasts an upcoming fusion point between terror organizations and cybercriminal groups which might result in synchronized digital and physical assaults against maritime infrastructure (INTERPOL Maritime Terrorism Unit, 2023).

4.6 Environmental and Navigational Hazards in the Strait of Malacca

4.6.1 Navigational Challenges in a Constricted Waterway

Plantime Shipping faces one of the globe's toughest navigational challenges within the Strait of Malacca due to its challenging physical conditions as well as high maritime vessel density. Recent hydrographic surveys show that 27 percent of the main shipping lanes currently present underkeel clearance challenges because the depths reach only below 23 meters. The Phillip Channel poses the greatest danger to maritime navigation because it contains less than 1.7 nautical miles of passage area that supports more than 150 vessel crossings each day with numerous VLCCs and mega-container ships (Lloyd's Intelligence List, 2023). Unprecedented maritime traffic in the strait operates dangerously with spring currents exceeding 4.5 knots which creates vast hydrodynamic effects that exceed standard vessel operating capacity. A National University of Singapore research study shows that congested waters cause annual navigational incidents reaching 248 incidents on average during which tankers account for 38 percent of all incidents because their restricted movement in tight spaces (National University of Singapore, 2022).

4.6.2 Chronic Environmental Degradation

Environmental damage in the strait remains severe and continuous because of spills originating from accidents in combination with routine operations. Satellite imagery shows a toxic marine environment exists as there are ongoing oil slicks that affect 1,200 square kilometers of the marine surface every day. Following the 2018 MT Dawn Horizon spill that released 4,500 tonnes of marine fuel oil the environment suffered long term damage resulting in fish larvae populations decreasing by 72% throughout numerous breeding cycles. The 25,000 tonnes per year of oil pollution from illegal bilge discharging and tank washing operations results in a 40% biodiversity decline throughout affected marine zones (World Wildlife Fund, 2023). Environmental destruction creates multiple adverse effects that result in severe harm to fishing communities which depend on ocean resources for their survival.

4.6.3 Economic Consequences and Systemic Risks

Environmental factors and navigational obstacles within the strait produce significant economic expenses throughout different supported sectors. Shipping companies pay substantial costs due to their VLCC waiting period risk because they pay 25% higher insurance premiums and average 280,000 per day in demurrage charges. Annual losses exceed 280,000 per day

from the fishing industry because VLCCs need to wait for favorable tidal conditions (Baltic and International Maritime Council, 2023). Annual fishing industry financial losses from depleted stocks exceed 120 million dollars and coastal tourism brings in less than 45 million dollars per year because of oil-contaminated beaches and damaged natural environments. The projections show that sea level rise will decrease underkeel clearances by 15% by 2050 and increased storm intensity will elevate accident risks by 20%. A dangerous feedback loop develops when environmental destruction diminishes navigational protection systems allowing more ecological troubles that dangerously approach a threshold of no return for the strait (United Nations Development Programme, 2023).

4.6.4 Mitigation Efforts and Future Challenges

These challenges face partial success in the current initiatives that have been implemented. The advanced Vessel Traffic Information System (VTIS) of Singapore uses technological capabilities to track vessels and cut collision frequencies by 18% through operational tracking of vessel positions. Several neighbor countries without equivalent safety systems create substantial limits to regional safety management effectiveness. The Malacca Strait Environmental Protection Project has collected 45,000 tonnes of marine debris since 2018 yet it continues to struggle against continual environmental pollution (United Nations Development Programme, 2023). New technologies leveraging AI for navigation systems and space-based pollution detection reveal potential but need extensive regional financial support alongside cooperative efforts. The strait will meet an ecological breaking point within the next ten years unless thorough coordinated actions are introduced which could lead to massive shipping lane reorganization and trade disturbances. The pending crisis requires urgent attention of all strait users and managers to collaborate for immediate resolution.

4.7 Smuggling and Illicit Trade in the Strait of Malacca

4.7.1 The Scale and Complexity of Maritime Smuggling Networks:

The United Nations Office on Drugs and Crime estimates that illegal shipments make up 12-15% of oceanic trade moving through this important waterway that is now a global crime hub. Sovereign techniques deployed across more than 17,000 islands as well as numerous smaller poorly secured ports enables complex smuggling operations. Research from INTERPOL in 2023 identifies sea-covered illicit maritime commerce in Southeast Asia at a minimum value of \$6.8 billion per year which makes up 40% of illegal seaborne trade in a yearly estimated return of \$17 billion. The dense amount of lawful vessels operating in addition to the intricate coastal features provides multiple ideal scenarios for criminals to hide their operations (INTERPOL, 2023).

4.7.2 Narcotics Trafficking: Methods and Case Studies

Organized crimes transport heroin throughout global markets primarily through the strait based on documented seizures which grew by 62% according to UNODC's Southeast Asia Opium Survey 2023. Human traffickers constantly develop complex concealment techniques which makes the detection of their operations increasingly difficult. The Royal Malaysian Marine Police documented an incident where drug smugglers pulled drug pods beneath cargo ships with state-of-the-art magnetic coupling systems ship personnel construct

complex hidden compartments inside fishing vessels which detection requires ultrasonic scanning. The 2023 Annual Enforcement Report from Singapore Customs emphasizes growing concerns about container spoofing which involves traffickers creating fake documents and altered container seals to hide narcotics.

Malaysian authorities conducted a telling interception of the MV Ocean Infinity during March 2022. An ASEAN Narcotics Cooperation Center report named the botched tile shipment as the biggest seizure in regional history because officials found 4.3 tons of highly pure methamphetamine valued at \$1.2 billion. The forensic examination determined that illegal drugs found their origin in clandestine manufacturing facilities situated within Myanmar's Shan State where they were intended for distribution to Asian Pacific market territories. The demonstrated case illustrates how organized crime organizations purloin legal shipping operations as their preferred method to sidestep detection while moving unusually large drug consignments.

4.7.3 Weapons Trafficking: Patterns and Regional Impacts

Small Arms Survey investigations found 57 intercepted weapons shipments from 2020 to date which revealed dangerous weapon stocks involving 12,400 firearms alongside 840 RPG-7 rocket launchers and 25 Igla surface-to-air missile systems. The majority of these weapons serve to create and sustain conflicts primarily in the southern Philippines as well as other volatile areas in the region. In a press release from the Indonesian Navy dated August 15 2021 it was revealed that 1,200 M16 rifles together with 50,000 rounds of ammunition were discovered beneath fish holds by naval units during an inspection at sea of the *Jaya Lestari* vessel near Aceh. Laboratory evaluation of the weapons revealed their Cambodian military origin before being sent to insurgent groups operating in Mindanao. The incident showcased the rising technical capabilities of lethal weapons transfer organizations along with their successful usage of maritime paths to create severe security risks throughout the region.

4.7.4 Environmental Crimes: The Illegal Wildlife Trade Crisis

The data collected by TRAFFIC in 2023 showed concerning wildlife trafficking patterns in the strait with 1,200 live animal shipments yearly and 45 metric tons of ivory transported for Vietnamese carving operations (Wildlife Justics Commission, 2022). The interception of 8.5 tons of pangolin scales in Penang during May 2022 became particularly alarming because the scales originated from 16,000 slaughtered animals as documented. The traffickers concealed the scales within legitimate seafood exports to take advantage of "cover loads" while attempting to avoid detection. Criminal organizations now use advanced methods to take advantage of shipping lane traffic in the strait to conduct environmentally harmful operations which became evident through this specific case investigation.

4.7.5 Persistent Enforcement Challenges and Systemic Vulnerabilities

Authorities must overcome major barriers even though they increased their monitoring activities to fight illegal actions. Three states bordering the strait create jurisdictional vacuum areas which traffickers manipulate. The technological constraints make execution even harder since the Maritime and Port Authority of Singapore reports a continuous radar coverage span of 65% across the strait. The Transparency International document in its 2023 Corruption Risks

Report investigates the documented instances of port officials helping smugglers which poses the most serious concern. The core maritime passage demands combined international approaches to handle the intricate structure of illegal activities that exist within this vital maritime route.

5. Conclusion

Strait of Malacca is becoming more important for shipping and is confronted by different security risks and environmental factors. It has become clear from this research that pirates and armed robbers are now using advanced methods that involve both cyber space and coordinated abductions, so safety at sea requires new strategies. Tensions between ship-bearing countries and competing military powers make security governance more problematic, as fighting and antagonism in the area weaken joint efforts to maintain a safe water route.

Chronic pollution from oil, along with dangerous navigation routes and harm to the environment near the coast, are now big concerns for seafaring and the people who depend on it. Problems in the environment overlap with issues in the economy, as extra insurance and delay problems in transportation directly impact world trade. It is also important to note that both narcotics and wildlife trafficking happen regularly in the strait, thanks in part to weaknesses in enforcement.

Although regional joint patrols and technology at ports have brought improvements, it is still clear that stronger and broader systems are needed. Sustainable plans are possible with better abilities and information-swapping and by improving the political resolve needed to balance single nation interests against security for all. Whether the strait remains a reliable maritime route depends on how well nations manage both their own needs and their shared responsibilities, as well as proper treatment of the environment now and in the future. If integrated strategies are not applied, the risks here could become much bigger, with results affecting regions far outside Southeast Asia as well. Today, because the Strait of Malacca faces challenges that cross different countries, everyone involved has to cooperate more than ever to protect it from disruption.

6. References

- Bateman. (2022). *Maritime Security in Southwast Asia: The Piracy-Terrorism Nexus*. Yusof Ishak Institute in Singapore.
- Baltic and International Maritime Council. (2023). *Maritime Economics Annual Review*. Copenhagen: BIMCO Publications.
- Beckman, R. (2022). UNCLOS and the Malacca Strait Legal Status. *Ocean Development & International Law*, 198-215.
- International Maritime Bureau. (2009). *Piracy and Armed Robbery Against Ships: Annual Report 2008*. London: International Maritime Bureau.
- INTERPOL . (2023). *Transnational Maritime Crime Assessment*. INTERPOL Publication.
- Wildlife Justics Commision . (2022). *Intelligence Brief: Pangolin Scale trafficking*. The Hague : WJC Publication.
- ISC, ReCAAP Information Sharing Centre. (2023). *Annual Privacy Report*. Singapre: ReCAAP ISC.

- International Maritime Bureau. (2023). *Privacy And Armed Robbery Against Ships: Annual Report 2023*. London: International Maritime Bureau.
- International Maritime Organization. (2022). *Port Facility Security Assessment: Southeast Asia*. London: IMO Publishing.
- INTERPOL Maritime Terrorism Unit. (2023). *Emerging Trend in Maritime Security*. Lyon: INTERPOL Publication.
- Lloyd's Intelligence List. (2023). *Strait of Malacca Traffic Analysis*. London: Informa PLC.
- National University of Singapore. (2022). *Hydrodynamics Challenges in the Malacca Strait*. Singapore: NUS Press
- Malaysian Maritime Enforcement Agency. (2022). *Counter Terrorism Operations Report*. Malaysia: Agency Press.
- Storey, I. (2021). *Southeast Asia's Maritime Disputes: Conflict and Diplomacy*. Georgetown University Press.
- Thai Maritime Enforcement Command . (2023). *Andaman Sea Security Assessment*. Bangkok: TMEC Publications.
- U.S. Department of Defence. (2022). *Annual Freedom of Navigation Report*. Washington DC: Department of Defence Press.
- United Nations Office on Drugs and Crime. (2022). *The Evolving Nature of Maritime Terrorism*. Vienna: UNODC Publications.
- Southeast Asia* . New York: UNDP Publications.
- Velencia, M. (2023). *Energy and Maritime Boundary Disputes In Asia*. Honolulu: East-West Center Press.
- World Wildlife Fund. (2023). *Marine Ecosystem Health Index: Malacca Strait Assessment*. Washington DC: WWF Scientific Publications.
- United Nations Development Programme. (2023). *Marine Conservation Initiatives in* Schofield. (2022). *Maritime Boundary Disputes In Southeast Asia*. Routledge.
- World Bank. (2022). *The Economic Dimensions of Maritime Piracy*. Washington DC: World Bank Publications.
- Zhang, H. (2023). *China Maritime Silk Road: Security Implications*. China Social Sciences Press, 45-17.