

# **Opportunities and Threats to Develop an Integrated Model of Stakeholder Collaboration in an Effort to Improve Marine Security in the Malacca Strait**

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**Abstract:** *The Malacca Strait is a crucial maritime corridor that facilitates a significant portion of global trade, making its security paramount for economic stability in the region and beyond. This paper explores various opportunities and threats associated with developing an integrated model of stakeholder collaboration aimed at enhancing marine security in the Strait. The significance of stakeholder collaboration is underscored, highlighting its potential to address complex maritime security challenges. The findings aim to provide insights for policymakers and stakeholders involved in maritime governance.*

**Keywords:** Malacca Strait, maritime security, stakeholder collaboration, institutional frameworks, regional cooperation.

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## Introduction

The Malacca Strait, stretching approximately 805 km between the Malay Peninsula and the Indonesian island of Sumatra, serves as one of the world's busiest maritime routes. It is a vital artery for international trade, with approximately 50,000 vessels transiting annually, accounting for around 25% of global trade (Long et al., 2022). The Strait's significance is further amplified by its role in the transportation of oil, with about 15 million barrels per day passing through, underscoring its critical importance to energy security (Hadyanti et al., 2023).

However, the Malacca Strait faces numerous maritime security challenges, including piracy, smuggling, and illegal fishing. According to the International Crisis Group (2021), incidents of piracy have seen a resurgence, with the region recording a significant number of attacks, impacting trade and navigation safety. The complexity of these challenges necessitates a collaborative approach among various stakeholders, including governments, private sector entities, and non-governmental organisations (NGOs)

This study aims to identify opportunities for stakeholder collaboration in enhancing maritime security within the Malacca Strait. By examining existing frameworks and practices, the research seeks to highlight potential synergies that can be harnessed among stakeholders. Furthermore, the study will assess the various threats to maritime security in the region, providing a comprehensive overview of the challenges that need to be addressed collaboratively (Isa et al., 2020).

The findings of this research contribute to the body of knowledge on maritime security, particularly in the context of the Malacca Strait. By exploring stakeholder collaboration, the study offers practical implications for policymakers and stakeholders engaged in maritime governance. Enhanced understanding of collaborative dynamics can lead to more effective strategies for addressing security challenges, thereby promoting safer maritime operations and safeguarding economic interests.

Maritime security encompasses a broad range of concepts aimed at ensuring the safety and security of maritime activities (Kismartini et al., 2024). (Bueger, 2015) defines maritime security as the protection of maritime interests against threats such as piracy, terrorism, and environmental degradation. In the context of the Malacca Strait, key challenges include illegal fishing, human trafficking, and the presence of armed groups that threaten navigation safety (MARTINS, 2024; Utomo et al., 2025).

The unique geographical and geopolitical dynamics of the Malacca Strait contribute to its vulnerability. The narrowness of the Strait, combined with high traffic volumes, creates an environment conducive to illicit activities. Moreover, the diverse interests of regional states complicate the security landscape, necessitating a nuanced understanding of maritime security threats.

Collaboration among diverse stakeholders is essential for addressing the multifaceted challenges of maritime security (Aiken et al., 2025). (Mehmood et al., 2024) highlights the significance of stakeholder engagement in collaborative governance, noting that effective

partnerships can enhance resource sharing, information exchange, and operational coordination. Successful case studies, such as the joint patrols conducted by Indonesia and Malaysia, demonstrate the potential of collaborative frameworks in mitigating security threats (West et al., 2025).

The need for a coordinated response to transnational maritime threats further underscores the importance of stakeholder collaboration. As maritime security challenges often transcend national boundaries, collaborative approaches enable stakeholders to pool resources and expertise, fostering a more resilient maritime security environment.

A review of existing frameworks and models reveals various approaches to stakeholder collaboration in maritime security. (Ganeshu et al., 2023) Identify key elements of effective collaborative governance, including clear communication channels, mutual trust, and shared objectives. However, barriers to effective collaboration persist, as highlighted by Putra (2025), who notes issues such as bureaucratic inertia and lack of coordination among stakeholders.

The analysis of existing models suggests that while there are frameworks in place, their implementation often falls short due to entrenched interests and inadequate engagement strategies. Addressing these barriers is crucial for the development of a more integrated approach to stakeholder collaboration in maritime security.

## **Method**

This study employs a mixed-methods approach, combining qualitative and quantitative research techniques to gather comprehensive insights into stakeholder collaboration in maritime security. Qualitative methods, including interviews and case studies, will provide in-depth perspectives from key stakeholders, while quantitative analyses will assess the prevalence and impact of various maritime security threats.

Data will be collected from a range of sources, including academic journals, government reports, and case studies. Relevant literature on maritime security and stakeholder collaboration will be reviewed to establish a theoretical foundation for the study. Additionally, primary data will be gathered through interviews with maritime security experts, policymakers, and representatives from relevant stakeholder groups.

Analytical methods will include thematic analysis of qualitative data to identify key patterns and insights related to stakeholder collaboration. Quantitative data will be analysed using statistical techniques to evaluate trends in maritime security incidents and the effectiveness of collaborative efforts. This comprehensive analysis aims to provide a nuanced understanding of the opportunities and threats associated with stakeholder collaboration in enhancing maritime security in the Malacca Strait.

## **Findings and Discussions**

### *Opportunities for Stakeholder Collaboration*

#### *Institutional Frameworks.*

The role of institutional arrangements in enhancing maritime security is critical, particularly in regions like the Malacca Strait, which is a pivotal maritime route for global trade. (Hanafiah et al., 2022); (Liu et al., 2024). Effective institutional frameworks can facilitate cooperation among various stakeholders, including government agencies, private sector entities, and non-governmental organisations (NGOs). According to (van Donkersgoed, 2025) An integrated approach that includes robust institutional frameworks is essential for safeguarding maritime security. These frameworks not only establish clear roles and responsibilities but also promote information sharing and collaborative decision-making processes.

A notable example of successful institutional collaboration can be seen in the joint efforts of the ASEAN member states to address maritime security challenges. Labandi & Haris (2023) highlight the establishment of the ASEAN Maritime Forum, which serves as a platform for dialogue and cooperation among member states. This forum has led to the development of joint initiatives aimed at enhancing maritime security, including the sharing of intelligence and best practices in maritime law enforcement. Such institutional arrangements have proven effective in mitigating risks and responding to threats, thereby improving overall maritime security in the region (Syailendra et al., 2024).

Moreover, the implementation of the Code for Unplanned Encounters at Sea (CUES) by ASEAN countries demonstrates the potential of institutional frameworks to foster cooperation in maritime security. This code provides guidelines for naval interactions to prevent misunderstandings and escalation of conflicts at sea, thus enhancing safety for all vessels operating in the Malacca Strait. The success of such frameworks underscores the importance of fostering a culture of collaboration among stakeholders, which is essential for addressing the multifaceted challenges of maritime security. (Poonnawatt, 2023).

In addition to regional frameworks, national institutions also play a vital role in maritime security. For example, the establishment of the Marine Security and Safety Agency in Indonesia has significantly improved the country's capacity to address maritime threats. This agency works closely with other governmental bodies and international partners to enhance surveillance and enforcement capabilities in Indonesian waters. (van Donkersgoed, 2025). The integration of various institutional efforts can lead to a more comprehensive approach to maritime security, ensuring that all stakeholders are aligned in their objectives.

The continuous evolution of institutional frameworks is necessary to adapt to emerging challenges in maritime security. As threats such as piracy, illegal fishing, and environmental degradation become more complex, stakeholders must be proactive in updating their strategies and enhancing collaboration. By leveraging existing institutional arrangements

and fostering new partnerships, stakeholders can create a resilient network that effectively addresses the dynamic nature of maritime security in the Malacca Strait.

### *Technological Advancements*

Technological advancements have revolutionised the way maritime security is monitored and enforced, particularly in busy shipping lanes like the Malacca Strait. The utilisation of technology in securing maritime routes is paramount, as it enables stakeholders to enhance their surveillance capabilities and respond swiftly to incidents. (Wibowo et al., 2022) notes that the integration of advanced technologies, such as satellite imagery, Automatic Identification Systems (AIS), and unmanned aerial vehicles (UAVs), has significantly enhanced the monitoring of vessel movements and maritime activities in this critical region.

A case study on vessel traffic systems in the Malacca Strait illustrates the effectiveness of technology in enhancing maritime security. (Nofandi et al., 2022) discusses the implementation of the Vessel Traffic Service (VTS) in Singapore, which has become a model for other countries in the region. The VTS employs sophisticated radar systems and data analytics to monitor vessel traffic, providing real-time information to maritime authorities. This system has significantly reduced the risk of collisions and accidents, thereby contributing to safer navigation in the strait.

Furthermore, the use of technology for illegal fishing detection has become increasingly vital. The deployment of satellite-based monitoring systems allows authorities to track fishing vessels and identify suspicious activities in real-time. This capability not only aids in the enforcement of fishing regulations but also helps to protect marine ecosystems from overexploitation. The success of such technological interventions highlights the importance of investing in maritime technology to bolster security efforts in the Malacca Strait.

In addition to surveillance, technology also plays a crucial role in enhancing communication and coordination among stakeholders. The development of integrated communication platforms enables various agencies, including naval forces, coast guards, and environmental organisations, to share information and collaborate effectively. This interconnectedness is essential for a coordinated response to maritime threats, as it allows for timely decision-making and resource allocation.

As technology continues to evolve, there is a need for stakeholders to remain adaptable and open to innovation. Embracing new technologies can lead to improved maritime security outcomes, but it also requires ongoing training and capacity building for personnel involved in maritime operations. By fostering a culture of technological advancement and collaboration, stakeholders can effectively address the challenges posed by an increasingly complex maritime security landscape in the Malacca Strait.

### *Regional Cooperation*

Regional cooperation is of paramount importance in enhancing maritime security in the Malacca Strait, given its strategic significance as one of the busiest shipping lanes in the world. The role of ASEAN and other regional partnerships cannot be overstated, as they provide a framework for collective action against common threats. Lau, (2024) emphasises that regional cooperation fosters a sense of shared responsibility among member states, enabling them to address maritime security challenges more effectively.

One significant aspect of regional cooperation is the establishment of joint patrol operations among ASEAN countries. The Kementerian Pertahanan Malaysia (2018) reports on the success of joint maritime patrols conducted by Malaysia, Indonesia, and Singapore in the Malacca Strait. These patrols have not only deterred piracy and other illegal activities but have also strengthened trust and collaboration among the participating nations. Such initiatives demonstrate the effectiveness of regional cooperation in enhancing maritime security through shared resources and intelligence.

Moreover, the importance of multilateral agreements in fostering regional cooperation cannot be overlooked. The ASEAN Declaration on the Conduct of Parties in the South China Sea serves as a framework for dialogue and cooperation among member states, promoting peace and stability in the region. By establishing common principles and guidelines, these agreements facilitate collaborative efforts to address maritime security challenges, thereby enhancing overall security in the Malacca Strait.

In addition to formal agreements, informal networks and partnerships among stakeholders also play a crucial role in regional cooperation. The establishment of platforms for dialogue, such as the ASEAN Maritime Forum, allows for the exchange of ideas and best practices among member states. These platforms encourage collaboration among government agencies, NGOs, and the private sector, fostering a holistic approach to maritime security that takes into account the diverse perspectives and expertise of various stakeholders.

As geopolitical dynamics evolve, the need for sustained regional cooperation becomes increasingly evident. The Malacca Strait is not only a vital trade route but also a focal point for geopolitical tensions. By fostering strong partnerships and collaborative frameworks, regional stakeholders can effectively address maritime security challenges while promoting stability and prosperity in the region.

### **Threats to Maritime Security**

#### *Illegal Fishing and Resource Exploitation*

Illegal fishing practices pose a significant threat to maritime security in the Malacca Strait, impacting both local economies and marine ecosystems. The Kementerian Kelautan dan Perikanan (2021) reports that illegal, unreported, and unregulated (IUU) fishing is rampant in Indonesian waters, with an estimated loss of billions of dollars annually due to these practices.

This loss not only undermines the livelihoods of local fishing communities but also jeopardises the sustainability of fish stocks in the region.

The impact of illegal fishing extends beyond economic losses; it also has detrimental effects on marine ecosystems. Overfishing and destructive fishing practices contribute to the degradation of marine habitats, threatening biodiversity and the health of the ocean. Greenpeace (2021) highlights the importance of community monitoring programs to combat illegal fishing, empowering local communities to report suspicious activities and engage in sustainable fishing practices. Such initiatives not only enhance marine security but also promote environmental stewardship among stakeholders.

Furthermore, illegal fishing often goes hand in hand with other criminal activities, such as human trafficking and drug smuggling, exacerbating security challenges in the region. The intertwining of these issues necessitates a comprehensive approach to maritime security that addresses the root causes of illegal fishing while promoting collaboration among stakeholders. By integrating efforts to combat IUU fishing with broader security initiatives, stakeholders can develop more effective strategies to protect marine resources and enhance overall maritime security.

The challenges posed by illegal fishing also highlight the need for stronger enforcement mechanisms and regional cooperation. Collaborative efforts among ASEAN countries to share intelligence and resources can significantly enhance the ability to combat illegal fishing in the Malacca Strait. By working together, stakeholders can develop more effective monitoring and enforcement strategies, ensuring the sustainability of marine resources for future generations.

In conclusion, addressing the threat of illegal fishing in the Malacca Strait requires a multifaceted approach that involves collaboration among various stakeholders, including government agencies, local communities, and NGOs. By fostering a culture of cooperation and sustainable practices, stakeholders can effectively combat illegal fishing and enhance maritime security in the region.

### *Piracy and Armed Robbery*

Piracy and armed robbery at sea remain significant threats to maritime security in the Malacca Strait, which has historically been a hotspot for such activities. The ReCAAP (2021) reports a concerning trend in piracy incidents, with a notable increase in armed robberies against vessels transiting the strait. These incidents not only endanger the safety of crews and cargo but also disrupt international trade, highlighting the urgent need for effective countermeasures.

Recent case studies underscore the challenges posed by piracy in the Malacca Strait. For instance, the hijacking of a tanker in 2020 serves as a stark reminder of the vulnerabilities faced by vessels operating in the region. The incident involved armed assailants boarding the ship, leading to the theft of cargo and posing significant risks to the crew's safety. Such incidents

## Opportunities and Threats to Develop an Integrated Model of Stakeholder Collaboration in an Effort to Improve Marine Security in the Malacca Strait

illustrate the need for enhanced security measures and collaboration among stakeholders to mitigate the risks associated with piracy.

The response to piracy in the Malacca Strait has evolved over the years, with stakeholders increasingly recognising the importance of joint efforts in combating this threat. Regional cooperation among ASEAN countries has led to the establishment of frameworks for information sharing and coordinated patrols, which have proven effective in deterring piracy incidents. However, challenges remain, particularly in addressing the root causes of piracy, such as poverty and lack of economic opportunities in coastal communities.

In addition to regional cooperation, the role of technology in combating piracy cannot be overlooked. The implementation of advanced surveillance systems and real-time monitoring technologies can enhance the ability of authorities to detect and respond to piracy incidents promptly. By leveraging technology, stakeholders can strengthen their maritime security capabilities and create a safer environment for vessels transiting the Malacca Strait.

In summary, the threat of piracy and armed robbery in the Malacca Strait necessitates a comprehensive approach that combines regional cooperation, technological advancements, and targeted interventions. By addressing the underlying causes of piracy and fostering collaboration among stakeholders, it is possible to enhance maritime security and ensure the safe passage of vessels in this critical maritime corridor.

### *Geopolitical Tensions.*

Geopolitical tensions significantly impact maritime security in the Malacca Strait, as various regional and global powers vie for influence in this strategically vital area. (Setiawan, 2023) examines the complex geopolitical dynamics that shape the security landscape in the Strait, highlighting the interplay between national interests, territorial disputes, and external influences. The presence of multiple claimants in the South China Sea, coupled with the strategic importance of the Malacca Strait, creates a volatile environment that poses challenges to maritime security.

The role of external powers in the region further complicates the security dynamics in the Malacca Strait. Buzan (1991) argues that the involvement of major powers, including the United States and China, has significant implications for regional stability. The strategic competition between these powers often manifests in military posturing and naval operations, raising tensions and increasing the risk of miscalculations that could lead to conflict. Such geopolitical dynamics necessitate a nuanced understanding of the security environment and the need for proactive measures to mitigate risks.

Moreover, the impact of geopolitical tensions extends beyond military considerations. Economic interests, such as trade routes and resource exploitation, also play a crucial role in shaping the security landscape in the Malacca Strait. As countries seek to secure their economic interests, competition for resources and control over maritime routes can exacerbate tensions and lead to confrontations at sea. This underscores the importance of fostering dialogue and cooperation among stakeholders to address shared concerns and promote stability in the region.

To navigate the complexities of geopolitical tensions, regional cooperation, and multilateral engagement is essential. Initiatives aimed at fostering dialogue among regional powers can help build trust and understanding, reducing the likelihood of conflicts that threaten maritime security. By promoting collaborative frameworks that address common challenges, stakeholders can work towards a more stable and secure maritime environment in the Malacca Strait.

In conclusion, the geopolitical dynamics affecting maritime security in the Malacca Strait require a comprehensive approach that considers the interests of various stakeholders. By fostering regional cooperation and dialogue, it is possible to mitigate the risks associated with geopolitical tensions and enhance overall maritime security in this critical naval corridor.

### **Integrated Model of Stakeholder Collaboration**

#### *Framework Development.*

The Malacca Strait, a vital maritime corridor linking the Indian and Pacific Oceans, is pivotal for global trade, with approximately 80,000 vessels transiting annually (UNCTAD, 2020). This strategic waterway, however, faces significant maritime security challenges, including piracy, smuggling, and illegal fishing. To address these issues effectively, an integrated model of stakeholder collaboration is essential. This model proposes a framework that includes government entities, private sector stakeholders, and non-governmental organisations (NGOs) working together to enhance marine security.

The development of this framework begins with a comprehensive assessment of existing maritime security policies and stakeholder roles within the region. (Alfiansyah et al., 2025) argues that a collaborative approach can lead to more effective governance and resource allocation, thereby improving overall security. The proposed model should facilitate information sharing, joint operations, and coordinated responses to maritime threats. By leveraging the strengths of each stakeholder group, the integrated model can create a more resilient maritime security environment.

For instance, the establishment of a regional maritime security centre could serve as a hub for intelligence sharing among stakeholders. This centre would not only consolidate data on maritime incidents but also provide a platform for joint training exercises and simulations. Such initiatives have been successfully implemented in other regions, demonstrating the efficacy of collaborative frameworks in enhancing maritime security (International Crisis Group, 2021).

Moreover, the framework should incorporate mechanisms for stakeholder engagement, ensuring that all voices are heard in the decision-making process. This inclusive approach can help build trust and foster a sense of ownership among stakeholders, which is crucial for the long-term sustainability of maritime security initiatives. The integration of local communities into the framework can also enhance surveillance and reporting of suspicious activities, thereby bolstering security efforts (Greenpeace, 2021).

## Opportunities and Threats to Develop an Integrated Model of Stakeholder Collaboration in an Effort to Improve Marine Security in the Malacca Strait

In summary, the development of an integrated model of stakeholder collaboration for the Malacca Strait requires a multifaceted approach that considers the unique challenges and opportunities within the region. By fostering cooperation among government, private sector, and civil society actors, the model aims to create a more secure maritime environment that benefits all stakeholders involved.

### *Key Components of the Model*

The proposed integrated model of stakeholder collaboration in the Malacca Strait hinges on several key components that are critical for its success. Firstly, the identification of key stakeholders is paramount. This includes government agencies responsible for maritime security, such as the Indonesian Ministry of Marine Affairs and Fisheries and the Malaysian Maritime Enforcement Agency, as well as private sector players like shipping companies and NGOs focused on marine conservation. (Utomo et al., 2025);(Lau, 2024).

Effective communication and cooperation mechanisms are the second essential component. Establishing clear lines of communication among stakeholders can facilitate timely information sharing and coordinated responses to maritime threats. For instance, the implementation of a digital platform that allows stakeholders to report incidents, share intelligence, and coordinate patrols can significantly enhance situational awareness in the Strait (Nofandi et al., 2022). This platform could also serve as a repository for best practices and lessons learned from past incidents, promoting continuous improvement in maritime security efforts.

Furthermore, the model must incorporate a framework for conflict resolution among stakeholders. Given the diverse interests and objectives of various stakeholders, conflicts may arise that could hinder collaborative efforts. Establishing a mediation mechanism can help address these conflicts constructively, ensuring that all parties remain committed to the overarching goal of enhancing maritime security. (West et al., 2025).

Training and capacity building represent another critical component of the integrated model. Stakeholder collaboration will be most effective when all parties possess the requisite skills and knowledge to engage meaningfully in security initiatives. Joint training exercises, workshops, and simulation drills can enhance the capabilities of stakeholders, ensuring they are well-prepared to respond to potential threats (Lloyd's List, 2021).

In conclusion, the key components of the integrated model of stakeholder collaboration in the Malacca Strait include the identification of stakeholders, effective communication mechanisms, conflict resolution frameworks, and capacity-building initiatives. By addressing these components, the model can create a robust foundation for enhancing maritime security in this vital waterway.

### *Implementation Strategies*

The successful implementation of the integrated model of stakeholder collaboration in the Malacca Strait requires a strategic approach that encompasses several key steps. First and

foremost, a comprehensive stakeholder mapping exercise should be conducted to identify all relevant parties and their respective roles in maritime security. This mapping should include government agencies, private sector entities, NGOs, and local communities, ensuring that no critical stakeholders are overlooked.

Once stakeholders have been identified, the next step involves establishing a formalised framework for collaboration. This could take the form of a memorandum of understanding (MoU) among stakeholders, outlining their commitments, roles, and responsibilities in enhancing maritime security. The MoU should also include provisions for regular meetings and updates to ensure ongoing engagement and collaboration (Andy, 2024).

Monitoring and evaluation are crucial components of the implementation strategy. A robust framework for assessing the effectiveness of the integrated model should be established, with clear indicators of success. Regular assessments can help identify areas for improvement and ensure that stakeholders remain accountable for their commitments. This framework should also incorporate feedback mechanisms that allow stakeholders to voice their concerns and suggestions for enhancing collaboration.

Additionally, the implementation strategy should include public awareness campaigns aimed at educating local communities about maritime security issues and the importance of their involvement. By fostering a culture of vigilance and responsibility among local populations, stakeholders can enhance surveillance and reporting of suspicious activities, thereby contributing to overall maritime security (Kementerian Kelautan dan Perikanan, 2021).

In summary, the implementation strategies for the integrated model of stakeholder collaboration in the Malacca Strait encompass stakeholder mapping, formalising collaboration frameworks, establishing monitoring and evaluation mechanisms, and engaging local communities in maritime security efforts. By following these steps, stakeholders can work together more effectively to address the pressing security challenges facing this critical maritime corridor.

## **Conclusion**

In conclusion, the analysis of opportunities and threats related to the development of an integrated model of stakeholder collaboration for improving marine security in the Malacca Strait reveals several key insights. The opportunities identified include the potential for enhanced information sharing, improved coordination among stakeholders, and increased community engagement in maritime security efforts. These factors can significantly contribute to a more secure maritime environment in the strait, benefiting all parties involved.

However, several threats also pose challenges to the successful implementation of the integrated model. These include potential conflicts of interest among stakeholders, varying levels of commitment and capacity, and the complexities of coordinating efforts across multiple jurisdictions. Addressing these threats will be critical to ensuring the long-term sustainability and effectiveness of collaborative initiatives in the region.

*Implications for Policy and Practice*

The findings of this study have important implications for policymakers and stakeholders involved in maritime security in the Malacca Strait. First, there is a need for greater emphasis on collaborative governance models that prioritise stakeholder engagement and inclusivity. Policymakers should facilitate platforms for dialogue and cooperation among stakeholders, ensuring that all voices are heard in the decision-making process.

Furthermore, investments in capacity building and training for stakeholders are essential to enhance their ability to contribute effectively to maritime security initiatives. This includes providing resources and support for joint training exercises and simulations, as well as fostering a culture of collaboration among stakeholders.

*Future Research Directions*

Finally, future research should explore the dynamics of stakeholder collaboration in maritime security more comprehensively. This includes investigating the impact of different governance structures on collaborative efforts and identifying best practices from other regions facing similar security challenges. Additionally, research should focus on the role of emerging technologies in enhancing communication and coordination among stakeholders, as well as their potential to improve situational awareness in the Malacca Strait.

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Opportunities and Threats to Develop an Integrated Model of Stakeholder Collaboration in an Effort to Improve Marine Security in the Malacca Strait

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