E-ISSN : 3063-4245
P-ISSN : 3063-5705

VOLUME 1 NOMOR 1, APRIL 2024

Journal of Maritime Policy Science

Published by:
Center for Maritime Policy and Governance Studies
Universitas Maritim Raja Ali Haji. Indonesia
Email: cmpgs@umrah.ac.id
Website :cmpgs.umrah.ac.id

Volume 1
Nomor 1
April, 2024
Journal of Maritime Policy Science

E-ISSN : 3063-4245
P-ISSN : 3063-5705

PREFACE

Journal of Maritime Policy Sciences, managed by the Center for Maritime Policy Governance Studies (CMPGS) Universitas Maritim Raja Ali Haji. Indonesia, serves as a vital platform for the dissemination of research and scholarly work in the field of maritime policy. This journal aims to foster a deeper understanding of maritime issues, promote innovative policy frameworks, and facilitate discussions that are crucial for the sustainable development of maritime resources. The journal invites contributions from researchers, policymakers, and practitioners interested in various aspects of maritime studies, including maritime governance, shipping regulations, marine environmental protection, maritime security, and the socio-economic impacts of maritime activities. Through its rigorous peer-review process, the journal ensures the publication of high-quality articles that contribute to the advancement of knowledge and best practices in maritime policy.

The first article Digital Transformation in the Maritime Industry; Opportunities and Challenges for Indonesia, The maritime industry is undergoing significant digital transformation, driven by technological advancements and changing global trends. The second article, The Role of Regional Government and Implementation of Environmental Management in Managing Tidal Floods in Bintan Regency, This study assesses the effectiveness of environmental management in mitigating floods in Bintan Regency, Indonesia. The third article, Application of the Public Private Partnership Concept in Airport Development in Bintan Regency to Improve the Economy of Coastal Areas,This paper explores the potential of public-private partnerships (PPPs) in developing airports in Bintan Regency, Indonesia. The fourth article, Enhancing Maritime Security: Challenges and Strategies in Indonesia's Natuna Sea, The Natuna Sea is a critical maritime route with significant economic and strategic importance. This paper identifies the challenges facing maritime security in the region, including piracy, terrorism, and environmental threats. The final article, Unraveling the Maintenance of Southeast Asia Maritime Security; A Look into the ASEAN Maritime Outlook, This study provides an overview of maritime security issues in Southeast Asia, highlighting the complexities and challenges faced by regional countries.

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Nomor 1
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Journal of Maritime Policy Science

E-ISSN : 3063-4245
P-ISSN : 3063-5705

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Nomor 1
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Journal of Maritime Policy Science

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P-ISSN : 3063-5705

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Nomor 1
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Digital Transformation in the Maritime Industry; Opportunities and Challenges for Indonesia

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https://doi.org/10.31629/jmps.v1i1.6872

Received: February 27, 2024 | Revised: March 20, 2024 | Accepted: April 28, 2024

ABSTRACT

Digital transformation is reshaping industries worldwide, including the maritime sector, by integrating advanced technologies to improve efficiency, safety, and sustainability. In the context of Indonesia, a country with a vast archipelago and significant maritime activities, digital transformation offers substantial opportunities but also presents distinct challenges. This paper explores the multifaceted impacts of digital transformation on Indonesia's maritime industry, examining both the opportunities and challenges that arise from this technological shift. Opportunities in the maritime sector include enhanced operational efficiency, improved safety, and better environmental management. Technologies such as the Internet of Things (IoT), big data analytics, artificial intelligence (AI), and blockchain are pivotal in optimizing logistics, predictive maintenance, and real-time monitoring of vessels and cargo. These advancements can lead to reduced operational costs, minimized human errors, and lower environmental footprints. For Indonesia, leveraging these technologies could significantly boost its competitiveness in global shipping, enhance port operations, and support the sustainable management of its extensive marine resources. However, the journey towards digital transformation in Indonesia’s maritime industry is fraught with challenges. Key issues include inadequate digital infrastructure, limited technological expertise, and regulatory hurdles. The uneven distribution of digital infrastructure across Indonesia's archipelago hampers the consistent application of advanced technologies. Additionally, the maritime workforce requires upskilling to handle new digital tools effectively, necessitating substantial investment in education and training. Regulatory frameworks also need to evolve to address data security, privacy concerns, and the integration of international standards, ensuring a seamless transition to digital operations.

Keyword: Digital Transformation, Maritime Industry, Opportunities

INTRODUCTION

The maritime industry is a cornerstone of global trade and economic activity, encompassing a wide range of sectors and operations related to the transportation of goods and passengers across the world's oceans and waterways (Mière, 2014). It plays a pivotal role in the international supply chain, facilitating the movement of approximately 90% of global trade by volume. This industry includes various segments such as shipping companies, port operators, shipbuilders, and maritime logistics providers (Yang et al., 2013). Shipping companies are responsible for the operation of fleets that transport cargoes such as raw materials, finished goods, and energy resources. Ports and terminals act as critical hubs where

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e-ISSN: 3063-4245 p-ISSN: 3063-5705
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goods are loaded, unloaded, stored, and transshipped, making them vital nodes in global logistics networks (Djalal, 2013).

In addition to cargo transport, the maritime industry also covers passenger services, including cruise lines and ferries, which contribute significantly to tourism and regional connectivity. The industry is characterized by a high degree of international collaboration and regulation, governed by organizations such as the International Maritime Organization (IMO), which sets global standards for safety, security, and environmental performance (Jousselme et al., 2021). Technological advancements and innovations, such as automated and smart ports, autonomous vessels, and digitalization, are increasingly shaping the industry's future, aiming to enhance efficiency, safety, and sustainability (Saha, 2016).

The maritime industry is undergoing a significant transformation with the advent of digital technologies. This paper examines the opportunities and challenges that digital transformation presents for the maritime industry in Indonesia. The urgency of addressing this issue stems from Indonesia's strategic position as the world's largest archipelagic state and its dependency on maritime transport for economic growth and development (Roe, 2013). The paper will explore the core issues of digital transformation in the maritime sector, analyze existing literature, and present original insights into the unique challenges and opportunities for Indonesia. This analysis is critical to ensure that Indonesia can leverage these technological advancements to enhance its maritime capabilities and maintain its competitive edge (Kurth et al., 2019; Roe, 2020).

Maritime industry is integral to global trade and the economy, with over 90% of the world's goods being transported by sea. Digital transformation in this sector promises increased efficiency, safety, and sustainability. However, it also presents significant challenges, especially for developing countries like Indonesia (Laksmana, 2022; Sivaramaganesh et al., 2014). The main issues addressed in this paper include the potential benefits of digital technologies for the maritime sector, the barriers to their adoption, and the specific challenges faced by Indonesia in implementing these technologies (Panayides, 2006; Shimoyama et al., 2013).

Indonesia's maritime industry is vital to its economy, given its extensive coastline and strategic location along major shipping routes. However, the sector faces numerous challenges, including outdated infrastructure, limited technological adoption, regulatory hurdles, and a shortage of skilled labor. By examining the digital transformation within this context, this paper positions itself within the broader discourse on maritime modernization and economic development. It builds on existing research by highlighting Indonesia's unique position and the specific hurdles it must overcome to benefit from digital advancements (Abdullah & Zaki Ahmad, 2019; Rusli, 2012).

Tabel 1. Outlining the impact of digital transformation technologies on the maritime industry

Technology	Description	Impact on Maritime Industry
Artificial Intelligence (AI)	Utilizes algorithms to perform tasks traditionally requiring human intelligence, such as route optimization and predictive maintenance.	Enhances operational efficiency, improves safety through predictive analytics.
Internet of Things (IoT)	Network of interconnected devices that collect and exchange data.	Enables real-time monitoring of vessel conditions, enhances fleet management.

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Technology	Description	Impact on Maritime Industry
Big Data Analytics	Analyzes large datasets to uncover patterns and insights, aiding in decision-making.	Optimizes logistics, improves fuel efficiency, enhances supply chain visibility.
Blockchain	Decentralized digital ledger technology ensuring transparency and security in transactions.	Streamlines documentation processes, enhances supply chain traceability.
Automation	Integration of robotics and automated systems to perform tasks with minimal human intervention.	Reduces labor costs, enhances operational efficiency in port operations and on vessels.

Source: Author, 2024

Digital transformation in the maritime industry refers to the fundamental shift driven by digital technologies across various facets of maritime operations and management. This transformation encompasses the integration of advanced technologies such as artificial intelligence (AI), the Internet of Things (IoT), big data analytics, blockchain, and automation into traditional maritime practices. These technologies are revolutionizing how shipping companies, ports, logistics providers, and related stakeholders operate, communicate, and manage resources.

At the heart of this transformation is the quest for increased efficiency, safety, sustainability, and competitiveness in an industry that forms the backbone of global trade. AI, for example, enables predictive maintenance of vessels and optimization of shipping routes, thereby reducing operational costs and downtime while enhancing safety. IoT devices are deployed to monitor vessel performance in real-time, track cargo conditions, and manage fleet logistics efficiently. Meanwhile, blockchain technology ensures transparent and secure transactions within maritime supply chains, preventing fraud and improving accountability. The urgency of digital transformation in the maritime sector is underscored by the industry's inherent complexities and challenges.

These include navigating through stringent regulatory frameworks, adapting to environmental sustainability goals, and addressing the rising demands for faster and more reliable supply chain operations. Indonesia, as a prominent maritime nation with a vast archipelago and a strategic position in global shipping routes, stands to benefit significantly from embracing digital transformation (Hammervoll et al., 2014; Wicaksana, 2017). The country's maritime industry, pivotal for its economic growth and development, faces both opportunities and challenges in adopting these technologies. While digitalization promises enhanced efficiency, reduced costs, and improved competitiveness, it also requires substantial investments in infrastructure, digital literacy among the workforce, and regulatory adaptations to ensure seamless integration.

The maritime industry is a critical component of Indonesia's economy, given the nation's status as the largest archipelago in the world with over 17,000 islands. This geographic expanse necessitates a robust and efficient maritime sector to ensure the seamless movement of goods and people, thereby driving economic growth and regional development (Kurnianingsih et al., 2022; Muhammad et al., 2021). The digital transformation of this sector represents a pivotal opportunity to enhance operational efficiencies, reduce costs, and improve safety and sustainability(Afriansyah et al., 2022; Octavian & Jatmiko, 2020). By integrating advanced technologies such as the Internet of Things (IoT), big data analytics, blockchain, and artificial intelligence, maritime operations can achieve unprecedented levels

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of automation, predictive maintenance, and real-time decision-making. This not only boosts competitiveness but also aligns with global trends towards smarter, more connected industries.

Furthermore, digital transformation in the maritime industry can address several challenges that Indonesia currently faces. These include outdated infrastructure, regulatory inefficiencies, and security concerns. For instance, blockchain technology can streamline and secure shipping documentation processes, reducing the risk of fraud and enhancing transparency. Similarly, IoT-enabled sensors and big data analytics can provide predictive insights to prevent equipment failures and optimize maintenance schedules, thus minimizing downtime and operational disruptions. Moreover, digital platforms can facilitate better coordination between various stakeholders, including port authorities, shipping companies, and logistics providers, leading to more synchronized and efficient supply chain operations (Dwicahyono et al., 2021; Tran et al., 2018).

However, the transition to a digitally-driven maritime sector is not without its challenges. Significant investment in technology and infrastructure is required, alongside a concerted effort to upskill the workforce to handle new digital tools and systems. Regulatory frameworks need to be updated to accommodate technological advancements and ensure cybersecurity measures are robust enough to protect against emerging threats. Additionally, there is a need for international collaboration and standardization to ensure interoperability and seamless integration across global supply chains

METHODOLOGY

The methodology employed in this paper involves a qualitative analysis of secondary data, including academic articles, industry reports, and government publications (Bogdan & Taylor, 1975; Johnston, 2014). This approach allows for an in-depth understanding of the current state of digital transformation in the maritime industry and the specific challenges faced by Indonesia. The analysis is structured around three key areas: technological advancements, regulatory frameworks, and human capital. By examining these areas, the paper aims to provide a holistic view of the digital transformation process and its implications for the maritime sector in Indonesia.

This paper employs a qualitative analysis of secondary data sources to investigate the digital transformation in the maritime industry, focusing particularly on Indonesia. Structuring the analysis around these dimensions, the paper aims to offer a thorough perspective on the current landscape of digital transformation and its implications for Indonesia's maritime industry. This approach allows for a nuanced exploration of challenges, opportunities, and strategic recommendations to foster digital advancement in maritime operations.

RESULTS AND DISCUSSION

The digital transformation of the maritime industry in Indonesia represents a crucial evolution, addressing the pressing need for modernization in a sector characterized by traditional practices and limited technological integration. The global maritime industry is highly competitive, and Indonesia, with its strategic geographic location and extensive coastline, is uniquely positioned to leverage technological advancements to enhance its maritime operations. This comprehensive analysis explores the contextual background, the inputs driving transformation, the processes involved, the expected outputs, and the continuous feedback mechanisms necessary.

1. General Conditions of Digital Transformation in the Maritime Industry in Indonesia

Digital transformation in the maritime industry in Indonesia presents a unique set of challenges and opportunities influenced by the nation's geographic, economic, and regulatory

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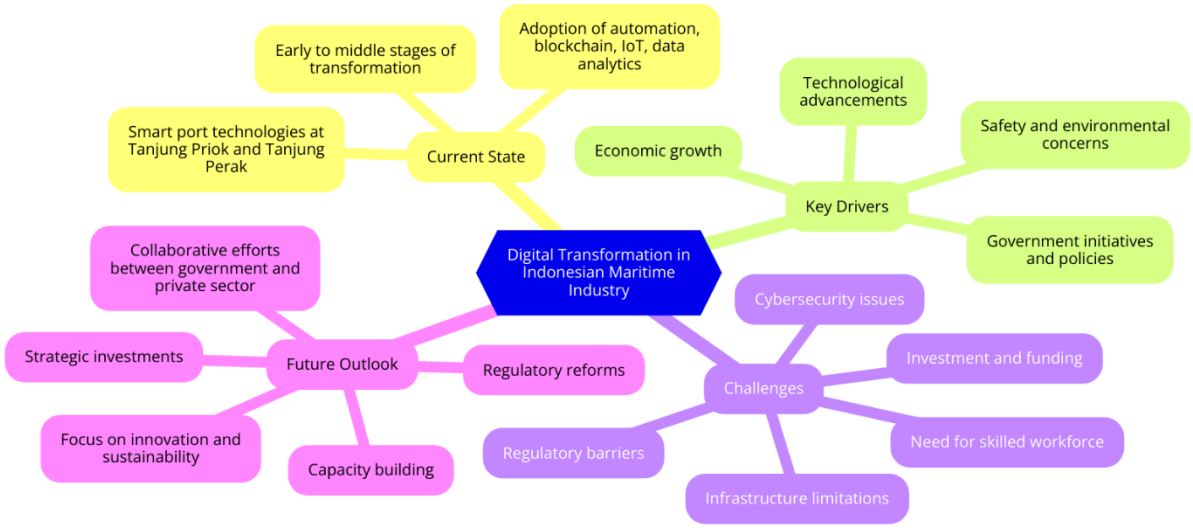
landscape. As the largest archipelagic country in the world, Indonesia's maritime industry plays a critical role in its economy, supporting trade, transportation, and national security. The drive towards digital transformation is motivated by the need to enhance operational efficiency, ensure safety, and maintain competitiveness in a rapidly evolving global maritime sector. This essay will explore the general conditions of digital transformation in Indonesia's maritime industry, focusing on the current state, key drivers, challenges, and the future outlook.

Indonesia's maritime industry is in the early to middle stages of digital transformation. While there have been significant strides in adopting digital technologies, many areas still rely heavily on traditional methods. Ports, shipping companies, and other maritime stakeholders have begun implementing technologies such as automation, blockchain, Internet of Things (IoT), and data analytics to streamline operations, reduce costs, and enhance safety. For instance, major ports like Tanjung Priok in Jakarta and Tanjung Perak in Surabaya are investing in smart port technologies to improve efficiency and cargo handling capabilities.

Figure 1. Mindmap general conditions of digital transformation in the maritime industry in Indonesia



Source: Author, 2024

The Indonesian government has also played a pivotal role in driving digital transformation through various initiatives and policies. The Ministry of Transportation has launched the Indonesia National Single Window (INSW) system to facilitate smoother and faster customs processes. Additionally, the Indonesian Sea Toll Road program aims to enhance connectivity between islands, supported by digital solutions to optimize logistics and supply chain management. Digital transformation in Indonesia's maritime industry is an ongoing process characterized by significant opportunities and considerable challenges.

The current state of digital adoption reflects a mix of advanced initiatives and areas needing improvement. Key drivers such as economic growth, government initiatives, technological advancements, safety concerns, and environmental sustainability underscore the importance of digitalization. However, challenges related to infrastructure, skilled workforce, regulatory barriers, investment, and cybersecurity must be addressed to realize the full potential of digital transformation. The future of Indonesia's maritime industry hinges on collaborative efforts between the government and private sector, strategic investments, regulatory reforms, capacity building, and a focus on innovation and sustainability. By

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embracing these strategies, Indonesia can enhance its maritime operations, bolster economic growth, and secure a competitive edge in the global maritime industry.

2. Thingking Framework Digital Transformation In The Maritime Industry In Indonesia

a. Context: Current State and Need for Transformation

The maritime industry in Indonesia has historically relied on conventional methods, with limited adoption of modern technology. This has resulted in inefficiencies, higher operational costs, and reduced competitiveness on the global stage. The industry's reliance on outdated systems has also made it challenging to meet the stringent safety and environmental standards increasingly demanded by international regulatory bodies. The need for transformation is further underscored by the rapid technological advancements occurring globally, which offer unprecedented opportunities for enhancing operational efficiency, safety, and overall productivity.

Digital transformation is not merely an option but a necessity for Indonesia to maintain and enhance its position in the global maritime industry. The adoption of advanced technologies can streamline operations, reduce costs, and improve service delivery, thereby attracting more business and fostering economic growth. The transformation journey begins with understanding the current state of the industry and recognizing the need for change, which is driven by the desire to remain competitive, meet regulatory requirements, and harness the potential of digital technologies.

b. Inputs: Technological Innovations and Stakeholder Perspectives

The digital transformation of the maritime industry is fueled by several key technological innovations. These include the Internet of Things (IoT), Big Data and Analytics, Blockchain, and Artificial Intelligence (AI). IoT enables real-time monitoring and control of maritime operations, improving efficiency and safety. Sensors placed on ships and port infrastructure can collect data on various parameters, such as equipment performance, fuel consumption, and environmental conditions. This data can be analyzed to optimize operations, predict maintenance needs, and enhance decision-making processes.

Big Data and Analytics play a critical role in extracting actionable insights from the vast amounts of data generated by maritime activities. By analyzing historical and real-time data, maritime companies can identify patterns, trends, and anomalies, leading to improved operational efficiency, reduced downtime, and enhanced safety. Predictive analytics can also be used to forecast demand, optimize routes, and manage inventory more effectively. Blockchain technology offers a secure and transparent way to manage transactions and track assets in the maritime industry. It can be used to streamline processes such as cargo tracking, documentation, and payments, reducing the risk of fraud and errors. Blockchain can also enhance supply chain visibility, enabling better coordination and collaboration among stakeholders.

AI can be leveraged to automate various tasks, such as navigation, cargo handling, and administrative processes. AI-powered systems can analyze data, recognize patterns, and make decisions in real time, improving efficiency and reducing human error. Additionally, AI can be used for predictive maintenance, identifying potential issues before they become critical, thereby reducing downtime and repair costs. Stakeholder perspectives are crucial in driving digital transformation. Government policies and regulations play a significant role in creating an enabling environment for technological adoption. Industry leaders and maritime workers provide valuable insights into the practical challenges and opportunities associated with implementing new technologies. Technology providers offer the tools and expertise needed to integrate and manage these innovations effectively.

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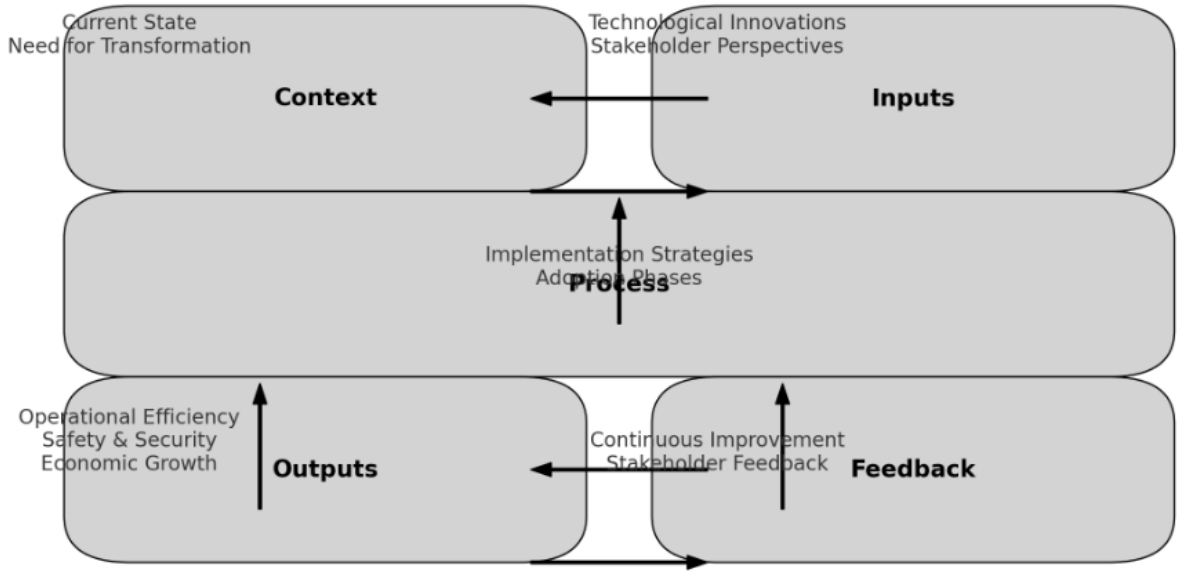
c. Process: Implementation Strategies and Adoption Phases

Digital transformation is a multifaceted process that necessitates strategic planning and phased implementation to be effective. A key strategy for implementation is ensuring policy and regulatory support from the government. This involves creating and enforcing policies that encourage technological innovation and provide incentives for adopting digital technologies. Updating regulations to accommodate new technologies, ensuring cybersecurity, and promoting data sharing and collaboration among stakeholders are essential components of this strategy. Another critical aspect is investing in infrastructure. Significant investments are needed to modernize maritime infrastructure, including upgrading port facilities, deploying IoT sensors, and implementing advanced data analytics platforms. The integration of blockchain and AI systems is also vital.

Figure 1. Thingking Framework Digital Transformation in the Maritime Industry in Indonesia



Source: Analysis Author, 2024

Public-private partnerships can be instrumental in mobilizing the necessary resources for these upgrades. Additionally, training and capacity building are crucial. The workforce must be trained to operate and maintain new technologies, which requires the development of training programs and educational initiatives focused on digital literacy, data analysis, and technical proficiency. Continuous learning and professional development are essential to stay updated with technological advancements.

The adoption of digital transformation can be broken down into several phases. The first phase involves an initial assessment of the current state of the industry. This assessment helps identify gaps, understand the specific needs of various stakeholders, and set clear objectives for digital transformation. Following this, pilot projects are implemented. These projects allow for the testing of new technologies and processes on a smaller scale, helping to identify potential challenges, refine strategies, and demonstrate the benefits of digital transformation. Successful pilot projects can then serve as models for broader implementation. The final phase is full-scale implementation, which involves deploying technologies across the entire maritime infrastructure, integrating systems, and ensuring interoperability. Continuous monitoring and evaluation are necessary to ensure that the digital transformation achieves the desired outcomes.

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d. Outputs: Enhanced Operational Efficiency, Safety, and Economic Growth

The digital transformation of the maritime industry is set to bring about substantial benefits across several key areas. One major advantage is enhanced operational efficiency. Automated processes, such as automated cargo handling, navigation, and administrative tasks, reduce the need for manual intervention, minimizing errors and accelerating operations. Furthermore, real-time data monitoring, enabled by IoT sensors and data analytics, allows for continuous oversight of equipment, environmental conditions, and operational performance. This facilitates proactive decision-making and swift responses to arising issues. Additionally, predictive maintenance, which leverages data from IoT sensors, can foresee potential equipment failures, allowing for timely maintenance and thus minimizing downtime.

Another critical benefit is improved safety and security. Advanced tracking systems using GPS and IoT technologies enable precise tracking of ships and cargo, enhancing situational awareness and improving safety. This capability is crucial for preventing accidents and ensuring rapid response during emergencies. Moreover, as the industry increasingly relies on digital systems, implementing robust cybersecurity measures becomes essential to protect sensitive data and maintain the integrity of maritime operations.

Economic growth is also a significant benefit of digital transformation in the maritime industry. By streamlining operations, reducing costs, and improving efficiency, digital technologies can increase productivity, making the industry more attractive and competitive. This, in turn, can draw in more business and bolster the industry's overall economic impact. Additionally, digital transformation fosters the emergence of new business models. For instance, blockchain technology can revolutionize the management and financing of maritime logistics, while artificial intelligence can support the development of autonomous ships and smart ports, further driving innovation and growth within the sector.

e. Feedback: Continuous Improvement and Stakeholder Feedback

The process of digital transformation is an ongoing journey that necessitates continuous improvement and adaptation. Regular performance evaluations and stakeholder feedback are crucial for identifying areas needing enhancement and ensuring that the transformation aligns with industry needs and technological advancements. Continuous improvement involves several key aspects. Firstly, regular performance evaluations, including assessments of operational performance, efficiency, and safety, are essential. These evaluations typically involve data analysis, audits, and benchmarking against industry standards to pinpoint areas for further enhancement.

Secondly, adaptation to new technologies is vital. The maritime industry must remain flexible and continuously integrate emerging technologies, necessitating ongoing investment in research and development and a willingness to experiment and innovate. Finally, stakeholder feedback is invaluable. Engaging with a broad range of stakeholders, such as government bodies, industry leaders, maritime workers, and technology providers, offers critical insights into the effectiveness of digital transformation initiatives. This feedback helps identify challenges, highlight successes, and inform future strategies.

CONCLUSION

The digital transformation of Indonesia's maritime industry is an imperative, driven by the necessity to modernize and remain competitive in a global landscape that is increasingly technology-driven. The current state of the industry, characterized by a reliance on traditional methods and limited technological integration, underscores the urgent need for change. By adopting advanced technologies such as the Internet of Things (IoT), Big Data and Analytics, Blockchain, and Artificial Intelligence (AI), Indonesia can enhance operational efficiency, safety, and service delivery. This transformation is essential not only to meet international

safety and environmental standards but also to capitalize on the economic opportunities presented by Indonesia's strategic geographic position. The journey towards digital transformation in Indonesia's maritime sector involves a comprehensive framework that begins with recognizing the need for change and understanding the current state of the industry. Technological innovations, supported by robust government policies and active stakeholder engagement, are key inputs driving this transformation. Strategic implementation through public-private partnerships, significant investment in modern infrastructure, and extensive training and capacity building are crucial for a successful transition. The phased adoption of these technologies, starting with pilot projects and culminating in full-scale implementation, ensures that the transformation is well-managed and effective.

The expected outputs of this digital transformation are multifaceted, encompassing enhanced operational efficiency, improved safety and security, and significant economic growth. Automated processes and real-time data monitoring will streamline operations, reduce costs, and enable proactive decision-making. Advanced tracking systems and robust cybersecurity measures will enhance safety and security, while the overall modernization of the maritime industry will boost productivity and competitiveness, attracting more business and fostering economic development. Continuous improvement and stakeholder feedback will ensure that the transformation remains aligned with technological advancements and industry needs, securing Indonesia's position as a key player in the global maritime industry.

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Journal of Maritime Policy Science
e-ISSN: 3063-4245 p-ISSN: 3063-5705
VOL 1 NO 1 APRIL 2024
https://ojs.umrah.ac.id/index.php/jmps

The Role of Local Government and Environmental Management in Managing Tidal Floods in Bintan Regency

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https://doi.org/10.31629/jmps.v1i1.6873

Received: February 10, 2024 | Revised: March 07, 2024 | Accepted: April 29, 2024

ABSTRACT

Indonesia is highly vulnerable to natural disasters, with tidal floods being a significant concern in Bintan Regency due to its exposure to sea tides and extreme weather events. The local government's role and environmental management strategies are crucial in mitigating these risks. This research seeks to evaluate these aspects by focusing on the measures implemented by Bintan Regency to manage tidal floods. The study employs a qualitative approach, relying on literature reviews to collect data from various sources such as scientific journals, books, research reports, and other relevant documents. This method provides a comprehensive understanding of the current practices and effectiveness of flood management and environmental management strategies in Bintan Regency. The research findings indicate that the Bintan Regency local government has undertaken significant initiatives to reduce tidal flood risks. These initiatives include spatial planning that integrates disaster risk considerations, the development of flood management infrastructure, and community education programs aimed at increasing preparedness. The effective implementation of environmental management practices, including the use of advanced technology for monitoring and evaluation, has been instrumental in these efforts. The local government's approach reflects a proactive stance in addressing the challenges posed by tidal floods, emphasizing both preventative measures and responsive strategies. The study concludes that a holistic and sustainable approach is essential for effective tidal flood management. The integration of comprehensive spatial planning, infrastructure development, community engagement, and modern technology forms a robust framework for disaster mitigation.

Keyword: Role, Local Government, Tidal Floods, Disaster Mitigation

INTRODUCTION

Natural disasters include natural phenomena such as earthquakes, tsunamis, volcanic eruptions, floods, landslides, droughts, and storms. As an archipelagic country in the Pacific ring of fire, Indonesia is very vulnerable to various natural disasters. Due to its location between three large tectonic plates: the Eurasian Plate, the Indo-Australian Plate, and the Pacific Plate, Indonesia frequently experiences earthquakes and volcanic eruptions (Kirschenbaum, 2004; Wang et al., 2020). Apart from that, the tropical climate and diverse geographical conditions also make Indonesia vulnerable to floods, landslides and droughts (Aldunce et al., 2021; Rus et al., 2018). According to the National Disaster Management Agency, disaster management includes prevention and reconstruction before, during and after a disaster because disasters often affect communities (Mahadiansar et al., 2023; Setiawan & Mahadiansar, 2020).

Journal of Maritime Policy Science
e-ISSN: 3063-4245 p-ISSN: 3063-5705
VOL 1 NO 1 APRIL 2024
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Disasters can generally be divided into three main phases: pre-disaster, when the disaster occurs, and post-disaster. All three are included in joint disaster management efforts.

Disaster mitigation is a series of efforts made to reduce or minimize the negative impacts caused by natural disasters. This mitigation includes coordinated and systematic preventive, preparation and response measures. In the Indonesian context, disaster mitigation is very crucial considering the high frequency and intensity of disasters (Weichselgartner, 2001). Disaster mitigation efforts can be divided into two main categories, structural and non-structural. Structural mitigation involves building infrastructure that is resilient to disasters, such as building embankments to prevent flooding, earthquake-resistant houses, and early warning systems for tsunamis (Dartanto, 2022; Fuady et al., 2021). Meanwhile, non-structural mitigation includes educating the public about disaster preparedness, developing policies and regulations that support disaster risk reduction, as well as strengthening the capacity of institutions and communities in dealing with disasters (Boudreaux et al., 2023; Ishiwatari et al., 2020).

The Indonesian government has developed various policies and programs to increase disaster mitigation capacity. The National Disaster Management Agency (BNPB) was established as the institution responsible for coordinating disaster management at the national level. In addition, programs such as Disaster Resilient Villages and Disaster Safe Schools aim to increase the preparedness and resilience of local communities to disasters. The importance of disaster mitigation is also recognized in various international frameworks such as the Sendai Framework for Disaster Risk Reduction 2015-2030, which emphasizes the importance of reducing disaster risk through a holistic and inclusive approach. In disaster mitigation efforts, this framework underlines that government, the private sector and civil society must work together (Kusumastuti et al., 2014; Zamroni et al., 2020).

This collaboration relies largely on social network management, which helps stakeholders communicate with each other (Kapucu et al., 2010; Raschky, 2008) With effective mitigation efforts, it is hoped that the negative impacts of natural disasters can be minimized, so that communities can be better prepared and resilient in facing various disaster threats. This effort not only requires an active role from the government and related institutions, but also participation and awareness from all levels of society. Disaster preparedness education and training is key in building a community that is resilient and responsive to natural disasters (Kusumasari & Alam, 2012; Yulianto et al., 2021).

In order to achieve optimal disaster mitigation, an integrated and sustainable approach is needed, involving various stakeholders, and supported by accurate data and research. Only in this way can people live more safely and be protected from the threat of natural disasters that continue to lurk. Natural disasters not only cause immediate impacts such as physical damage and loss of life, but also long-term impacts such as economic disruption, loss of livelihood and psychological disorders for victims. Therefore, it is important to understand the characteristics and causes of natural disasters as a first step in disaster mitigation efforts (Liu et al., 2021; Oktari et al., 2020).

Bintan Regency, as one of the island regions in the Riau Islands Province, often faces significant challenges related to the tidal flood phenomenon. Tidal floods, which are caused by a combination of sea tides and extreme weather conditions, often cause damage to infrastructure, disruption of economic activities, and have an impact on community welfare. This phenomenon is not only a seasonal threat but also shows the urgency for comprehensive and sustainable treatment (Coppola, 2015; Toya & Skidmore, 2007). The impact of tidal floods is very significant, both from a social and economic perspective.

Socially, tidal floods cause major disruption to people's daily lives, ranging from disruption of household activities to disruption of public services such as education and health. From an economic perspective, tidal floods cause major losses, especially in key sectors such

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e-ISSN: 3063-4245 p-ISSN: 3063-5705
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as fisheries, tourism and trade. Vital infrastructure such as roads, bridges and other public facilities often suffer damage which requires large costs to repair and restore. The height of the tidal flood is the same as the height of the sea tide, and this flood will recede when the sea water recedes. Sea level height can change according to changes in tides. In this way, we can estimate how large an area will be inundated by tidal floods at a certain time.

Table 1. Total Regional Height Above Sea Level According to District in Bintan Regency

No.	District	Height Above Sea Level (masl)
1	Teluk Bintan	10
2	North Bintan	20
3	Teluk Sebong	20
4	Seri Kuala Lobam	5
5	East Bintan	25
6	Gunung Kijang	3
7	Mantang	4
8	Coastal Bintan	30
9	Toapaya	25
10	Tambelan	3

Source: Bintan Regency in Figures 2022

The height of areas in Bintan Regency varies, with a maximum height of 30 meters above sea level (masl) and a minimum of 3 meters above sea level. This variation affects the region's vulnerability to tidal floods, where areas with lower elevations are more vulnerable to the impact. Districts with a height below 10 meters above sea level such as Gunung Kijang, Seri Kuala Lobam, Mantang, and Tambelan are the most vulnerable to tidal floods. Mitigation efforts such as raising embankments, better drainage systems, and evacuation measures should be prioritized in these areas.

Districts with altitudes between 10 meters above sea level and 20 meters above sea level such as Bintan Bay, North Bintan and Sebong Bay have a moderate risk. Although the risk is not as high as in low-altitude areas, preventive measures are still necessary. Districts with a height of 25 meters above sea level such as East Bintan, Pesisir Bintan and Toapaya are relatively safer from tidal floods. However, monitoring and management efforts remain essential to ensure safety. Low-altitude areas in Bintan Regency are very vulnerable to tidal floods and require special attention in terms of mitigation and infrastructure. The height of the area is an important factor in determining disaster management priorities, where lower areas require more immediate and intensive action.

Tidal floods in Bintan Regency not only threaten infrastructure and property, but also disrupt the daily lives of local residents. The impact includes damage to roads, houses, public facilities, to agricultural land and ponds. Apart from that, tidal floods also have the potential to cause health problems due to polluted water and spread disease. Therefore, tidal flood management is a very important issue for local governments to ensure the safety and welfare of the community. Local governments have a very important role in managing natural disasters such as tidal floods. This role includes formulating policies, implementing mitigation programs, and coordinating with various parties to improve disaster preparedness and response. These efforts require a holistic approach, involving good spatial planning, building flood defense infrastructure, and educating the public regarding preventive and adaptation measures.

According to the 2018 Indonesian Disaster Risk Index calculations, disaster threats in Bintan Regency include (1) floods, (2) extreme waves and abrasion, (3) extreme weather, (4) drought, (5) epidemics and disease outbreaks, and (6)) forest and land fires. Bintan Regency's

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e-ISSN: 3063-4245 p-ISSN: 3063-5705
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IRBI score is 132.40, which is in the medium risk category, and the highest among the six districts/provinces. Tornadoes, forest and plantation fires, drought during the dry season, floods during the rainy season, and tidal waves are some of the disasters that can occur in Bintan Regency. However, Regional Regulation Number 1 of 2020 concerning Bintan Regency Regional Spatial Planning (RTRW) 2020–2040, Article 27 states that disaster-prone areas, namely areas prone to tidal waves, tornadoes and abrasion, have a low level of vulnerability and impact. (Harsoyo, 2022)

Implementing effective environmental management is one of the main strategies in managing tidal floods. Ecosystem-based approaches, such as mangrove conservation and rehabilitation, as well as the use of environmentally friendly technology, such as environmentally sound drainage systems, are some of the steps that can be taken to reduce the impact of tidal floods. This research aims to examine the role of local government and the implementation of environmental management in managing tidal floods in Bintan Regency.

METHODOLOGY

This research adopts a qualitative approach, specifically utilizing a literature study method to gather and analyze data (Creswell & Creswell, 2018). The data for this study were meticulously collected from a wide array of relevant literature sources. These sources encompass scientific journals, books, research reports, and other pertinent documents, as outlined (Moleong, 2012). Additionally, the research involves a thorough analysis of various policy and program documents that are relevant to the subject matter. The primary objective of this data collection and analysis is to gain a comprehensive understanding of the role that local governments play in the management of tidal floods, as well as to evaluate the implementation of environmental management strategies in this context.

The data analysis was conducted in a descriptive manner, aiming to elucidate the intricate dynamics and the effectiveness of local government interventions in managing tidal floods. Through this descriptive analysis, the study seeks to identify key factors and best practices that can enhance the capacity of local governments in this critical area of environmental management (Robins et al., 2011). Ultimately, the findings of this research are intended to culminate in the formulation of policy recommendations. These recommendations are expected to be of practical use to local governments and other stakeholders, providing them with actionable insights and strategies to improve their capacity for managing tidal floods more effectively. By contributing to the body of knowledge in this field, the research aims to support the development of more robust and resilient environmental management frameworks that can better address the challenges posed by tidal floods.

RESULTS AND DISCUSSION

The coastal areas of Bintan Regency have been significantly impacted by tidal flooding, affecting numerous communities across various districts. In Bintan Utara, the town of Tanjunguban Kota has experienced the highest impact, with 359 households affected. Additionally, Tanjung Uban Selatan and Tanjung Uban Utara each have three affected households. Moving to Mantang, the villages of Mantang Besar, Mantang Baru, Mantang Lama, and Dendun have seen 75, 23, 91, and 79 households affected, respectively. In Bintan Pesisir, the villages of Numbing, Air Gelubi, Kelong, and Mapur have 53, 59, 49, and 3 households affected, respectively.

Further impacts are noted in Sri Kuala Lobam, where Teluk Sasah, Busung, Kuala Sempang, Tanjung Permai, and Teluk Lobam have 30, 47, 28, 1, and 8 households affected, respectively. In Teluk Bintan, the villages of Penaga, Tembeling, Pengujan, Pangkil, and Bintan Buyu have seen 55, 101, 72, 2, and 69 households affected, respectively. Teluk Sebong has

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also experienced flooding, with the villages of Pengudang, Sri Bintan, Ekang Anculai, and Kota Baru reporting 5, 26, 17, and 13 affected households, respectively.

In Gunung Kijang, the villages of Malang Rapat and Kawal have 19 and 28 households affected, respectively. The district of Tambelan has reported minimal impact, with the villages of Batu Lepuk and Kampung Melayu each having one household affected. Lastly, in Bintan Timur, the areas of Kijang Kota, Sei Enam, Sei Lekop, and Gunung Lengkuas have seen 199, 32, 98, and 4 households affected, respectively. These figures highlight the widespread impact of tidal flooding across the coastal regions of Bintan, as reported by the Bintan Regency Regional Disaster Management Agency in 2023.

Tidal floods have had a significant impact on certain areas in Bintan Regency, with North Bintan, East Bintan and Teluk Bintan Districts being the most affected areas. The total number of heads of families (KK) affected in all sub-districts reached 1653 families. North Bintan is the most affected area, with the largest number of affected families, namely 365 families. Of this number, the majority are in Tanjunguban Kota Subdistrict (359 families), indicating that this area requires special attention in tidal flood mitigation. East Bintan has the second largest number of affected families with 333 families, especially in Kijang Kota sub-district (199 families). Data shows that Kijang City also requires immediate flood management measures. Teluk Bintan is in third position with 299 families affected.

Tembeling sub-district is the most affected area in this sub-district with 101 families. Mantang has 268 affected families, with the largest number in Mantang Lama (91 families) and Dendun (79 families) sub-districts. Bintan Pesisir recorded 164 families affected, with Air Gelubi Village as the most affected area (59 families). Sri Kuala Lobam was affected with 114 families, with Busung (47 families) as the sub-district that needed assistance the most. Sebong Bay recorded 61 families affected, with Sri Bintan (26 families) being the highest. Tambelan is the sub-district with the least impact, only 2 families were affected in Batu Lepuk and Kampung Melayu, 1 family each.

Based on the data, mitigation and assistance efforts must be focused first on the Districts of North Bintan, East Bintan and Teluk Bintan. Further mapping is needed to understand the topographic details and infrastructure conditions that make these areas more vulnerable to tidal flooding. The role of regional government in managing tidal floods is very crucial considering that regional government has direct authority and responsibility for the development and welfare of local communities. In Bintan Regency, the local government has taken various steps to overcome the problem of tidal flooding, both through preventive and responsive efforts.

1. Tidal Flood Management Strategies in Bintan Regency

a. Planning and Policy

The Bintan Regency Government has prepared various plans and policies that focus on reducing the risk of tidal floods. The Bintan Regency Regional Spatial Planning (RTRW) includes land use arrangements that take into account the risk of tidal flooding, including zones where no development is permitted. Apart from that, local policies that support sustainable development and environmental management have also been implemented to minimize the impact of tidal floods. The Bintan Regency Regional Spatial Planning Plan (RTRW) is the main instrument in regulating land use that takes into account the risk of tidal floods. This RTRW not only regulates physical development such as housing and infrastructure, but also determines certain zones where development cannot be carried out due to the high potential risk of disaster. This approach ensures that regional development is carried out by considering aspects of environmental security and sustainability.

Apart from RTRW, the Bintan Regency government also implements local policies that support sustainable development. This policy not only aims for sustainable economic growth,

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but also takes into account environmental impacts including the potential risk of tidal floods. These steps include integrated water management, preserving natural vegetation, and developing green infrastructure to absorb rainwater. Thus, tidal flood risk mitigation efforts are integrated into the long-term development strategy of Bintan Regency.

Environmental management is also an important focus in Bintan Regency government policy. These efforts include controlling land use, monitoring water and soil quality, and increasing awareness of the importance of environmental conservation. This policy not only aims to protect the environment in general, but also to reduce vulnerability to tidal floods by minimizing natural changes that could worsen the situation. The Bintan Regency RTRW has regulated land use by considering the risk of tidal floods. Areas that are prone to tidal flooding, such as North Bintan and East Bintan, which have a high number of affected families, must be included in conservation zones or zones where development is restricted. Areas such as Bintan Pesisir and Gunung Kijang sub-districts, which are at low elevations, were identified as conservation zones to reduce the risk of tidal flooding. This approach helps reduce development in flood-prone areas and maintains ecosystem balance.

Implementation of green infrastructure in affected areas, such as the construction of city parks, water catchment areas and natural vegetation, helps absorb rainwater and reduce waterlogging. For example, in East Bintan, which has a number of families significantly affected. Local policies that support integrated water management ensure that the drainage system is able to accommodate and convey water efficiently. Areas such as Tanjunguban City in North Bintan can benefit from improvements and maintenance of good drainage systems.

Determining no-building zones and monitoring land use in flood-prone areas such as Sri Kuala Lobam, which is at a low altitude (5 meters above sea level), helps reduce the risk of tidal floods. The Bintan Regency Government carries out regular monitoring of water and soil quality to ensure that the environment is maintained. This is important for areas with a high number of affected families such as Tanjunguban City in North Bintan. Local policies that support sustainable development and environmental management are also implemented, including the development of green infrastructure and integrated water management. It is hoped that this effort can reduce the impact of tidal floods, especially in areas with a high number of affected families. The success of this policy is highly dependent on proper implementation and cooperation of all relevant parties, including government, society and the private sector

b. Infrastructure development

One of the structural efforts undertaken is the construction and improvement of flood prevention infrastructure. A better drainage system can reduce the risk of tidal floods. Maintenance of the drainage system is carried out regularly to ensure smooth water flow. Improving the drainage system is also the main focus in dealing with tidal floods. A good and regular drainage system ensures that rainwater and tidal water that enters land can be channeled quickly and efficiently to the sea or nearby rivers. The local government has repaired and built new drainage channels in various areas prone to tidal flooding, to reduce waterlogging and speed up the flow of water out. Routine maintenance of the drainage system is also an important step in dealing with tidal floods. Maintenance includes cleaning drainage channels, repairing damage, and regular inspections to ensure that the drainage system is functioning properly.

c. Community Education and Preparedness

Regional governments also play a role in increasing community awareness and preparedness for tidal floods. Educational programs through outreach and disaster preparedness training are often held to provide understanding to the public about the actions

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that must be taken when a tidal flood occurs. The formation of disaster resilient communities in various villages also aims to increase active community participation in flood management. Local governments often hold education and outreach programs about tidal floods as an effort to increase public awareness. This program includes education about the causes of tidal floods, danger signs, and steps that must be taken to reduce the risk and deal with tidal floods. Through intensive outreach, the regional government hopes to create a better understanding among the community of the urgency and importance of disaster preparedness.

In general, people take attitudes that are appropriate to the problems occurring in their environment when facing changes in environmental conditions. This attitude is closely related to how society views disasters. Apart from outreach, disaster preparedness training is also an integral part of local government strategies in dealing with tidal floods. This training not only teaches practical skills such as emergency evacuation and first aid, but also forms a prepared mentality and attitude among the community. By increasing skills and knowledge about appropriate actions when a disaster occurs, it is hoped that the community can be better prepared to face emergency situations and reduce the negative impacts that may occur.

The formation of disaster resilient communities in various villages is a long-term regional government strategy in building local resilience to tidal floods. This disaster resilient community aims to organize local communities in mitigation and response efforts to disasters. They are trained to identify risks, develop emergency plans, and conduct disaster response simulations on a regular basis. In this way, communities can act independently but coordinated when a disaster occurs, speeding up the response process and reducing the losses incurred. These strategies have a significant positive impact on society.

Increasing awareness of the risk of tidal floods and knowledge about the actions that must be taken can reduce the level of community vulnerability to disasters. Active participation in disaster resilient communities also increases the sense of belonging and social cohesion among residents, strengthening solidarity and cooperation in facing crises. Educational programs regarding the dangers of tidal flooding and mitigation measures must be intensified. This includes direct outreach, use of social media, and information campaigns in vulnerable areas such as Tanjunguban City in North Bintan, which has the highest number of affected families (359).

Training involving tidal flood simulations can help communities prepare for emergency situations. In areas with a high level of risk such as Kijang City in East Bintan, which has 199 affected families, this training is very important. Implementation of an early warning system for tidal floods in frequently affected areas. This can be done through the installation of tidal sensors and rainfall gauges in areas such as Numbing in Coastal Bintan and Sasah Bay in Sri Kuala Lobam. Preparation of a clear and coordinated evacuation plan. In areas such as Tembeling in Bintan Bay, with 101 families affected, efficient evacuation plans are essential to reduce the risk of loss of life.

Formation of community groups that are trained and ready to handle emergency situations in each village/sub-district, such as Mantang Besar in Mantang District with 75 affected families, this group can function as the spearhead in disaster management. Involving non-governmental organizations and local institutions in efforts to increase tidal flood preparedness and mitigation. In areas such as Sebong Bay, which has several villages with a small but distributed number of affected families, this collaboration can increase effectiveness. Building infrastructure that is resistant to flooding, such as houses on stilts in areas frequently affected by tidal floods.

In areas such as Tanjunguban City, this can significantly reduce the impact of flooding. Encourage the planting of mangroves and other natural vegetation in coastal areas to reduce the impact of tidal floods. Areas like Kelong in Coastal Bintan can benefit greatly from this

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program. Community education and preparedness are the keys to dealing with tidal floods in Bintan Regency. Awareness raising programs and disaster management training must be increased, especially in areas with a high number of affected families. An early warning system and clear evacuation plans can reduce the risk and impact of tidal floods. In addition, community empowerment and development of flood-resistant infrastructure and environmental adaptation will support community resilience to tidal floods. Collaboration between government, communities, and local institutions is critical to ensuring the success of these efforts.

2. Integrated Strategies for Tidal Flood Management in Bintan Regency

a. Monitoring and Evaluation

The local government of Bintan Regency has adopted modern technology for monitoring areas prone to tidal flooding, such as Geographic Information Systems (GIS) and automatic sensors. Data collected through this technology is used to evaluate and improve policies and actions to deal with tidal floods. Periodic evaluations are also carried out to assess the effectiveness of existing programs and design better strategies in the future. This analysis will discuss the importance of routine monitoring and evaluation in tidal flood mitigation efforts in Bintan Regency.

The local government of Bintan Regency uses modern monitoring technology such as Geographic Information Systems (GIS) and automatic sensors to monitor areas prone to tidal flooding. GIS technology allows detailed and real-time mapping of areas, so that local governments can monitor changes in environmental conditions that can affect the risk of tidal floods. Automatic sensors are installed at various strategic locations to measure environmental parameters such as water level, rainfall and soil moisture. This automatically collected data provides accurate and fast information, which is very important for timely decision making in tidal flood management.

Data collected through this monitoring technology is used by local governments to evaluate and improve policies and actions to deal with tidal floods. Data analysis helps in identifying areas most vulnerable to tidal flooding and assessing the effectiveness of the actions taken. Governments can use this information to improve existing infrastructure, plan new development, and adjust policies as needed to increase protection against tidal floods. Periodic evaluation is an important part of the tidal flood management strategy in Bintan Regency. This evaluation involves assessing the programs and policies that have been implemented, with a focus on their effectiveness, efficiency and impact on society. Regular evaluation allows local governments to identify the strengths and weaknesses of existing programs, as well as develop new, more effective strategies. By conducting regular evaluations, local governments can ensure that tidal flood management efforts remain relevant and responsive to changes in environmental conditions and community needs.

b. Cooperation and Coordination

Robust flood management cannot be carried out effectively without cooperation between various parties. The Bintan Regency Government is collaborating with the provincial government and the Regional Disaster Management Agency (BPBD) to obtain technical and financial support. Apart from that, collaboration with the private sector and non-governmental organizations is also being established to optimize existing resources. Collaboration between the Bintan Regency Government and the provincial government is very crucial in managing tidal floods. The provincial government has a role as a liaison between the central government and district governments, so that good coordination between the two can ensure the effective flow of information and resources. The provincial government also plays a role in planning and implementing policies that support reducing the risk of tidal floods at the local level.

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BPBD, as the national agency responsible for disaster management, provides significant technical and financial support. BPBD can provide assistance in the form of disaster preparedness training, provision of flood management equipment, as well as emergency financial assistance when a disaster occurs. Collaboration with BPBD ensures that tidal flood management efforts in Bintan Regency are in line with national standards and receive adequate support from the central government. Bintan BPBD must coordinate with the Provincial and National BPBD to obtain the latest data, technical assistance and logistics during tidal flood management. Kijang City in East Bintan, with 199 affected families, can benefit from this collaboration.

The private sector has an important role in providing the financial and technical resources needed for tidal flood management. Through corporate social responsibility (CSR) programs, companies can contribute in the form of funding, building flood prevention infrastructure, or providing needed equipment and technology. This collaboration not only benefits local governments, but also improves the company's positive image in the eyes of the public. Local companies can provide assistance in the form of funds, labor and equipment. They can also support community education and preparedness programs. Companies in industrial areas such as Teluk Lobam in Sri Kuala Lobam can play an active role in this effort.

Collaboration between various parties allows optimization of existing resources. Each party brings different skills, resources, and networks, so this collaboration produces greater synergy than individual efforts. Local governments can benefit from technical and financial expertise from BPBD and international institutions, as well as logistical and material support from the private sector and NGOs. In this way, the tidal flood management program can be carried out more effectively and efficiently. NGOs can provide assistance in the form of training, education, and emergency assistance. They can also help in conducting research and collecting data to develop tidal flood management strategies.

Effective cooperation and coordination are key in dealing with the impact of tidal floods in Bintan Regency. Local governments, the private sector, communities and non-governmental organizations must work together to develop and implement mitigation and emergency management strategies. Active participation from all parties, both in planning and implementation, will ensure that tidal flood management efforts run well and efficiently. The integration of technology and science-based approaches will also strengthen regional capacity in dealing with tidal flood disasters.

c. Ecosystem Based Approach

Ecosystem-based coastal management is a strategy that integrates the natural functions of coastal ecosystems to reduce the risk of tidal floods and increase resilience to natural disasters. This analysis reviews various important elements that contribute to the effectiveness of this approach in Bintan regency.

- Mangrove forests play a key role in reducing ocean wave energy and reducing the impact of tidal floods. Mangroves' strong roots hold sediment and strengthen shorelines, thereby reducing erosion and increasing coastal stability. The mangrove rehabilitation program carried out involves replanting and restoring damaged mangrove forests. Data shows that areas that have been rehabilitated with mangroves have experienced a significant reduction in the frequency and intensity of tidal floods. Mangroves function as a natural barrier to sea waves and wind and help reduce the impact of tidal floods. Mangrove restoration in coastal areas such as Tanjunguban City (North Bintan) and Penaga (Bintan Bay) can reduce the number of affected families. The Bintan Regency Government can carry out a large-scale mangrove planting program, involving local communities and non-governmental organizations (NGOs) to increase awareness and participation.

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- Coral reefs function as natural barriers that absorb wave energy before it reaches the coast. Coral reef restoration is carried out by transplanting corals and protecting coral areas from destructive activities. Bintan Regency shows that areas with healthy coral reefs are more resistant to tidal floods and experience less damage during high tide events. Coral reefs function as natural barriers that can reduce wave speed and energy, thereby reducing the risk of tidal floods. Rehabilitation of coral reefs in areas such as Numbing (Coastal Bintan) and Sasah Bay (Sri Kuala Lobam) can help protect coastlines. Coral reef rehabilitation programs involving local divers and fishing communities can increase the effectiveness and sustainability of these efforts.
- Wetlands act as natural water reservoirs that absorb excess water during high tides and heavy rains. Wetland restoration through realignment of water flow and protection from human activities has increased water storage capacity and reduced the risk of flooding in the surrounding area.

An ecosystem-based approach in mitigating tidal floods in Bintan Regency involves mangrove and coral reef restoration, watershed management, green infrastructure development, as well as community education and participation. These steps not only help reduce the direct impact of tidal floods but also increase environmental resilience and sustainability of coastal ecosystems. Collaboration between government, communities, NGOs and the private sector is very important to ensure the success of this strategy and increase regional resilience to tidal floods.

The use of environmentally friendly materials, the materials used in drainage construction are selected in such a way as to minimize negative impacts on the environment. For example, the use of porous concrete allows water percolation into the soil, reduces surface runoff, and helps recharge groundwater. Adaptive design: This drainage system is designed to adapt to local conditions, including climate change and sea level rise. The drainage structure is designed to be flexible and able to accommodate varying water volumes. Adaptive design allows drainage systems to respond to climate changes such as increased rainfall intensity or changing water flow patterns.

This helps maintain the function of the drainage system in reducing the risk of tidal floods. A drainage system designed with flexibility is able to accommodate varying water volumes, from light rainfall to very high rainfall intensity. This reduces the possibility of waterlogging in urban and rural areas. By reducing the risk of tidal flooding, adaptive drainage system design also contributes to environmental sustainability. This includes protecting freshwater ecosystems, reducing water pollution, and maintaining environmental quality.

CONCLUSION

The coastal areas of Bintan Regency have been significantly impacted by tidal flooding, with North Bintan, East Bintan, and Teluk Bintan districts experiencing the highest number of affected households. The data shows that Tanjunguban Kota in North Bintan is particularly vulnerable, necessitating urgent flood mitigation efforts. Similarly, Kijang Kota in East Bintan also requires immediate attention due to the high number of affected families. This extensive impact underscores the need for targeted and comprehensive flood management strategies to protect the most vulnerable communities and mitigate future risks.

The Bintan Regency government has implemented various strategies to manage and mitigate the impact of tidal flooding. These include strategic planning and policy development through the Regional Spatial Planning Plan (RTRW), which regulates land use and promotes sustainable development. Infrastructure development focuses on improving drainage systems and building flood-resistant structures, while community education and preparedness programs aim to enhance local resilience. The formation of disaster-resilient communities and

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the integration of green infrastructure are crucial steps in fostering a proactive and informed response to tidal flooding.

Effective tidal flood management in Bintan Regency relies on continuous monitoring and evaluation, robust cooperation among government entities, private sector involvement, and ecosystem-based approaches. Utilizing modern technology such as GIS and automatic sensors, the local government can make data-driven decisions and improve policy effectiveness. Collaboration with various stakeholders, including BPBD, private companies, and NGOs, optimizes resource utilization and strengthens flood management efforts. The restoration of mangroves, coral reefs, and wetlands further enhances coastal resilience, emphasizing the importance of preserving natural ecosystems as a defense against tidal floods. Through these integrated strategies, Bintan Regency can achieve long-term resilience and sustainability in the face of tidal flooding challenges.

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VOL 1 NO 1 APRIL 2024
https://ojs.umrah.ac.id/index.php/jmps

Application of the Public-Private Partnership Concept in Airport Development in Bintan Regency to Enhance the Coastal Economy

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https://doi.org/10.31629/jmps.v1i1.6875

Received: February 26, 2024 | Revised: March 05, 2024 | Accepted: April 20, 2024

ABSTRACT

The efforts of various regions to introduce the identity and beauty of their areas are often hindered by inadequate infrastructure and poor management by local governments. Additionally, funding, which is critical for development, poses a significant challenge. As a solution, Public-Private Partnerships (PPP) offer an alternative approach to budgeting and financing that extends beyond the use of regional (APBD) and national (APBN) budgets. In Bintan Regency, various infrastructure developments aimed at supporting the tourism sector have been undertaken. Notably, PT. Angkasa Pura II, in collaboration with PT. Bintan Aviation Investments, is committed to constructing an international airport designed with Airport Resort Facilities, named Bintan New Airport or Busung Airport, to bolster the economy of Bintan Regency. However, the study reveals that the development, which is anticipated to become a cornerstone of economic strength in Bintan Regency, faces significant challenges from the Airport Business Entity (BUBU). This has resulted in delays and complications in the continuation of the airport construction project between PT. Angkasa Pura II and PT. Bintan Aviation Investments. Despite these obstacles, the partnership remains focused on achieving its goal of enhancing the regional economy through improved infrastructure and tourism facilities. he collaboration between PT. Angkasa Pura II and PT. Bintan Aviation Investments represents a strategic move to leverage private sector efficiency and innovation in public infrastructure projects. Nonetheless, the ongoing challenges with the Airport Business Entity highlight the complexities involved in such partnerships, necessitating careful management and oversight to ensure project continuity and success.

Keyword: Public-Private Partnership (PPP), Airport Development, Coastal Economy

INTRODUCTION

Infrastructure is one of the main factors in driving the economy of a region, low investment in the region is one of the successes of the region's ability to develop the desired infrastructure. in the ability of the region to develop the desired infrastructure, and has a negative impact if the government is not able to attract investment and infrastructure. has a negative impact if the government is unable to attract investment and abandon certain projects, resulting in hampered economic growth (Abdullah, 2020). certain projects are abandoned, resulting in the obstruction of economic growth in a region. economic growth in a region.

The main challenge that often occurs in a region is the funding gaps between the need for infrastructure investment and the relatively limited between the need for infrastructure investment and the relatively limited financial capacity of the state to fulfil these needs. to

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fulfil these needs. Therefore, the need to strengthening public-private partnerships that are seen from 3 (three) dimensions as follows (Gasali & Surya, 2016). (1) Political reasons: creating a democratic government and promoting good governance and good society. (2) Administrative reasons: limited government resources, including budgetary resources, human resources, assets, and management capabilities. (3) Economic reasons: to reduce gaps or inequalities, spur growth and productivity, improve quality and continuity, and reduce risk.

Public Private Partnership (PPP) can be translated as a contractual agreement between the private sector and the government, both of which join together in a cooperation to use their respective expertise and capabilities to improve services to the public where the cooperation is formed to provide the best quality of service at an optimal cost to the public (Sompa, 2019). In addition, Presidential Regulation No. 67 of 2005 also explains the cooperation between the government and business entities in the provision of infrastructure, defining the types of infrastructure that can be cooperated with business entities, including: transportation, roads, irrigation, drinking water, wastewater, telecommunications, electricity, and oil and gas (Masitoh, 2014). Transportation infrastructure includes: Airports, ports, and railways, while road infrastructure includes: toll roads and toll bridges (Sari, 2020).

Public Private Partnership which is the hope of change in the current era of globalisation, where the increase and development are relatively significant in aspects of human life, especially agencies, especially Regional Owned Enterprises (BUMD) as belonging to a region that is demanded to be able to increase its existence, but the role of the local government or region concerned is also demanded to be able to keep agencies from mistakes and even misappropriation of funds that could one day occur (Anggraini, 2017). The development of government agencies makes it impossible for management to supervise every activity that takes place in the government (Kustiningsih, 2017).

Law No. 32 of 2004 concerning Regional Government has decided on several authorities over the Central Government to the Regional Government (Pemda), including the construction sector which is currently or in the process of being worked on. Therefore, the Regional Government, both from the Province and Regency / City, plays an important role in realising airport development infrastructure that is able to provide employment opportunities and the growth of MSMEs and is able to support regional development activities with integrity in an infrastructure system and the concept of cooperation with the Private Sector (Tukuboyo et al., 2018). The important role of the implementation of this cooperation is one of the alternatives to all financing strategies that can be applied and used apart from APBN and APBD expenditures (Ahmad et al., 2021).

Infrastructure Development is the development of facilities and infrastructure aimed at the public or society in supporting every economic activity of a country, besides that the availability of infrastructure is very important in the level of efficiency and effectiveness of economic activities (Akbar & Ikhsan, 2019). With the development of quality infrastructure and sufficient levels of productivity, economic resilience and in the process aimed at building a better quality of life (Suhendra, 2017).

MRO companies abroad continue to increase capacity and provide facilities. According to him, MRO business opportunities are obtained from the maintenance budget of each airline which is at least USD1 billion or around Rp13.2 trillion per year. With an average increase in passenger numbers above 15 per cent per year, the national MRO industry must be able to increase capacity and capability. If not, then foreign parties will take the business opportunity. As the aviation business grows, IAMSA estimates that Indonesia will need 12,000-15,000 experts in the next 15 years.

Seeing the high growth of the aviation industry in Indonesia and the Asia Pacific region, Indonesia needs to have an Integrated Aviation Industrial Park (Aerospace Park) as mandated in Law No. 1 of 2009 concerning Aviation article 370 paragraph 3f. Expected support from the

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government Establishing an Integrated Aviation Industrial Estate (Aerospace Park) in accordance with the mandate of Law No. 1 of 2009. With consideration of geographical proximity to Singapore, which is one of the logistics centres and manufacturing/vendor representatives in the Asia Pacific region, the Riau Islands (Bintan and Batam) can be considered to become an Aerospace park in Indonesia, which has been designated as a Free Trade Zone (FTZ).

The concept of international eco-tourism has been chosen as the development template for this area. Nationally, 17 million foreign tourists are targeted this year. And through the Destination Origin Time (DOT) strategy, the target of foreign tourists to Bintan itself is targeted at 900 thousand or 5.3% of the national target. In terms of industry, BIE is targeted to be filled with 16 tenants with a total of 4242 workers. The industries that will be built here are Bintan Offshore Marine Centre (BOMC) which provides marine services, ship repair and dismantle, car dismantle. Furthermore, there is Bintan Aviation Investment (BAI), which focuses on airport development, aerospace focuses on airport development, aerospace park, and MRO facilities. Halal Hub is also developed as a halal industrial area and halal food. Meanwhile, to support industries in the region, a logistics hub will be established for e-commerce businesses.

The land used for Bintan International Airport (± 800 hectares) and Aerospace Industry Park (± 500 hectares) is part of what is designated as a free trade zone (FTZ), and is fully owned by the private party that initiated the project. The management of the land is also run by the private sector and is integrated with the BIE area. To date, the land acquisition progress has reached 80%, including the Phase 1 MRO facility. In early 2021, it is targeted that the runway construction will be completed, and the entire airport will be completed by the end of the year, so that it can start operating in 2020.

Regional Asset Management, which is one of the things that is done in several countries, can be practised with various kinds of cooperation. One of the provinces in Indonesia that applies Public Private Partnership is the Bintan Regency Government, which is one of the regencies located in the Riau Islands Province. The Riau Islands Province or often referred to as the Riau Islands Province, which has one of the largest industrial cities in Indonesia, is trying to implement a model of cooperation with the private sector in managing public assets.

One of the public assets whose management will be carried out and authorised for its development is the Bintan New Airport. Where, the person in charge of this implementation is a collaboration between PT Angkasa Pura II as the BUMD Party and PT Bintan Aviation Investment. The agreement made by the Bintan Regency government and PT Bintan Aviation Investment found an agreement that PT Angkasa Pura II would act as the Bintan Airport Manager, and PT Bintan Aviation Investment would provide funds and build the total airport infrastructure and other facilities. The development is entitled Airport Resort Facilities or an airport that focuses on aviation services that support the tourism sector in Bintan Regency which is very different from Raja Haji Fisabillillah Airport which focuses on commercial or general aviation (Latif, 2018).

To develop this industry, PT Bintan Aviation Investment is ready to build a project called Bintan Airport & Aerospace Industry Park with an airport area of 800 hectares (ha) and an industrial area of 510 ha. The airport area will be able to handle general aviation business, MRO facilities, and logistics centres. Bintan Airport & Aerospace Industry Park project in Bintan Island, Riau Islands Province. This is an integrated aircraft maintenance, repair, and overhaul (MRO) industry park. The airport accommodates general aviation businesses, MRO facilities, and logistics centres.

The runway length reaches about 3,000 metres and can be landed by wide-body aircraft, allowing national and international airlines to conduct maintenance. The MRO industry

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in Indonesia will continue to grow along with the need for transport and mobility between regions and the world. This opportunity must be utilised by aircraft maintenance companies to continue to improve the provision of facilities balanced with qualified human resources.

The company is starting the construction of the first phase in the form of a passenger terminal and industrial area. Later, an offshore marine centre, power plant, commercial business area and residential area will be built. The company also established a specialised MRO polytechnic to support the provision and capacity building of human resources. There are three trainings, namely Aircraft Maintenance Basic Training, Aircraft Maintenance Type Training, and Specific Training.. Land Cleaning: 1,563,736 M^2 (87.75%), Cut: 2,653,249 M^3 (74.18%), Fill: 1,996,545 M^3 (74.82%), and Turf: 116,655 M^2 (10.26%).

This research was conducted to find out how the cooperation between PT Angkasa Pura II and PT Bintan Aviation Investment in the construction of Bintan New Airport saw the implementation of the delay and what the latest developments are regarding the cooperation carried out in 2017. This is interesting for researchers to study considering the agreement made according to the agreement will be completed in 2020.

METHODOLOGY

Bintan New Airport, situated in Bintan Regency, is the first airport in Indonesia designed with the unique concept of an international resort. This innovative approach aims to enhance the travel experience by integrating luxurious resort amenities with airport facilities, catering to both local and international travelers. The research on this airport has been conducted using a descriptive qualitative method, as outlined by Samsu (2017). This approach enables a detailed exploration of the airport's development and its implications, providing insights into the interplay between infrastructure growth and tourism enhancement.

The data collection for this research primarily involved a literature study and an examination of policies and regulations pertinent to the airport's development. According to Lutfiyah (2017), these methods are essential for understanding the regulatory framework and the strategic planning behind the project. The researcher meticulously reviewed various documents and regulations to gather comprehensive data on the collaboration between the Bintan Regency government and the private sector. This partnership is crucial for the development of aviation infrastructure, highlighting how public-private cooperation can drive significant projects in emerging economies.

Based on the collected data, the researcher analyzed the relevant regulations and assessed the impacts of the Bintan New Airport on the local community. The construction of the airport is anticipated to bring various benefits, including job creation, improved local infrastructure, and increased tourism. However, it is also vital to consider potential challenges, such as environmental concerns and displacement issues. The study further delves into the latest developments at the airport, providing an updated overview of its operational status and future prospects. By examining these aspects, the research offers a holistic view of the airport's role in regional development and its potential to transform Bintan into a premier tourist destination.

RESULTS AND DISCUSSION

Literally, the cooperation between the central or regional government and the private sector is a form of cooperation in providing adequate infrastructure and being able to generate various sectors in the region, especially the economic sector. Similarly, the government of Bintan Regency is making an airport with a resort concept, which is the first airport in Indonesia. With the creation of this airport, it is hoped that foreign tourists will be able to enjoy the beauty and introduce Bintan Island to the international scene. The cooperation carried out by BUMD, namely PT Angkasa Pura II with one of the private companies, PT Bintan

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Aviation Investment, proves the seriousness of the Bintan Government in supporting and improving various existing sectors. Bintan New Airport as the name of the new airport was built because of the need for accessibility for the general public in supporting the tourism sector on Bintan Island which is mostly engaged in the form of resorts and other tourist areas. The most persuasive monetary variable is capital, trailed by risk factors as lawful guidelines and market factors as interest. risk factors as law and order and market factors as interest. Financial variables are considered the most compelling on the grounds that monetary issues, for this situation as capital, are viewed as a significant element whose presence can kill different factors like gamble and market. The presence of adequate capital is thought of as equipped for limiting dangers and different variables.

1. Determination of public-private organizations (PPPs)

The determination of public-private organizations (PPPs) in foundation arrangement is a consequence of the public authority's restricted financial plan and the choice of PPPs is one of the endeavors to share liability made by the public authority. In the projection information claimed by Bappenas, to fund foundation advancement in 2015-2019, Indonesia needs essential speculation worth Rp. 4,796.2 T. Of the aggregate sum, APBN/APBD is simply ready to satisfy around 41.3%, while BUMN 22.2% and the leftover 36.5% are supposed to come from private investment. Capital is the main sub-standard as it is the principal justification for why PPPs can occur. the principal motivation behind why PPPs can happen.

Capital is communicated as long haul assets of an organization. Practically all respondents Practically all respondents expressed that capital is a vital variable, given the restricted capacity of the public authority concerning finance. The public authority through the Service of Transportation's smart course of action expresses that PPP is one of the elective techniques that can be done to foundation improvement is vital to help the exercises of the local area. exercises of the local area. The subsequent variable considered powerful after the economy is risk. Endeavors to limit risk are compulsory that should be finished. In the gamble factor, law and order subcriteria is the most compelling subcriteria.

The gathering that picked the lawful subcriteria had the assessment that each strategy that is the reason for executing a movement needs serious areas of strength for an as a fundamental rule. This is on the grounds that Indonesia is a nation of regulation where each course and step that should be taken has been painstakingly directed in clear legitimate guidelines. In the last component that impacts the determination of PPP structures, specifically market factors, the interest sub-measures is the most compelling sub-standards. Request is characterized as an interest that depicts the organic market relationship that happens in a market.In the transportation office, the interest subcriteria is a reference that the transportation office is genuinely necessary.

In the agreed cooperation, according to (Fauzela et al., 2019) is in the form of Built-Transfer (BT). Where, the Bintan Regency Government as the first party is run by PT Angkasa Pura II with the second party, PT Bintan Aviation Investment with the provisions that the land owned is owned by the government, the second party builds and finances it to completion, after the construction is completed it will be given or handed over to the government with a predetermined period of time and the local government pays for the construction.

2. Cooperation and Development of Bintan New Airport

The development carried out is certainly in accordance with the initial agreement between the local government and the private sector. In this case, the government needs financing in the construction of the Bintan New Airport and the main reason for the development to be handed over to the private sector is limited financing. After the development process is completed, the results of infrastructure development are handed back

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to the government and will be operated by the government. The government considers their ability to run the infrastructure facilities is good enough. The Built Transfer (BT) scheme can be selected because the main obstacles to the development of Bintan New Airport infrastructure are financing problems and the priority scale of development owned by the government. The problem of financing and priority scale causes the need for alternative strategies in terms of infrastructure development, one of which is through Public Private Partnership, namely the Built Transfer (BT) scheme.

Transport offices are truly necessary. At the point when the vehicle office is truly necessary, this is one of the pieces of information that the office merits creating or should be possible. office is practical to create or facilitate advancement can be done. The airport can be used by private or commercial aircraft. Road accessibility with an approximate 35-minute drive from Lagoi Bay and a 5-minute drive to Bintan Inti Industrial Estate. Suitable for all wide-body aircraft with 3 km runway (Phase 1). For domestic and international routes and capable of handling up to A380 aircraft. Here is the design form of Bintan New Airport.

Figure 1. Planning Internasional Airport in Bintan Regency

Source: Bintan Resource, 2023

Expansion and investment in the aircraft maintenance, repair, and overhaul (MRO) business sector. This is because, to date, around 60 per cent of aircraft operating in Indonesia are repaired at foreign MROs. Expansion and investment are smart, strategic, and profitable steps for companies entering the MRO field. That way, it will create a market for the Indonesian aircraft component industry to be able to supply the need for spare parts. Currently, the development of the MRO industry in Indonesia has the right moment because the air transport service business continues to stretch, both domestic and foreign airlines. The aircraft maintenance business market in Indonesia is considered very large. One illustration is that around 60 per cent of commercial aircraft operating in Indonesia are still maintained abroad. Industry Park with an airport area of 800 hectares (ha) and an industrial area of 510 ha. The airport area will be able to handle general aviation business, MRO facilities, and logistics centres.

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Built Transfer has a relationship or cooperation as a partner. Partnership is a business strategy carried out by two or more parties within a certain period of time to achieve mutual benefits with the principle of mutual need and mutual improvement. Simply put, a partnership business model is a business with many owners, each of whom has invested in the business. However, in a partnership system, the participation of each partner can be limited according to the agreement.

The development of Airport Aviation Investment (BAI) or Busung Airport in the industrial area located in Bintan is still constrained by the Airport Business Entity (BUBU) permit. Through the Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 190 of 2015 concerning Management of Handling Airport Regular Operations (Airport Irregular Operation). Where, in article 1 explains "Airport Business Entity is a state-owned business entity, regionally-owned business entity, or Indonesian legal entity in the form of a limited liability company (PT) or cooperative, whose main activity is to operate airports for public services".

Therefore, the management or continuation of Bintan New Airport is constrained. The Central Government wants its management to be limited, where after the time the management of land and buildings is returned to the government (Nurhadi, 2021). For funding and licensing issues, it is fully managed by PT Bintan Aviation Investment, various permits have been fulfilled starting from operating permits, location, and construction which has begun to the stage of building MRO and terminals. The budget spent to produce all is estimated at 900 million US Dollars (Slamet, 2021). The development of Bintan New Airport, while ambitious and potentially transformative for the region, faces numerous challenges and obstacles that must be addressed to ensure its successful completion and operation. These challenges span various domains, including financial, legal, logistical, and environmental aspects, each presenting unique hurdles that require careful planning and strategic management.

a. Financial Constraints and Capital Acquisition; One of the most significant challenges in the development of Bintan New Airport is financial constraints. The Indonesian government, particularly at the regional level, often faces budget limitations that impede large-scale infrastructure projects. The Bintan Regency Government's partnership with PT Angkasa Pura II and PT Bintan Aviation Investment under the Built-Transfer (BT) scheme underscores the reliance on private sector investment to bridge funding gaps. However, securing adequate capital remains a persistent challenge. Ensuring continuous and sufficient funding throughout the project lifecycle is critical, and any delays or shortfalls in financing can stall construction, leading to increased costs and prolonged timelines. Additionally, fluctuations in economic conditions and market dynamics can affect investor confidence and the availability of funds, further complicating the financial landscape.
b. Legal and Regulatory Hurdles; Navigating the complex legal and regulatory environment in Indonesia presents another layer of challenges. The development of Bintan New Airport involves multiple stakeholders, including government agencies, private investors, and local communities, each with distinct interests and legal considerations. The adherence to Indonesian laws and regulations, such as the Regulation of the Minister of Transportation No. PM 190 of 2015 concerning the Management of Handling Airport Regular Operations, is paramount. This regulation outlines the roles and responsibilities of Airport Business Entities (BUBU), which include state-owned enterprises, regionally-owned entities, and private companies. Ensuring compliance with these regulations, securing necessary permits, and addressing legal disputes that may arise during the project are critical to maintaining progress and avoiding legal setbacks.
c. Logistical and Infrastructure Challenges; The logistical aspects of constructing a new airport, particularly in a geographically diverse region like Bintan Island, pose significant

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challenges. The island's infrastructure, including roads, utilities, and communication networks, must be enhanced to support the airport's construction and operation. Accessibility to the construction site, transportation of materials and equipment, and coordination of construction activities require meticulous planning and execution. Additionally, the integration of the new airport with existing transportation networks and the development of supporting infrastructure, such as hotels, restaurants, and other amenities, are essential to creating a seamless travel experience for passengers and fostering economic growth in the region.

d. Environmental and Social Considerations; Environmental sustainability and social impact are critical factors that must be addressed in the development of Bintan New Airport. The construction and operation of the airport can have significant environmental impacts, including habitat disruption, noise pollution, and increased carbon emissions. Implementing environmentally friendly practices, such as sustainable construction techniques, efficient waste management, and the use of renewable energy sources, can mitigate these impacts. Moreover, engaging with local communities, addressing their concerns, and ensuring that the development benefits the local population are vital for gaining public support and minimizing social disruptions. The project must balance economic development with environmental conservation and social responsibility to achieve long-term sustainability.

The development of Bintan New Airport presents a multitude of challenges and obstacles that require comprehensive planning, strategic management, and collaborative efforts to overcome. Addressing financial constraints, navigating legal and regulatory hurdles, managing logistical complexities, ensuring environmental sustainability, and engaging with stakeholders are critical to the project's success. By adopting a holistic approach that integrates risk management, technological innovation, and workforce development, the Bintan Regency Government and its partners can transform these challenges into opportunities and create a world-class airport that drives economic growth and enhances the region's connectivity and prosperity.

CONCLUSION

Based on the results of the research conducted, it can be concluded that the Public Private Partnership carried out by the Bintan Regency government, namely PT Angkasa Pura II with the private sector, namely PT Bintan Aviation Investment in the effort to develop Bintan New Airport is with the Built Transfer (BT) scheme. Where, the relationship that is carried out provides benefits to each company in the development of the aviation sector for the Bintan Regency Government. In addition, the results obtained with the construction of this airport are the increase in the MSME sector and provide additional income to the community in Bintan Regency, especially the surrounding community. However, the various obstacles faced by the private sector regarding the Airport Business Entity (BUBU) are still a polemic and in the delays obtained provide a reduction and long work will result in damage to the facilities that have been built and made. So with this, the researcher wants to provide suggestions for the Bintan Regency Government to take more decisive and swift action in handling this, which certainly will not harm the various parties who welcome the construction of the Bintan New Airport.

The most persuasive calculate the choice of the PPP structure is the monetary component, trailed by the gamble factor and the latter is the market factor. In the monetary variable, the most persuasive subcriteria is the capital subcriteria, while in the gamble factor the most powerful subcriteria is law and order subcriteria and in the market factor the most compelling subcriteria is the interest subcriteria.

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e-ISSN: 3063-4245 p-ISSN: 3063-5705
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Enhancing Maritime Security: Challenges and Strategies in Indonesia's Natuna Sea

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https://doi.org/10.31629/jmps.v1i1.6876

Received: February 15, 2024 | Revised: March 09, 2024 | Accepted: April 25, 2024

ABSTRACT

The Natuna Sea, a strategic region within Indonesia's exclusive economic zone, faces multifaceted maritime security challenges that threaten national sovereignty, economic interests, and regional stability. This abstract explores the key issues and strategic responses to enhance maritime security in this vital area. Indonesia's maritime security challenges in the Natuna Sea are driven by illegal, unreported, and unregulated (IUU) fishing, territorial disputes, and transnational crimes such as smuggling and human trafficking. The encroachment of foreign fishing vessels, particularly from neighboring countries, exacerbates the IUU fishing problem, undermining local economies and depleting fish stocks. Additionally, overlapping territorial claims, particularly with China, complicate Indonesia's efforts to assert its sovereignty and maintain peace in the region. To address these challenges, Indonesia has developed a comprehensive maritime security strategy that includes diplomatic, legal, and operational measures. Diplomatic efforts focus on strengthening regional cooperation through ASEAN and other multilateral forums to foster dialogue and build consensus on maritime security issues. Legal measures involve the enforcement of national and international laws, including the United Nations Convention on the Law of the Sea (UNCLOS), to uphold Indonesia's territorial rights and combat IUU fishing. Operationally, Indonesia has enhanced its maritime patrols, surveillance capabilities, and naval presence in the Natuna Sea. The establishment of the Maritime Security Agency (Bakamla) and the deployment of advanced technology, such as unmanned aerial vehicles (UAVs) and satellite monitoring, have improved the detection and interdiction of illegal activities. Despite these efforts, challenges persist due to resource constraints, coordination issues among agencies, and the complex geopolitical landscape. This abstract underscores the importance of a holistic and adaptive approach to maritime security, integrating diplomatic, legal, and operational strategies.

Keyword: Maritime Security, Natuna Sea, Challenges, Strategies

INTRODUCTION

The Natuna Sea, a crucial maritime region within Indonesia's territorial waters, has increasingly become a focal point of maritime security concerns. The primary issues addressed in this paper revolve around the escalating challenges of safeguarding this strategically significant area against illegal activities, territorial disputes, and maintaining sovereignty (Riska, 2017). The urgency of this issue is underscored by the rising frequency of illegal fishing, territorial infringements by foreign vessels, and the broader implications these activities have on national security and regional stability (Riyadi & Sari, 2019; C. M. Yang &

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Tran, 2004). This paper aims to explore these maritime security challenges and propose viable strategies to enhance the security framework in the Natuna Sea (Hao et al., 2014).

To achieve this, the paper will first delineate the core issues at hand, providing a comprehensive background and situating the discussion within the broader context of existing literature and studies. A brief review of related works will highlight the originality and necessity of this study, distinguishing it from previous research by focusing on recent developments and emerging threats. Key aspects pertinent to the topic, such as the geopolitical significance of the Natuna Sea, the economic implications of maritime security, and the impact on local communities, will be examined (Anggraini et al., 2019; Jaya et al., 2024). The rationale behind addressing these aspects is to underscore their critical importance and the scientific contributions this paper intends to make.

The Natuna Sea, located in the northern part of Indonesia's Riau Islands, is not only a rich fishing ground but also a significant area for natural gas reserves. Its strategic location, adjacent to the South China Sea, further amplifies its geopolitical importance (Dillenia & Troa, 2016). Over the past decade, the region has witnessed a surge in illegal fishing activities, predominantly by vessels from neighboring countries (Sambuaga et al., 2023). These incursions not only deplete marine resources but also challenge Indonesia's sovereignty (Meyer et al., 2019; Yang & Zou, 2024). Moreover, the Natuna Sea is part of the broader territorial disputes involving the South China Sea, where overlapping claims by various nations, including China, Vietnam, and Malaysia, create a complex security environment (Darwis & Putra, 2022; Muna et al., 2023).

The Chinese nine-dash line claim, in particular, has led to repeated confrontations between Indonesian and Chinese vessels, exacerbating tensions and posing significant challenges to maritime security in the region (Fernandes et al., 2021). The Indonesian government has responded with various measures, including the deployment of naval and coast guard assets, enhanced patrols, and diplomatic efforts (Arsetyo, 2021). However, these efforts have met with limited success due to the scale of the challenges and the limitations in resources and infrastructure. Consequently, there is a pressing need for a comprehensive strategy that addresses these multifaceted security threats effectively.

The topic of maritime security in the Natuna Sea has been addressed by various scholars and practitioners, highlighting different dimensions of the issue. For instance, Bateman (2019) discusses the broader implications of South China Sea disputes on regional security, while Beckman (2020) examines the legal frameworks governing maritime boundaries and their enforcement challenges. However, these studies often focus on either the legal or geopolitical aspects without providing an integrated analysis that includes economic and local community perspectives. This paper seeks to fill this gap by offering a holistic view of maritime security challenges in the Natuna Sea, incorporating the latest developments and utilizing a multidisciplinary approach to propose comprehensive strategies (Batara, 2023).

The originality of this paper lies in its focus on recent incidents and the evolving nature of maritime threats, which have not been adequately covered in existing literature. By analyzing current data and trends, this study aims to provide actionable insights that can inform policy and operational decisions. The significance of addressing maritime security in the Natuna Sea cannot be overstated. As Indonesia's front line in the South China Sea disputes, ensuring the security of this region is paramount for national sovereignty and economic sustainability. Illegal fishing alone results in significant economic losses, estimated at billions of dollars annually, affecting local communities and the national economy.

Furthermore, the security of the Natuna Sea has broader implications for regional stability. As a key player in ASEAN and a pivotal maritime nation, Indonesia's ability to secure its maritime boundaries is critical for maintaining regional peace and security. By addressing

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these security challenges, Indonesia can strengthen its position in regional security architectures and contribute to the stability of the broader Indo-Pacific region.

METHODOLOGY

This study employs a qualitative research methodology, supplemented by qualitative data where applicable, to offer a comprehensive analysis of maritime security in the Natuna Sea. The research process encompasses several critical steps. First, a thorough literature review is conducted, focusing on maritime security specific to the Natuna Sea and related regional issues. This review includes an examination of academic articles, government reports, and policy briefs to build a solid foundation of existing knowledge and context (Galvan & Galvan, 2017). Second, data collection is undertaken from diverse sources, incorporating official statistics on illegal fishing incidents, naval patrol reports, and economic impact assessments (Johnston, 2014).

This phase also includes interviews with experts in maritime security, government officials, and local community leaders, providing additional qualitative insights and perspectives that enrich the analysis. Third, the study involves detailed case studies of specific maritime security breaches in the Natuna Sea, aiming to understand the nature of these threats and the corresponding responses by Indonesian authorities. These case studies offer concrete examples of challenges and strategies in action, highlighting areas of success and those requiring improvement.

Finally, a comparative analysis is conducted, juxtaposing Indonesia's maritime security strategies with those of other countries facing similar challenges. This comparative approach seeks to identify best practices and potential areas for enhancement, drawing lessons from international experiences to inform policy recommendations. By integrating these research steps, the study aspires to present a nuanced and actionable understanding of maritime security in the Natuna Sea, providing a basis for informed decision-making and strategic planning.

RESULTS AND DISCUSSION

1. Key Maritime Security Challenges

The Natuna Sea faces several interrelated security challenges, which can be categorized into three main areas:

a. Illegal Fishing: The most immediate threat to maritime security in the Natuna Sea is illegal, unreported, and unregulated (IUU) fishing. Foreign fishing vessels, primarily from China and Vietnam, frequently encroach on Indonesian waters, exploiting marine resources and causing significant economic losses. The lack of adequate surveillance and enforcement capabilities exacerbates this issue.
b. Territorial Disputes: The overlapping maritime claims in the South China Sea, particularly China's nine-dash line, pose a persistent challenge to Indonesia's sovereignty. Despite not being a claimant in the South China Sea disputes, Indonesia faces regular incursions by Chinese fishing and coast guard vessels, challenging its territorial integrity.
c. Transnational Crimes: The Natuna Sea is also a conduit for various transnational crimes, including smuggling, human trafficking, and piracy. These activities not only threaten maritime security but also undermine regional stability and economic development.

Natuna Sea faces significant and multifaceted maritime security challenges that necessitate a comprehensive and integrated approach. The primary threat of illegal, unreported, and unregulated (IUU) fishing, driven largely by foreign vessels from China and Vietnam, underscores the need for enhanced surveillance and enforcement capabilities to protect Indonesia's marine resources and economic interests. Territorial disputes, particularly those involving China's nine-dash line, pose ongoing threats to Indonesia's sovereignty and

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territorial integrity, requiring robust diplomatic and regional cooperation to mitigate these tensions.

Additionally, the prevalence of transnational crimes such as smuggling, human trafficking, and piracy further complicates the security landscape, threatening regional stability and economic development. Addressing these challenges will require concerted efforts across multiple fronts, including legal reforms, capacity building, community engagement, and international collaboration, to ensure the long-term security and prosperity of the Natuna Sea region.

2. Effectiveness of Current Strategies

The Indonesian government has implemented several measures to address these challenges, including increasing naval patrols, establishing a dedicated maritime security agency (Bakamla), and enhancing cooperation with neighboring countries. However, the effectiveness of these strategies has been limited by several factors:

a. Resource Constraints: The vast maritime area of the Natuna Sea requires significant resources for effective surveillance and enforcement. Limited budget allocations and logistical challenges hinder the operational capabilities of Indonesian maritime forces.
b. Coordination and Integration: Effective maritime security requires seamless coordination between various agencies, including the navy, coast guard, and fisheries department. However, bureaucratic inefficiencies and lack of integration often lead to fragmented efforts.
c. Diplomatic Engagement: While Indonesia has engaged in diplomatic efforts to address territorial disputes, the complexity of the South China Sea dynamics requires more robust and consistent diplomatic initiatives. Strengthening regional alliances and participating in multilateral forums are crucial for enhancing maritime security.

In conclusion, while the Indonesian government has taken significant steps to address maritime security challenges in the Natuna Sea, such as increasing naval patrols, establishing Bakamla, and enhancing cooperation with neighboring countries, the effectiveness of these measures has been constrained by resource limitations, coordination issues, and the complexities of diplomatic engagement. The vast maritime area requires substantial resources for effective surveillance and enforcement, but limited budget allocations and logistical challenges impede the operational capabilities of Indonesian maritime forces.

Additionally, the need for seamless coordination between various agencies is hampered by bureaucratic inefficiencies and lack of integration, leading to fragmented efforts. Furthermore, the intricate dynamics of the South China Sea disputes necessitate more robust and consistent diplomatic initiatives. Strengthening regional alliances and actively participating in multilateral forums are essential for achieving comprehensive maritime security. To overcome these challenges, Indonesia must prioritize resource allocation, enhance inter-agency coordination, and adopt a more proactive diplomatic approach.

3. Policy Recommendations

To enhance maritime security in the Natuna Sea, a comprehensive strategy is necessary, encompassing enhanced surveillance and enforcement, capacity building and training, community engagement, strengthening legal frameworks, and diplomatic and regional cooperation. Investing in advanced surveillance technologies, such as satellite monitoring and unmanned aerial vehicles (UAVs), alongside increasing the presence of maritime patrol vessels and improving the operational readiness of the navy and coast guard, will significantly enhance the detection and deterrence of illegal activities.

Moreover, specialized training for maritime security personnel and improved coordination between different agencies are crucial for the effectiveness of maritime

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operations. Joint exercises with regional partners can further build capacity and foster cooperation. Engaging local communities in maritime security efforts can provide valuable intelligence and support, with initiatives such as community-based monitoring programs and economic incentives for legal fishing practices helping to reduce illegal activities.

Additionally, updating and harmonizing maritime laws and regulations to align with international standards will enhance enforcement capabilities, while clear protocols for handling maritime security incidents and prosecuting offenders are vital. Strengthening diplomatic efforts to address territorial disputes and engaging in regional security frameworks, such as the ASEAN Regional Forum (ARF) and the East Asia Summit (EAS), can bolster collective security measures. Promoting confidence-building measures and dialogue with China and other claimant states is essential for reducing tensions and fostering cooperation.

4. Maritime Security Challenges and Obstacles in the Natuna Sea

Maritime security in the Natuna Sea, part of the broader South China Sea region, has become an increasingly prominent issue in international relations and regional security. The Natuna Sea is strategically located and rich in resources, making it a focal point of geopolitical tensions, particularly among Southeast Asian countries and major powers such as China and the United States. This paper aims to provide a comprehensive analysis of the challenges and obstacles to maritime security in the Natuna Sea, considering historical context, geopolitical dynamics, legal frameworks, and regional cooperation efforts.

a. Geopolitical Significance of the Natuna Sea; The Natuna Sea, located in the southern part of the South China Sea, is significant due to its strategic location and abundant natural resources, including fisheries and potential hydrocarbon reserves. The sea is bordered by Indonesia's Riau Islands province, which includes the Natuna Islands, a critical outpost for Indonesia in maintaining its territorial sovereignty and economic interests. The region's geopolitical importance is further heightened by its proximity to major shipping lanes, through which a significant portion of global maritime trade passes.
b. Historical Context of Territorial Disputes; The territorial disputes in the Natuna Sea are part of the broader South China Sea conflict, involving overlapping claims by several countries, including China, Vietnam, the Philippines, Malaysia, Brunei, and Indonesia. While Indonesia does not consider itself a claimant state in the South China Sea dispute, it has faced challenges related to China's expansive claims, particularly those outlined by the "Nine-Dash Line." This demarcation, which China uses to assert historical rights over most of the South China Sea, overlaps with Indonesia's exclusive economic zone (EEZ) around the Natuna Islands, leading to periodic confrontations and heightened tensions.
c. Legal Framework and UNCLOS; The United Nations Convention on the Law of the Sea (UNCLOS) provides the primary legal framework for addressing maritime disputes and establishing maritime boundaries. Indonesia ratified UNCLOS in 1986, which supports its claims to an EEZ extending 200 nautical miles from its baselines. However, China's interpretation of historical rights, as reflected in the Nine-Dash Line, has created legal ambiguities and conflicts with UNCLOS provisions. The 2016 Permanent Court of Arbitration ruling in favor of the Philippines against China clarified that the Nine-Dash Line has no legal basis under international law, yet China has continued to reject the ruling, complicating efforts to resolve disputes through legal means.
d. Security Challenges and Military Presence; The Natuna Sea has witnessed an increasing military presence and maritime security challenges due to the ongoing territorial disputes. Indonesia has strengthened its military capabilities in the region, establishing a new military base on the Natuna Islands and increasing patrols to safeguard its sovereignty and resources. The presence of Chinese fishing vessels, often accompanied by coast guard ships, has led to several confrontations with Indonesian authorities, raising concerns about

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potential escalation and the risks of miscalculation. Moreover, the involvement of external powers, notably the United States, has added another layer of complexity to the security dynamics. The U.S. conducts freedom of navigation operations (FONOPs) in the South China Sea to challenge what it views as excessive maritime claims by China. These operations, while aimed at upholding international law and freedom of navigation, have been met with strong opposition from China, further contributing to the region's militarization and heightening the risk of conflict.

e. Economic Implications and Resource Management; The economic implications of maritime security in the Natuna Sea are significant, particularly concerning fisheries and potential hydrocarbon resources. The waters around the Natuna Islands are among the richest fishing grounds in the region, supporting the livelihoods of local communities and contributing to Indonesia's national economy. However, illegal, unreported, and unregulated (IUU) fishing by foreign vessels, primarily from China, poses a serious threat to these resources, undermining sustainable management and conservation efforts. In addition to fisheries, the potential for hydrocarbon exploration and extraction in the Natuna Sea has attracted considerable interest. Indonesia has been exploring the feasibility of developing these resources to enhance its energy security and economic development. However, overlapping claims and the risk of confrontations with China complicate these efforts, necessitating careful navigation of both legal and diplomatic challenges.
f. Regional Cooperation and ASEAN's Role; Regional cooperation is crucial for addressing the complex security challenges in the Natuna Sea. The Association of Southeast Asian Nations (ASEAN) plays a pivotal role in fostering dialogue and cooperation among member states and external partners. ASEAN has sought to promote a rules-based order and peaceful resolution of disputes through mechanisms such as the ASEAN Regional Forum (ARF) and the ASEAN-China Dialogue. However, the effectiveness of these initiatives has been limited by divergent national interests and the absence of a unified stance on the South China Sea disputes. The ASEAN-China Code of Conduct (COC) negotiations, aimed at establishing a framework to manage and prevent conflicts in the South China Sea, represent a critical step towards enhancing regional security. While progress has been slow, the COC has the potential to provide a more structured and predictable environment for managing disputes and promoting cooperation. Nonetheless, the success of the COC will depend on the political will of all parties involved and their commitment to upholding international law.

Maritime security in the Natuna Sea presents a multifaceted challenge that requires a holistic and cooperative approach. The region's geopolitical significance, coupled with legal ambiguities and resource competition, necessitates robust national and regional strategies to ensure stability and security. Indonesia's efforts to strengthen its military capabilities, assert its legal rights, and promote regional cooperation are critical steps in addressing these challenges. However, the success of these initiatives will depend on the political will and commitment of all stakeholders to uphold international law, foster dialogue, and work towards sustainable solutions. As the Natuna Sea continues to be a flashpoint in the broader South China Sea disputes, maintaining peace and security in the region remains a key priority for Indonesia and the international community.

CONCLUSION

Enhancing maritime security in Indonesia's Natuna Sea is a complex and multifaceted challenge that requires a comprehensive and integrated approach. By addressing the key challenges of illegal fishing, territorial disputes, and transnational crimes through enhanced surveillance, capacity building, community engagement, legal reforms, and diplomatic initiatives, Indonesia can strengthen its maritime security framework and contribute to

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regional stability. The proposed strategies and policy recommendations aim to provide actionable insights for policymakers and stakeholders, emphasizing the critical importance of securing the Natuna Sea for Indonesia's sovereignty, economic sustainability, and regional peace. This study underscores the need for continued research and collaboration to develop innovative solutions and adapt to evolving maritime security threats.

Based on the comprehensive analysis and conclusions drawn, the following recommendations are proposed to enhance maritime security in Indonesia's Natuna Sea, Invest in advanced surveillance technologies, including satellite monitoring and unmanned aerial vehicles (UAVs), to improve real-time detection and deterrence of illegal activities. Develop an integrated maritime surveillance system that enables seamless data sharing and coordination among the navy, coast guard, and other relevant agencies. Provide specialized training programs for maritime security personnel to improve their operational capabilities and response efficiency. Facilitate joint exercises and training sessions with regional partners to enhance cooperation and readiness in addressing maritime security threats. By implementing these recommendations, Indonesia can strengthen its maritime security framework, safeguard its sovereignty, ensure economic sustainability, and contribute to regional peace and stability in the Natuna Sea.

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e-ISSN: 3063-4245 p-ISSN: 3063-5705
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Journal of Maritime Policy Science
e-ISSN: 3063-4245 p-ISSN: 3063-5705
VOL 1 NO 1 APRIL 2024
https://ojs.umrah.ac.id/index.php/jmps

Unraveling the Maintenance of Southeast Asia's Maritime Security: A Look into the ASEAN Maritime Outlook

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https://doi.org/10.31629/jmps.v1i1.6878

Received: March 01, 2024 | Revised: March 15, 2024 | Accepted: April 25, 2024

ABSTRACT

The sea is an important engine of development for the growth of Southeast Asia. It has provided the states with new opportunities for growth and development. It is not surprising that many initiatives have been undertaken to leverage the vast sea in the region. Under Indonesia's chairmanship, ASEAN's focus towards the maritime domain was accentuated by the release of the ASEAN Maritime Outlook (AMO). This new addition to ASEAN's maritime security instruments serves as a reference for upcoming endeavors on the field and to avoid duplication. Through using the qualitative research methods, the author seeks to explore the ways ASEAN has sought to maintain its multifaceted maritime security. Against that backdrop, apart from elaborating what the AMO has to offer, the author also unravels the strides ASEAN has taken in maintaining some dimensions to its maritime security. The aforementioned dimensions, referring to Christian Bueger, consisted of national security, human security, marine environment, and economic development. It is found how ASEAN's effort to maintain maritime security is apparent in the initiatives done within its 3 pillars. Moreover, ASEAN also expands its effort by cooperating with actors outside of Southeast Asia in many aspects given the interconnectedness inherent to the sea. Based on the conclusion, it is recommended that ASEAN continues to prioritize and enhance its multifaceted approach to maritime security, building on the foundations laid by the ASEAN Maritime Outlook (AMO). ASEAN should intensify efforts to strengthen national security, human security, marine environment protection, and economic development through its three pillars: Political-Security Community, Economic Community, and Socio-Cultural Community. To further bolster these initiatives, ASEAN should deepen its cooperation with external partners, leveraging the interconnected nature of the maritime domain.

Keyword: AMO, ASEAN, Maritime Security, Southeast Asia

INTRODUCTION

One of the characteristics of the 20th century international system is the growing role and influence of the Indo-Pacific region. From the emergence of new global giants like China to the vast growth of its regional power counterparts like South Korea, Australia, and Japan, the region has long been on the minds of the old guards of the west. Such a reality is apparent in the strong presence the US and others have built over the years in this new stage of geopolitics. Apart from the grand picture of the Indo-Pacific and its aforementioned states, it is also important to take into account the very heart of the region, Southeast Asia.

As impressive as the growth of East Asia states have been in the last decades, one can not overlook the same occurrence in Southeast Asia. Following the tumultuous chapters of

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e-ISSN: 3063-4245 p-ISSN: 3063-5705
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the region's history, from the rise and twilight of the Cold War to the economic crisis that pervaded the region in the last decades, growths and developments have filled the region's plate. Now, the region has gone the distance in its trajectory of growth. An example can be made out of its GDP where Southeast Asia's combined GDP was the third largest in 2021 (Kominfo, 2023). Moreover, Southeast Asia's enormous population, being the third largest population, has also caught the attention of investments from outside of the region (Yogatama, 2023). However, the stream of investments is not the sole engine of the region's growth. One of the key region's engines of growth is present in an inseparable part of its identity, the sea.

As one of the engines of growth, the sea becomes the base for numerous industries and activities to take place. Long before present times, the people of Southeast Asia have relied on the sea as a means of subsistence, notably through fishing (Morgan & Staples, 2006). Now, the fishery industry stands as one of the key activities taking place on the region's vast sea. Almost all states in the region have leveraged on the priceless resources, from the fish to natural gas, that are stored below the sea. In 2018, Southeast Asia was responsible for around 52% of the global fishery production which amounted to almost 50 million MT of fish (Winch, 2022). The sheer size of the fishery industry alone has attracted many people across the region to join the industry as migrant fishers. In regard to other resources like natural gas, the landscape in Southeast Asia has also garnered attention as discovery of gas columns have occurred in states like Indonesia (Cavcic, 2023). Against that backdrop of utility, it is imperative for the sea to remain stable and secured from any threat.

As laid out by Christian Bueger, the dimensions of maritime security comprises national security, human security, economic development, and marine environment. The aforementioned dimensions are related that one can not seek to attain maritime security by not undertaking a holistic effort that encompasses them all. In the ever-globalizing world we live in, numerous threats have emerged alongside the many innovations it brought about. Threats to the region's maritime security can arise not only from state or non-state actors, but also from events taking place there. The former can be seen in conflicting interests between states, like the one occurring in the South China Sea, or the presence of non-state groups with ill intention as seen in many assortments of transnational crimes on the sea.

The latter is closely related to the environmental dimension of maritime security as apparent in the likes of environmental degradation as a result of unsustainable exploitation of the sea. The aforementioned assortments of threats have occurred in the past and in present times in Southeast Asia. At times, difficulty to overcome those threats would be too much for a single state given the strong interconnectedness inherent to the sea. What is meant by the interconnectedness in the sea is how the maritime security of one state in a region is closely related to that of its neighbors. Under such circumstances, The Southeast Asian states would need to work together to maintain maritime security from the plethora of threats in the region.

To accommodate cooperation and dialogue between states in Southeast Asia, the Association of Southeast Asian Nations is present for that end. Established with the Bangkok Declaration in 1967, the regional bloc that initially had 5 member states has grown to encompass the whole Southeast Asia. Its vast growth in membership has made it inevitable for ASEAN to cater to far wider areas of interests. From economic cooperation and conflict resolution to the bigger regional integration for Southeast Asia, ASEAN has been involved in the region's development over the decades of its existence. One of the areas of cooperation and deliberation that the regional bloc is no stranger to is its maritime security. ASEAN has had its share of experience in deliberation on said matters, not to mention how it has its own forum for maritime deliberations, that is the ASEAN Maritime Forum (Agastia, 2021).

Such is the case as member states have made use of its capacity as a forum to highlight issues related to the region's sea which then could open the door for an agreement or a

Journal of Maritime Policy Science
e-ISSN: 3063-4245 p-ISSN: 3063-5705
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practical initiative. Apart from the aforementioned ones, in 2023, ASEAN released another strategic document that highlights ASEAN's initiatives in the maritime domain which entails existing cooperation and maritime security.

During Indonesia's chairmanship in ASEAN, the ASEAN Maritime Outlook or AMO was released. In the past, research overtures have been done over the field of Southeast Asia's maritime security. Many of those undertakings were done over threats to the region's maritime security, like maritime piracy and its adaptation (Hastings, 2020), or the relevant initiatives under the ASEAN banner like the ASEAN Coast Guard Forum in 2023 (Manullang, 2023). However, given the recent release of the AMO, there has been little to no undertaking to properly look into it. With that in mind, the author aims to provide explanations as to what the AMO has to offer for the region's multifaceted maritime security as well as highlighting the challenges inherent to the region's maritime security. Through this undertaking, it is hoped that a look into the new chapter of Southeast Asia's maritime security development can be provided which could enrich the existing knowledge landscape of the topic.

METHODOLOGY

In undertaking its research problems, the author utilizes the qualitative research method in the paper. The qualitative research method can be understood as a research method that is done through qualitative examination of data from which the conclusion can be drawn. Qualitative research method is more concerned with understanding the problem or subject at hand as opposed to predicting the outcome (Denzin & Lincoln, 2011). This approach involves the use of both primary and secondary data sources to provide a well-rounded explanation in the discussion section of the paper. Primary data is collected from official documents and records of relevant organizations, such as ASEAN, ensuring that the information is authoritative and directly related to the topic.

Secondary data, on the other hand, includes insights from previous studies, academic articles, and pertinent media coverage, offering a broader perspective on the issue. The data from these sources is then synthesized to create a cohesive narrative and is triangulated to enhance the reliability and validity of the findings. Triangulation involves cross-verifying information from multiple sources to minimize the risk of misinformation and bias. This thorough process of data collection and analysis forms the foundation for the arguments and conclusions presented later in the paper, ensuring that the discussion is grounded in robust and credible evidence. By using the qualitative research method, the author aims to provide a nuanced and detailed exploration of ASEAN's efforts in maintaining maritime security, drawing from a rich array of documentary and empirical sources.

RESULTS AND DISCUSSION

1. The ASEAN Maritime Outlook

The ASEAN Maritime Outlook or AMO is a strategic document that contains the plentiful cooperation on the maritime field that ASEAN has undertaken over the years. The launch of the first document was done back in August 2023, during Indonesia's chairmanship in ASEAN (MOFA Indonesia, 2023). The document, prior to its launch, had been around for some time, making its presence in numerous ASEAN deliberations like in the ASEAN Political and Security Council (APSC) meeting in 2022 (Kurmala & Suharto, 2022). Indonesia played an important role not only during its launch in 2023 but even in its early stages of formulation. Long before that, Indonesia had sought to formulate the document to support the ASEAN Outlook on the Indo-Pacific (Bradford, 2023). In the future, the document is expected to be published every 3 years where it would be updated with new maritime initiatives.

The emergence of the strategic document could serve numerous purposes, one of them being its role as the container of the many maritime initiatives ASEAN has spearheaded

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e-ISSN: 3063-4245 p-ISSN: 3063-5705
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or been involved in over the years. While this may appear simple, its importance can not be downplayed. Such is the case as, referring to Moch Faisal Karim, there are many maritime initiatives among ASEAN member states as a result of the different interests or priorities each member states have in regard to the sea (CSDR New Delhi, 2023). For example, other states may have a higher stake on the national security dimension, like the claimant states in the South China Sea dispute, whereas such concerns may not resonate at all with other states in the region. Another purpose it serves is its role as a reference for ASEAN to point out opportunities for cooperation that would complement the existing initiatives. This particular purpose can be understood upon learning the different capacity in the maritime domain that each member state has.

ASEAN's centrality is another matter that the AMO can be paired with. ASEAN centrality can be understood as the ASEAN's centrality in the regional order of Southeast Asia (Indraswari, 2022). With such a centrality in place, ASEAN has a bigger chance of being relevant to the region's development and states' interest there. States would find ASEAN to be an important element to their national interest in the region either as a means to engage with other states or even to work together over regional issues, including ones in the maritime domain. In regard to the AMO, the strategic document could serve as a means to underline ASEAN's centrality, notably its internal centrality, to its member states. What is meant by that is how the existing regional architecture on maritime cooperation, including maritime security, which is enjoyed by the states in the region could come to be as a result of ASEAN's presence to accommodate their interaction.

The many initiatives that the member states have partaken in the past can be seen in the strategic document itself. Another way the AMO supports ASEAN centrality is how it promotes enhancement among member states over maritime issues by highlighting ASEAN's principles like non-intervention, rule-based framework, equality, mutual respect, and other values that are enshrined in the ASEAN Charter and Treaty of Amity and Cooperation in Southeast Asia. It is also important to point out how apart from accentuating said values, ASEAN also takes into account the bigger international regime like the 1982 UNCLOS (United Nations Convention on the Law of the Sea) as one of its guiding principles.

The launch of the AMO can be viewed as another proof of ASEAN's commitment to cooperate on matters related to its maritime domain as well as the great deal it puts over the stability and security of its sea. Upon looking at the contents of the outlook, one may see how many of the initiatives do not have maritime security as part of its title. The absence of said naming does not mean that maritime security is not the main concern contained in the document. One way to look at it is by understanding how maritime security itself is quite multifaceted as apparent in its many dimensions. Hence, should an initiative appear to only be concerned with the environmental or economic dimension of the issue, it is nonetheless also concerned with maritime security.

As mentioned before, the primacy of the sea itself for the region can not only be seen in its role as the base for numerous industries, but also upon looking at the growing threats to the sea as a whole. However, one can not overlook the prospect to overcome said challenges. While it is true that the strong interconnectedness in the sea and the non-state nature of the threats make it seemingly overwhelming to tackle, said interconnectedness also pushes states, especially within the region, to come and work together. This is apparent to witness in the many maritime initiatives that ASEAN and its pillars have undertaken to further the member states' interest in the maritime domain.

2. The 4 Encompassed Dimensions of Maritime Security

As previously mentioned, maritime security has some notable dimensions that consist of national security, economic development, marine environment, and human security

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(Bueger, 2015). Similar to the maritime domain, the threats on the field are also interconnected in how they can affect more than one sector (Bueger et. al., 2019). A threat to one sector can resonate on other sectors as well, like how Illegal, Unreported, Unregulated fishing could not only jeopardize the blue economy practice (economic dimension), but it could also harm the marine ecosystem as a result of its unsustainable practice.

That attribute makes it necessary for a holistic approach that not only involves cross-sector planning but more states as well. Moving back to the AMO, the aforementioned need for such an approach can be seen to imbue ASEAN as seen in the many initiatives contained in the document. Maritime cooperations in ASEAN take place in its three pillars, that being the ASEAN Political Security Community, ASEAN Economic Community, and the ASEAN Socio-Cultural Community. The existing initiatives in the ASEAN Political Security Community have a stronger focus on the national security dimension of maritime security. Cooperations in this pillar could take place in many of its bodies like the East Asia Summit, ASEAN Maritime Forum, ASEAN Defence Ministers' Meeting, ASEAN Regional Forum, etc.

Matters that are discussed here have the national security dimension as its salient feature. Regional issues that could have major repercussions to a state's national security emanating from state to state dispute or more direct threats take the center stage. Deliberations over numerous threats or issues in the maritime domain could occur in the aforementioned bodies. Some of its outputs could range from declarations or statements to call for cooperation or effort to combat threats in the maritime domain, like the EAS Statement on Enhancing Regional Maritime Cooperation (ASEAN, 2023).

Another example of the national security dimension of maritime security at work is the deliberations of regional issues like the outlook towards regional development as well as ongoing issues like the South China Sea dispute. A by-product of the ASEAN Foreign Ministers' Meeting is the ASEAN Outlook on the Indo-Pacific that highlights the outlook towards the region's development as well as areas of cooperation which includes maritime security. As for the South China Sea dispute, efforts to push for progress have been taken like by the release of the Declaration on the Conduct of Parties in the South China Sea and the ongoing progress to come up with the Code of Conduct in the South China Sea.

The approach to maritime security is also present in the form of capacity building activities. Training and exercises or workshops have been held on numerous occasions involving member states over a range of maritime issues like combating transnational crimes on the sea to maritime law enforcements. In the ASEAN Economic Community, the cooperations have a stronger focus on the economic dimension of the issue. Deliberations within this pillar may occur in the ASEAN Ministers on Agriculture and Forestry, ASEAN Transport Ministers Meeting, Meeting of the ASEAN Tourism Ministers, High-Level Task Force on ASEAN Economic Integration, etc. The scope of the issue here can range from trade policy and blue economy, and fishery development over maritime goods to its forthcoming shipping process. Threats that could jeopardize the economic dimension also resonate with the previously discussed dimension.

Transnational crimes like illegal, unreported, unregulated fishing (IUU fishing) is a good example as it could jeopardize the practice of the blue economy given its severe impact (Ma, 2020). An initiative related to that issue is present in the ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain. Another example of maritime security imbued initiative is present in the security initiatives, notably ones related to port security and search and rescue operations. The former can be seen in the 2017 Regional Action Plan on Port Security that is concerned with port security measures and the relevant human resource development. As for the latter, the establishment of a specific forum, like the ASEAN Transport SAR Forum, that caters to the said matter is also another example in the pillar.

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The salient feature of cooperations in this pillar is its focus on the environmental and human dimension of maritime security. Cooperations under the ASEAN Socio-Cultural Community are done over sectoral bodies like the ASEAN Ministerial Meeting on Environment and the ASEAN Labour Ministers Meeting. Against that backdrop of concerns, ASEAN has made numerous strides on efforts to maintain the security of said fields. In regard to the environmental dimension, marine debris is one of the threats to the region's sea. Debris on the sea has the capacity to jeopardize the marine ecosystem which in the long run would also have its toll on the economic activity and human health (Purba et. al., 2019).

To face that threat, ASEAN has formulated numerous initiatives like the ASEAN Framework on Marine Debris and the ASEAN Regional Action Plan (RAP) on Combating Marine Debris. Similar to the previous pillars, some of the issues there also come to be seen as such. One in particular is transnational crimes with the likes of human trafficking taking the forefront given its immense threat towards human security. In regard to human security, ASEAN has developed numerous declarations and frameworks to overcome existing threats. Concerns over those who work on the sea have caught the attention of ASEAN as apparent in one of its newest strides known as the ASEAN Declaration on the Placement and Protection of Migrant Fishers (Greenpeace Southeast Asia, 2023). The declaration represents ASEAN's awareness of the plight of migrant fishers who play an important role in the region's fishery industry as well as the desire to fulfill their rights to a safe workplace.

Apart from the three ASEAN pillars, maritime initiatives involving ASEAN are also present elsewhere. ASEAN has established a wide web of relations with other states beyond Southeast Asia, from those in East Asia all the way to South America. The strong ties it has established has led to numerous cooperations across many fields, including ones on the maritime domain. The existing cooperation, along with the potential fields in the future, can be taken as another example of ASEAN's external centrality. As opposed to internal centrality, the external counterpart is concerned with how ASEAN is relevant or important for states that are not its member states. Another reason that could drive maritime cooperation, including but not limited to maritime security, is the interconnected nature inherent to the sea.

An example here can be made by the relations ASEAN has maintained with global powers like the US and China even as they are both in competition for influence in the region. In regard to the US, under the strategic partnership, ASEAN has the opportunity to further cooperate with the US on maritime cooperation that seeks to promote understandings of existing international regimes as well as regional stability. As for China, even amidst the existing dispute on the South China Sea, the two still have the leeway to work together and maintain ties through numerous maritime cooperation. Said cooperation could range from the framework to avoid tension, like efforts to conclude a Code of Conduct in the South China Sea, to cooperations to overcome a common threat like transnational crimes on the sea.

Moreover, the resort towards ASEAN can also be seen as a means for capacity building or knowledge sharing in the maritime domain. This particular example can be seen in ASEAN partnerships with European states like France, Germany, and Italy that entail maritime cooperation on issues like maritime debris, IUU fishing, and circular economy.

3. Challenges and Opportunities beyond the Sea

Following the litany of maritime initiatives ASEAN has developed over the years, the document also lays out the existing challenges and opportunities that could be worked on. In the long run, there also remains numerous issues in the maritime domain to be worked on by the regional bloc. Maritime cooperation in the region has many room to be strengthened, from areas of cooperation over renewable energy, blue economy, sustainable development, etc. Putting them aside, the AMO also underlines some notable maritime security issues that still

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remain on the region's plate. Some notable ones fall under the transnational crimes group like IUU fishing and maritime piracy (ASEAN, 2023).

The aforementioned threats can inflict severe damage to the region's maritime security. Its capacity to do so is also further exacerbated given the interconnected nature of maritime security's dimensions. For example, the presence of the two threats could jeopardize and bring about instability to the region's sea. Such a condition would make activities on the sea involving cargo, fishing, or even passenger vessels exposed to the risks associated with those threats. Should such a landscape come to fruition, it would certainly not benefit the region's growth given the important role the sea holds for the states in the region. Another important thing to point out is how incapacity to overcome those threats could also negatively affect ASEAN centrality.

Said implication could come about in the form of stronger presence of outside powers, like the US and China, in the region, including its maritime domain. The global powers' presence in the region could be further accentuated should they find that the ongoing state of the region's maritime security as detrimental to their interest. Yes, ASEAN member states are not only ones that place huge importance on the region's maritime security. States like the US and China have had their share of initiatives, from programs on the field to cooperation with ASEAN or its member states, over issues in the maritime domain (Paszak, 2021).

The growing presence the two states could have in the region may outshine that of ASEAN should they be able to better cater ASEAN member states' interests as opposed to ASEAN itself. Such a case could potentially push ASEAN out of the region's spotlight, making them not as relevant as they could have been. This particular fragmentation or cohesion issue itself is already present in the South China Sea dispute as ASEAN member states can not find a common ground as they have different views towards the dispute (De Castro, 2020). Hence, ASEAN's awareness towards what's at stake as seen in the AMO demonstrates the importance it puts for future endeavors in maintaining maritime security.

Opportunities that ASEAN can explore to address the existing challenges that emanate from the aforementioned threats are present within and outside of ASEAN. Within ASEAN, ASEAN underlines the importance of enhancing the ASEAN Maritime Forum. The use of this ASEAN body could be further developed to enhance its capacity to facilitate dialogues and information sharing. Similar attention is also given to the regional bloc's lead sectoral bodies. For the latter, ASEAN is also aware of the potentials that cooperations with external partners have to offer. The document highlights the prospect to do so by mentioning the existence of a relevant framework to ground said opportunity like the AOIP.

It is also important to note the existing network of cooperations that ASEAN has established with external states across the world (ASEAN, n.d). The wide scope of states is not the only thing that could be developed, but also the scope of activities, which has taken the form of strategic partnerships, capacity building initiatives, and dialogues. The inclusion of external states to the region's maritime security maintenance could help in bolstering the available capacity for the task. Cooperations involving them could pave the way for a more holistic approach to the region's maritime security. Through some of those opportunities, it is hoped that the management and coordination of a plethora of maritime issues in the region could be improved.

CONCLUSION

The centrality of maritime security in Southeast Asia has made it an important matter to be paid attention to by ASEAN. Through its numerous sectoral bodies and member states, ASEAN has brought about numerous initiatives that embody maritime cooperation that at times could also entail the involvement of external states. One of ASEAN's recent overtures came in the form of a strategic document known as the AMO. The aforementioned document

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was released in August 2023 as another output of Indonesia's chairmanship in ASEAN. The document provides a litany of ASEAN maritime initiatives over the years which could be used as a reference for future endeavors as well as to avoid duplication of similar strides. The AMO lays out three pillars that encompass ASEAN's maritime initiatives that consist of the APSC, AEC, and ASCC.

Many initiatives under those pillars have their focus on the 4 dimensions of maritime security, from human security, marine environment, national security, and economic development. Finally, in regard to challenges and opportunities, the AMO highlights the threats posed by transnational crimes like maritime piracy and IUU fishing towards the region's maritime security and stability. As for opportunities to explore, the AMO points out numerous areas of cooperations in the maritime domain like renewable energy and sustainable development. It also points out the need for a collaborative approach that would require the involvement of external states that also have their share of interest in the region. Given its novel nature, there lies many things to be observed in regard to the AMO. Later down the road, other undertakings over the AMO could be done, for example by looking at its future development and how ASEAN's commitment to maintain maritime security would evolve as the years go by.

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Journal of Maritime Policy Science
e-ISSN: 3063-4245 p-ISSN: 3063-5705
VOL 1 NO 1 APRIL 2024
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