

IDENTIFICATION OF KEY FACTORS IN THE DEVELOPMENT OF NAVAL BASES IN MAINTAINING MARITIME SECURITY IN INDONESIA

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The dynamics of the strategic environment in ALKI II continue to evolve due to geopolitical changes, increased international trade activities, and the potential for increasingly complex maritime security threats. This condition demands the optimization of the role of the Naval base as an operational control center in maintaining regional stability and sovereignty. The base must be able to function effectively in maritime surveillance, improve operational readiness, and strengthen its ability to respond to various threats, both from state and non-state actors.

This study aims to analyze the factors that influence the development of naval bases in supporting Indonesia's maritime defense and security. Using the Delphi method approach, this study involved 15 experts in the field of maritime defense and security. Through a systematic analysis process, this study succeeded in identifying 39 main factors that play a role in the development of the Naval base. These factors include aspects of base infrastructure, level of expertise, territorial control, operating patterns, defense, coastal defense, political, economic, social and technological aspects.

The results of this research are expected to be the basis for the formulation of a strategy to strengthen naval bases that are more adaptive, modern, and able to respond to future maritime security challenges effectively and sustainably.

Key words: *Development Planning, Naval Base, Delphi, Maritime Security.*

1. INTRODUCTION

The development of the strategic environment at the global level shows that there is increasingly intense competition between the world's great powers (Zendelovski, 2024). In modern geopolitical dynamics, countries with superior

military capabilities tend to have a stronger bargaining position in relations (Nye & Keohane, 1990). This is due to their ability to defend sovereignty, protect national interests, and project power in various strategic areas (Budiana & Budiman, 2024).

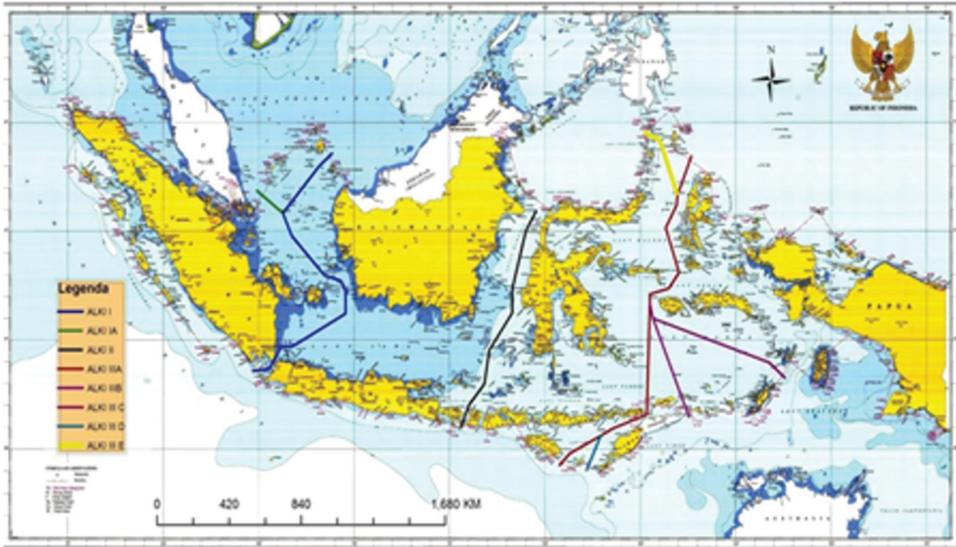


Fig. 1. Map of the Sea Channel of the Indonesian Archipelago.

Indonesia as the largest archipelagic country in the world plays an important role in the global maritime map with its abundant marine resource potential, as well as a strategic crossing route in the Indonesian Archipelago Sea Channel (ALKI) for international shipping connecting the Indian Ocean and the Pacific Ocean (Cribb & Ford, 2009). This strategic position makes Indonesia not only a center of maritime economic activities, but also a region that is vulnerable to various global interests (Attamimi, 2024). As a result of increasingly fierce global competition, various potential threats have emerged that can disrupt national security stability (Horowitz et al., 2022). These threats are not only conventional, but also increasingly complex and vary

with the times. Conflicts of interest between countries often trigger tensions in various strategic sectors, including economic, political, and defense. Traditional forms of threats faced include military conflicts, territorial violations, and foreign infiltration that can threaten the country's sovereignty. Meanwhile, non-traditional threats are on the rise, such as piracy in the waters, smuggling of illegal goods, human trafficking, as well as cybercrime that attacks national digital infrastructure (Arto et al., 2019). In addition, terrorist activities are also a serious threat that has the potential to shake the stability of the country. Not only that, the uncontrolled exploitation of natural resources also causes environmental damage that has an impact on ecosystem sustainability and community welfare.

In addition, military dominance also plays a role in determining the direction of global policy, both in economic, diplomatic, and security aspects (Buyukakinci, 2024). Therefore, Indonesia needs to strengthen its maritime defense to be able to face various increasingly complex challenges. One of the strategic steps that can be taken is to increase the capacity and infrastructure of the Navy base (Amelia et al., 2022). Naval bases must continue to function optimally in accordance with their role and not experience decreased effectiveness (degradation) in the face of various threats, disturbances, obstacles, and challenges. Thus, the Naval base can continue to operate optimally in maintaining the sovereignty and security of Indonesia's maritime territory.

This research aims to identify the factors necessary in the development of a Naval base. The implementation of this research is important to provide an overview of efforts to maintain sovereignty and maintain national security stability, especially in ALKI areas that are vulnerable to various threats, both traditional and non-traditional (Sartono et al., n.d.). In addition, this research contributes to the field of maritime defense by formulating base development strategies that are adaptive, effective, and in accordance with global challenges. The analysis is carried

out based on various key aspects, including base infrastructure, personnel competence, territorial control, operating patterns, and coastal defense, so as to create sustainable and optimal maritime security.

This research is supported by sea power theory, maritime security theory and base theory. Statistical descriptive qualitative methods are used in the research to analyze survey data and factors of the Navy base, qualitative methods use approaches such as delphi to explore the opinions of relevant experts in the field of maritime defense involving 15 (fifteen) experts from stakeholders academia and practitioners, this consensus is important to understand the relationship between strategic variables and produce solutions based on collective thinking, While descriptive statistics are used to analyze the data obtained such as the assessment scale in the questionnaire, identifying priorities and patterns of relationships between elements.

This research offers several contributions. First, the study develops a theoretical framework that integrates various theories to provide a deeper understanding of how bases can adapt to changing threats and defense needs. Second, in terms of practical implications, this study provides concrete recommendations for infrastructure development, the application of advanced

technologies and policies related to sustainable base management. These recommendations not only enhance Indonesia's maritime defense capacity, but also offer practical guidance for policy-making and operational management of bases, so that they can be better prepared to face evolving global challenges.

2. LITERATURE REVIEW

2.1. Sea Power Theory

The Sea Power theory developed by Alfred Thayer Mahan is one of the important pillars in the study of maritime power. Mahan emphasized the importance of the strength of the sea fleet supported by maritime infrastructure, namely the existence of bases or ports that have a strategic role for ships sailing (MacHaffie, 2020).

Sea power is not only about having a powerful warship, but also the ability to maintain and project that power (Grove, 2021). This is where the importance of the seabase lies. The base is a critical element that allows fleet operations to take place effectively and sustainably. Without an adequate base, sea power will lose its flexibility, logistics become disrupted, and power projection capabilities are limited (Marsetio, 2019).

2.2. Marine Safety Theory

Maritime security theory refers to multidimensional efforts to address

threats in the maritime region that include inter-state conflicts, maritime terrorism, piracy, illegal trade, and environmental damage.

As a dynamic concept, maritime security is often considered a buzzword in international relations, reflecting uncertainty in definition but creating a foundation for cross-actor coordination. Bueger (2015) in his article proposes three main approaches to understand maritime security, namely First, through the maritime security matrix which connects security with other concepts such as marine safety, sea power, blue economy and resilience (Chapsos, 2016); Second, a securitization framework that explores how threats are politically constructed (Piedade, 2016); Third, the theory of security practices that focus on real actions such as maritime patrols and law enforcement (Bueger, 2013).

Wibawa et al (2021) emphasized this theory emphasizing the need for international and cross-sectoral collaboration to create inclusive and sustainable security in the maritime region.

2.3. Base Theory

Bases are one of the pillars in military strategy that underlie the planning and implementation of armed forces operations in various parts of the world (Zulham & Saragih, 2019). Alfred Thayer Mahan (1890) first emphasized the importance of

a strong base as a key element in creating maritime dominance and maintaining the stability of global trade routes. The effectiveness of a base is determined by its location, especially in a major trade route or strategic area (Bell & Griffis, 2015). In addition, technological developments in the 20th century added new dimensions to this theory, such as air bases, cross-domain bases, to space bases that integrate radar, satellite communications, and air defense systems.

In the 21st century, the concept of military bases continues to evolve by adopting a forward operating bases (FOB) approach to support military operations in conflict areas (Wong, 2006). FOBs are designed to be smaller but flexible, such as those applied by the United States military in the wars in Afghanistan and Iraq.

In the modern context, bases are becoming an integral part of multi-domain strategies that span land, sea, air, cyber, and space, making them relevant in the face of traditional and non-traditional threats such as terrorism, piracy, as well as cyberattacks. The base also functions to support operations through five main functions: rebase, refuelling and replenishment, repair, and rest and recreation (Okol, 2015).

3. METHOD

The type of research used in this study is categorized as qualitative

research with descriptive statistics referring to (Widyaksa et al., 2024). This study uses literature from journal articles, interviews, and observations as a method of data collection. Data was collected through questionnaires given to 15 expert panels to reach consensus using the Delphi method, with the aim of identifying factors influencing the development of the Naval Base.

To analyze the survey data, a descriptive statistical approach is used, which presents statistics and percentages of each aspect of the criteria. The Delphi method is applied in two stages, namely the pre-Delphi study and the successive Delphi study.

In the pre-Delphi stage, research indicators were identified based on the approach developed by (Okoli & Pawlowski, 2004). Furthermore, the data that has been collected is analyzed using Nvivo software for qualitative analysis and Microsoft Excel for quantitative analysis.

3.1. Selection criteria for the expert panel

The Delphi method relies on the selection of experts who have in-depth insight into the issue under study (Flanagan et al., 2016). In qualitative research, the role of experts is crucial, so demographic details that explain their credentials are needed. This step aims to assess the level of expertise and ensure that they are

truly competent in contributing to the research. The selection of experts is carried out based on predetermined criteria, such as education level, field of expertise, experience, and professional activities.

These criteria are designed to maintain the credibility of the research by ensuring that the experts involved are reputable and respected individuals in their fields. Previous research has also confirmed that the selected experts must have a strong scientific foundation, as well as sufficient experience and skills to support the validity of the research results.

group so that an effective process is achieved in obtaining solutions to complex problems. The Delphi method aims to reach consensus from a series of information mining processes. In carrying out the Delphi method, opinions and judgments from experts and practitioners are needed (Halim et al., 2021). In carrying out the Delphi method, opinions and judgments from experts and practitioners are needed.

In the Delphi method, 10-15 problem topic items are suggested, while the number of respondents is suggested between 15-20 respondents (Lee et al., 2020). The process of

Table 1. Demographic information of the experts.

Characteristics	Amount	Percentage
	n	%
Rank		
<i>Major</i>	1	0,07
<i>Liutenant Colonel</i>	4	0,27
<i>Colonel</i>	10	0,67
Work Experience		
16 Y-20 Y	1	0,07
21 Y- 25 Y	4	0,27
> 25 Y	10	0,67
Graduate		
<i>Post Graduate</i>	13	0,87
<i>Doctoral/Phd</i>	2	0,13

3.2. Delphi Method

The Delphi method was developed by Derlkey and his associates at the Rand Corporation, California in the 1960s. The Delphi method is a method that harmonizes the communication process of a

implementing the Delphi method is approximately 45 days with a span of two weeks per round of the panel. The consensus process in the panel. The consensus process in the Delphi method occurs when there is a percentage of 80% of all members with a score scale of 0-7. Gunduz &

Elsherbeny (2020) suggest at least 70% with the average value of each item of questionnaire points being three or four Likert scales and having a median score of at least 3.25.

According to Karakikes & Nathanail (2020), there are three main steps in this process, namely:

- a) The first questionnaire was sent to the expert panelists to ask them for some of their opinions (from experience or within their assessments), some predictions and also their recommendations.
- b) In the second round, a summary of the results of the first questionnaire was sent to each expert panelist to be able to re-evaluate their first assessment on the questionnaire using the set criteria.
- c) In the third round, the questionnaire was given again with information about the results of the panelists' assessment and the consensus results. The panelists were asked again to revise their opinions or explain the reasons for disagreeing with the group consensus.

3.3. Content Validation Index (CVI)

The Content Validity Index (CVI) is an important method for assessing the content validity of an

instrument and is widely used in various fields of research. The CVI measures the level of agreement among experts regarding the relevance or representativeness of each item in an instrument. This method provides insight into the validity of content, both at the level of a specific item (Item-level CVI/ I-CVI) and as a whole in a single instrument (Instrument-level CVI). The CVI calculation is carried out based on the evaluation of experts on each item, taking into account the extent to which the item is relevant or represents the concept being measured (Almanasreh et al., 2018).

To explore the factors that influence the panel's agreement regarding the achievement of Minimum Essential Strength (MEF) in a domain during the Delphi process, standard mean and deviation calculations were used to measure the degree of factor convergence. A panel of experts assessed the level of importance of each goal using a 5-point Likert scale, which helps in understanding the extent to which agreement was reached among the experts (Stancine et al., 2019). To assess the validity of the content, this study used the item-level content validity index (I-CVI) and the scale-level average content validity index (S-CVI/Ave). S-CVI/Ave is determined by dividing the number of I-CVI scores by the number of items. An S-CVI/Ave of

≥ 0.8 is considered acceptable, while an S-CVI/Ave of ≥ 0.90 indicates excellent overall content validity. On the other hand, I-CVI is calculated from the number of experts who assess an item ≥ 3 divided by the total number of experts, with I-CVI ≥ 0.78 acceptable. The literature suggests that for a new assessment instrument to be considered valid, it must achieve a total CVI of ≥ 0.90 or 90% and I-CVI of ≥ 0.78 or 78% (Marisa, 2021).

In these cases, the S-CVI/Universe method is not used due to the large size of the expert panel, potentially leading to results to an unacceptable level. Moreover, this approach does not take into account the possibility of coincidental agreement among experts (Roya & Behrooz, 2017) emphasizing the method's reliance on expert consensus without adjustment for the randomness of the answers.

In exploring the factors that influence the panel's consensus regarding the achievement of Minimum Essential Forces (MEFs) in a given domain (during the Delphi round), mean and standard deviation are calculated to measure factor convergence. The assessment of the importance of each goal by a panel of experts is facilitated through a 5-point Likert scale (Stancine et al., 2019).

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4. RESULT

The identification of factors influencing the development of a Naval base is carried out through a comprehensive literature review as well as insights from experts in the field of maritime defense. To obtain

accurate and objective data, this study involved a panel of 15 professionals, academics, and stakeholders who have experience and expertise in the military and maritime defense fields. This study uses the Delphi method, which aims to evaluate and reach consensus among experts on the main criteria in the development of a Naval base from a military point of view.

As a first step, the list of factors relevant to the development of the Naval base is systematically compiled based on the results of

literature studies and input from experts. This list is then entered into a questionnaire specifically designed to gauge the level of agreement among the expert panel. Each expert was asked to respond to the criteria that had been compiled by expressing their agreement or disagreement using verbal variables. Through this process, research can identify the factors considered most crucial in the development of the Naval base, so that it can be the basis for the formulation of more effective and sustainable strategies.

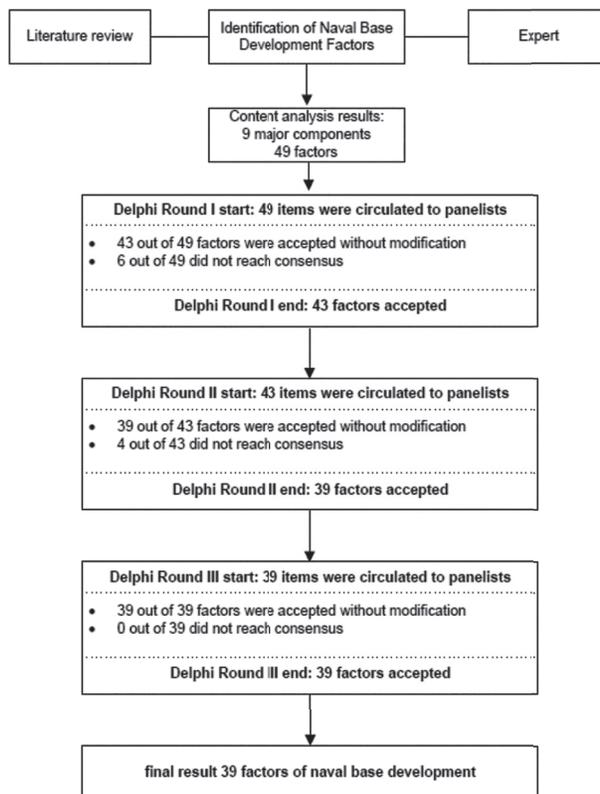


Fig. 2. Proposed research framework.

Round 1: The initial round involved distributing a Google Form questionnaire to 15 expert panelists. This questionnaire outlines the research and its objectives and includes 9 variable aspects: 6 items on the infrastructure of the Naval Base, 5 items on personnel competence, 6 items on territorial control, 5 items on operating patterns, 6 items on coastal defense, 7 items on politics, 5 items on economics, 5 items on social, 4 items on technology. Using a Likert scale of 1-5 for the assessment, the assessment of completion time is between 10-15 minutes. The analysis shows that all aspects are very important in the preparation of the assessment tool, as evidenced by the average level of importance of each dimension being above 3 (mean). The item-CVI score ranges from 0.73 to 1, validating all items. The set achieved an S-CVI of 87% (≥ 0.8 acceptable) and an I-CVI of 82% (I-CVI ≥ 0.78 acceptable), without any suggestion for modification of themes or indicators (Lakmini et al., 2023). The first round resulted in the elimination of 1 operational pattern item, 2 coastal defense items, 1 political item, 1 economic item, 1 social item, thus shrinking from 49 items to 43 items.

Round 2: Two weeks later, the

second round asked experts to assess the CVI of the remaining 43 items across 9 variable aspects. Item-CVI ranges from 0.73 to 1. Again validating all items on a Likert scale of 1-5 for the assessment, the completion time assessment estimates a time of about 10-15 minutes. This round achieves an S-CVI of 90% and an I-CVI of 82% which reaffirms the fundamental nature of all dimensions, as the average importance rating of each dimension remains above 3 (mean). This round resulted in the elimination of 4 items including 1 operation pattern item, 1 political item, 1 social item, 1 technology item so that it was reduced from 43 items to 39 items.

Round 3: After reformulation, the instrument undergoes a third round of evaluation to assess its final validity. The consensus was almost unanimous, with an I-CVI value of 83% for almost all items, which shows 100% agreement among experts. This results in an impressive S-CVI of 100%. Given the excellent S-CVI and I-CVI values, this round effectively completed the overall validity phase of the instrument, thus neveraging the need for further evaluation. All items fall into the valid or highly valid category, reaching consensus in the Delphi process.

Table 2. Expert judgment results in the first, second, and third rounds.

SN	As-pects	Item	Delphi Round I			Delphi Round II			Delphi Round III		
			A	I-CVI	Cate-gory	A	I-CVI	Cate-gory	A	I-CVI	Cate-gory
1	Infrastructure of the Indonesian Navy Base	Functions of 5R Base	14	0,93	Highly Valid	14	0,93	Highly Valid	14	0,93	Highly Valid
2		Base Defense Facilities	15	1,00	Highly Valid	15	1,00	Highly Valid	15	1,00	Highly Valid
3		Early Warning System (EWS) Radar	15	1,00	Highly Valid	12	0,80	Valid	12	0,80	Valid
4		Cyber Command	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
5		Ground Based Air Defense (GBAD)	15	1,00	Highly Valid	12	0,80	Valid	12	0,80	Valid
6		Naval Post	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
7	Skill Level	Level of Expertise	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
8		Experience	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
9		Personnel Readiness	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
10		Organizational Structure	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
11		Training and Exercises	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
12	Territorial Control	Regional Geostrategic Awareness	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
13		Intelligence Capability	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
14		Hydrographic and Oceanographic Conditions	13	0,87	Highly Valid	14	0,93	Highly Valid	14	0,93	Highly Valid
15		Maritime Surveillance System	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
16		Rapid Response to Incidents	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
17		AI for ISR (Intelligence, Surveillance, and Reconnaissance)	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid

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SN	As- pects	Item	Delphi Round I			Delphi Round II			Delphi Round III		
			A	I- CVI	Cate- gory	A	I- CVI	Cate- gory	A	I- CVI	Cate- gory
18	Operating Pattern	Operational Interope- rability	13	0,87	Highly Valid	14	0,93	Highly Valid	14	0,93	Highly Valid
19		Operational Tactics	14	0,93	Highly Valid	11	0,73	Less Valid			
20		Base Presence and Readiness	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
21		C4ISR Command and Control System	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
22		Strategic Planning of Operations	11	0,73	Less Valid						
23	Coastal Defense	Marine Battalion for Base Defense	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
24		Patrol Ships	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
25		Fixed & Mobile Mis- sile System	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
26		Sonar	11	0,73	Less Valid						
27		Sonobuoy	11	0,73	Less Valid						
28		Anti-Submarine War- fare (ASW) Defense	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
29	Politics	National Defense and Security Policy	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
30		Sovereignty and Le- gal Status	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
31		Regional Cooperation	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
32		Domestic Political Stability	11	0,73	Less Valid						
33		Territorial Violations by Neighboring Countries	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
34		Dynamic Foreign Po- litics	12	0,80	Valid	11	0,73	Less Valid			
35		Geopolitical Tensions	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid

SN	As-pects	Item	Delphi Round I			Delphi Round II			Delphi Round III		
			A	I-CVI	Cate-gory	A	I-CVI	Cate-gory	A	I-CVI	Cate-gory
36	Economics	Increased Investment Around the New Capital (IKN)	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
37		Maritime Economic Potential	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
38		Increased Defense Budget	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
39		Dependence on Resources	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
40		Global Trade Disruptions	11	0,73	Less Valid						
41	Social	Increased Public Awareness	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
42		Community Involvement in Regional Security	13	0,87	Highly Valid	13	0,87	Highly Valid	13	0,87	Highly Valid
43		Human Resource Development	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
44		Local social disturbances	11	0,73	Less Valid						
45		Illegal activities	12	0,80	Valid	11	0,73	Less Valid			
46	Technology	Digital Transformation	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
47		Implementation of Cyber Defense System	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
48		Cyber threats to modern technological systems	12	0,80	Valid	12	0,80	Valid	12	0,80	Valid
49		Dependence on foreign technology	12	0,80	Valid	11	0,73	Less Valid			

Table 3. Factors related to the development of naval bases

Code	Factors	Sources
C1	5R Base Functions	(De Yoshinov, 2022); (Suryawan, 2023); (Fajar et al., 2020)
C2	Base Defense Facilities	(Wallin, 2022); (Cabestan, 2021); (Hammes, 2021)
C3	<i>Early Warning System</i> (EWS) Radar	(Cusson et al., 2021); (Rød et al., 2024); (Guzzetti et al., 2020)
C4	<i>Cyber Command</i>	(Lindsay, 2021); (Amro & Gkioulos, 2022); (Koo et al., 2020); (Slayton, 2021)
C5	Ground Based Air Defense (GBAD)	(Bronk et al., 2022); (A. Ahmad et al., 2024); (Bjerke & Valaker, 2022)
C6	Naval Post	(Russell, 2020); (Speller, 2023)
C7	Level of Expertise	(Klein & Hoffman, 2020); (Singhal et al., 2025); (Wolff et al., 2021)
C8	Experience	(Bion & Hinshelwood, 2023); (Andresen et al., 2020); (Lau et al., 2022)
C9	Personnel Readiness	(Lubis et al., 2022); (Nwagwu, 2020); (Bloshchynskiy et al., 2021); (Frolova et al., 2020)
C10	Organizational Structure	(Verhoef et al., 2021); (Fuertes et al., 2020); (Paltridge, 2021)
C11	Training and Exercises	(Zatsiorsky et al., 2020); (Association, 2021); (Atakan et al., 2021); (Stensvold et al., 2020)
C12	Regional Geostrategic Awareness	(Lipkan et al., 2023); (MAISAIA, 2024); (Khan et al., 2023)
C13	Intelligence Capability	(Pepler, 2020); (Lina Mohammad Ahakhatreh, 2022)
C14	Hydrographic and Oceanographic Conditions	(Daudén-Bengoa et al., 2020); (de Freitas et al., 2023); (Pnyushkov et al., 2022)
C15	Maritime Surveillance System	(Liu et al., 2021); (Gamage et al., 2023); (Al-Mansoori et al., 2020)
C16	Rapid Response to Incidents	(Dias et al., 2020); (Reaser et al., 2020); (Reeves et al., 2020)
C17	AI for ISR (Intelligence, Surveillance, and Reconnaissance)	(Hintz, 2020); (Hong, 2020); (Cheng et al., 2022)
C18	Operational Interoperability	(Kasunic & Anderson, 2004); (Wegner, 1996); (Ford et al., 2007)
C19	Base Presence and Readiness	(Choucri et al., 2003); (Westgarth, 2023); (Schurger et al., 2021)

Code	Factors	Sources
C20	C4ISR Command and Control System	(Y. Li et al., 2021); (Hordiichuk et al., 2024)
C21	Marine Battalion for Base Defense	(Berger, 2021); (Carter, 2022); (Fogle, 2022)
C22	Patrol Ships	(Suardi et al., 2022); (Rahmaji et al., 2022)
C23	Fixed & Mobile Missile System	(Cui et al., 2022); (Bronk et al., 2022)
C24	Anti-Submarine Warfare (ASW) Defense	(Peters, 2021); (Tirk & Salisbury, 2024)
C25	National Defense and Security Policy	(S. Ahmad, 2022); (Bondarenko et al., 2022)
C26	Sovereignty and Legal Status	(Bondarenko et al., 2022); (Manurung et al., 2023)
C27	Regional Cooperation	(Zhang et al., 2024); (Armstrong & Drysdale, 2022)
C28	Territorial Violations by Neighboring Countries	(Ramírez, 2022); (Z. Li, 2022)
C29	Geopolitical Tensions	(Cheikh & Zaied, 2023); (Mignon & Saadaoui, 2024)
C30	Increased Investment Around the New Capital (IKN)	(Oduma et al., 2021); (Shang et al., 2024)
C31	Maritime Economic Potential	(Prasetyo et al., 2023); (Carvalho et al., 2021)
C32	Increased Defense Budget	(Robertson, 2022); (Becker, 2021)
C33	Dependence on Resources	(Nandi et al., 2021); (Maja & Ayano, 2021); (Wang & Azam, 2024)
C34	Increased Public Awareness	(Omoyajowo et al., 2022); (Okoye et al., 2021)
C35	Community Involvement in Regional Security	(Rijal, 2023); (Acharya, 2021)
C36	Human Resource Development	(Darman et al., 2023); (Hamouche, 2023); (Votto et al., 2021)
C37	Digital Transformation	(Kraus et al., 2021); (Fernandez-Vidal et al., 2022)
C38	Implementation of Cyber Defense System	(AL-Dosari et al., 2024); (Husák et al., 2021)
C39	Cyber Threats to Modern Technology Systems	(Aslan et al., 2023); (Y. Li & Liu, 2021)

5. DISCUSSION

Faced with the increasingly complex dynamics of geopolitical developments and Indonesia's strategic geographical condition as an archipelagic country, it is important for Indonesia to have a comprehensive marine security strategy. As stated in the introduction to this study, maritime security is a crucial aspect in maintaining state sovereignty and regional stability. One of the key steps in realizing an effective maritime security strategy is through the development of naval bases that can support maritime defense operations optimally.

In this context, the identification of naval bases is of great importance to ensure that its development is in accordance with national strategic needs. By identifying the main factors that affect the development of naval bases, it is hoped that the policies taken can be based on accurate data and holistic considerations. The results of the analysis show that there are 39 main sub-factors that contribute to the development of the Naval base, including **5R Base Functions**. The function of the base, which includes Rebase, Replenishment, Repair, Rest, and Recreation, is a vital element in supporting maritime operations in a sustainable manner. According to Song & Panayides (2012), bases with 5R functions are able to improve logistical and operational sustainability in modern maritime conflicts.

1. Base Defense Facilities.

Improved defense facilities, such as radars, bunkers, and air defense systems, are essential to protect the base from external attack. Ashraf et al (2022) emphasized that the modernization of defense facilities can strengthen the security of strategic bases.

2. Early Warning System (EWS) Radar.

The Early Warning System (EWS) Radar plays a crucial role in improving the ability to detect various maritime threats, such as foreign vessels, unidentified aircraft, and illegal activities in Indonesian waters (Neild et al., 2007). The implementation of EWS Radar at the TNI Navy base allows for threat identification from the beginning, so that preventive measures or responses can be carried out effectively.

3. Cyber Command.

With the increasing risk of hacking, sabotage, and digital espionage, Cyber Command ensures the security of radar, monitoring, and command control (C4ISR) systems. In addition, according to Scherrer & Grund (2009), this unit is responsible for early detection of threats, the development of data

encryption, as well as the training of personnel in cybersecurity

- 4. Ground Based Air Defense (GBAD).** Ground Based Air Defense (GBAD) protects against air threats such as attacks on enemy aircraft, drones, and missiles. Therefore, according to Nikolakakos et al (2022), improving technology and coordination in the GBAD system is urgently needed to maintain the readiness and security of military bases.
- 5. Naval Post.** The Naval Post (Posal) serves as a leading surveillance point that strengthens control of the maritime area. In the context of ALKI II, the existence of strategic Posal supports early detection of illegal activities, such as piracy, smuggling, or territorial violations. A study by Simanjuntak (2021) shows that small surveillance posts equipped with modern communication technology are able to increase the effectiveness of maritime security.
- 6. Level of Expertise.** The quality of personnel with high skills greatly determines the operational success of the base. Expertise in navigation, electronic warfare, and the operation of advanced

technologies (such as drones and radar) are required to deal with modern threats (Taufiqerrochman, 2018).

- 7. Experience.** Personnel with good experience in the field of maritime operations are better able to deal with complex situations, such as conflicts in the waters or asymmetric threats. Widiantoso (2024) shows that operational experience reduces the risk of failure in critical missions.
- 8. Staff Readiness.** Operational readiness includes physical health, mental readiness, and personnel availability for operational tasks. According to BNPB (2016), high readiness increases the ability to respond to threats that arise suddenly.
- 9. Organizational Structure.** A clear and integrated organizational structure makes it easier to make decisions and coordinate between units. Norman & Pahlawati (2024) show that organizations with adaptive structures are more resilient in dealing with unexpected situations.
- 10. Training and Exercises.** Periodic exercises improve technical skills and inter-unit coordination. Suharyo (2017) emphasized the importance of scenario-based simulation as

an effective training method in dealing with threats at sea.

11. **Regional Geostrategic Awareness.** An understanding of geostrategic conditions, including trade routes, ocean currents, and vulnerable points, is critical to designing an effective security strategy. Santoso (2023) stated that geostrategic analysis improves maritime risk mitigation capabilities.
12. **Intelligence Capability.** Intelligence capabilities play a crucial role in early detection of threats. Ford & Rosenberg (2005) show that the integration of intelligence data increases the effectiveness of marine defense strategies.
13. **Hydrographic and Oceanographic Conditions.** Hydrographic and oceanographic conditions are highly influential in navigation, water safety, and warship operations. Factors such as water depth, ocean currents, tides, and seafloor structure determine the feasibility of the dock, vessel maneuverability, and the effectiveness of the underwater detection system (Fiedler & Talley, 2006).
14. **Maritime Surveillance System.** Technology-based surveillance systems, such as radars and drones,

provide full visibility into operational areas. Stefanus & Adiyanto (2015) note that modern maritime surveillance systems are able to detect the movements of small vessels that are difficult to track with conventional radar.

15. **Rapid Response to Incidents.** The ability to respond quickly to incidents, such as ship accidents or pirate threats, is a top priority. Sarjito et al (2023) emphasize that fast response times prevent the escalation of threats in maritime areas.
16. **AI for ISR (Intelligence, Surveillance, and Reconnaissance).** AI enables real-time monitoring through drones, sensors, and satellites, as well as processing intelligence data faster and more accurately (Buchter, 2018).
17. **Operational Interoperability.** Interoperability improves the efficiency of joint operation between units. Yani & Montratama (2015) mention interoperability as a key element in maritime security alliances.
18. **Base Presence and Readiness.** The physical presence of base elements, such as patrol boats, helicopters, and UAVs,

increases the base's ability to maintain operational areas. Tanjung (2020) shows that the presence of these elements has a preventive effect on illegal activities.

19. C4ISR Command and Control System.

The Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) system enables strategic coordination. Ye et al (2022) call C4ISR the backbone of modern maritime operations.

20. Marine Battalion for Base Defense.

Marine battalions are the main force for defending bases from direct threats. According to Kharish et al (2022), trained marine battalions improve integrated defenses in strategic bases.

21. Patrol Ships.

Patrol boats play a strategic role in maritime surveillance. Supandi (2015) emphasized that fast patrol boats (FPVs) are effective in securing economic exclusive zones (EEZs).

22. Fixed & Mobile Missile System.

Fixed and moving missile systems become the main defense of strategic bases. Sarjito (2023) mentioned that the flexibility of missile systems can prevent asymmetric threats.

23. Anti-Submarine Warfare (ASW) Defense.

Anti-Submarine Defense (ASW) ensures security from underwater threats. Syahferzi (2022) shows that modern ASW technologies, such as sonar and underwater drones, are very effective at protecting bases.

24. National Defense and Security Policy.

National Defense policies that emphasize the importance of maritime security are a great opportunity for the development of bases (Sarjito et al., 2023). Strategies such as the vision of the "World Maritime Axis" and the National Defense Strategic Plan support the development of military infrastructure in strategic areas.

25. Sovereignty and Legal Status.

The affirmation of international law such as UNCLOS provides a legal basis for defending the FTAA and strengthening the base (Yustitiantingtyas, 2015).

26. Regional Cooperation.

Regional cooperation is an important element in maintaining maritime security stability, especially in strategic areas such as ALKI II which involves various countries with common interests.

Through initiatives such as joint military exercises, intelligence information exchange, and strengthening maritime diplomacy, countries in the region can improve their collective capabilities in dealing with threats such as piracy, smuggling, and territorial conflicts (Al Syahrin, 2018).

27. Territorial Violations by Neighboring Countries.

Territorial violations by neighboring countries are a serious threat that can trigger diplomatic tensions and disrupt regional stability (Zacher, 2001). These incidents are often linked to overlapping claims to strategic maritime zones or natural resources in disputed waters. This kind of violation not only has an impact on national security but also suppresses the state's ability to defend its territorial sovereignty (Brown, 1996).

28. Geopolitical Tensions.

Geopolitical tensions involving major countries and regional powers have the potential to extend to the ALKI II region, which is a strategic trade route and a region of high maritime security importance. These tensions can arise from

territorial disputes, military power rivalries, or ideological differences between countries that have interests in the region. As conveyed by Purwantoro (2023), geopolitical tensions often trigger an arms race, the deployment of military forces in sensitive areas, and the risk of increasing open conflicts that can disrupt economic stability and maritime security in the region.

29. Increased investment around the new capital (IKN).

Investment in the port and infrastructure sectors supports the Indonesian Navy base as a logistics and operational center (Limas et al., 2021). Local economic development also increases public support for military operations (Ginting et al., 2024).

30. Maritime Economic Potential.

As an international trade route, ALKI II plays a strategic role in ensuring the smooth running of global trade (Kusuma et al., 2020).

31. Increased Defense Budget.

Increasing the defense budget is a strategic step to support the development of military bases, especially in areas with strategic value such as ALKI II (Maesza et al., 2022). Larger budgets allow for the

modernization of facilities, the procurement of advanced technologies, and the capacity building of personnel operating at the base (Geng & Doberstein, 2008).

32. Dependence on Resources.

Reliance on resources such as high operational costs and the need to continuously update defense infrastructure and technology often create significant economic burdens if not managed efficiently Hillman et al (2009), highlight that budget constraints can hinder the modernization of military facilities, thereby reducing the ability of bases to deal with modern maritime threats

33. Increased Public

Awareness. Increasing public awareness of the importance of maritime security encourages collaboration with the Indonesian Navy in protecting maritime areas (Sumarlin et al., 2023).

34. Community Involvement in Regional Security.

Community involvement in maintaining regional security, especially in strategic maritime areas such as ALKI II, plays an important role in supporting national defense efforts (Palar et al., 2022). Community participation can

be done through community-based surveillance, suspicious activity reporting, and collaboration with security forces in identifying local threats, such as smuggling or piracy.

35. Human Resource Development.

The development of human resources (HR) around military bases opens up significant opportunities to provide intensive training to local communities, which can ultimately support base operations while increasing community capacity. According to Tang & Zhang (2021), the development of local human resources has a positive impact on socio-economic stability, as people not only acquire new skills but also get better job opportunities.

36. Digital Transformation.

Digitalization supports operational efficiency through geographic information systems (GIS) and technology-based surveillance. This makes patrol planning and logistics easier (Parung et al., 2021).

37. Implementation of Cyber Defense System.

The implementation of a strong cyber defense system is an

urgent need to protect critical infrastructure, especially in military bases and strategic areas such as ALKI II. According to Naseer (2020), the application of artificial intelligence-based security technology and advanced encryption can provide more proactive protection against cyber threats. In addition, intensive training for personnel to increase cyber awareness and establish rapid incident response procedures is an important step to ensure operational sustainability and security of critical infrastructure.

38. Cyber Threats to Modern Technology Systems.

Cyberattacks targeting critical infrastructure, such as communications systems, automated weaponry, and surveillance devices, can significantly cripple base operations. Subagyo (2015) stated that cyberattacks not only have the potential to damage hardware and software, but can also access strategic data that can be used by foreign parties or terrorist groups.

Implications

This research provides strategic implications for the development

of naval bases in maintaining Indonesia's maritime security. The identification of the main factors that affect the effectiveness of the base shows the need for planning based on operational needs, infrastructure capacity building, and optimization of inter-agency coordination.

From a policy perspective, these findings underscore the importance of regulatory reforms that support the strengthening of bases as a key element of national maritime defense. Practically, the results of this study encourage increased investment in surveillance technology and logistics readiness to ensure the resilience and responsibility of bases against maritime threats.

The academic implications of this study lie in its contribution to the strategic literature of maritime defense, particularly in the context of the management of naval bases. Thus, this research not only provides an empirical basis for policymakers but also enriches the academic discourse in maritime security strategies. The implementation of the results of this research is expected to strengthen Indonesia's maritime defense posture in facing threat dynamics in strategic waters.

6. CONCLUSIONS

This research confirms that the development of naval bases has a strategic role in maintaining Indonesia's maritime security,

especially in areas with high levels of vulnerability. Based on the analysis conducted, the main factors that affect the effectiveness of the base include infrastructure, human resources, technology, and policies and regulations that support the base's operations. The integration of these factors is essential in increasing combat readiness and deterrence against various maritime threats, both conventional and non-conventional.

The results of this study also show that the modernization of bases, through the improvement of supporting facilities and the adoption of digital-based technology, can improve operational efficiency and strengthen the ability to detect early threats in the first place.

In terms of policy, reforms are needed in the planning and management of bases to be more adaptive to threat dynamics and geopolitical changes in the region. Data-driven approaches and strategic studies are crucial in ensuring that the development of the base is in line with national defense needs. The implications of this study not only provide recommendations for policymakers, but also open up opportunities for further research on the optimization of base-based maritime defense strategies.

This study confirms that the transformation of naval bases is not just a necessity, but a necessity in facing future maritime security

challenges. The implementation of these findings is expected to strengthen Indonesia's maritime defense posture and ensure sustainable national maritime stability and sovereignty.

Future Research

This research opens up opportunities for further studies related to the development of naval bases in the face of increasingly complex maritime security challenges. One of the future research directions is a more in-depth analysis of the optimization of the design and location of the base to improve operational efficiency and strategic carrying capacity. In addition, further research may focus on the integration of advanced technologies, such as artificial intelligence (AI) and satellite-based surveillance systems, to improve early detection capabilities and rapid response to maritime threats.

Further studies can also explore base defense scenarios under various geopolitical conditions, particularly in the context of the dynamics of the Indo-Pacific region. Simulation and modeling-based approaches can be used to evaluate the effectiveness of marine defense strategies in a variety of threat scenarios. In addition, research on cross-sectoral collaboration, both between domestic agencies and international cooperation, can provide further

insights into how naval bases can play a key role in a broader maritime defense system.

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