

Measurement of Indonesian Naval Base Development in a Border Area: A Case Study

By I Made Jiwa

Measurement of Indonesian Naval Base Development in a Border Area: A Case Study

I Made Jiwa Astika¹, Kazan Gunawan², Avando Bastari³, I Nengah Putra⁴ and I Putu Yogi⁵

^{1,3,4,5} Sekolah Tinggi Teknologi Angkatan Laut, STTAL, Surabaya, Indonesia.

² Universitas Esa Unggul, Jakarta, Indonesia.

ORCIDs : ¹0000-0002-8162-8099, ²0000-0002-4124-9334, ³0000-0003-3810-1360, ⁴0000-0002-6799-691X, ⁵0000-0002-2147-9562

Abstract

The world economy path that uses Indonesian sea lanes can make Indonesia as the world's maritime axis. The construction of Naval Base in the border area has been prioritized to increase the strength of maritime defense as an important pillar of Indonesia's development. Due to the current conditions of necessity in some border areas, it is necessary to formulate a strategy of Naval Base development. The use of Borda-SWOT combination methods can measure the priority of a strategic value decision. The result of analysis showed that the development in the boundary area using S-T strategy was the weight of 10.66% where the Naval Base had Strength's influence with the weight of 17.89%. The priority formulation of the strategy of Naval Base facility development was to build facilities Command Headquarters - Housing Facilities and Mess - Service Facilities - Port Facilities and Communication Facilities.

Keywords: Naval Base, Priority Strategic Decision, Border Area

INTRODUCTION

Indonesia's archipelago territory located on the crossroads of continents and oceans make Indonesia as a regional economic crossing paths of various countries. More than 40% of the world's economic pathways use Indonesian maritime or maritime lanes including using path that pass through the territory of the Indonesian Archipelagic Sea Pass (ALKI) [1]. Vessel of foreign countries whether commercial vessels or warships that are through the ALKI can pass without having to ask permission first to the Indonesian government. The existence of ALKI gives security consequences in Indonesian waters mainly because many of the economic crossing lines are also the border of Indonesia with other countries.

Joko Widodo as Indonesian President has launched the national strategic policy of Indonesia as the World Maritime Axis. This strategic policy brings Indonesia's ideals towards the excellence in the maritime field. The excellence of the maritime state as expressed by the President is performed through development based on the 5 main pillars of building maritime culture, maintaining and managing marine resources, building maritime infrastructure and connectivity, strengthening maritime diplomacy and building maritime defense forces [2].

Building maritime defense forces becomes one of the

important instruments to maintain the situation and stability of the region on the border of the country. One of the role of the military force presence in the border of the country is to support the smoothness and sustainability of the wheels of the country's economy. In addition, the presence of Indonesian maritime defense forces serves as a unit of state interest to observe the dynamics of the surrounding region [3]. This is because the conditions in some border areas of Indonesia which is also the path of the world economic path still requires a lot of attention. Some of the strategic aspects that need to get important attention are sovereignty aspect, defense aspect and economic aspect.

Therefore, the Navy as one of the defense components will deploy the power of the Integrated Fleet Weapon System (SSAT) throughout Indonesia including the cross-sea route on the state border [4]. Thus, the development of Naval Base in Indonesian maritime territory bordering with other countries is an important priority [5]. However, the declining budget outlook (Figure 1) and the ever-changing geostrategic environment have urged the Navy's institution to change its decision-making strategy to build a Naval Base [6] [7] [8]

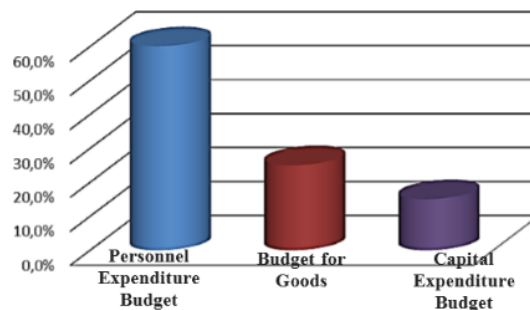


Figure 1. The Expenditure of Indonesian Defense Budget [7]

Therefore, every planning and implementation of the Navy's development is always based on policies that sharpen and strengthen the Navy's development program toward Minimum Essential Force (MEF). The preparation of programs and activities along with budget allocations is implemented realistically and prioritizing the priority principle. The development of the Naval Base on the border prioritizes the construction of facilities and basic infrastructure facilities on strategic islands [9]. It is expected that the acceleration of

Naval Base development in the border area can help the development goals in the border areas. The targets of border area development are prosperity, security and environment [10].

Thus, in order to measure the strategic decision of Naval Base development in Indonesian border area, the Borda method and SWOT method is used. The Borda method can show which alternatives are better in pairwise comparisons. The decision-making is based on an alternative choice of various Naval expert respondents by making the criteria into a numerical calculation [11]. While the SWOT method analysis is useful to create strategic formula by conducting an overall evaluation of the strengths, weaknesses, opportunities, and threats. The end result of the SWOT approach is to obtain a decision which shows the variable along with the added value or less value [12].

By combining Borda-SWOT method in measuring the strategic of decision-making process, a precise ranking of strategic variables in the development plan of Naval Base in the border area will be generated. Furthermore, this strategic planning can be used as a tool of the organization to start and manage its main tasks. Strategic planning is part of a research operation based on a multi-criteria decision-making (MCDM) process. MCDM-based research operations are a series of alternatives evaluations in a set of criteria to achieve optimal strategic formulation [13].

The benefit of this study is the development plan of Naval Base that has the benefit and great contribution in the border region. The order of development priorities is part of the strategy formulation in order to enhance the benefit of Naval Base development to be perceived immediately by the border community development target. In addition, it also provides a case study for the development of the Naval Base and its facilities in the future.

In this paper, the Methodology used would be described in Section 2, Research Results in Section 3, Discussion in Section 4, and Conclusions in Section 5.

METHODOLOGY

Naval Base Development

The functions of the Naval Base Station are classified into 5Rs including Base as Replenishment/Refueling, a Repairing Place, a Resting Place, a Refreshing Place, and a Resistance (Base for Defense) [14]. In order to carry out the function, the main facility that must be built in an Naval Base, including Port facilities, Maintenance and Repair facilities, Supplies facilities, Personnel maintenance facilities and Base building facilities. While the supporting facilities of the main facilities consist of Housing and Messing facilities, Command Headquarters facilities, Public facilities, Communication facilities, Defense facilities, Service facilities, and Operating and Training facilities [15]. The following Figure 2 is the amount of budget for the construction of Naval Base facilities

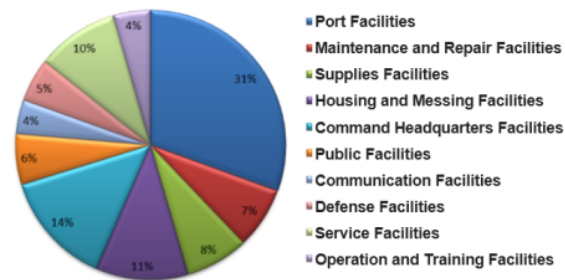


Figure 2 The Amount of Navy Base Facilities Budget Development [15].

Indonesian Maritime Power Development

Indonesia as an archipelagic country has a geo-strategic aspect that demands the development of naval power as the main theme in the development of Indonesia's defense force [16]. In Indonesia maritime development, the policy is strongly influenced by political policy, economy, defense, and state interest [17]. The Navy's development program towards MEF is performed not only with the modernization of defense to ensure Indonesia's territorial sovereignty and marine resources to be maintained, but also to keep the navigation path and maritime trade safe. In the development of naval power, the Naval Base development is based on six characteristics that influence the condition of national naval power such as geography, natural resources, climate, land area, community character and character of local government.

Borda Method

De Borda's voting method is used to rank out problems with multicriteria [18]. The measurement steps with Borda method are as follows:

- Evaluator determination, decision makers, judges or members of the jury sourced from experts
- The elements determination or alternatives to be classified
- Assessments collection from each evaluator in the form of perceptual assessments to form alternative sequences
- A ranking score association for each alternative, as well as evaluate the main purpose of the problem
- For each alternative, add up the rank rank rankings
- Getting the final ranking of the alternatives.

In Borda's rule, it is known that the points given or ratings to each alternative is based on voter preferences or experts. In this method if there are (n) alternatives, then the first choice score has a weight of (n-1), the second choice score has a weight of (n-2) and so on until the last option, which is 0 points. Based on the measurement of the voter number on the

criteria, the Total Frequency (Rt) can be calculated with the following formula

$$Rt = \sum_{j=1}^m R_{1j} \quad (1)$$

$$R_1 = \sum_{i=1}^n R_{1j} \quad ; \text{ where } j = (n-1), (n-2), \dots, (n-n) \quad (2)$$

As for knowing Weight (Wi) on each choice variables, it is formulated into:

$$W_i = \frac{R_i}{\sum_{i=1}^m R_1} \quad ; \text{ where } i = \text{variable option} \quad (3)$$

So, the priority rank of variable option is

$$W_{i1} > W_{i2} > W_{i3} \dots > W_{in}$$

; where n is the amount of variable option (4)

The theoretical characteristic of Borda's measurement is to determine the value of the majority of variables whose median value is consistent. While the ranking of variables is defined as the majority as well as the highest weight among the chosen various options [19].

SWOT Method

SWOT approach Analysis is a simple way to communicate an idea or policy. This technique is very effective because it is structured, objective, and focused on strategy with strong goals [20]. The information obtained has been systematically represented in the matrix, in which the combination of the four matrix factors is a tool in determining strategy. SWOT can build optimal strategies by relying on strengths and reducing their weaknesses, while also taking advantage of opportunities and determining plans to eliminate threats to be faced [21]. By maximizing Strengths and Opportunities, and simultaneously minimizing Weaknesses and Threats, it will result in strategic decisions of several factors or variables [22]. Some strategies that can be used in the SWOT matrix (Table 1) is the S-O (Maxi-Maxi) Strategy, W-O (Mini-Maxi) Strategy, S-T (Maxi-Mini) Strategy, and W-T (Mini-Mini) Strategy [23].

Table 1. SWOT Matrix [23]

SWOT Matrix	Strength (S)	Weakness (W)
	Existing internal conditions and can be strengthened in planning.	Internal conditions that can be improved in planning.
Opportunity (O)	S-O Strategy	W-O Strategy
External conditions that can be taken advantage of.	Utilizing Internal strength to take advantage of opportunities	Fixed internal flaws by taking advantage of opportunities
Threat (T)	S-T Strategy	W-T Strategy
External conditions that can not be controlled and have a negative impact.	Use the power to avoid or reduce the impact of threats	Defensive strategy to reduce internal weakness and avoid threats

Conceptual Framework

A research flow diagram integrating Borda and SWOT methods (Figure 3) will help to measure strategic decision making processes. The Borda-SWOT method is a simple alternative to present another explanation that priority decisions have a widespread impact in society [24]. In addition, the construction of Naval Base in the border area is a strategic decision that has a wide impact on the maritime environment to make Indonesia as a maritime axis of the world.

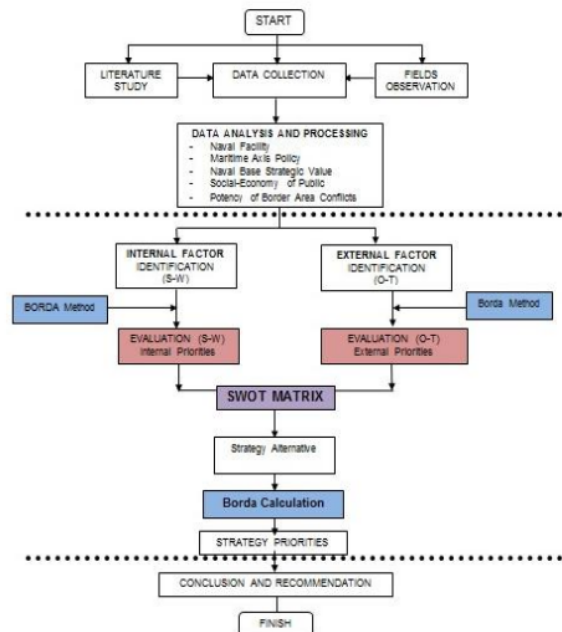


Figure 3. Research Diagram of Borda-SWOT Integration [24]

RESULTS OF RESEARCH ANALYSIS

Numerical Calculations Design

Borda-SWOT primary data processing was conducted by interviews and questionnaires to officers of officials within the Naval Base Area, Naval Base Facilities Office, and Navy officers who have both technical and strategic expertise. Placement of SWOT criteria was shown on SWOT Analysis Software sourced from expert data. Interview data and questionnaires were subsequently processed using Excel to get weighted calculations according to numerical design calculations with the the priority ranking strategy as the final results.

Internal Criteria

Table 2. Primary Data of Strength and Weakness

Internal Criteria	Strengths		
	S.1	World Maritime Axis Policy	85
	S.2	Strategic Location	68
	S.3	Naval Base	51
	S.4	Operation Area	46
	S.5	Defense System Readiness	35
	Weaknesses		
	W.1	Development Center	74
	W.2	Supporting Facilities	64
	W.3	Availability of Shipyard	55
W.4	Availability of Area Logistics	54	
W.5	Availability of Public Facilities	38	

Source: Expert Data Processing and Questionnaire

External Criteria

Table 3. Primary Data of Opportunities and Threats

External Criteria	Opportunities		
	O.1	National Patriotism	69
	O.2	Availability of Fields	65
	O.3	Geostrategic and Geo-economy	56
	O.4	Resident Population	56
	O.5	Area Supports	39
	Threats		
	T.1	Illegal Act	71
	T.2	Shipping Safety	66
	T.3	Separatism	55
T.4	Sailing Lane Volume	54	
T.5	Social Cultural Insecurity	39	

Source: Expert Data Processing and Questionnaire

SWOT Diagram of Border Maritime Area Development

Using the Borda method in accordance with Tables 2 and 3 above, it was found that existence of Naval Base had a Strength effect to maritime development of border area with weight of 17,89% and rating score of 0.0447 from the whole variable. While the internal factor weight (S-W) was greater than the external factor (O-T) which indicated that maritime development in the border area could be done well if there was strong commitment from the government despite many challenges faced (Figure 4).

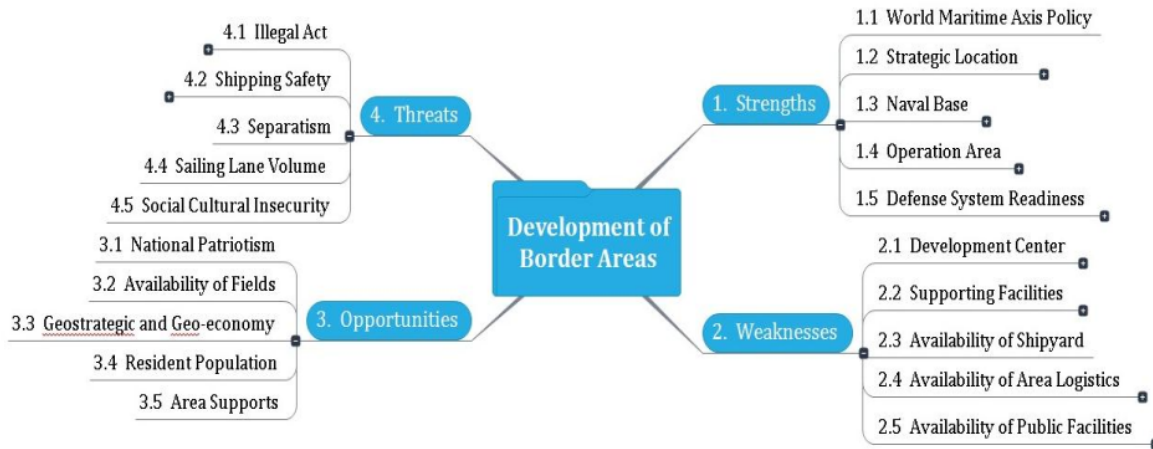


Figure 4. Research SWOT Diagram

Source: SWOT Analysis Software

SWOT Matrix of Border Maritime Area Development

Table 4. Research SWOT Matrix

		<i>Strengths</i>		<i>Weaknesses</i>	
		<i>Internal</i>		<i>External</i>	
<i>Internal</i>	<i>Strengths</i>	S1. World Maritime Axis Policy S2. Strategic Location S3. Naval Base S4. Operation Area S5. Defense System Readiness		W1. Development Center W2. Supporting Facilities W3. Availability of Shipyard W4. Availability of Area Logistics W5. Availability of Public Facilities	
	<i>Weaknesses</i>				
<i>External</i>	<i>Opportunities</i>	S-O Strategy		W-O Strategy	
	<i>Threats</i>	S-T Strategy		W-T Strategy	

<i>Opportunities</i>	S-O Strategy	W-O Strategy
O1. National Patriotism O2. Availability of Fields O3. Geostrategic and Geo-economy O4. Resident Population O5. Area Supports	Maritime becomes national policy which provides the power to improve maritime security capabilities to protect resources in certain region. (S1) (S3) (O3) (O5)	Strong human resources potentially make the economic power in the border region supported by the construction of facilities and infrastructure (W1) (W4) (O2) (O4)
<i>Threats</i>	S-T Strategy	W-T Strategy
T1. Illegal Act T2. Shipping Safety T3. Separatism T4. Sailing Lane Volume T5. Social Cultural Insecurity	The Naval Base conducts maritime security operations to prevent illegal activities and keep the shipping lines safe (S3) (S4) (T1) (T4)	The facility development can reduce the various conflicts of society, especially separatism and other socio-cultural vulnerabilities (W2) (W5) (T3) (T5)

Based on the SWOT matrix (Table 4), the maritime development in the border area was using S-T strategy. With a weight of 10.66%, this strategy was implemented with the establishment of Naval Base that serves to provide support for maritime security operations of the Navy to prevent illegal activities and keep the shipping lines safe.

DISCUSSION

Strategy Priority Weighing of Naval Facility Development

In order to implement the S-T strategy of the SWOT matrix and to build the Naval Base, the development of necessary facilities was performed. The objective of the analysis in 10 Naval Base facility using the Borda method was to obtain priority facilities (Figure 5).

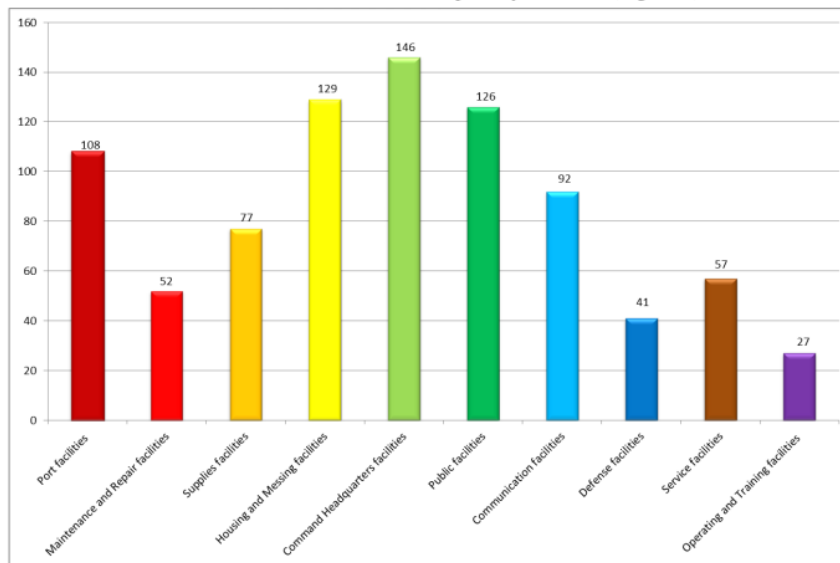


Figure 5. Diagram of Priority Weighing in Research Strategy

Strategic Priorities Formulation

The strategic decision formulation of Naval Base Development in border area was obtained from weight

calculation from each facility that would be built. The ranking of weighted rankings was a priority order of facility construction required in border areas (Figure 6).

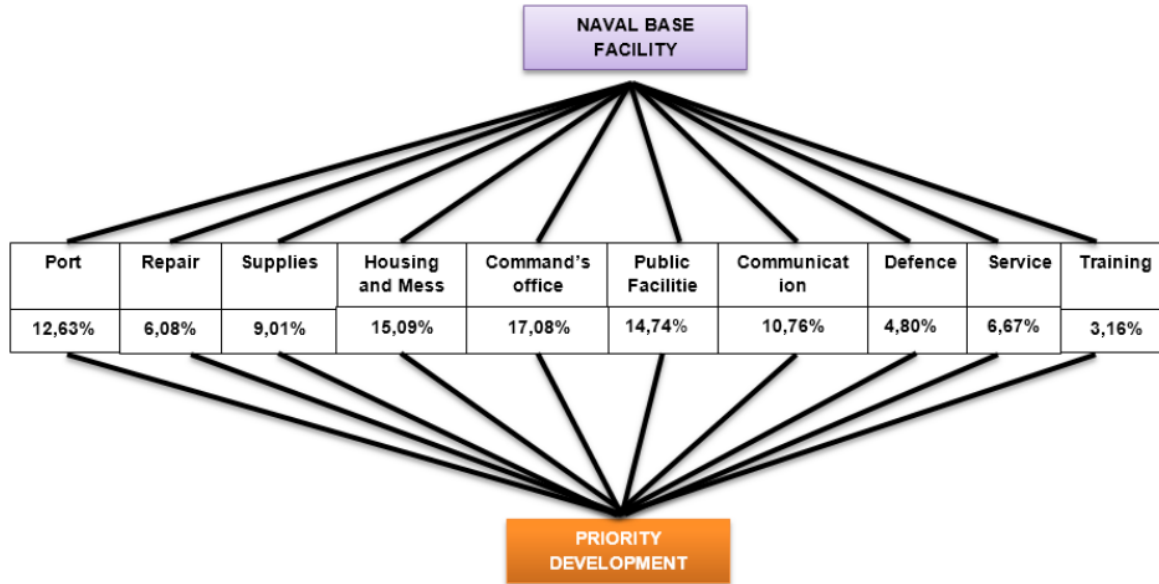


Figure 6. Diagram of Research Strategy Priority Formulation

CONCLUSION

Strategic decisions measurement of the Naval Base Development in the border area using the Borda-SWOT method is one of the quicker ways of conveying the idea of multi-criteria decision-making. The S-T strategy approach is the best strategy to develop a challenging border region. While the development of the Naval Base is an important part of Indonesia's maritime development which has an impact on the security of international shipping lines. Based on the strategy priority formula, it can be known that Naval Base Facilities which have a major impact on the border region is Command Headquarters Development - Housing Facilities and Mess - Service Facilities - Port Facilities and Communication Facilities. It is expected that this research can be continued in the future to know the ability of logistics and administrative support for sea security operations in the border region.

REFERENCE

1. ISMAH RUSTAM. ALKI Challenge in Achieving Indonesia's Ideal as a World Maritime Axis. *Indonesian Perspective*, v. 1, p. 1-21, 2016.
2. MURNININGTYAS, E. **Optimizing the Utilization of Marine Potential Toward the Realization of Indonesia as a Maritime Axis**. Jakarta: Badan Perencanaan

Pembangunan Nasional (BAPPENAS), 2016.

3. ADHIRA, P. **Development Policy of China Military Base in Djibouti, Africa 2016**. Universitas Muhammadiyah. Yogyakarta. 2017.
4. SANTOSO, P. et al. The Implementation of Multi-Attribute Approach in Decision Making for Defense Sea Region Models. *Journal of Theoretical and Applied Information Technology*, Surabaya, p. 134-141, 2013.
5. SAPUTRA, R.; NADLIR, M. Natuna Military Base Project Must Be Completed In 3 Years, 2016. Disponivel em: <<http://www.viva.co.id/berita/nasional/791903>>. Acesso em: 29 June 2016.
6. RUSSELL, D. J. A. et al. **Navy Strategy Development: Strategy in the 21st Century**. California: Naval Research Program, 2015.
7. TRISUTRISNO, B. **TNI Strength: The Dilemma of the Guardian of the State**. Lembaga Kajian Pertahanan Untuk Kedaulatan NKRI. Jakarta. 2016.
8. WICAKSONO, K.; ASMARA, C. G. Minister of Finance Will Lower the Allocation of Defense Budget, 2017. Disponivel em: <<http://www.viva.co.id/berita/bisnis/947412>>. Acesso

- em: 17 August 2017.
9. KEMHAN, I. J. The Chief of Indonesia Navy Opened a Naval Financial Coordination Meeting 2017, 2017. Disponivel em: <www.kemhan.go.id>. Acesso em: 28 April 2017.
 10. SHOLIAH, I. Legal Policy for Development of Border Area through Technology Based Infrastructure. **Jurnal RechtsVinding**, v. 5, p. 305–321, 2016.
 - 5 11. GARCIA-LAPRESTA, J. L.; MARTINEZ-PANERO, M.; MENESES, L. C. Defining The Borda Count In A Linguistic Decision Making Context. **Elsevier Science**, p. 1-16, 2008.
 12. WANG, K.-C. **A Process View Of SWOT Analysis**. National Taipei University, Taipei, Taiwan, R.O.C. Taipei, Taiwan. 2007.
 - 6 13. TRIANTAPHYLLOU, E. et al. Multi-Criteria Decision Making: An Operations Research Approach. **Encyclopedia of Electrical and Electronics Engineering**, p. 175-186, 1998.
 - 2 14. SUHARYO, O. S.; MANFAAT, D.; ARMONO, H. D. Establishing the Location of Naval Base Using Fuzzy MCDM and Covering Technique Methods: A Case Study. **International Journal of Operations and Quantitative Management IJOQM**, v. 23, n. 1, p. 61-87, 2017.
 15. **INDONESIAN NAVY HEADQUARTERS. Indonesian Naval Base Standard Administration Handbook**. Jakarta: Indonesian Navy Headquarters, 2013.
 16. PERWITA, A. B.; KOMEINI, Y. **Readiness of Indonesia Sea Power in Facing Indonesia's Maritime Security in Southeast Asia**. Universitas Presiden. Jakarta. 2012.
 - 7 17. VERTZBERGER, Y. Y. I. **Coastal States, Regional Powers, Superpowers and the Malacca Singapore Straits**. University of California. California. 1984.
 18. COSTA, H. G. AHP-DE BORDA: A Hybrid Multicriteria Ranking Method. **Brazilian Journal of Operations & Production Management**, v. 14, p. 281-287, 2017.
 19. MOHAJAN, H. K. Majority Judgment in an Election with Borda Majority Count. **International Journal of Management and Transformation**, v. 6, n. 1, p. 19–31, 2011.
 - 3 20. HEYER, R. **Understanding Soft Operations Research: The methods, Their Application and Its Future in the Defence Setting**. Australia: DSTO Information Sciences Laboratory, 2004.
 - 4 21. ŽIVKOVIĆ, Ž. et al. Analytical Network Process in the Framework of SWOT Analysis for Strategic Decision Making (Case Study: Technical Faculty in Bor, University of Belgrade, Serbia). **Acta Polytechnica Hungarica**, v. 12, p. 199-216, 2015.
 - 12 22. JYRKI KANGAS, M. K. P. L. A. M. K. Incorporating MCDS And Voting Into SWOT – Basic Idea. **Serbian Journal of Management**, p. 1-13, 2016.
 - 10 23. GRETZKY, W. S. Logic Planning And SWOT Analysis. In: HARRISON, J. P. **Essentials of Strategic Planning in Healthcare**. Chicago: Health Administration Press, 2010. p. 91-97.
 24. ISHIDA, R.; OGURO, K. **Borda Count Method for Fiscal Policy: A Political Economic Analysis**. Research Department Policy Research Institute. Tokyo. 2017.

Measurement of Indonesian Naval Base Development in a Border Area: A Case Study

ORIGINALITY REPORT

12%

SIMILARITY INDEX

PRIMARY SOURCES

- 1** Meghanan Bhairu Mutgekar, Pradip C. Bhaskar. "Analysis of DCT and FAST DCT using soft core processor", 2019 3rd International Conference on Trends in Electronics and Informatics (ICOEI), 2019 147 words — 4%
Crossref
- 2** "The Relationship Model of Maritime Culture and State Policy Towards National Resilience", International Journal of Recent Technology and Engineering, 2019 43 words — 1%
Crossref
- 3** Orji, Ifeyinwa Juliet, and Sun Wei. "An innovative integration of fuzzy-logic and systems dynamics in sustainable supplier selection: A case on manufacturing industry", Computers & Industrial Engineering, 2015. 34 words — 1%
Crossref
- 4** Yatish Bathla, Marta Takacs. "Evaluating product system behavior using soft computing in product structure modeling", 2017 IEEE 15th International Symposium on Applied Machine Intelligence and Informatics (SAMII), 2017 30 words — 1%
Crossref
- 5** R. Krishankumar, S. Shyam, R. P. Nethra, S. Srivatsa, K. S. Ravichandran. "Chapter 104 Extending Borda Rule Under q-rung Orthopair Fuzzy Set for Multi-attribute Group Decision-Making", Springer Science and Business Media LLC, 2020 20 words — 1%
Crossref
- 6** C. Dyk. "A Technology Development Methodology Developed for Application on the Solar Chimney" 16 words — < 1%

Structure", 2006 Technology Management for the Global Future -
PICMET 2006 Conference, 2006

Crossref

7 Ian Storey. "Japan's maritime security interests in Southeast Asia and the South China Sea dispute", Political Science, 2017 15 words — < 1%

Crossref

8 Helmy Syamsuri, Amril Amril, Dien Triana. "The Strategy of Increasing Economic Growth of the Maritime Sector: South Sulawesi Analysis Context", IOP Conference Series: Earth and Environmental Science, 2018 15 words — < 1%

Crossref

9 Rachmat Ashari, Emil Budianto, Herdis Herdiansyah. "Environmental risk assessment on ship repair work at cilegon national shipyard company", Journal of Physics: Conference Series, 2019 14 words — < 1%

Crossref

10 Aida Granulo, Anel Tanovic. "The advantage of using SWOT analysis for companies with implemented ITIL framework processes", 2020 43rd International Convention on Information, Communication and Electronic Technology (MIPRO), 2020 12 words — < 1%

Crossref

11 Keisuke Nishida. "NUMERICAL EXAMINATION OF PLASMOID-INDUCED RECONNECTION MODEL FOR SOLAR FLARES: THE RELATION BETWEEN PLASMOID VELOCITY AND RECONNECTION RATE", The Astrophysical Journal, 01/01/2009 12 words — < 1%

Crossref

12 Sanela Arsić, Djordje Nikolić, Živan Živković. "Hybrid SWOT - ANP - FANP model for prioritization strategies of sustainable development of ecotourism in National Park Djerdap, Serbia", Forest Policy and Economics, 2017 8 words — < 1%

Crossref

13 Alfaraj, Qais. "Attaining and Sustaining Competitive Advantage in Dubai's Real Estate Industry.", Walden 8 words — < 1%

14 Advances in Intelligent Systems and Computing, 2013. 7 words — < 1%
Crossref

15 Samriti Kapoor, Mandeep Kaur. "Basel III Norms: A SWOT and TOWS Approach", Vision: The Journal of Business Perspective, 2017 6 words — < 1%
Crossref

EXCLUDE QUOTES OFF

EXCLUDE MATCHES OFF

EXCLUDE BIBLIOGRAPHY OFF