The Use of Analytical Network Process (ANP) for the Development Strategy of PT PAL to Support Indonesia's Defence Industry

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Abstract

Indonesia's strategic geopolitical position, bridging two continents and two oceans, includes vital straits used by numerous foreign ships along the Indonesian Archipelago Sea Route (ALKI). Its strategic importance poses significant defense and maritime security challenges. To address these, President Joko Widodo has enhanced the Navy's role by leveraging the Indonesian defense industry to position Indonesia as a global maritime axis. PT PAL, a key player in this industry, must develop strategic shipbuilding policies to support this vision. This study aims to analyze and identify optimal strategic policies for PT PAL using the Analytical Network Process (ANP) method and Super Decisions software. The findings indicate that prioritizing the development of the warship division is crucial, as it received the highest weight in defense equipment needs. Consequently, PT PAL should focus on enhancing its warship division to align with Indonesia's maritime defense and security objectives.

Introduction

Indonesia is the largest archipelago in Asia and one of the largest archipelagos in the world. Indonesia has more than 17,504 islands and a coastline of 95,181 km, with a land area of approximately 2,012,402 km2. Indonesia has a strategic maritime and marine sector in terms of economic, political, ideological, socio-cultural, legal, environmental, defense, and security aspects as an archipelago with a long coastline and vast seas (Hidayat and Ridwan 2017, 108). As the largest archipelago, Indonesia has maritime potential in several fields, such as biotechnology, marine tourism, the shipping industry, deep sea waters, and marine minerals. Indonesia also benefits from a geopolitical position between the Asian continent and the Australian continent that directly connects the economies of developed countries, as well as between the two Pacific and Indian oceans that make Indonesia a link between countries in East Asia, Southeast Asia, and South Asia (Syahrin 2018, 2).

Joko Widodo declared Indonesia to be the World Maritime Axis, which can strengthen Indonesia's identity as a maritime country and awaken the maritime spirit. Hence, Indonesia has opportunities to improve the national economy and maritime defense (Hidayat and Ridwan 2017, 108). The Maritime Axis is Indonesia's vision to be a sovereign, independent, advanced, and strong maritime nation that can make a positive contribution to world safety and peace according to national interests (Medina and Azmi 2023, 674). The maritime axis is a strategic idea implemented to ensure connectivity between islands, improve sea transformation, develop the shipping and fisheries industry, and focus on marine security (Hidayat and Ridwan 2017, 113).

Previous research related to this is an article by Hendra Siregar and M. Achnaf, discussing Indonesia's sea defense strategy through modernizing the Navy's defense equipment. The modernization of vital defense equipment makes Indonesia's defense stronger in dealing with threats and disturbances in Indonesia's sea areas, such as theft of natural resources, piracy, illegal fishing, terrorism, human trafficking, and sea border disputes. Furthermore, the article by Hertadi Eko Prastyo discusses the importance of developing the shipping industry in Indonesia to develop the maritime service industry and help national defense at sea. The development of the shipping and support industries involves many parties, including the government, the shipping industry, and users of defense equipment. Furthermore, Dayu Medina and Rizqi Azmi, in their article, discuss the efforts of the Indonesian government in realizing Indonesia as a World Maritime Axis by looking at the policies issued by the Indonesian government regarding the use of sea areas to policies to realize Indonesia as a World Maritime Axis. This article differs from the article above because it only focuses on PT PAL and recommends sectors that PT PAL can develop in the future to support Indonesia's program as a World Maritime Axis. Therefore, research is needed to determine the strategic policy development of PT PAL can be used in ship development to support the World Maritime Axis policy.

Method

This research was executed in four stages, namely the preliminary stage, data collection, data processing, analysis, and the last stage is the conclusion and suggestion stage. A systematic process for conducting strategic policy analysis using the Analytical Network Process (ANP) method and Super Decisions software (Saaty 2001, 365). The process begins with the identification and formulation of the problem, which is the foundational step where the key issues and objectives are clearly defined. Following this, relevant data is collected from various sources, which can include literature reviews, surveys, and historical records. Once the data is gathered, the next step involves defining the criteria and alternatives, establishing the parameters for evaluation, and identifying possible strategic options.

Interviews with experts or stakeholders are then conducted to gather qualitative insights and validate the collected data. This step is crucial for ensuring the accuracy and relevance of the information used in the analysis. The collected data is subsequently processed using Super Decisions software, which facilitates the application of the ANP method to evaluate the alternatives based on the defined criteria.

A consistency test is performed to ensure the reliability and logical coherence of the data and the analysis results. If the consistency test yields negative results, indicating inconsistencies, the data or the defined criteria and alternatives may need to be revisited and refined. Once the data passes the consistency test, conclusions are drawn, and recommendations are made based on the analysis. The process concludes with the finalization and documentation of the findings and recommendations, providing a comprehensive and well-founded basis for strategic decision-making. This structured approach ensures that the proposed policies are supported by thorough data analysis and are logically consistent.

The preliminary stage involves identifying problems, collecting data, and determining criteria and alternatives. The data collection stage was implemented through interviews and literature studies to find the criteria used to determine the strategic policies used. The data processing uses the analytical network process (ANP) method using Super decision tools. At the data analysis stage, these calculations are analysed by considering the consistency value, which will later be used as a reference when making a decision. At the conclusion stage, conclusions are drawn from the calculations that have been made, and suggestions are made to support the conclusions that have been drawn.

The Analytic Network Process (ANP) is a general theory of relative measurement used to derive the composite priority ratio from the individual ratio scale, which reflects the relative measurement of the influence of interacting elements on control criteria (Saaty 2001). ANP uses

the network without having to set levels, as in the hierarchy used in the Analytic Hierarchy Process (AHP), which is the starting point for ANP. The main concept in ANP is influence, while the main concept in AHP is preference. AHP, with its dependency assumptions about clusters and elements, is a particular case of ANP. ANP qualitative research method is a new approach in the decision-making process that provides a general framework for treating decisions without making assumptions about the independence of elements at a higher level from elements at lower levels and about the independence of elements -elements in a level (Saaty 1999).

The basic principle of ANP is to think analytically, decision making in the ANP methodology is based on the following principles: (a) Network structure which is a step in dividing complex problems into clusters and their elements and identifying the interdependent relationships within them. This structure is prepared based on the views of parties with expertise and knowledge in the relevant field; (b) Priority determination which consists of criteria elements that can be viewed as their weight or contribution to the decision-making objectives. ANP performs element priority analysis using a pairwise comparison method between two elements. This priority is determined based on the views of experts and interested parties on the decision, either directly (interviews) or indirectly (questionnaires); (c) Logical consistency which become the main principle determining the validity of the data and the results of decision-making is the consistency of respondents' answers in determining the priority of elements. In general, respondents must be consistent in comparing elements. This study uses ANP theory to assist strategic policy decisions in shipbuilding.

PT PAL and Indonesia as the World Maritime Axis

President Joko Widodo's speech at the 9th East Asia Summit in Nay Pyi Taw, Myanmar, on November 13, 2014 was the first affirmation in an international forum of Indonesia's agenda as the world's maritime axis. The government wants to make Indonesia as World Maritime Axis supported by five main pillars, namely rebuilding Indonesia's maritime culture, committing to protecting and managing marine resources, encouraging the development of maritime infrastructure and connectivity, maritime diplomacy to invite Indonesian partners to cooperate in the maritime field, and building maritime defense (Indonesia.co.id). The main programs to realize Indonesia as the world's maritime axis are the programs to uphold the sovereignty of the Republic of Indonesia's maritime territory, revitalize marine economic sectors, strengthen and develop maritime connectivity, rehabilitate environmental damage and conserve biodiversity, and improving our marine human resources quality and quantity (Hidayat and Ridwan 2017, 113-114).

President Jokowi's understanding of Indonesia's geoeconomic and geostrategic position, manifested in the maritime axis policy, is an essential step towards strategic synergy in improving the economy. However, it also directly strengthens Indonesia's defense and security (Syahrin 2018, 3-4). Indonesia's strategic position with its geopolitics between two continents and two oceans through which thousands of foreign ships pass through the ALKI (Indonesian Archipelago Sea Route) and important straits, on the one hand, shows a strategic geographical position. However, on the other hand, it can cause vulnerability in defense and security, especially maritime security. Problems faced in the aspect of defense and security, such as awareness of the archipelago's insight that has not been fully understood, limited infrastructure and major weapons systems, and regulations in the maritime sector that do not yet have supremacy, have an impact on increasing illegal activities using maritime media. Local and transnational actors exploit and engage in illegal activities involving maritime resources. Other problems are maritime border delimitation, quantity and quality of maritime human resources, weak law enforcement, and limited maritime infrastructure, which add to the list of maritime problems in Indonesia (Hidayat and Ridwan 2017, 109).

The success of handling the prevention and eradication of illegal fishing and prosecution of all violations at sea cannot be separated from the role of law enforcers at sea, one of which is the

Navy, which has the main task of maintaining state sovereignty at sea. In carrying out its primary task, the Navy is very dependent on the readiness of the defense equipment currently owned, so in carrying out this mission, the Navy cannot stand alone but must be supported and strengthened by several defense industries, one of which is PT PAL in the field of maintenance to the manufacture of defense equipment, in this case, is KRI.

PT PAL is one of the State-Owned Enterprises engaged in the shipbuilding industry in Surabaya, East Java, as one of the strategic industries that produce Indonesia's primary defense system equipment, especially warships (KRI), therefore to support government policies in realizing Indonesia as a World Maritime Axis, a strategy is needed which can later be used as a basis for determining policies that are in line with government policies. The purpose of this journal is to identify the direction of PT PAL's future development policy hopes to be used as a basis for determining policy.

Assessment Criteria of Determination Policy

PT PAL Indonesia is one of the companies engaged in the defense of the maritime sector. With its position as the leading guide for the marine defense equipment system, PT PAL Indonesia (Persero) will continue to improve its ability to drive synergy to global maritime access in the future. This critical role of PT PAL Indonesia (Persero) will bring the Indonesian maritime industry to the global maritime market (PT PAL Indonesia n.d.). In line with the above, Defense Minister Prabowo Subianto is committed to developing the defense industry, as conveyed at the 2022 Defense Ministry Leadership Meeting at the Ministry of Defense Building, Central Jakarta (Amanda 2022).

Moreover, Indonesia has entered the Minimmum Essential Force (MEF) program stage 3 (2019-2024), but the achievement of the MEF in the marine dimension has only reached 59.69%, as conveyed by the TNI Commander General Andika Perkasa in a Working Meeting in the Commission I Meeting Room of the DPR Nusantara II Parliament Building, Senayan, Central Jakarta (Fajarta 2022). Therefore, PT PAL as a strategic partner, also assists the Government in realizing the MEF program. Indonesia has made substantial investments in PT PAL Indonesia (Persero) through the inclusion of state capital (PMN). These investments support the success of technology mastery, Transfer of Technology (ToT), and Transfer of Knowledge (ToK). As with other investments, their value depreciates over time due to factors such as amortization and other overhead costs. These investments have been maximized for high-tech projects, including Landing Platform Docks (LPD), Perusak Kawal Rudal (PKR), frigates, and submarines, to maintain productivity and sustainability. This investment also carries the people's mandate for the benefit and unity of the Unitary Republic of Indonesia (NKRI) (PT PAL Indonesia n.d.).

The government's programs rely heavily on effective law enforcement at sea, a responsibility shouldered by the Navy. To fulfill this role, the Indonesian Navy requires the readiness of the KRI Alutsista, a key asset in maintaining sovereignty at sea. The Navy's strength is further bolstered by the commitment, capability, and vision of PT PAL, a crucial partner in realizing a robust Indonesian Navy. Even though PT PAL is a state-owned company, it is still required to be professional and able to develop the company so that it does not become a burden for the government. In order to maintain the existence of the company, PT PAL must demonstrate PT ability. The global maritime market is trusted PT PAL to be able to work on large projects.

Therefore, before distributing the questionnaires and inputting the results of the questionnaire, the analytical network process (ANP) model was first carried out on the objectives and criteria used by the analytic network process (ANP), enabling dependencies both within a cluster (internal dependence) and between clusters (external dependence) (Saaty 1999). Each variable at each level must be defined along with its relationship (based on the results of brainstorming experts) with other elements in the system. Several criteria codes have been used to identify the network correlaation among variables. There are at least four criterions, defense industry development policy (K1); the need for defense equipment towards MEF (K2); President

Joko Widodo's Vision and Mission in Realizing Indonesia as the World Maritime Axis(K3); PT PAL must be able to develop themselves in a profitable way (K4). Meanwhile, in this study, the alternatives choices used are as follows: development of design division (A1); development of commercial ship division (A2); development of warship division (A3); development of submarine division (A4); development of marketing division (A5).

The Implementation of ANP as Development Strategy

After the network model is created, the value of pairwise comparison between criteria and alternatives for each criterion can be determined. The pairwise comparison value was obtained using a questionnaire. The priority weight value for each category obtained based on the pairwise comparison value will be compared to obtain the final priority weight value.

The data obtained from the questionnaire distribution is a pairwise comparison between the criteria and alternatives. The assessments from the experts will be combined using the geometric mean formula (geometric mean). Furthermore, the calculated geometric mean is then entered into the pairwise comparison matrix in the Super Decisions 2.10 software, as shown in Figure 1.

Figure 1. Pairwise Comparison

In addition to filling in the Geomean value in pairwise comparison, inconsistency values must also be considered. The inconsistency value should not exceed 0.1 (Saaty 1999). If a value > 0.1 is obtained, the questionnaire must be repeated, but if it is still worth > 0.1, the researcher must look for other sources that better understand the problem being studied. The following is the inconsistency value of the weighting of this study can be seen in the Figure 2.
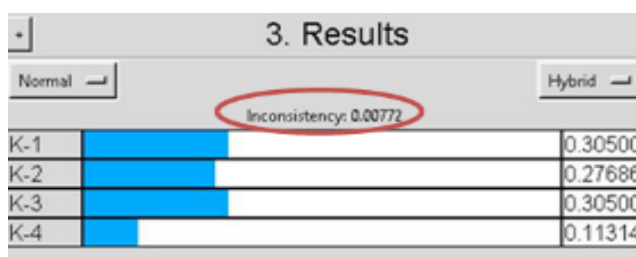

Figure 2. Inconsistency Value

The final weight results of the process using the super decision software are, K-1 has a final weight value of 0.34; K-2 has a final weight of 0.35; K-3 has a final weight of 0.20; and the final weight value of K4 is 0.09. Furthermore, the final results of the alternative category are, A-1 has a final weight of 0.06; A-2 has a final weight of 0.13; A-3 has a final weight of 0.38; A-4 has a final weight of 0.30; and A-5 has a final weight of 0.11. According to the final data, K-2 criteria (Needs for defense equipment) have the highest weight of 0.35. It means that in making shipbuilding policies, priority is given to meeting the needs of the defense equipment system. Government programs support the defense industry, so it becomes one of the keys to success, as in one of the

priority programs of the Ministry of Defense, namely the development of the national defense industry, one of which is PT. PAL (Yahya 2021), with the successful involvement of PT PAL is a strategic partner of the TNI. The Navy in the warship construction project will positively impact the existence of PT PAL in the global maritime world, of course, will have implications for the interests of other countries in making defense equipment at PT PAL. The chosen alternative is A-3 (Warship Division), with the highest weight of 0.38. From this weight value, the strategic policy in development towards Indonesia as a World Maritime Axis is currently the development of the Warship Division. This is very much because the achievement of the MEF target stage 3 (2019-2024) of the Indonesian Navy is only 59.69%, as is the presence and participation of PT PAL, especially the Warship Division, is expected to be able to contribute to accelerating the achievement of Navy MEF.

Conclusions

Based on the analysis, PT PAL should focus on enhancing its warship division. This strategic policy supports Indonesia's World Maritime Axis policy and strengthens its maritime defense posture. Enhancing the warship division will enable PT PAL to build advanced naval vessels, meeting the defense needs of the Indonesian Navy and ensuring the country's sovereignty over its maritime territories. This approach not only aligns with national defense priorities but also contributes to the broader goal of positioning Indonesia as a significant maritime power on the global stage. Prioritizing the warship division will allow PT PAL to leverage technological advancements and fulfill its mandate effectively, ensuring long-term productivity and sustainability in Indonesia's defense sector.

Using the Analytical Network Process (ANP) method and Super Decisions software, the collected data is processed to evaluate various strategic alternatives. This approach facilitates the identification of the most critical factors and optimal policies for PT PAL's development strategy. By leveraging the ANP method, decision-makers can account for complex interdependencies among decision criteria, ensuring a comprehensive and holistic evaluation. The Super Decisions software aids in systematically analyzing the data, prioritizing alternatives based on the defined criteria, and ensuring consistency in the decision-making process. This methodology helps PT PAL to align its strategic policies with national defense priorities and supports its goal of enhancing the warship division to bolster Indonesia's maritime defense posture.

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