STRATEGY DEVELOPMENT OF THE NAVAL ACADEMY WARSHIP MECHANICAL ENGINEERING STUDY PROGRAM FOR IMPROVING QUALITY OF NAVAL EDUCATION

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ABSTRACT

The Naval Academy (AAL) is one of the educational implementing units within the Indonesian Navy which is tasked with producing graduates of Indonesian Navy Officers with a Bachelor's Degree in Applied Defense. One of the study programs is the Warship Mechanical Engineering Study Program which has an A accreditation based on the decision of BAN-PT. With this achievement, it is hoped that the qualification profile of graduates can be improved with international standard abilities as a supporter of professional duties as Assistant to the Head of the Machinery Division on the Corvette Warship type Sigma class. For that we need a strategy in improving the quality of education that refers to the vision and mission of AAL. This study aims to identify the influencing factors in determining the development strategy of the Warship Mechanical Engineering Study Program, formulating alternative development strategies and determining strategic priorities along with a development roadmap. The methods used are the Borda method to calculate the weight of each factor, the SWOT method to formulate strategies and the ISM method to determine the roadmap for the next five years. The conclusion of this study is the WO strategy as the chosen strategy with nine substrates in the form of a roadmap for the Warship Mechanical Engineering Study Program which will start from 2022 to 2026.

Keywords: *Warship Mechanical Engineering Study Program, Borda, SWOT, ISM.*

1.   INTRODUCTION

1.1   Background

In an effort to become a competent and professional of Indonesian Navy, the Chief of Staff of the Indonesian Navy Admiral Yudo Margono, S.E., M.M., formulated 9 priority programs in strength building and capacity building of the Navy. The nine priority programs include the development of Indonesian Navy human resources, the modernization of the Warship, aircraft and combat materials, the construction and improvement of the Indonesian Navy's facilities and infrastructure, the development of a strength development system and operational readiness. The first program presented by the Chief of Staff of the Indonesian Navy was the Development of Indonesian Navy Human Resources. In this case, TNI AL personnel are expected to be able to master marine technology. Currently, the Indonesian Navy has made a strategic plan that aims to advance the level of mastery

of technology in the 4.0 era.

AAL as one of the universities in Indonesia that has been accredited by the National Accreditation Board for Higher Education (BAN-PT), implements an education system based on the Tri Dharma of Higher Education which includes education and teaching, research and community service (RI, 2012). AAL has a study program that includes the Marine Defense Management Study Program (Operation Corps), Warship Mechanical Engineering Study Program (Mechanical Engineering Corps), Warship Electrical Engineering Study Program (Electronic Corps), Marine Logistics and Financial Management Study Program (Supply Corps) as well as the Defense Management Study Program for the Land Aspects of the Marine Dimension (Marine Corps).

The Warship Mechanical Engineering Study Program is one of the majors in AAL which has a profile with graduate qualifications, among others, having the basic

professional skills of the Technical Corps Officer as a supporter of logistics administration. Furthermore, he is able to carry out the professional duties of the Corps in the field as an Assistant to the Head of the Machine Division on the Corvette Warship type Sigma class. In addition, he is able to carry out the professional duties of the Corps in the field as an executor of ship repair and rescue and has the potential for defense science capabilities in the field of warship mechanical engineering for career development as a cadre of leaders.

To be able to meet the demands for graduate qualifications above, it is necessary to increase the implementation of education that refers to AAL's vision and mission in response to the development of Science and Technology in the industrial revolution 4.0 era, community needs, and the needs of graduate users. In addition to being faced with such rapid technological advances, currently the Warship Mechanical Engineering Study Program is carrying out efforts to improve the quality of education based on the National Higher Education Standards set by the Ministry of Education, Culture, Research and Technology through the National Accreditation Board for Higher Education in the hope of maintaining accreditation status A and can realize accreditation on an international scale. Based on the foregoing, it can be concluded that there is a need for a development strategy that the Warship Mechanical Engineering Study Program must implement in an effort to improve the quality of education. Strategy development aims to face the challenges of fast and modern science and technology, improve a dynamic national education system, meet and even exceed the graduate competency standards required by stakeholders.

Several studies on higher education development strategies have been carried out with various methods offered. One of them is the research conducted by the Special Implementation Program Development Strategy in Post-Graduate (Astuti, Fahmi, & Hubeis, 2015). The research above uses a combination of SWOT analysis and QSPM (Quantitive Strategic Planning Matrix) with ranking and attractiveness values obtained subjectively, but the process requires objective information that can lead to different interpretations of information.

From the above review, it can be concluded that the research that has been carried out cannot be applied to the problems that occur in the Indonesian Navy Educational Institution. This is because there are many factors and specific competencies that must be considered for analysis. On the average development strategy discussion only provides an overview of alternatives without any weighting and calculation of priority strategies so that further research is needed to be more accurate and effective. Based on the description above, the authors are interested in conducting in-depth research by taking the title "Strategy for the Development of the AAL Warship Mechanical Engineering Study Program in Improving the Quality of Indonesian Navy Education, which has never been studied by anyone before. The use of this research method is to combine Borda, SWOT and ISM methods.

This paper has many literatures to support the research, such as literature with title Modeling Agility of Supply Chain. *Industrial Marketing Management* (Agarwal, Shankar, & Tiwari, 2007), Integrating Hoshin Kanri and the Balanced Scorecard for Strategic Management: The Case of Higher Education (S. S Asan, 2007), Interpretative Structural Modelling (ISM) Approach: An Overview (Attri, Dev, & Sharma, 2013), Sustainability in strategic Management Education: Collins-Kreiner, N., & Wall, G. (2007). Evaluating tourism potential: A SWOT analysis of the Western Negev (Collins-Kreiner & Wall, 2007), Effect Of Leadership Of Caregiver Officers Towards Theachievement Values Through Motivation And Discipline Of Navy Academy's Cadets (Hartono, 2017), Firoz, N., & Rajesh, R. (2012). Relationship among Supplier Selection Criteria using Interpretative Structural Modeling for Manufacturing Organization in Kerala (Firoz & Rajesh, 2012), Jingxuan, F. (2017). Sales Performance Evaluation Based on Borda Method. (Jingxuan, 2017), Use of a Combination of AHP and ISM for Making an Innovative Rescue Caring Design in Landslide Area (Wang, 2015), Using the Analytic Network Process (ANP) in a SWOT Analysis – A Case Study for a Textile Firm (Yuksel & Dagdeviren, Using the Analytic Network Process (ANP) in a SWOT Analysis – A Case Study for a Textile Firm. , 2007), Relevance Feedback Based Query Expansion Model Using Borda Count and Semantic Similarity

Approach (Singh & Sharan, 2015), Social Choice in the South Seas: Electoral Innovation and the Borda Count in the Pacific Island Countries (Reilly, 2002), Using Interpretative Structural Modeling to Determine the Relation between Youth and Sustainable Rural Development (Panackal N. &., 2016).

This research is organized as follows, chapter 1 introduction, chapter 2 shows material and methodology, chapter 3 shows the results of data and discussion, chapter 4 conclusion.

2 LITERATURE REVIEW

2.1 Strategic Management Concept

Strategic management can be defined as the art and science of formulating, implementing, and evaluating cross-functional decisions that enable an organization to achieve its goals. This definition implies, strategic management focuses on integrating management, marketing, finance/accounting, production/operations, scriptwriting and development, and information systems to achieve organizational success. The term strategic management in this text is used synonymously with the term strategic planning. The latter term is more often used in the business world, while the former is often used in academia (David, 2011).

Strategic management is a set of managerial decisions and actions that determine the long-term performance of a company. This includes environmental scanning (both external and internal), strategy formulation (strategic or long-range planning), strategy implementation, and evaluation and control. Therefore, strategic management scriptwriting emphasizes monitoring and evaluating external opportunities and threats by considering the company's strengths and weaknesses (Wheelen, 2012).

The goal of strategic management is to capitalize on and create new and different opportunities for tomorrow; Long term planning, on the other hand, tries to optimize for tomorrow's trends today. A strategic plan results from a difficult managerial choice among many good alternatives, and it signifies a commitment to certain markets, policies, procedures, and operations in lieu of other courses of action.
Strategic management has now evolved to the point where its primary value is in helping organizations operate successfully in dynamic and complex environments. To be competitive in a dynamic environment, companies are becoming less bureaucratic and more flexible. In a stable environment as it was in the past, competitive strategy simply involves defining a competitive position and then maintaining it.

2.2 National Higher Education Standards

Higher Education is a level of education after secondary education which includes diploma programs, undergraduate programs, master programs, doctoral programs, and professional programs, as well as specialist programs, organized by universities based on the culture of the Indonesian nation. Furthermore, Higher Education is an educational unit that organizes Higher Education. State Universities, hereinafter referred to as universities, are those established and/or organized by the Government.

Every university in Indonesia applies higher education standards for the implementation of education. The Higher Education Standards consist of: the National Higher Education Standards set by the Minister at the suggestion of a body tasked with compiling and developing the National Higher Education Standards; and Higher Education Standards set by each Tertiary Education Institution with reference to the National Higher Education Standards.

The National Standard for Higher Education is a standard unit that includes national education standards, plus research standards, and community service standards. The national standards of higher education are set forth in the accreditation criteria which are the spirit of state universities and private universities. Accreditation itself is an assessment activity to determine the feasibility of study programs and universities (Kebudayaan, 2020).

2.3 AAL Mission Vision

Through its vision and mission, AAL seeks to improve the human resources of its cadets who have higher education in order to achieve a world-class Navy. AAL's vision is the realization of a Naval Academy that is able to produce TNI AL officers who are responsive, responsive and competent (TNI., 2008).

2.4 SWOT Analysis Concept

SWOT analysis is the most common technique that can be used to analyze strategic cases. SWOT is a tool that is often used to analyze the internal and external environment to achieve a systematic approach and support for decision situations. SWOT is an acronym for strengths (S), weaknesses (W), opportunities (O) and threats (T). The first two factors (strengths and weaknesses) relate to the internal factors of the organization, while opportunities and threats cover the wider context or environment in which the entity operates (Hill & Westbrook, 1997).

The SWOT analysis shows the appropriate strategy in the four categories SO, ST, WO and WT. The strategy identified as SO, involves taking advantage of opportunities by using existing strengths. ST is a strategy related to the use of force to eliminate or reduce the effects of threats. Similarly, the WO strategy seeks to take advantage of the opportunities presented by external environmental factors by paying attention to its weaknesses. The fourth and final one is WT, in which the organization tries to reduce the impact of its threats by considering its weaknesses (Yuksel & Dagdeviren, 2007).

2.5 Concept of Interpretative Structural Modeling (ISM)

Interpretive Structural Modeling (ISM) is used for ideal planning, it is an effective method because all elements can be processed in a simple matrix. The ISM was first proposed by Warfield in 1973. Interpret structural modeling is a methodology that aims to identify the relationship between certain items, which defines a problem or related issue and a suitable modeling technique to analyze the effect of one variable on another variable (Soti & Kaushal, 2010).

ISM is often used to provide a fundamental understanding of complex situations, as well as to devise a course of action to solve a problem. ISM begins with the identification of elements relevant to the problem or problem and extends to group problem solving techniques. A self-structural interaction matrix (SSIM) was developed based on the comparison of paired elements (Panackal & Singh, 2016).

3. RESEARCH METHODS

3.1 Methodology

To solve a problem in an observed research, steps are needed and determined to describe the approach and model of the problem. The steps taken are:
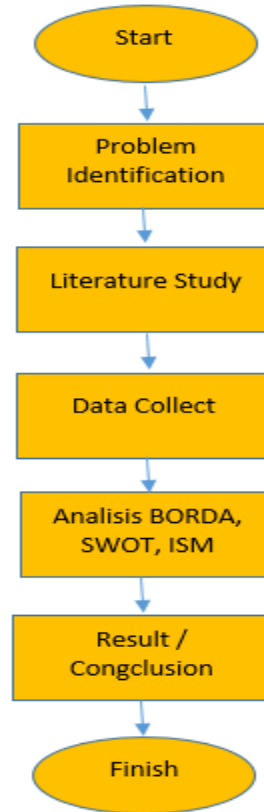

Figure 1. Research flow chart

Target: The purpose of this study is to identify several factors that influence the improvement and development of the AAL mechanical engineering study program.

Steps: This research step is step 1 identifying problems that affect the successful development of the AAL mechanical engineering study program, 2 conducting a literature study, collecting data and analyzing the collected data, step 3 analyzing data using Borda, SWOT and ISM techniques, step 4 providing suggestions for improvement and conclusions.

This research was conducted over a period of 6 months, from March 2021 to August 2021 with observations on the development of the AAL mechanical engineering study program in realizing the

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improvement of the quality of AAL graduates. Respondents in this study are stakeholders who are competent in the success of Indonesian soft power in the successful development of the AAL mechanical engineering study program consisting of 5 people including the Engineering department, Graduate Users and three other experts. The result of this research is a development strategy that affects the success of the development of the AAL mechanical engineering study program in realizing the quality of AAL graduates based on the analysis of the weighting criteria.

4. ANALYSIS AND DISCUSSION

4.1 Formulation of Influencing Factors

4.1.1 Internal Factor

Respondents in this primary data collection are experts and official officers who have competence in their fields and are equipped with official experience and have strategic thinking orientation about the AAL Warship Mechanical Engineering Study Program with all the problems in it. The formulation of internal factors starts from the calculation of the graduate user questionnaire regarding the responses and assessments of the competence of the graduates of the Warship Mechanical Engineering Study Program. The next stage is data processing according to the SWOT research method. In this method the data that is processed is questionnaire data which is the perception of respondents who are experts in their fields. SWOT analysis is used to capture expert perceptions and assessments of internal and external factors in the Warship Mechanical Engineering Study Program. Furthermore, the factors will be weighted using the Borda method.

Table 1. Internal factor Identification

No	Internal Factor	Criteria
1	The vision and mission of AAL's Warship Mechanical Engineering Study Program supports the achievement of AAL's vision and mission.	S
2	Leadership has a clear chain of command and hierarchy.	S
3	Fulfillment of the number of permanent lecturers of the AAL Warship Mechanical Engineering Study Program	S
4	Availability of adequate buildings and classrooms	S
5	Periodically carry out community service focusing on active maritime potential	S
6	The study period is carried out according to the specified time	S
7	The achievement of the specified graduate competency standards	S
8	Lack of cooperation with foreign universities	W
9	Lack of cadet activities partnering with students from other universities	W
10	There are several non-permanent lecturers who do not have a Master's degree (S2).	W
11	Insufficient number of Engineering Department personnel	W
12	Lack of library facilities	W
13	Lack of Logistics material in the curriculum	W
14	Lack of broad scope of community service.	W
15	Lack of research publications in reputable international journals	W

4.1.2 External Factor

Furthermore, the classification of external factor criteria is carried out, then the classification of opportunity factors (Opportunity) and threat factors (Threats) as shown in the table below:

Table 2. External factor Identification

No	External Factor	Criteria
1	There is budgetary support from the government and the Navy	O
2	There is support from the Ministry of Education and Culture, Research and Technology in the implementation of the Tri Dharma of Higher Education	O
3	The existence of partnerships with other institutions and universities	O
4	Graduates are projected to fill strategic positions in the Indonesian Navy	O
5	User stakeholders are satisfied with the competence of graduates	O
6	There are technological advances for curriculum development and infrastructure	O
7	High level of Tour of Duty and Tour of Area for Technical corps AAL cadet personnel and instructors	T
8	Dynamic community conditions demand better community service activities	T
9	The existence of technological advances in all fields requires the development of research	T
10	Increased user needs for graduate competencies	T
11	There is a virus pandemic that causes limited space for movement	T

4.2 Factor Weighting Using Borda Method

The Borda method begins with filling out questionnaires by experts to determine the order/ranking based on the level of importance of each factor criterion. After the results of the questionnaire are obtained, the next step is to calculate the frequency of each factor criterion. Then from these results, normalization of the Borda method is carried out, which is multiplied by a multiplier factor (n-1). The results of the normalization are then added up as a whole. The next step is to determine the weight by dividing the sum of each factor by the total number of all. The last step of the Borda method is to determine the order/ranking based on the results of the normalized weight calculation of each factor criteria.

Table 3. Weight of Strength Factor (S)

RANKING	NORMALIZATION OF FACTOR CRITERIA						
	S1	S2	S3	S4	S5	S6	S7
I	18	12	0	0	0	0	0
II	10	5	0	0	0	0	10
III	0	8	0	0	0	0	12
IV	0	0	9	0	0	6	0
V	0	0	4	0	0	6	0
VI	0	0	0	3	2	0	0
VII	0	0	0	0	0	0	0
TOTAL	28	25	13	3	2	12	22
TOTAL	105						
WEIGHT	0,267	0,238	0,124	0,029	0,019	0,114	0,210
ORDER	1	2	4	6	7	5	3

Based on the above calculations, the results of the weight values for each element of the strength factor (S) are obtained, namely for S1 with the highest weight of 0.267, for S2 with a weight of 0.238. Furthermore, S3 has a weight of 0.124, S4 has a weight of 0.029, and S5 has a weight of 0.019. Next the S6 factor gets a weight value of 0.114 and finally S7 with a weight of 0.210. From the results above, it can be seen that the highest weight is on the S1 factor, namely the vision and mission of the AAL Warship Mechanical Engineering Study Program to support the achievement of AAL's vision and mission. For the weight with the lowest value, the S5 factor whose contents periodically carry out community service focusing on active maritime potential.

Table 4. Weight of Weakness Factor (W)

RANKING	NORMALIZATION OF FACTOR CRITERIA							
	W1	W2	W3	W4	W5	W6	W7	W8
I	0	0	21	14	0	0	0	0
II	0	0	6	0	0	12	0	12
III	0	5	0	5	0	5	5	5
IV	12	0	0	0	4	0	0	4
V	3	9	3	0	0	0	0	0
VI	2	2	0	2	2	2	0	0
VII	0	0	0	0	3	0	1	1
VIII	0	0	0	0	0	0	0	0
TOTAL	17	16	30	21	9	19	6	22
TOTAL	140							
WEIGHT	0,121	0,114	0,214	0,150	0,064	0,136	0,043	0,157
ORDER	5	6	1	3	7	4	8	2

Based on the level of importance according to the experts, the weakness factor (W) is obtained for W1 with a weight of 0.121, W2 with a weight of 0.114, W3 with a weight of 0.214. For W4 a weighted value of 0.150, a W5 factor with a weight of 0.064, a W6 factor with a weight of 0.136, a W7 factor with a weight of 0.043 and the last factor W8 a weight of 0.157.

The weight of the weakness factor with the highest level of importance is on the W3 factor, namely there are several non-permanent lecturers who do not yet have a Master's degree (S2). While for the lowest weight there is In the W7 factor, the scope of community service is less broad.

Table 5. Weight of Opportunities Factor (O)

RANKING	NORMALIZATION OF FACTOR CRITERIA					
	O1	O2	O3	O4	O5	O6
I	20	0	0	5	0	0
II	4	4	0	0	4	8
III	0	3	0	6	3	3
IV	0	2	0	2	4	2
V	0	0	3	0	1	1
VI	0	0	0	0	0	0
TOTAL	24	9	3	13	12	14
TOTAL	75					
WEIGHT	0,320	0,120	0,040	0,173	0,160	0,187
ORDER	1	5	6	3	4	2

Based on the above calculations, the results of the weight values for each element of the opportunity factor (O) are obtained, namely the O1 factor gets a weight of 0.320, the O2 factor gets a weight of 0.120, the O3 factor gets a weight of 0.040, the O4 factor gets a weight of 0.173, the O5 factor gets a weight of 0.160 and finally factor

O6 gets a weight of 0.187. The highest weight is on the O1 factor, namely the existence of budgetary support from the government and the Navy. Meanwhile, the lowest weight is on the O4 factor, namely the existence of partnerships with other institutions and universities.

Table 6. Weight of Threats Factor (T)

RANKING	NORMALIZATION OF FACTOR CRITERIA				
	T1	T2	T3	T4	T5
I	16	0	0	4	0
II	3	0	6	6	0
III	0	2	4	2	2
IV	0	3	1	0	1
V	0	0	0	0	0
TOTAL	19	5	11	12	3
TOTAL	50				
WEIGHT	0,380	0,100	0,220	0,240	0,060
ORDER	1	4	3	2	5

Based on the calculations in accordance with table 6 above, the results of the weight values for each element of the threat factor (T) are that the T1 factor gets a weight of 0.380, the T2 factor gets a weight of 0.100, the T3 factor gets a weight of 0.220, the T4 factor gets a weight of 0.240 and the T5 factor gets a weight 0.060. The one with the highest weight on the threat factor is T1 which contains a high level of Tour of Duty and Tour of Area for personnel and instructors of the AAL cadets of the Technical Corps. While the factor with the lowest weight is T5, there is a pandemic virus that limits the space for movement.

4.3 IFAS and EFAS Analysis

Based on the results of calculations that have been carried out through a SWOT analysis, the final value and recapitulation of internal and external factors are obtained, as shown in the following table:
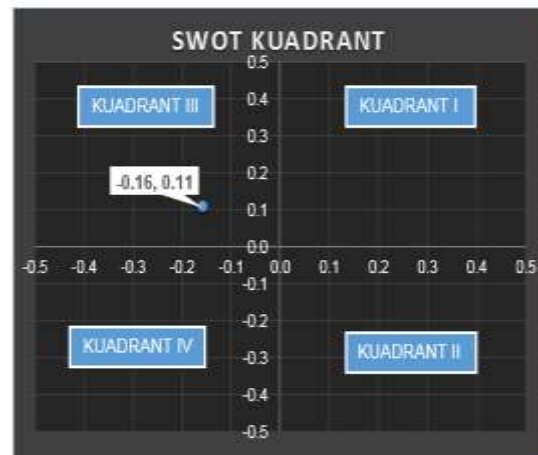
Table 7. Internal and External Weighting

NO	FACTOR	Description	Value
1.	Internal Factor	Strenght (S)	3,163
		Weakness (W)	3,321
2.	External Factor	Opportunity (O)	3,387
		Threat (T)	3,280

The next step, to find out the position in the SWOT quadrant, is to calculate the weight of the following strategy combination:

$$X=S-W=3.163-3.321=-0.158$$
$$Y=O-T=2,900-2,767=0,107$$

From the calculation results obtained (-0.158; 0.107), then the position of the SWOT quadrant can be seen in the following diagram:

Figure 2. SWOT Kuadrant

The interaction of the weighting of internal and external factors resulted in the alternative strategy that got the highest score was the Weakness–Opportunity (WO) Strategy as shown in Figure 4.6. This can be translated as a strategy

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that takes advantage of opportunities to overcome their weaknesses. The strategy formulation was obtained through a combination of S, W, O, and T elements, the results obtained that the AAL Warship Engineering Study Program was in quadrant III position or in its development carried out the Weakness Opportunity (WO) strategy. This condition is favorable, because in terms of external factors, the opportunities that exist are far greater than the threats.
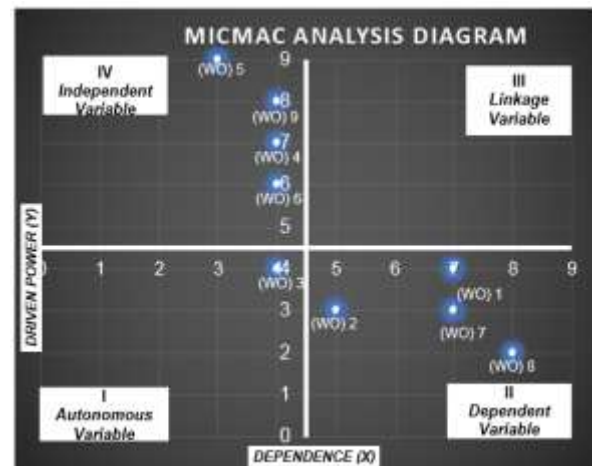
4.4   ISM Method Data Analysis

Furthermore, the determination of the strategy mapping for the development of the AAL Warship Mechanical Engineering Study Program is presented. The method used is Interpretative Structural Modeling. Based on the results of the SWOT analysis method, the WO strategy was obtained as the first alternative with nine sub strategies, namely:

Table 8. W-O Strategy

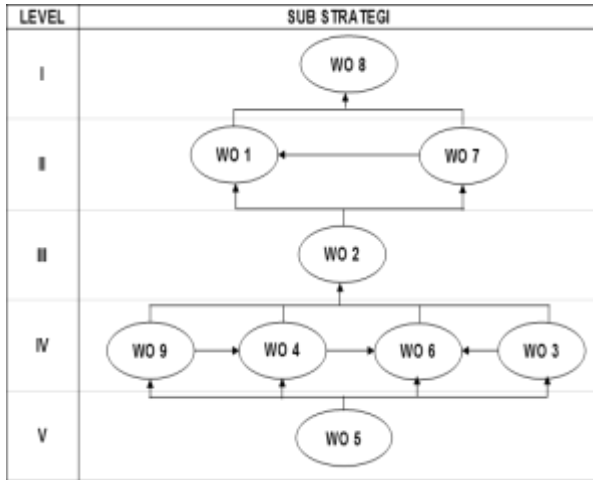| No	Code	Strategy WO
1	WO1	Increase the number of AAL Department of Technology personnel through intensive coordination with Disminpersal.
2	WO2	Carry out functional position proposals for Lecturers.
3	WO3	Implement international standardization of ATT III and IV for graduates of AAL Corps of Engineering cadets.
4	WO4	Increase the number and quality of reputable international publications.
5	WO5	Increasing linear competence for Lecturers and Education Personnel gradually.
6	WO6	Adding lecture material and Lattek adapted to the development of marine technology.
7	WO7	Holding visiting professors from abroad.
8	WO8	Expanding locations and deepening community service study materials
9	WO9	Carry out the rejuvenation of infrastructure facilities by adapting to technological developments.

In the SSIM matrix (Structural Self Interaction Matrix) representing the elements of the Expert's perception of the elements of the intended goal. The four symbols used to represent the type of relationship that exist between the two elements of the two systems under consideration are:

1. V : The relationship of Ei affects Ej, not vice versa;
2. A : The relationship of Ej affects Ei, not vice versa;
3. X : The relationship between Ei and Ej influence each other;
4. O : Shows that Ei and Ej are not related.

Figure 3. MICMAC Analysis Diagram

The next step, based on the results of the ISM assessment from the Expert and the Micmac diagram, will then display the strategy hierarchy structure as follows:

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Figure 4. Strategy Hierarchy Structure

Based on the results of the classification of elements in the WO strategy, we get five levels of hierarchical structure as shown above. In the hierarchical structure, it can be seen that:
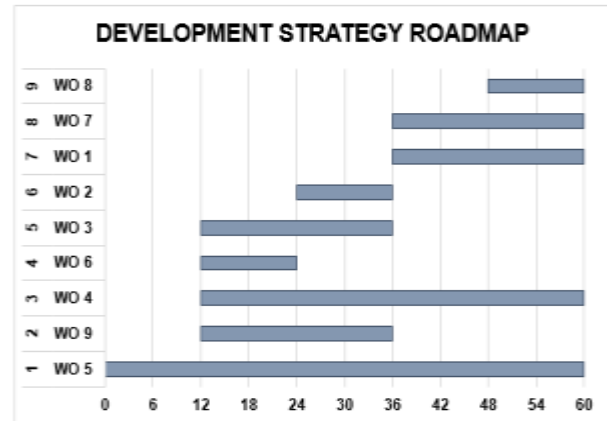
a. At level V there is a sub-strategy of WO 5 carrying out the rejuvenation of facilities and infrastructure by adapting to technological developments.

b. At level IV there are four sub-strategies, namely WO 9 expanding the location and deepening community service study materials, WO 4 increasing the competence of lecturers and education staff gradually, WO 6 adding material and lectures Lattek adapted to the development of marine technology and finally WO 3 proposing positions functional for Lecturers.

c. Level III consists of one sub-strategy of WO 2, namely holding visiting professors from abroad.

d. Furthermore, at level II, there are two sub-strategies WO 1 to increase Ministry of Technology personnel through intensive coordination with Disminpersal and WO 7 to increase the number and quality of reputable international journal publications.

f. At level I, there is a sub-strategy of WO 8, namely implementing international standardization of ATT III and IV for graduates of the AAL Corps of Engineering cadets.

4.5 Development Strategy Roadmap

The plan for the development of the AAL Warship Mechanical Engineering Study Program is generally carried out in a strategic plan (Renstra) which is divided into five-year programs for the years 2022-2026. The output of this process is a plan map in the form of a document that explains how the future is estimated and the goals to be achieved, how to implement the

trajectory and the steps needed to achieve it, in this case the development of AAL Warship Mechanical Engineering.

The plan for the implementation of the development of the AAL Warship Mechanical Engineering Study Program can be seen in outline in the following figure:

Figure 5. Development Strategy Roadmap of the AAL Warship Mechanical Engineering Study Program

The plan for implementing the development strategy of the AAL Warship Mechanical Engineering Study Program consists of one strategic plan for a period of five years (60 months). Starting with carrying out the rejuvenation of facilities and infrastructure by adapting to the development of marine technology, which will be carried out starting from the beginning of the year in stages for the next five years.

5. CONCLUSIONS AND SUGGESTIONS

5.1 Conclusions

Based on a series of data processing, scenario preparation and analysis of research results, some conclusions can be drawn as follows:

a. In the implementation of the identification and weighting of the influencing factors, fifteen internal factors and eleven external factors were obtained. The internal factor of strength with the highest score of 1.067 in the vision and mission factor of the AAL Warship Mechanical Engineering Study Program supports the achievement of AAL's vision and mission. On the internal factor of weakness with the highest score of 0.857, there are several non-permanent lecturers who do not yet have a Master's degree (S2). To determine the external factor, the

opportunity with the highest score of 1.280 is the existence of budget support from the government and the Navy. The threat factor with the highest score of 1,520 is the high level of the Tour of Duty and Tour of Area for the personnel and instructors of the AAL cadets of the Technical Corps.

b.   The formulation of the chosen strategy is the WO strategy is in quadrant III. The strategy consists of nine substrategi namely:
   1). Increase the number of personnel of the Ministry of Marine Affairs and Fisheries through intensive coordination with Disminpersal.
   2). Carry out the proposal for functional positions for Lecturers.
   3). Implement international standardization of ATT III and IV for graduates of the AAL Corps of Engineering cadets.
   4). Increase the number and quality of reputable international publications.
   5). Increasing linear competence for Lecturers and Education Personnel gradually.
   6). Adding lecture materials and Lattek adapted to the development of marine technology.
   7). Conducting visiting professors from abroad.
   8). Expanding locations and deepening community service study materials
   9). Carry out the rejuvenation of infrastructure facilities by adapting to technological developments.
c.   The Roadmap for the AAL Warship Mechanical Engineering Study Program is carried out for five years starting from 2022 to 2026 based on a hierarchical structure according to the ISM method.

5.2   Suggestions

Based on the results of the research that the author has done, there are several inputs in improving and developing this research in the future, namely:
a.   In strategic management there are three stages, namely development, implementation and evaluation. To support further research, it is hoped that the analysis phase of strategy implementation and strategy evaluation plans can be discussed.
b.   In this research, the cost calculation in strategy implementation has not been investigated. There is a need for further research on the analysis of the cost calculation of implementing alternative strategies.

c.   For implement an education system that has a specificity with military organizations that must keep up with technology 4.0 developments, suggestions are submitted to AAL leaders to always carry out continuous coordination with Dikti, Disdikal and other related institutions so that they always get updated information and can immediately make adjustments to the needs of facilities. training in accordance with the assignment field.
d.   It is necessary to pay attention to learning patterns and Lattek, including the atmosphere of the training place or laboratory, arrangement of practical tools, visual aspects and learning media.

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