

INDONESIAN NAVY OFFICERS PLACEMENT USING ANALYTIC NETWORK PROCESS (ANP) (CASE STUDY: PATROL SHIPS COMMANDER)

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ABSTRACT

Indonesian Navy (TNI AL) as one of the core components of the national defense system, carries out the task of the marine dimension in the defense sector and protects the law and maintains security in the sea area in accordance with the provisions of national law and ratified international law. The readiness of the Navy's organization is supremely determined by the components of the Navy's strength, which consists of personnel and the main equipment of the weapon system (defense equipment). The placement of positions, especially for the position of commander of a patrol ship, is a process to obtain the best human resources. This study focuses on analyzing and determining the criteria for the position of the KRI Commander on the Patrol Ship (as one of the important positions in the Indonesian Navy). The Analytic Network Process Model can be used as an instrument in determining alternative officers fulfill the requirements for occupying positions. Hasil Kuisioner akan digunakan sebagai input dalam software Superdecision. Hasil dari software tersebut adalah bobot dari masing-masing subCriteria yang dapat digunakan dalam penilaian seleksi Komandan Kapal Patroli serta dapat diketahui peringkat dari alternatif calon pada model. The results of data processing using Super Decisions software can be known as alternative priorities by looking at the weight value of each alternative, namely Priority 1 is Candidate A with a weight value of 0.384181, Priority 2 is Candidate B with a weight value of 0.309020 and Priority 3 is Candidate C with a weight value of 0.306799.

Keywords: ANP, Personel Placement, Patrol Ship

1. INTRODUCTION.

Indonesian Navy (TNI AL) as one of the core components of the national defense system, carries out the task of the marine dimension in the defense sector and protects the law and maintains security in the sea area in accordance with the provisions of national law and ratified international law. (Govement, 2004). The Indonesian Navy is a system formed by sub-systems whose readiness should maintained with the appropriate method in order

The challenges of the Navy's future duties include violations and crimes at sea such as illegal fishing, illegal logging, human trafficking and ship piracy (Asops, 2004) The challenges of the Navy's tasks in the future include violations and crimes at sea such as illegal fishing, illegal logging, human trafficking and ship piracy, demanding the readiness of Navy's components especially Patrol Ships to encounter these challenges Nowadays, condition of the Indonesian Navy has deployed

to can be used in various operations, both Military Operations for War (OMP) and other Military Operations (OMSP). (Marsetio, 2013). The readiness of the Navy's organization is supremely determined by the components of the Navy's strength, which consists of personnel and the main equipment of the weapon system (defense equipment). Indonesian Warship is one of the defense equipment that determines the readiness of the Navy organization in maintaining the integrity of Indonesia (Malik, 2014).

new domestically made patrol boat so that the readiness of the ship is maintained (Kasal, 2005). Patrol ship personnel often changes due to organizational cycles; Therefore, it is necessary to have job criteria formulation mechanism by considering many aspects that must be possessed by patrol ship personnel in order to maintain the quality of patrol boat personnel, whose duty is to ensure the readiness of the KRI in enforce state sovereignty at sea.

The placement of positions, especially for the position of commander of a patrol ship, is a process to obtain the best human resources. The right positioning requires analysis of information and efforts to identify various important factors regarding data from candidates (Suharyo, 2017). These important factors include personality, education, assignment, health, physical fitness or in other words through a multicritical approach. The existing condition, becomes conflictual when found the parable of candidates who have good grades in certain criteria (e.g., physical fitness requirements), but less in other criteria (e.g., Skills).

In this study, the position of navy officer in occupying the position of commander of patrol boats, so that the final result of this study is expected to get the right personnel in occupying a position, especially the position of patrol boat commander. The benefit of this research is to create a method that can be presented in the Navy in the framework of the placement of the position of navy officer.

In this paper, there is some literature used including Law No. 34 of 2004 concerning the TNI (Government, 2004), Research Methods (Nazir, 1995), ASRO Application in Organizational Performance Improvement (Marsetio, 2013), Decision Making with Feedback: The Analytical Network Process (Saaty, 1996), Analysis and Determination of the Position of Commander in the Diponegoro Class (Sigma) Based on the Papi Kostick Personality Method and the Dematel Fuzzy Analytic Network Process (DFANP) Method (Malik, 2014), Maritime Security Operations Guide Book (Asops, 2004), Sustainability-Based Naval Base Location Model (Suharyo, 2017) dan Navy Power Building 2005 to 2024 (Kasal, 2005). This paper describes the design of decision-making models in the placement of the position of navy officers using the Analytic Network Process (ANP) method.

In the writing of this paper presented systematics as follows, part 1 Introduction, part 2 about material and methods, part 3 results and discussion of research part 4 is the conclusion of writing.

2. MATERIAL AND METHODS

2.1 Navy Patrol Ship

The grouping of Indonesian warships in 3 forces, namely Striking Forces, Patrolling Forces and Supporting Forces, is intended to focus priorities in the preparation of ships in accordance with the reality of combat functions

with support. Patrolling Forces group prioritizes propulsion systems, navigation equipment and naval presence operations for maritime security crackdown (Kasal, 2005). Elements of warships belonging to the Patrolling Forces group consist of Fast Patrol Boat (FPB), Salawaku Class and Pari-class Fast Patrol (PC) (Suharyo, 2017).

2.2 Personnel Selection

Personnel selection is the process of selecting individuals who fit the qualifications needed to perform the prescribed work in the best possible way (Karsak, 2001). Personnel selection is one of the main phases of the human resource management process. The basic function of the personnel selection operation is to determine, among the candidates applying for a particular job in the company, those who have the knowledge, skills and abilities necessary to be able to perform the job requirements successfully (Kaynak, 2002). Therefore, personnel selection is a type of Multi-criteria decision-making (MCDM) problem, which requires MCDM methods for effective problem solving, it is clear that selection among candidates is a difficult issue that has quantitative and qualitative aspects, involving several people from functional areas in the personnel selection process increases the complexity of the selection process (Safari, Cruz-Machado, Sarraf, & Maleki, 2014).

2.3 Analytic Network Process (ANP)

ANP is an extension of Analytic hierarchy process (AHP), and AHP models a decision-making framework that assumes a unidirectional hierarchical relationship among decision levels. Although AHP can help resolve complex multi-criteria decision problems, it is less successful when applied to problems involving multi-criteria or hierarchy dependence relationships (Saaty, 1980). The AHP is used to solve problems having independencies on alternatives or criteria and ANP is used to solve the problem having dependence or relationship among alternatives or criteria (Saaty, 1996). The ANP method can be applied by following these steps for facility location selection (Mahmud, Rayhan, & Ahamed, 2016).

Step 1: Model construction and problem formulation.

Step 2: Establishment of the pair-wise comparison matrixes and criteria interdependency matrixes.

Step 3: Calculation of the priority vectors or priority weights.

Step 4: Consistency test by using the Eigen

value and Random consistency index.

Step 5: Construction of supermatrix by using the priority that are calculated in the comparison matrixes.

Step 6: Computations of limit supermatrix by multiplying the supermatrix itself numerical times. Step 7: Selection of best alternatives from the Limit matrix.

Judging from the type of data, the research method used in this study is quantitative method. With this research method the author intends to collect historical data and observe carefully about certain aspects related to the problem being studied by the author. The data sources in this study were collected in the

form of primary and secondary data. Primary data is obtained on objects studied during research directly to personnel staff (SPERS) and The Administrative and Personnel Office (Disminpers). While secondary data is data obtained from documents related to the Placement of Positions and Coaching of personnel in the Navy. Research as described by (Nazir, 1995) is a series of steps implemented to find a solution to a problem through the process of collecting and processing data to then analyze and interpret the results, where previously given the initial hypothesis that will be used in the preparation of the framework for research.

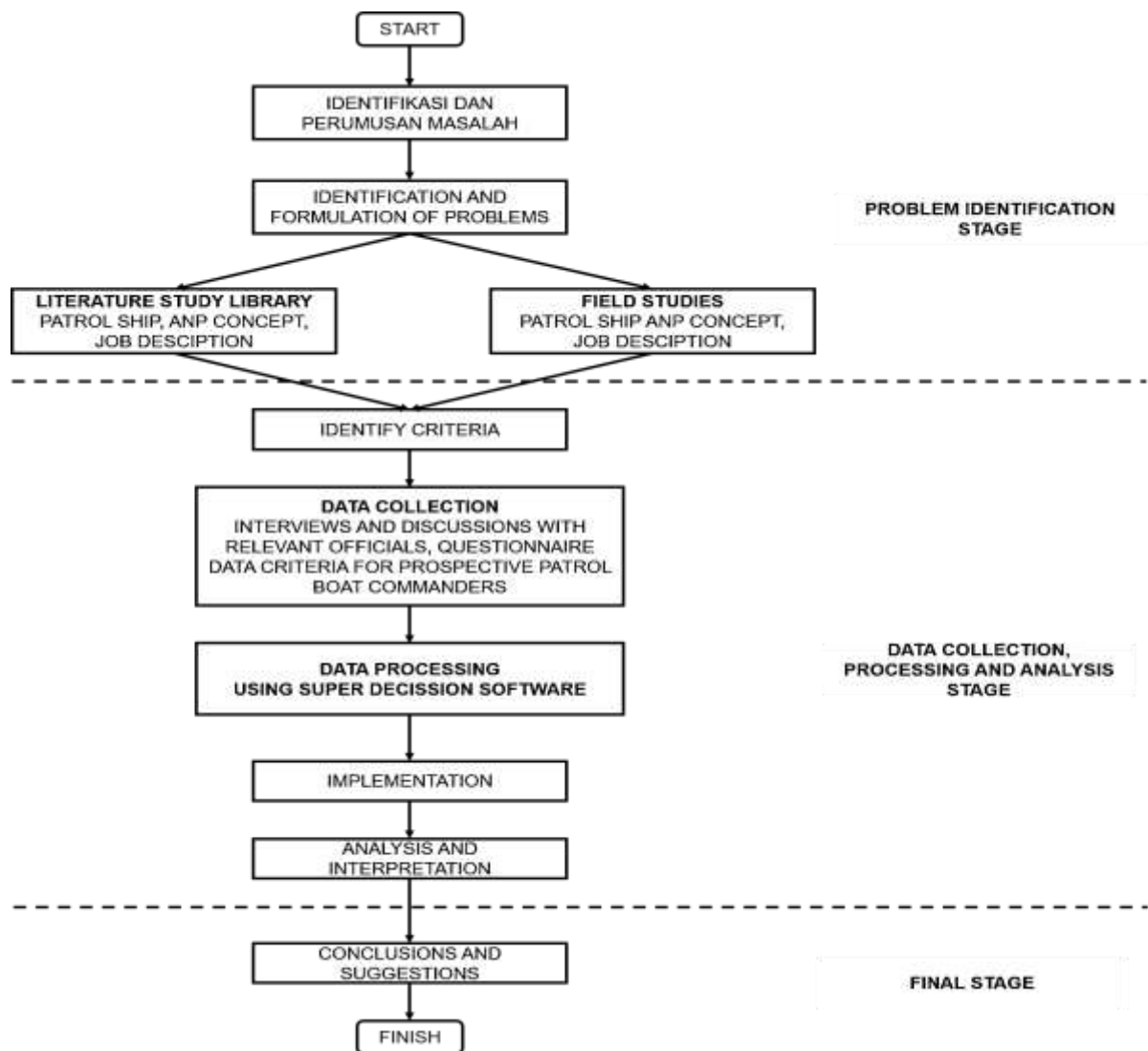


Figure 1. Flowchart Research

3. RESULTS AND DISCUSSION

Primary data retrieval conducted interviews and Brainstroming with relevant officials in the field of personnel to obtain criteria

and subcriteria in the selection of patrol boat commanders. Criteria and subcriteria obtained through interviews / brainstorming with competent officials and through literature studies can be seen in Table 1;

Table 1. Criteria Used In Alternative Determination

NO	Criteria	Subcriteria
1	Health	Physical Health
		Mental Health
2	Performance	Personality
		Achievement
		Input Source
3	Physical Fitness	Battery A (Running)
		Battery B (Pull Up, Sit Up, Push Up, shuttle run)
		Battery C (Swimming)
4	Intelligence	Maritime Security Knowledge (Kamla)
		English
		Psychology

The definition of each criteria and subcriteria is explained as follows:

Table 2. Definisi Criteria

NO	Criteria	Subcriteria
1	Health	Health test abbreviated as Urikkes is a system of physical and mental health examination of a person to be used to determine his health status.
2	Performance	Demonstrate the behavior, attitudes and activities of daily personnel activities covering various aspects of the assessment of the konduite,
3	Physical Fitness	Related to the absolute physical abilities of soldiers, including Battery A (run 12 minutes), battery B (push ups, sit ups, pull ups and shuttle runs) and Battery C (Swimming 50 m)
4	Intelligence	It is a measure of the level of intelligence of each soldier assessed from the results - the results of assessments that have been carried out periodically.

Table 3. Definisi SubCriteria

NO	Sub Criteria	Pengertian/ Parameter Penilaian
1	Physical Health	It is a physical health test of a person who is used to know and determine his health status.
2	Mental Health	It is a mental health test for a person who is used to know and determine his health status.
3	Personality	It is an assessment conducted on TNI personnel with several aspects of assessment.
4	Achievement	It is an assessment conducted on Navy personnels with several aspects of assessment related to the field of achievement.

5	Input Source	It is the formation of Navy Officers who have basic qualifications of Officers by utilizing and developing skills.
6	Physical Fitness	It is a criterion relating to physical capability that is absolutely a must-have, including Battery A, Battery B and battery c
7	Maritime Security Knowledge (Kamla)	It is the knowledge of a person in the field of kamlaan that can be implemented in the implementation of maritime security patrol duties,
8	English	It is an ability to communicate, especially with English, which is currently required to be mastered by every navy soldier
9	Psychology	It is an important aspect in the assessment of soldiers, consisting of 3 sub-aspects namely intelligence, work attitude and personality.

After determining the assessment criteria, it is then formed into a network model (Figure 2) which is then incorporated into the super decision software (Figure 3), to identify the existence of relationships that affect logically. The criteria are grouped into 4 clusters, namely Health, Performance, Physical Fitness, Intelligence and 1 Goal (goal). The following is the Network ANP model.



Figure 2. ANP Model

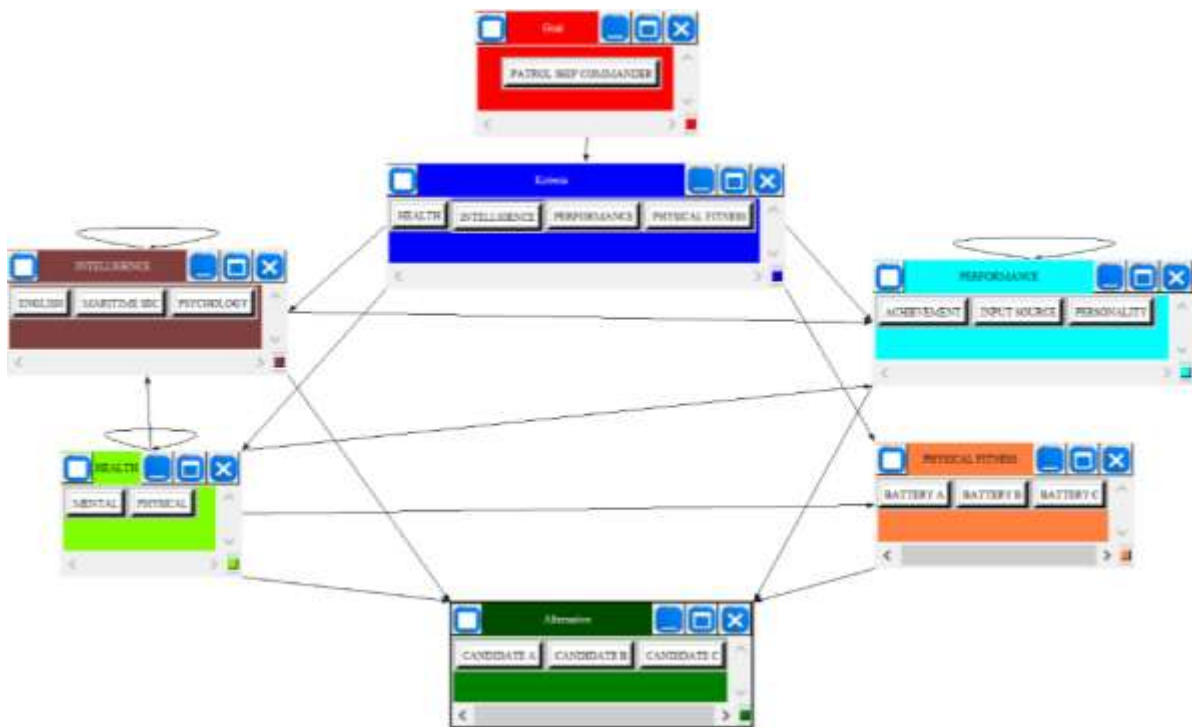


Figure 3. ANP Model on Super Decision Software

After the creation of the ANP Model, questionnaires are carried out using the reference network model that has been formed. Questionnaires are based on the relationship between criteria elements both interdependence and outer dependence and

preference relationships between criteria with goals by means of a comparison between clusters and between cluster elements. This questionnaire aims to find out how big the relationship is based on the assessment of the respondents. The respondents are experts, who

are Navy officials directly related to the field of personnel, namely eastern fleet command head of administration and personnel with staff. This questionnaire leads to the purpose of the assessment which is to determine the weighting of the criteria in the framework of placement of positions.

Data that has been obtained from the distribution of questionnaires in the form of pairwise comparison values between criteria and between alternatives for each subcriteria. The assessment of respondents will be

combined using geometric mean formula as follows:

$$\sqrt[n]{\prod_{i=1}^n X_i}$$

X_i = Decision on 1st criteria comparison

A recap of geometric average calculations of pairwise comparison values between criteria and subcriteria from questionnaire results can be found in Table 4.

Table 4. Geometric Mean

Job Placement			Geomean
Intelligence	vs	Health	3.63
Intelligence	vs	Physical Fitness	3.03
Intelligence	vs	Performance	2.26
Health	vs	Physical Fitness	0.33
Health	vs	Performance	0.50
Physical Fitness	vs	Performance	2.05
Intelligence Criteria			Geomean
English	vs	Maritime Security	1.74
English	vs	Psychology	0.45
Maritime Security	vs	Psychology	3.05
Health Criteria			Geomean
Physical Health	vs	Mental Health	1.63
Physical Fitness Criteria			Geomean
Battery A	vs	Battery B	3.08
Battery A	vs	Battery C	3.56
Battery B	vs	Battery C	2.43
Performance Criteria			Geomean
Personality	vs	Achievement	0.98
Personality	vs	Input Source	2.29
Achievement	vs	Input Source	1.41
Psychology SubCriteria			Geomean
English	vs	Maritime Security	3.04
Personality	vs	Input Source	1.94
Physical Health SubCriteria			Geomean
Battery A	vs	Battery B	0.34
Battery A	vs	Battery C	1.13
Battery B	vs	Battery C	3.47
Personality	vs	Achievement	1.28
Mental Health SubCriteria			Geomean
Personality	vs	Achievement	0.99
CANDIDATE COMPARISON			
English SubCriteria			Geomean
Candidate A	VS	Candidate B	0.44
Candidate A	VS	Candidate C	0.58

Candidate B	VS	Candidate C	3.04
Maritime Security SubCriteria			Geomean
Candidate A	VS	Candidate B	1.00
Candidate A	VS	Candidate C	1.95
Candidate B	VS	Candidate C	1.45
Psychology SubCriteria			Geomean
Candidate A	VS	Candidate B	2.09
Candidate A	VS	Candidate C	2.16
Candidate B	VS	Candidate C	1.16
Mental Health SubCriteria			Geomean
Candidate A	VS	Candidate B	0.90
Candidate A	VS	Candidate C	1.89
Candidate B	VS	Candidate C	1.54
Physical Health SubCriteria			Geomean
Candidate A	VS	Candidate B	0.56
Candidate A	VS	Candidate C	0.76
Candidate B	VS	Candidate C	0.60
Battery A SubCriteria			Geomean
Candidate A	VS	Candidate B	1.25
Candidate A	VS	Candidate C	1.00
Candidate B	VS	Candidate C	1.29
Battery B SubCriteria			Geomean
Candidate A	VS	Candidate B	0.68
Candidate A	VS	Candidate C	0.36
Candidate B	VS	Candidate C	0.96
Battery C SubCriteria			Geomean
Candidate A	VS	Candidate B	1.00
Candidate A	VS	Candidate C	1.44
Candidate B	VS	Candidate C	2.80
Personality SubCriteria			Geomean
Candidate A	VS	Candidate B	0.72
Candidate A	VS	Candidate C	0.68
Candidate B	VS	Candidate C	0.51
Achievement SubCriteria			Geomean
Candidate A	VS	Candidate B	1.20
Candidate A	VS	Candidate C	1.58
Candidate B	VS	Candidate C	0.85
Input Source SubCriteria			Geomean
Candidate A	VS	Candidate B	2.52
Candidate A	VS	Candidate C	2.05
Candidate B	VS	Candidate C	1.17

The geometric averages that have been calculated are then incorporated into the comparison matrix in pairs in the super

decisions software. For example, figure 4.3 shows the pairwise comparison matrix in Criteria.

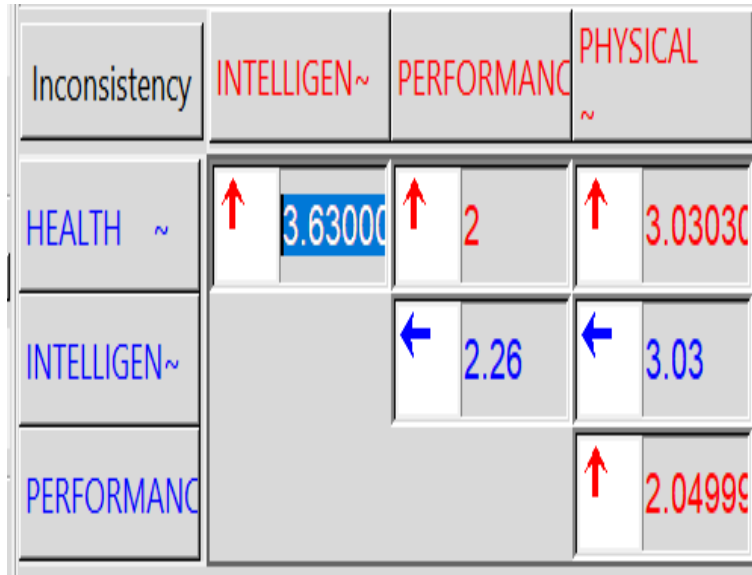


Figure 4. Pairwise Comparison

After obtaining one pairwise comparison value for each relationship is done local priority weight calculation. Each time a local priority weighting should be considered is its consistency value that should not exceed the value of 0.1. For example, it can be seen in Figure 5 which shows the inconsistency values of the paired comparisons between Criteria. It turns out from Figure 5 shows that the Inconsistency Index is 0.004820. The value is still below 0.1 which means that the answers given by the respondents in this questionnaire have been consistent.

After inserting all geometric mean into questionnaire format in Super Decisions software, then the software performs all stages of THEP method, candidate weight as seen in red circled value in figure 6.

Inconsistency: 0.04820		
HEALTH		0.09615
INTELLIGE~		0.48022
PERFORMAN~		0.16907
PHYSICAL ~		0.25456

Figure 5. Inconsistency Index

Here are the overall synthesized priorities for the alternatives. You synthesized from the network Super Decisions Main Window: ANP inggris.sdm0d

Name	Graphic	Ideals	Normals	Raw
CANDIDATE A		1.00000	0.384181	0.88135
CANDIDATE B		0.804331	0.309020	0.31765
CANDIDATE C		0.798571	0.306799	0.230099

Fig 6 Candidate Weight

From the results of an ANP calculation with Super Decission Software obtained the

result that Candidate A is a Candidate who has the highest weight of Criteria and Sub Criteria used in choosing the Position of Patrol Boat Commander.

4. CONCLUSION AND SUGGESTION

Based on the results of the analysis carried out, researchers can draw some conclusions. From the results of processing data in the form of questionnaires, consistency ratio can be obtained, where all consistency ratio values are below 10% (0.1), so that as stated by Saaty (1990) then this assessment system can be called consistent.

In the results of data processing using Super Decisions software can be known alternative priorities by looking at the weight value of each alternative obtained from the calculation of Limiting Supermatrix. From Figure 6, alternative priority sequences are obtained based on the weight value of each alternative as follows:

- Priority 1 is Candidate A with a weight value of 0.384181
- Priority 2 is Candidate B with a weight value of 0.309020
- Priority 3 is Candidate C with a weight value of 0.306799

Based on the above conclusions, researchers suggest the use of ANP Theory in the placement of navy personnel positions so as to facilitate the decision-making process in the placement of positions. The use of ANP can reduce subjectivity in the selection of personnel who will occupy a position.

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