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Implementation of Swot-Ahp Method to Determine the Best Strategy on Development Women Navy Resources in Indonesian War Ship

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Abstract*: (Indonesian Women Navy=kowal) is part of Indonesian Navy which have the same duties and responsibilities as other naval soldiers. The essence of Kowal's main task is to take part in performing the main tasks of the TNI in which their skills are needed to achieve greater efficiency by remembering his nature and femininity. SWOT is used as a planning tool. However, this analysis has weaknesses. Some of these weaknesses can be avoided, by connecting a SWOT analysis with AHP method. Following the basic steps of the SWOT-AHP, this research presented a case study of defining the strategy for the development of Indonesian Women Navy. The results indicate that development skill with study dikpengiptek strategy was the best strategy that could have been implemented. Based on the research results, the method SWOT-AHP application to determine the best strategy of development women navy resources would be described as follows : (1) reduce the weakness to increase opportunities (WO=0,28), (2) optimizing the strength to reduce the threat (ST=0,26), (3) increasing weakness and reducing threats (WT= 0,23) and (4) optimizing strengths and maximizing opportunities (SO= 0,23).*

Keywords: AHP, SWOT, Strategy, Woman Navy.

I. INTRODUCTION

(Indonesian Women Navy=Kowal) is part of Indonesian Navy which have the same duties and responsibilities as other naval soldiers in performing TNI AL duties in the field of defense, enforcing the law and maintaining the security of marine territory of national jurisdiction in accordance with ratified international law, performing the diplomacy tasks, carrying out TNI tasks in the development of maritime strength and carrying out the empowerment of the sea defense area (Hutabarat, 2017). The essence of Kowal's main task is to take part in the main tasks of the TNI by carrying out tasks in which their skills are needed to achieve greater efficiency by remembering his nature and femininity. A number of efforts continue to be carried out by the leadership of the Navy to reach the World Class Navy (Till, 2015). Starting from operational improvements, increasing the capacity of Human Resources that have comprehensive competency qualities including intellectual aspects, personality aspects and physical aspects, to improvements in other sectors (Pershing, 2006). Kowal is also a woman whose the knowledge needs to be sharpened to be more flexible in establishing social relations and more able to put themselves in service because Kowal is needed in the Navy's organization to support the main task of the Navy (Hutabarat, 2017).

This paper used some literature to support the research, for example paper with title Strengths, Weaknesses, Opportunities And Threats (SWOT) Analysis On Globacom Ltd (Bello, 2013). Strengths vs. Strong Position: Rethinking the Nature of SWOT Analysis (Clardy, 2013). SWOT Analysis of strategic Position of Cycling Federation in Iran (Arefeh Jamshidi, 2012). Comparing AHP and ANP: An Application of Strategic Decisions Making in a Manufacturing Company (GÖRENER, 2012). SWOT Analysis (LALITHA CHAVALI, 2017). The Strategic

Planning (SWOT) Analysis Outcomes And Suggestions According To The Students And The Lecturers Within The Distance Education System (Tugba Yanpar YELKEN, 2012). Coping with Imprecision in Strategic Planning: A Case Study Using Fuzzy SWOT Analysis (Hasan Hosseini-Nasab, 2011). Strategic Planning & SWOT Analysis (Kotnal, 2017). SWOT Balanced Scorecard (Rangkuti., 2012). Strategic development and SWOT analysis at the University of Warwick (Dyson, 2004). Combining SWOT and AHP Techniques for strategic planning (Osuna & Aranda, 2007). Prioritiation of e-Govrnment strategies using a SWOT-AHP analysis: the case of Turkey (Kahraman, Cetin, & Demirel, 2007). Studying strategies of sport management using SWOT technique (Leila Asayesh, 2013). Focused SWOT: diagnosing critical strengths and weaknesses (Ronen, 2009). A Synthesis on SWOT Analysis of Public Sector Healthcare Knowledge Management Information Systems in Pakistan (Arfan Arshad, 2017). A SWOT Analysis Tool For Indonesian Small and Medium Enterprise (Husni Thamrin1, 2017). Development of Strategic Plan for Hotel Industries through Swot Analysis (C.Kiritharan nair, 2016). Importance-Performance Analysis based SWOT analysis (Boonyarat Phadermrod, 2016).

At present, the policy of the leadership of the Navy has led to the provision of opportunities for kowal soldiers to carry out their assignments to remain in KRI (Permanent Members). The assignment of Kowal soldiers at KRI is currently still limited in the KRI class of the LPD (Landing Platform Dock). For now, several positions of Officers in KRI are taken from Naval Academy who have a Sailor, Electrical and Supply Corps, and for Kowal NCOs and officers taken from Inner Sleep (not yet married). However, the current dynamics development assessed stated that the quality and performance of Kowal has decreased, resulting from several disciplinary or criminal violations. Various problems that arise are more or less influenced by the negative impact of the environment (either at dormitory or at the office) which deviates from the pattern of life from the provisions of religion and military / official rules that have been determined.

In response to this, there needs to be a strategy to develop Kowal development, especially those who serve in KRI. The guidance of kowal personnel curently can be considered as decent, but it is necessary to add rules and strategies that can improve Kowal's professionalism in their respective units, especially Kowal who is placed on KRI and based on the dignity and nature of Kowal as a woman. Because Kowal himself is a soldier who has accuracy in performing their work, is able to communicate well with superiors or subordinates, and more flexible in handling internal problems. These things are a separate force for Kowal. However, there are also weaknesses, namely physical limitations in doing heavy work, family orientation and the existence of a monthly cycle that affects work productivity. Based on the description above, the author was interested in conducting in-depth research on the Development Strategy for Kowal Personnel Development to improve the quality of Kowal's performance in KRI. The use of this research method was combining SWOT and AHP method. The advantages, disadvantages, opportunities and threat would be obtained using the SWOT analysis matrix. In addition, the AHP method was used to determine a ranking of the results of the decision that will determine the right strategy in the development of Kowal personnel development to support the main task of the Indonesian Navy.

This Paper is organized as follows. Section 2 is review about the basic ship theory. Section 3 would be about the result of the research and section 4 discussion of research. Finally, while in section 5 we would present the conclusions of this paper.

II. MATERIALS AND METHODS

2.1 SWOT Analysis

SWOT analysis is a strategic planning method used to evaluate strengths, weaknesses, opportunities, and threats in a project or a business speculation (Hajikhani & Jafari, 2013). These four factors form the acronym SWOT (Strengths, Weaknesses, Opportunities, and Threats). This process involves determining the specific objectives of business or project speculation and identifying internal and external factors that support these goals. SWOT analysis can be applied by analyzing and sorting things that affect all four factors, then applying it in the SWOT matrix image, where the application is how strengths are able to take advantage of opportunities, how to overcome weaknesses which prevents advantages from opportunities that exist, then how strengths are able to deal with existing threats, and finally how to overcome weaknesses that can make threats real or create a new threat (Lumaksono, 2014).
The hierarchical representation of the SWOT structure is shown in Figure 1 (Chermack & Kasshanna, 2007).

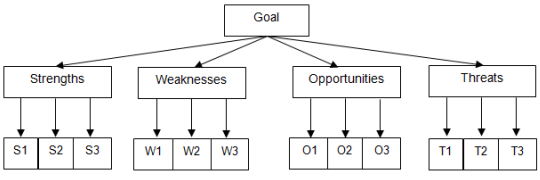

Fig.1. Hierarchical structure of the SWOT matrix

2.2 Analytic Hierarchy Process

Analytic hierarchy process (AHP) was developed by Thomas L. Saaty in the early 1970s (Saaty, 1980). The AHP method is one of the most popular pairwise comparison methods used for decision making on the Multi-Criteria Decision Making (MCDM) problem (Gorener, Toker, & Korkmaz, 2012). The AHP approach is designed to help decision makers to combine qualitative and quantitative factors from a complex problem.
The working principle of AHP is to form a problem structure. In solving problems, the AHP method used as a tool to help formulate strategies requires the preparation of hierarchies in the process. The hierarchy in question starts from the Goal, groups of factors, strategic factors and strategic alternatives (Kangas, Pesonen, & Mikko, 2001).

2.3 SWOT-AHP Method

In this research, the AHP structure obtained from the SWOT matrix and divided into three parts (Oreski, 2012). To create a SWOT-AHP based strategic management model, we designed the phases model. Firstly, we identified the SWOT through SWOT analysis, then found external and internal environment that relevated. Secondly modifying factors and third building an evaluation model (Figure 2) (Yogi, Rizal, & Ahmadi, 2017).

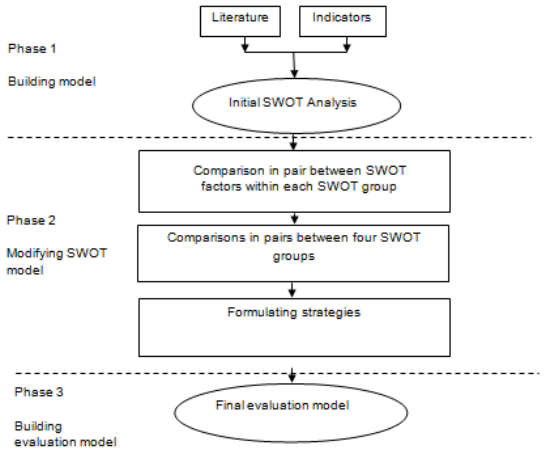

Fig.2. Phases Model

2.4 Technical Concept

This research was conducted based on existing problems, consideration of the availability of data and the willingness of institutional management to study its internal and external strategic studies. Primary data collection was obtained through in-depth interviews and focus group discussions (Hunger & Wheelen, 2010). And secondary data is obtained from literature studies of various relevant sources. There are five expert respondents who are competent in their fields. Then the data obtained, identified and grouped into internal and external strategic factors.

Weighting of internal and external strategic factors and group factors was performed through pairwise comparison methods. After an alternative strategy was created, the AHP method was used to prioritize the alternative. The AHP method produces the best strategy from various alternative strategies recommended through the SWOT matrix (Mehmet, 2011).

III. RESULT

The identified strategic factors were grouped into 4 groups of factors, namely Strength, Weakness, Opportunities, and Threats. The strengths and weaknesses were identified from the analysis of the internal environment while opportunities and threats were identified from the analysis of the external environment, as shown in Table 1.

Table 1: SWOT factors and sub-factors for the strategy selection

Strength (S) Which forces should be aware of? (S1) there are more enthusiasm to become Kowal (S2) precision and accuracy in performing the work (S3) good emotional control (S4) flexible in handling problems (S5) has good communication skills (S6) multitalent (protocol and sport)	Weakness (W) Weaknesses that need to be recognized? (W1) family orientation (W2) high sensitivity and empathy (W3) limited in doing heavy work (W4) there is a monthly period that interferes with work activities (W5) limited special kowal facilities at KRI
Opportunities (O) You can take advantage of the opportunities? (O1) promotion on KRI that does not look at gender (O2) increased career level	Threats (T) Threats which we must be aware of? (T1) there is no specific regulation for kowal serving in KRI

(O3) placement of kowal who have just graduated from education according to their expertise	(T2) sexual harassment (T3) high stress level due to work pressure or environmental influences (T4) full of risk

Alternative strategies based on the SWOT factors and sub-factors are developed using the SWOT matrix are shown in Table 2.

Table 2: SWOT matrix

Internal factor		
	Strength (S) (S1) there are more enthusiasm to become Kowal (S2) precision and accuracy in performing the work (S3) good emotional control and flexibility in handling problems (S4) high professionalism (S5) has good communication skills (S6) multitalent (protocol and sport)	Weakness (W) (W1) family orientation (W2) high sensitivity and empathy (W3) limited in doing heavy work (W4) there is a monthly period that interferes with work activities (W5) limited special kowal facilities at KRI
Eksternal factor		
Opportunities (O) O1) promotion on KRI that does not look at gender (O2) increased career level (O3) placement of kowal who have just graduated from education according to their expertise	SO Strategies 1. improving the ability of Kowal's multitalent by looking at the capabilities they have so that they can improve their career path according to their expertise (S6, O2, O3) 2. enhancing the professionalism on ships in filling positions that do not look at gender (S4, O1)	WO Strategies 1. improving special kowal facilities on KRI to create comfort in work (W5, O2) 2. improving kowal performance by giving the same workload as men (W2, W3, O1)
Threats (T) (T1) there is no specific regulation for kowal serving in KRI (T2) sexual harassment (T3) high stress level due to work pressure or environmental influences (T4) full of risk	ST Strategies 1. Preventing the occurrence of sexual harassment caused by work environment factors such as away from family. This requires the cooperation of all crew members to respect each other's rights and obligations 2. There needs to be additional regulations (special regulations) for kowal to serve on board a maximum of 2 years.	WT Strategies 1. kowal must have the same competency in order to improve performance equivalent to men on board. 2. there must be restrictions for kowal who have a family to serve in the ship for a maximum of 1 year

IV. DISCUSSION

The next step was pairwise comparison of SWOT factors by using Saaty (1-9) scale. The comparison results are shown in Table 3.

Table 3: Pairwise comparison of SWOT factors

With respect to the goal	Strengths	Weakness	Opportunities	Threats	Importance Degrees of SWOT Groups
Strengths	0,375	0,353	0,364	0,375	0,367
Weaknesses	0,125	0,118	0,091	0,250	0,146
Opportunities	0,375	0,471	0,364	0,250	0,365

Threats	0,125	0,059	0,182	0,125	0,123

The consistency ratio of the comparison between four SWOT groups was 0,064

Secondly, SWOT matrices' elements were compared considering every SWOT groups. All pairwise comparisons in the application were performed by the team experts. Using pair-wise comparison matrices given below and Expert Choice software package, the following priorities of the SWOT groups and subfactors had been obtained and shown at Table 4.

Table 4: Priorities of the SWOT groups and SWOT factors, the factor having the greatest weight in each SWOT group is underlined.

SWOT group	Group priority	SWOT factors	Consistency ratio	Priority of factor within group	Overall priority of factor
Strengths	0,367	There are more enthusiasm to become Kowal		0,048	0,0176
		Precision and accuracy in performing the work		0,054	0,0199
		Good emotional control and flexibility in handling problems	0,096	<u>0,373</u>	0,1369
		High professionalism		0,115	0,0421
		Has good communication skills		0,318	0,1166
		Multitalent (protocol and sport)		0,093	0,0340
Weaknesses	0,146	Family orientation		0,092	0,0134
		High sensitivity and empathy		0,050	0,0073
		Limited in doing heavy work		<u>0,390</u>	0,0569
		There is a monthly period that interferes with work activities	0,052	0,374	0,0545
		Limited special kowal facilities at KRI		0,095	0,0139
Opportunities	0,365	Promotion on KRI that does not look at gender		<u>0,539</u>	0,1967
		Increased career level	0,007	0,297	0,1085
		Placement of kowal who have just graduated from education according to their expertise		0,164	0,0598
Threats	0,123	There is no specific regulation for kowal serving in KRI		0,236	0,0290
		Sexual harassment	0,061	<u>0,380</u>	0,0468
		High stress level due to work pressure or environmental influences		0,217	0,0266
		Full of risk		0,167	0,0206

Pairwise comparisons of the alternative strategies based on the SWOT sub-factors were calculated. The details of the pair-wise comparison matrices and the calculated local weights are provided in Table 5-8. In table 5, the pair-wise comparison matrices of alternative strategies with respect to the strengths are given together with inconsistency ratios. Considering the sub factor S1, S2, S3, S4, S5 and S6, the strategies with the largest priorities are ST, WO, ST, WO, WT and ST respectively.

Table 5: The pair-wise comparisons of alternative strategies in term of the Strengths

In term of S1	SO	ST	WO	WT	Inconsistency ratio	Priorities of alternatives in term of S1
SO	1,00	0,20	6,00	5,00	0,07	0,25
ST	5,00	1,00	8,00	9,00		0,64
WO	0,17	0,13	1,00	1,00		0,06

WT	0,20	0,11	1,00	1,00		0,06
In term of to S2						Priorities of alternatives in term of S2
SO	1,00	3,00	0,17	3,00	0,10	0,20
ST	0,33	1,00	0,25	3,00		0,13
WO	6,00	4,00	1,00	8,00		0,61
WT	0,33	0,33	0,13	1,00		0,06
In term of S3						Priorities of alternatives in term of S3
SO	1,00	0,33	6,00	8,00	0,07	0,33
ST	3,00	1,00	5,00	9,00		0,54
WO	0,17	0,20	1,00	2,00		0,08
WT	0,13	0,11	0,50	1,00		0,05
In term of S4						Priorities of alternatives in term of S4
SO	1,00	0,50	0,50	0,33	0,08	0,15
ST	2,00	1,00	0,50	1,00		0,24
WO	2,00	0,25	1,00	5,00		0,37
WT	3,00	1,00	0,20	1,00		0,24
In term of S5						Priorities of alternatives in term of S5
SO	1,00	0,33	0,50	0,25	0,02	0,09
ST	3,00	1,00	1,00	0,33		0,22
WO	2,00	1,00	1,00	0,50		0,21
WT	4,00	3,00	2,00	1,00		0,47
In term of S6						Priorities of alternatives in term of S6
SO	1,00	0,14	0,20	3,00	0,14	0,11
ST	7,00	1,00	3,00	5,00		0,55
WO	5,00	0,33	1,00	3,00		0,26
WT	0,33	0,20	0,33	1,00		0,07

Table 6: The pair-wise comparisons of alternative strategies with respect to the Weaknesses

In term of W1	SO	ST	WO	WT	Inconsistency ratio	Priorities of alternatives in term of W1
SO	1,00	6,00	9,00	1,00	0,04	0,05
ST	0,17	1,00	0,50	0,13		0,06
WO	0,11	2,00	1,00	0,20		0,08
WT	1,00	8,00	5,00	1,00		0,42
In term of W2						Priorities of alternatives in term of W2
SO	1,00	0,20	3,00	6,00	0,05	0,22
ST	5,00	1,00	8,00	9,00		0,65
WO	0,33	0,13	1,00	2,00		0,08
WT	0,17	0,11	0,50	1,00		0,05
In term of W3						Priorities of alternativesin term of W3
SO	1,00	2,00	0,17	0,14	0,03	0,08
ST	0,50	1,00	0,20	0,14		0,06
WO	6,00	5,00	1,00	1,00		0,40
WT	7,00	7,00	1,00	1,00		0,45
In term of W4						Priorities of alternatives in term of W4
SO	1,00	0,13	1,00	0,14	0,07	0,06
ST	8,00	1,00	8,00	4,00		0,60
WO	1,00	0,13	1,00	0,14		0,06
WT	7,00	0,25	7,00	1,00		0,30

In term of W5						Priorities of alternatives in term of W5
SO	1,00	2,00	0,14	0,16	0,04	0,09
ST	0,50	1,00	0,20	0,20		0,07
WO	7,00	5,00	1,00	1,00		0,43
WT	6,00	5,00	1,00	1,00		0,41

In table 6, in term of W1, the strategies WT was the best strategy and had the largest priority. In term of W2, W3, W4 and W5, the strategies with the largest priorities were ST, WT, ST and WO. We can see in table 7 that based on the pairwise comparison matrices of alternative strategies in term of the opportunities, we had the largest priorities which are SO, SO and SO. The inconsistency ratio of O1, O2 and O3 were 0,02, 0,08 and 0,03 respectively.

Table 7: The pair-wise comparisons of alternative strategies with respect to the Opportunities

In term of O1	SO	ST	WO	WT	Inconsistency ratio	Priorities of alternatives in term of O1
SO	1,00	2,00	3,00	4,00	0,02	0,47
ST	0,50	1,00	1,00	3,00		0,24
WO	0,33	1,00	1,00	2,00		0,19
WT	0,25	0,33	0,50	1,00		0,10
In term of O2						Priorities of alternatives in term of O2
SO	1,00	8,00	5,00	2,00	0,08	0,50
ST	0,126	1,00	2,00	0,14		0,08
WO	0,20	0,50	1,00	0,14		0,06
WT	0,50	7,00	7,00	1,00		0,37
In term of O3						Priorities of alternatives in term of O3
SO	1,00	1,00	0,14	0,14	0,03	0,46
ST	1,00	1,00	0,17	0,14		0,30
WO	7,00	6,00	1,00	2,00		0,13
WT	7,00	7,00	0,50	1,00		0,11

In table 8, the pair-wise comparison matrices of alternatives strategies in term of the threats were given together with the consistency ratios. In term of to the T1, T2, T3 and T4 subfactors, the strategies with the best priorities were SO, ST, WO and WO with the inconsistency ratio of 0,03; 0,01; 0,03 and 0,08 respectively.

Table 8: The pair-wise comparisons of alternative strategies with respect to the Threats

In term of T1	SO	ST	WO	WT	Inconsistency ratio	Priorities of alternatives in term of T1
SO	1,00	2,00	3,00	4,00	0,03	0,46
ST	0,50	1,00	2,00	4,00		0,30
WO	0,33	0,50	1,00	1,00		0,13
WT	0,25	0,25	1,00	1,00		0,11
In term of T2						Priorities of alternatives in term of T2
SO	1,00	O,11	0,14	1,00	0,01	0,06
ST	9,00	1,00	2,00	7,00		0,54
WO	7,00	0,50	1,00	5,00		0,33
WT	1,00	0,14	0,20	1,00		0,07
In term of T3						Priorities of alternatives in term of T3
SO	1,00	0,50	0,20	0,50	0,03	0,09
ST	2,00	1,00	0,25	0,17		0,19
WO	5,00	4,00	1,00	3,00		0,59
WT	2,00	0,50	0,20	1,00		013
In term of T4						Priorities of alternatives in term of T4

SO	1,00	3,00	0,17	0,50	0,08	0,13
ST	0,33	1,00	0,20	0,17		0,06
WO	6,00	5,00	1,00	3,00		0,55
WT	2,00	6,00	0,33	1,00		0,26

Using the Expert Choice software, we obtained the result of SWOT AHP analysis. Overall priority weights of the alternative strategies which had been calculated were shown in Table 9.

Table 9: Priority Weights of SWOT factors, sub factors and alternative strategies

Group factors and sub factor	Priority weights of factor	Alternative			
		SO	ST	WO	WT
STRENGTHS	0,37				
S1	0,05	0,25	O,64	0,06	0,06
S2	0,05	0,20	0,13	0,61	0,06
S3	0,37	0,33	0,54	0,09	0,05
S4	0,11	0,15	0,24	0,37	0,24
S5	0,32	0,10	0,22	0,21	0,47
S6	0,09	0,11	0,55	0,26	0,08
	Total	0,07	0,14	0,10	0,06
WEAKNESSES	0,15				
W1	0,09	0,45	0,06	0,08	0,42
W2	0,05	0,22	0,65	0,08	0,05
W3	0,39	0,08	0,06	0,40	0,45
W4	0,37	0,06	0,59	0,06	0,30
W5	0,10	0,09	0,07	0,43	0,41
	Total	0,03	0,04	0,03	0,05
OPPORTUNITIES	0,36				
O1	0,54	0,47	0,24	0,19	0,10
O2	0,30	0,49	0,08	0,06	0,37
O3	0,16	0,06	0,07	0,50	0,37
	Total	0,13	0,05	0,09	0,10
THREATS	0,12				
T1	0,24	0,13	0,06	0,55	0,26
T2	0,38	0,06	0,54	0,33	0,07
T3	0,22	0,09	0,19	0,60	0,13
T4	0,17	0,13	0,06	0,55	0,26
	Total	0,01	0,03	0,06	0,02
	Total	**0,23**	**0,26**	**0,28**	**0,23**
	ranking	4	2	1	3

The calculation steps for the priority of the alternative strategies, the priority of strength can be calculated by summing the weights of each alternatives and then divided by number of sub-factor, finally we can multiply it by priority weight of strength in this case : 0,37*(0,25+0,20+0,33+0,15+0,10+0,11)/6 = 0,07. Thus, total of alternatives weight of SO was (0,07+0,03+0,13+0,01) / 4 = 0,23.The result from SWOT AHP analysis indicate that WO was the best strategy group with an overall priority value 0,28.

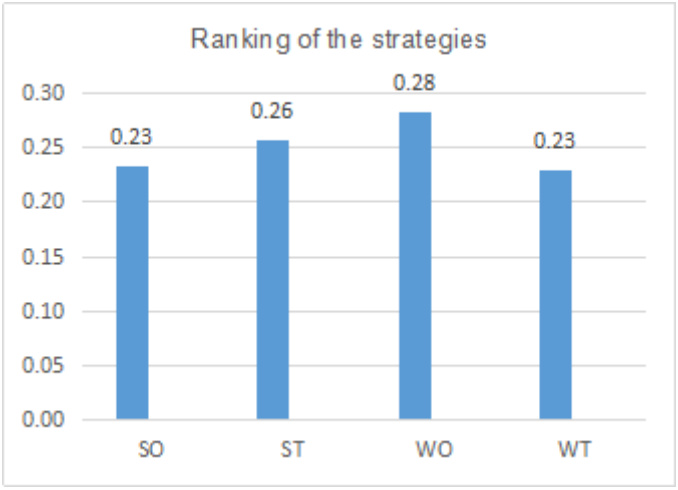

Fig.3. Ranking of the strategies

V. CONCLUSION

The SWOT-AHP method had been used to prioritize the alternative strategies and select the best strategy to develop navy woman in Indonesian war ship. The total of alternatives weight of SO was (0,07+0,03+0,13+0,01)/4=0,23. The result from SWOT AHP analysis indicate that WO is the best strategy group with an overall priority value of 0,28. The AHP model consisted of a goal (the best strategy), 4 SWOT factors, 18 SWOT sub-factors and 4 alternative strategies. The strategy WO had been found as the most important strategy to develop navy woman in Indonesian war ship. The second order strategy was ST and then WT and SO.

VI. ACKNOWLEDGEMENTS

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VII. REFERENCES

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