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ANALYSIS OF RECRUITMENT AND CAREER DEVELOPMENT OF THE INDONESIAN NAVY CORPS TO IMPROVE ORGANIZATIONAL EFFICIENCY

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ABSTRACT

This study aims to analyze the recruitment and career development system for officers in the Indonesian Navy in order to improve organizational efficiency. The main problem faced is an imbalance in the composition of officers across rank strata, which has an impact on career stagnation, suboptimal filling of positions, and reduced organizational effectiveness. The research uses a descriptive-qualitative approach supported by quantitative analysis, through the *Cross Sectional* method to map personnel flow (inflow, throughflow, outflow), calculating Length of Service in Rank (MDDP) and Length of Service as an Officer (MDP), and optimizing *Goal Programming* to determine the ideal intake of new officers according to the organizational structure requirements in the Personnel Structure List (DSP).
The results of the study show a surplus of officers at the Second Lieutenant and Colonel levels, as well as a significant shortage at the middle levels (First Lieutenant to Lieutenant Colonel). The optimization model using *Goal Programming* recommends the recruitment of 106 Second Lieutenants each year to achieve a balanced DSP structure by 2050. In addition, SWOT analysis resulted in priority strategies in the form of improving the DSP-based planning system and merit system, redistributing positions, and strengthening education and international cooperation.
This study provides theoretical contributions to the development of data-based human resource management concepts, as well as practical contributions to policy makers in formulating adaptive, efficient, and sustainable career development strategies for the Indonesian Navy Corps.

Keywords: Personnel Planning, *Cross Sectional*, *Goal Programming*, SWOT, Navy Corps, Organizational Efficiency

INTRODUCTION

Human resources (HR) are a vital component in every organization, including military institutions. The availability of personnel in the right numbers, quality, and distribution is crucial to the effectiveness of an organization in carrying out its main tasks. In the context of the Indonesian Navy, the Sailors Corps holds a strategic position as the backbone of maritime operations, both in times of peace and war. Therefore, career planning and development ( ) for Sailors Corps officers must be managed systematically, measurably, and in line with the organization's needs as outlined in the Personnel Structure List (DSP).

The current situation shows that the composition of Navy officers is not ideal. There is a surplus of personnel at the Second Lieutenant and Colonel levels, but there is a significant shortage at the middle levels (First Lieutenant to Lieutenant Colonel). This imbalance causes several problems, such as dual positions at the lower levels, colonels outside the formation, career stagnation due to limited positions, and decreased organizational effectiveness.

Previous studies (Grinold & Marshall, 1977; Siagian, 1994; Handoko, 2014) emphasize the importance of human resource planning based on personnel flow (*inflow, throughflow, outflow*), career cycles, and merit systems. However, personnel planning practices in the Indonesian Navy are still often based on budget availability rather than actual needs according to the DSP. This causes a significant deviation between the actual conditions and the ideal structure.

Based on this background, this study uses *Cross Sectional* analysis to map personnel flows, *Goal Programming* to determine the ideal intake of new officers, and SWOT analysis to formulate more adaptive career development strategies. This study is expected to provide theoretical contributions to the development of data-based HR management concepts, as well as practical contributions to supporting efficient and sustainable career development policies for Indonesian Navy officers.

RESEARCH METHOD

This study uses a descriptive-qualitative approach supported by quantitative analysis. The focus of the study is to analyze the imbalance in the composition of Indonesian Navy officers and formulate career development strategies in line with organizational needs.

1. Type and Source of Data

The data used consists of:

a. Primary data: obtained through interviews with Disminpersal officials, planning staff, and officers involved in career development.

b. Secondary data: derived from Personnel Composition Lists (DSP), personnel flow data (inflow, throughflow, outflow), Disminpersal archives, and literature related to HR management and personnel cycle theory.

2. Data Collection Techniques

a. In-depth interviews to obtain information on policies, obstacles, and expert opinions.

b. Documentation in the form of DSP, personnel reports, and historical data.

c. Literature review of HR management theory, personnel planning, and personnel flow concepts.

3. Data Analysis Techniques

Several analysis techniques are used in an integrated manner, namely:

a. Cross-sectional analysis to map the actual conditions of personnel flow (inflow, throughflow, outflow) based on historical data.

b. Calculation of Length of Service in Rank (MDDP) and Length of Service as an Officer (MDP) to describe promotion and retirement patterns.
c. Goal Programming is used to determine the optimal intake of second lieutenants each year in order to achieve the ideal DSP structure in the 2050 projection year.
d. SWOT analysis (Strengths, Weaknesses, Opportunities, Threats), to formulate a comprehensive career development strategy for Navy officers.

4. Research Location and Period

The research was conducted at Mabesal (Disminpersal) and (Srenal) as agencies in charge of personnel planning for the Indonesian Navy, with a research period from 2024 to 2025.

RESULTS AND DISCUSSION (Capital, 12 pts, bold)

RESULTS AND DISCUSSION

1. Current Condition of Indonesian Navy Officer Corps Personnel

The results of the DSP data analysis and interviews show that the composition of Indonesian Navy officers is not yet ideal. There is an excess of personnel at the Second Lieutenant (Letda) and Colonel strata, while there is a significant shortage at the middle strata (Lettu to Letkol). This imbalance causes a mismatch in the form of:

a. Dual positions at the lower ranks,
b. Colonel officers outside the formation (LF),
c. Career stagnation due to limited positions, as well as
d. suboptimal organizational effectiveness.

These findings reinforce the personnel cycle theory that imbalances at one level will have an impact on the entire flow of personnel.

Table 1.1 Recapitulation of the Actual Number of Indonesian Navy Officers

YEAR	RANK						NUMBER
	LETDA	LIEUTENANT	CAPTAIN	MAJOR	LIEUTENANT COLONEL	COLONEL	
2015	326	430	591	701	326	340	2714
2016	344		580	706	356	349	2794
2017	351	444	566	701	392	352	2743
2018	385	445	549	729	374	405	2760
2019	376	437	476	689	427	413	2818
2020	450	457	476	659	431	411	2884
2021	649	433	481	634	435	442	3074
2022	856	507	413	631	447	451	3305
2023	846	532	465	617	408	453	3321
2024	805	534	546	544	376	500	3305
2025	769	596	466	569	400	525	3325

(Source: Disminpersal, 2025)

Table 1.2 Data on the Surplus and Shortage of Naval Corps Officers According to DSP

RANK	DSP	ACTUAL	Difference
LETDA	624	769	+145

Lettu	822	596	-226
CAPTAIN	818	466	-352
MAJOR	679	569	-110
LIEUTENANT COLONEL	416	400	-16
COLONEL	144	525	+318

(Source: Disminpersal, 2025)

2. Cross-Sectional Analysis and Goal Programming

Cross-sectional analysis describes an unbalanced pattern of personnel flow (inflow, throughflow, outflow). Calculations **of length of service in rank (MDDP)** and **length of service as an officer (MDP)** reveal bottlenecks at certain strata, particularly at the colonel level. The results of optimization with a

a. *Cross Sectional* Model with Input

The provision of officer personnel with input from the first class for the rank stratum, namely Second Lieutenant, is part of the Indonesian Navy's personnel development system, which is one of its main tasks. Due to limited resources, the target for fulfilling the Indonesian Navy's officer personnel needs is limited to a certain number, which is adjusted according to the Indonesian Navy leadership's policy. With these resource limitations, it is necessary to control personnel recruitment so that it is in line with the availability of positions in the Personnel Structure List (DSP) or close to the predetermined target.

The *Cross Sectional* model with this input aims to determine how many recruits there will be in each period so that the results obtained can be as close as possible to the predetermined target, with the smallest possible deviation in each rank stratum for each group. Referring to the Q matrix of the calculation results using *Goal Programming*, personnel recruitment for each period in a balanced state can be determined using the simplified equation below, which incorporates the identity matrix:

$(I - Q)^{-1} \, . \, U = S$

where,

I = Identity Matrix

Q = Matrix q_{ii} and q_{ji} resulting from *Goal Programming* (without vector *w*)

U = Recruitment vector, i.e., only to class one.

S = DSP matrix per rank stratum

Therefore,

$$\left(\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} - \begin{bmatrix} 0,8298 & 0 & 0 & 0 & 0 & 0 \\ 0,1702 & 0,8708 & 0 & 0 & 0 & 0 \\ 0 & 0,1078 & 0,8917 & 0 & 0 & 0 \\ 0 & 0 & 0,0473 & 0,9430 & 0 & 0 \\ 0 & 0 & 0 & 0,0446 & 0,9274 & 0 \\ 0 & 0 & 0 & 0 & 0,0502 & 0,8542 \end{bmatrix} \right) \begin{bmatrix} r_1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 624 \\ 822 \\ 818 \\ 679 \\ 416 \\ 144 \end{bmatrix}$$

$$\begin{bmatrix} 0,1702 & 0 & 0 & 0 & 0 & 0 \\ -0,1702 & 0,1292 & 0 & 0 & 0 & 0 \\ 0 & -0,1078 & 0,1083 & 0 & 0 & 0 \\ 0 & 0 & -0,0473 & 0,057 & 0 & 0 \\ 0 & 0 & 0 & -0,0446 & 0,0726 & 0 \\ 0 & 0 & 0 & 0 & -0,0502 & 0,1458 \end{bmatrix} \begin{bmatrix} r_1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 624 \\ 822 \\ 818 \\ 679 \\ 416 \\ 144 \end{bmatrix}$$

$$\begin{pmatrix} 5{,}875441 & 0 & 0 & 0 & 0 & 0 \\ 7{,}739938 & 7{,}739938 & 0 & 0 & 0 & 0 \\ 7{,}704204 & 7{,}704204 & 9{,}23361 & 0 & 0 & 0 \\ 6{,}393138 & 6{,}393138 & 7{,}662277 & 17{,}54386 & 0 & 0 \\ 3{,}927465 & 3{,}927465 & 4{,}707129 & 10{,}77763 & 13{,}7741 & 0 \\ 1{,}352255 & 1{,}352255 & 1{,}620699 & 3{,}710817 & 4{,}742524 & 6{,}858711 \end{pmatrix} \begin{pmatrix} r_1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} 624 \\ 822 \\ 818 \\ 679 \\ 416 \\ 144 \end{pmatrix}$$

Then we obtain:

$5.875441\ r_1 = 624$

$7.739938\ r_1 = 822$

$7.704204\ r_1 = 818$

$6.393138\ r_1 = 679$

$3.927465\ r_1 = 416$

$1.352255\ r_1 = 144$

From these equations, the following calculation results are obtained:

$5{,}875441\ r1 + 7{,}739938\ r1 + 7{,}704204\ r1 + 6{,}393138\ r1 + 3{,}927465\ r1 + 1{,}352255\ r1 = 3503$

$32.99244\ r_1 = 3503$

$r_1 = \frac{3503}{32{,}99244}$

$r_{(1)} =$ **106.1758**

Thus, the recruitment of Indonesian Navy personnel for the officer class for each period (each year) is 106.1758 people, which can be rounded to 106 people. From these results, vector U is multiplied by the matrix $(I - Q)^{-1}$, yielding the following composition of personnel ranks that are close to the DSP:

$$\begin{pmatrix} 5{,}875441 & 0 & 0 & 0 & 0 & 0 \\ 7{,}739938 & 7{,}739938 & 0 & 0 & 0 & 0 \\ 7{,}704204 & 7{,}704204 & 9{,}23361 & 0 & 0 & 0 \\ 6{,}393138 & 6{,}393138 & 7{,}662277 & 17{,}54386 & 0 & 0 \\ 3{,}927465 & 3{,}927465 & 4{,}707129 & 10{,}77763 & 13{,}7741 & 0 \\ 1{,}352255 & 1{,}352255 & 1{,}620699 & 3{,}710817 & 4{,}742524 & 6{,}858711 \end{pmatrix} \begin{pmatrix} 106 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} 622{,}7967 \\ 820{,}4334 \\ 816{,}6456 \\ 677{,}6726 \\ 416{,}3113 \\ 143{,}339 \end{pmatrix}$$

With consistent recruitment each year based on the above calculation, where 21 officers are appointed each year, using the following equation:

$$S^*_{(t+1)} = Q \cdot S^*_{(t-1)} + U_{i(t+1)}$$

where,

$S^*_{(t+1)}$ = Matrix of total personnel strength per rank stratum in period (t + 1).

Q = Matrix Q resulting from *Goal Programming*.

$S^*_{(t-1)}$ = Matrix of personnel strength per rank stratum in period (t – 1).
$U_{i(t+1)}$ = Matrix of personnel recruitment numbers for each period (t + 1).

Using *Microsoft Excel*, the calculations using the above equation will achieve equilibrium up to period t + 26, as shown in Table 2.2. Meanwhile, the deviation (absolute difference) is 5 officers, as shown in Table 2.1.

Table 2.1 Difference in Recruitment of Indonesian Navy Officers with the Cross Sectional Model with an Input of 106 people

CLASS	RECRUITMENT	BALANCED COMPOSITION ROUNDING RESULT	COMPOSITION DSP	|DIFFERENCE| (ABSOLUTE)
S_1	106	623	624	1
S_2	0	821	822	1
S_3	0	817	818	1
S_4	0	678	679	1
S_5	0	416	416	0
S_6	0	143	144	1
Total		3498	3503	5

(Source: Researcher)

From Table 2.1, it can be seen that with the recruitment of 106 people per year, it is only in period t + 26 (Table 2.2) that the smallest deviation difference can be minimized, when compared to the deviation difference in historical data. From the table, it can be seen that up to period t + 26, there is a shortage of 5 officers, consisting of 1 First Lieutenant, 2 Captains, 1 Major, and 1 Lieutenant Colonel.

Table 2.1 CALCULATION RESULTS FOR EACH PERIOD (T) BY RANK STRATA UNTIL BALANCE WITH INPUT LETDA 10 6

t	YEAR	RANK						TOTAL
		LETDA	LIEUTENANT	CAPTAIN	MAJOR	LIEUTENANT COLONEL	COLONEL	
t	2025	769	596	466	569	400	525	3325
t + 1	2026	744	650	480	559	396	469	3297
t + 2	2027	723	692	498	549	392	420	3275
t + 3	2028	705	726	519	542	388	379	3259
t + 4	2029	691	752	541	535	384	343	3247
t + 5	2030	679	773	563	530	380	312	3238
t + 6	2031	669	788	586	527	376	286	3232
t + 7	2032	661	800	607	524	373	263	3229

t + 8	2033	654	810	628	523	369	243	3227
t + 9	2034	648	816	647	523	366	226	3227
t + 10	2035	644	821	665	524	362	212	3228
t + 11	2036	640	825	681	526	359	199	3230
t + 12	2037	637	827	696	528	357	188	3233
t + 13	2038	634	829	710	531	354	179	3236
t + 14	2039	632	829	723	534	352	170	3240
t + 15	2040	630	830	734	538	351	163	3245
t + 16	2041	628	830	744	542	349	157	3250
t + 17	2042	627	829	753	546	348	152	3255
t + 18	2043	626	829	761	551	347	147	3260
t + 19	2044	625	828	768	555	346	143	3266
t + 20	2045	624	828	774	560	346	140	3271
t + 21	2046	624	827	779	565	346	137	3277
t + 22	2047	623	827	784	569	346	134	3283
t + 23	2048	623	826	788	574	346	132	3289
t + 24	2049	623	825	792	578	347	130	3295
t + 25	2050	622	825	795	583	347	128	3300
t + 26	2051	622	824	798	587	348	127	3306
t + 27	2052	622	823	800	592	349	126	3312
t + 28	2053	622	823	802	596	350	125	3318
t + 29	2054	622	823	804	600	351	124	3324
t + 30	2055	622	823	806	604	352	124	3331

(Source: Researcher)

b. **Goal Programming** shows that the ideal intake is **106 First Lieutenants per year**. This pattern is projected to balance the DSP structure in 2050, thereby minimizing mismatches.

This *Goal Programming* optimization step is intended to minimize the deviation between the actual composition (results of transition pattern analysis based on historical data) and the target composition according to the current DSP, given the large deviation between the actual composition (results of analysis based on historical data) and the target composition (DSP) as shown in Table 2.2 and Table 2.3.

Table 2.2 Composition of Indonesian Navy Officer Personnel in Equilibrium Based on Historical Data

CLASS	COMPOSITION BALANCED	BALANCED COMPOSITION ROUNDING RESULTS	COMPOSITION DSP	|DIFFERENCE| (ABSOLUTE)
S_0	146,075	146		
S_1	626,336	626	624	2
S_2	633,693	634	822	-188
S_3	611,974	612	818	-206
S_4	663,468	663	679	-16
S_5	348,549	349	416	-67
S_6	472,555	473	144	329
Total	3,502.65	3503	3503	808

Table 2.3 Composition of Indonesian Navy Officer Personnel in a balanced state when vacancies are anticipated at the rank of Lieutenant

CLASS	COMPOSITION BALANCED	BALANCED COMPOSITION ROUNDING RESULT	COMPOSITION DSP	|DIFFERENCE| (ABSOLUTE)
S_1	653.52	654	624	30
S_2	661.44	661	822	-161
S_3	638.63	639	818	-179
S_4	692.51	692	679	13
S_5	363.54	364	416	-52
S_6	493.29	493	144	349
Total	3502.93	3503	3503	784

Using the basic formulation in the equation, a *Goal Programming* formulation can be developed for the optimization problem of active TNIAL officers in order to minimize the deviation from the target to be achieved.

The formulation obtained is as follows:

Objective function:

Min Z $= d_1^+ + d_1^- + d_2^+ + d_2^- + d_3^+ + d_3^- + d_4^+ + d_4^- + d_5^+ + d_5^- + d_6^+ + d_6^-$

1. Rank composition.

From Appendix A-2 Table 4.5, the expected composition according to the DSP yields the following constraint equation:

a. S1 $- d_1^+ + d_1^- = 624$
b. S2 $- d_2^+ + d_2^- = 822$
c. S3 $- d_3^+ + d_3^- = 818$
d. S4 $- d_4^+ + d_4^- = 679$
e. S5 $- d_5^+ + d_5^- = 416$
f. S6 $- d_6^+ + d_6^- = 144$

where:

He = Strength of officers at rank i (for i = 1, 2,..., 6)

d_i^+ = Upper deviation.

d_i^- = Lower deviation.

2. MDDP and MDP.

MDDP and MDP are among the requirements for a Navy officer to attain a certain rank. Based on the TNI Commander's Decree Number Skep/190/V/2005 dated May 17, 2005, concerning Administrative Guidelines for Promotion and Rank Awarding for TNI Soldiers, a person can be promoted if they meet the following requirements:

a. For officers whose rank promotion is delayed, MDDP must be completed at least 2 years before MDP at the next rank.

b. The promotion of officers is regulated as follows:

- Second Lieutenant to First Lieutenant: MDP 3 years.
- Second Lieutenant to Captain MDP 7 years after passing Dikspespa/Sarcab Setingkat
- Captain to Major: MDP 11 years after completing Diklapa/equivalent training.
- Major to Lieutenant Colonel: MDP 16 years after completing Sesko Angkatan.
- Lieutenant Colonel to Colonel MDP: 20 years, having completed the Military Academy.
- Colonel to One-Star General MDP: 24 years, having completed the National Defense College.

With the regulations regarding officer promotions, the equivalent service requirements will be:

$l_1 \geq 3$

$l_1 l_2 \geq 7$

$l_1 l_2 + l_3 \geq 11$

$l_1 + l_2 + l_3 + l_4 \geq 16$

$l_1 + l_2 + l_3 + l_4 + l_5 \geq 20$

$l_1 + l_2 + l_3 + l_4 + l_5 + l_6 \geq 24$

By using the equation to modify the above constraints to include the element $S_i$and considering the MDDP orl_1 requirements, namely the service period requirements for promotion to the next rank, then:

$l_1 \geq 3$

$l_2 \geq 4$

$l_3 \geq 4$

$l_4 \geq 5$

$l_5 \geq 4$

$l_6 \geq 4$

Using equation (2-19), a new equation can be formed in the form of a standard *Goal Programming* equation and its constraint equation becomes:

$S_1 - 3 f_{11}$

$S_2 - 4 f_{22}$

$S_3 - 4 f_{33}$

$S_4 - 5 f_{44}$

$S_5 - 4 f_{55}$

$S_6 - 4 f_{66}$

3. Personnel Flow.

The inflow of Indonesian Navy officers into the organization occurs due to the admission of new personnel in accordance with the provisions, namely through class 1 (Lieutenant). The outflow of personnel from the organization has a proportion of w_i and the size of this proportion is assumed to be constant, namely the vector *w* as before. Thus, what will be sought is the change in personnel flow that occurs within the organization ($q_{(ji)}$ and $q_{(ii)}$).

It is possible that there will be a change in conditions where the policy is to not accept any new personnel except at the Letda rank (N=1). Calculations taking into account the intake proportion based on historical data are as follows:

$$P^* = \begin{pmatrix} q_{11} & 0{,}02138 & 0{,}06105 & 0{,}0124 & 0{,}02241 & 0{,}14529 \\ q_{21} & q_{22} & 0 & 0 & 0 & 0 \\ 0 & q_{32} & q_{33} & 0 & 0 & 0 \\ 0 & 0 & q_{43} & q_{44} & 0 & 0 \\ 0 & 0 & 0 & q_{54} & q_{55} & 0 \\ 0 & 0 & 0 & 0 & q_{65} & q_{66} \end{pmatrix}$$

Using the equation, the matrix form for obtaining the values of q_{ji} and q_{ii} is as follows:

$$\left\{\begin{pmatrix} q_{11} & 0{,}02138 & 0{,}06105 & 0{,}0124 & 0{,}02241 & 0{,}14529 \\ q_{21} & q_{22} & 0 & 0 & 0 & 0 \\ 0 & q_{32} & q_{33} & 0 & 0 & 0 \\ 0 & 0 & q_{43} & q_{44} & 0 & 0 \\ 0 & 0 & 0 & q_{54} & q_{55} & 0 \\ 0 & 0 & 0 & 0 & q_{65} & q_{66} \end{pmatrix} - \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}\right\} \begin{pmatrix} S_1 \\ S_2 \\ S_3 \\ S_4 \\ S_5 \\ S_6 \end{pmatrix} = 0$$

$$\begin{pmatrix} q_{11}-1 & 0{,}02138 & 0{,}06105 & 0{,}0124 & 0{,}02241 & 0{,}14529 \\ q_{21} & q_{22}-1 & 0 & 0 & 0 & 0 \\ 0 & q_{32} & q_{33}-1 & 0 & 0 & 0 \\ 0 & 0 & q_{43} & q_{44}-1 & 0 & 0 \\ 0 & 0 & 0 & q_{54} & q_{55}-1 & 0 \\ 0 & 0 & 0 & 0 & q_{65} & q_{66}-1 \end{pmatrix} \begin{pmatrix} S_1 \\ S_2 \\ S_3 \\ S_4 \\ S_5 \\ S_6 \end{pmatrix} = 0$$

$(q_{11}-1)S_1+0.02138S_2+0.06105S_3+0.0124S_4+0.02241S_5+0.14529S_6 = 0$

$q_{21} . S_1 + (q_{22} - 1)S_2 = 0$

$q_{32} . S_2 + (q_{33} - 1)S_3 = 0$

$q_{43} . S_3 + (q_{44} - 1)S_4 = 0$
$q_{54}. S_4 + (q_{55} - 1)S_5 = 0$
$q_{65} . S_5 + (q_{66} - 1)S_6 = 0$
$S_{(1)}, S_{(2)}, S_{(3)}, S_{(4)}, S_{(5)}, S_{(6)} \geq 0$

To equate the variables in the previous equation, the above equation needs to be changed into an equation with variables S_i and f_{ii}. Therefore,

$q_{ji} = 1 - q_{ii} - w_i$

and

$q_{ii} . S_i = f_{ii}$,

so that the above equation becomes:

$-S_1 + 0.02138S_2 + 0.06105S_3 + 0.0124S_4 + 0.02241S_5 + 0.14529S_6 + f_{11} = 0$
$S_1 - S_2 - f_{11} + f_{22} = 0$
$0.97862S_2 - S_3 - f_{22} + f_{33} = 0$
$0.93895S_{(3)} - S_{(4)} - f_{(33)} + f_{(44)} = 0$
$0.98759S_4 - S_5 - f_{44} + f_{55} = 0$
$0.97759S_5 - S_6 - f_{55} + f_{66} = 0$
$S_0, S_1, S_2, S_3, S_4, S_5, S_6 \geq 0$

This constraint will determine the feasibility of the active personnel transition optimization solution. This solution is considered feasible if none of the decision variables obtained are negative. Thus, the above statement can be written in notation as follows:

$d_i^+, d_i^-, f_{ii}, f_{ij}$ and $S_{(i)} \geq 0$, for $(i) = 1,2,.......,6$ and $j = 0,1,2,.......,6$.

The solution to the above model was calculated using *Lingo 17 software*, and the results are as follows:

S_1	=	624	f_{11}	=	517.8
S_2	=	822	f_{22}	=	715.8
S_3	=	818	f_{33}	=	729.4
S_4	=	679	f_{44}	=	640.3
S_5	=	416	f_{55}	=	385.8
S_6	=	144	f_{66}	=	123

Using the equation , for the coefficient q_{ii} for the newly obtained matrix P*, the following result is obtained:

$$q_{11} = \frac{517{,}8}{624} = 0.8298$$
$$q_{22} = \frac{715{,}8}{822} = 0.8708$$
$$q_{33} = \frac{729{,}4}{818} = 0.8917$$
$$q_{44} = \frac{640{,}3}{679} = 0.9430$$
$$q_{55} = \frac{385{,}8}{416} = 0.9274$$
$$q_{66} = \frac{123}{144} = 0.8542$$

Using the formula to find $q_{ji} = 1 - q_{ii} - w_i$, we obtain a new P* matrix, which becomes:

$$\begin{pmatrix} 0,8298 & 0,02138 & 0,06105 & 0,0124 & 0,02241 & 0,14529 \\ 0,1702 & 0,8708 & 0 & 0 & 0 & 0 \\ 0 & 0,1078 & 0,8917 & 0 & 0 & 0 \\ 0 & 0 & 0,0473 & 0,9430 & 0 & 0 \\ 0 & 0 & 0 & 0,0446 & 0,9274 & 0 \\ 0 & 0 & 0 & 0 & 0,0502 & 0,8542 \end{pmatrix}$$

Using the new transition pattern obtained from the *Goal Programming* results, the estimated composition of officer personnel in a balanced state can be calculated using the formula, as follows:

$$\left\{ \begin{pmatrix} 0,8298 & 0,02138 & 0,06105 & 0,0124 & 0,02241 & 0,14529 \\ 0,1702 & 0,8708 & 0 & 0 & 0 & 0 \\ 0 & 0,1078 & 0,8917 & 0 & 0 & 0 \\ 0 & 0 & 0,0473 & 0,9430 & 0 & 0 \\ 0 & 0 & 0 & 0,0446 & 0,9274 & 0 \\ 0 & 0 & 0 & 0 & 0,0502 & 0,8542 \end{pmatrix} - \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \right\} \begin{pmatrix} S_1 \\ S_2 \\ S_3 \\ S_4 \\ S_5 \\ S_6 \end{pmatrix} = 0$$

$$\begin{pmatrix} -0,1702 & 0,02138 & 0,06105 & 0,0124 & 0,02241 & 0,14529 \\ 0,1702 & -0,1292 & 0 & 0 & 0 & 0 \\ 0 & 0,1078 & -0,1083 & 0 & 0 & 0 \\ 0 & 0 & 0,0473 & -0,057 & 0 & 0 \\ 0 & 0 & 0 & 0,0446 & -0,0726 & 0 \\ 0 & 0 & 0 & 0 & 0,0502 & -0,1458 \end{pmatrix} \begin{pmatrix} S_1 \\ S_2 \\ S_3 \\ S_4 \\ S_5 \\ S_6 \end{pmatrix} = 0$$

$-0.1702S_1 + 0.02138S_2 + 0.06105S_3 + 0.0124S_4 + 0.02241S_5 + 0.14529S_6 = 0$ …..(1)
$0.1702\, S_1 - 0.1292\, S_2 = 0$ ..... (2)
$0.1078\, S_2 - 0.1083\, S_3 = 0$ ..... (3)
$0.0473\, S_3 - 0.057\, S_{(4)} = 0$ ..... (4)
$0.0446S_4 - 0.0726S_5 = 0$ ..... (5)
$0.0502S_5 - 0.1458S_6 = 0$ ..... (6)

$S_1, S_2, S_3, S_4, S_5, S_6 \geq 0$

From equations (2) to (6) above, we obtain:

S_2	=	$1.317337\, S_1$		
S_3	=	$0.995383\, S_{(2)}$	=	$1.311255\, S_1$
S_4	=	$0.829825\, S_3$	=	$1.088112\, S_1$
S_5	=	$0.614325\, S_4$	=	$0.668454\, S_1$
S_6	=	$0.344307\, S_5$	=	$0.230153\, S_1$

where:

$S_1 + S_2 + S_3 + S_4 + S_5 + S_6 = 1$

$S1 + 1,317337\ S1 + 1,311255\ S1 + 1,088112\ S1 + 0,668454\ S1 + 0,230153\ S1 = 1$

$5.615311\, S_1 = 1$

$S_{(1)} = \frac{1}{5,615311}$

$S_{(1)} = 0.624085$

The following results for the Si ratio are obtained:

S_1 = 0.624085

S_2 = 1.317337 (0.178085) = 0.822598
S_3 = 0.995383 (0.178085) = 0.818263
S_4 = 0.829825 (0.178085) = 0.679779
S_5 = 0.614325 (0.178085) = 0.416402
S_6 = 0.344307 (0.178085) = 0.144316

Using the same calculation method as in the previous subsection, the composition of the total strength for each officer rank stratum can be seen in Table 2.4.

Table 2.4 Composition of Officer Personnel in a Balanced State Resulting from Goal Programming when Vacancies are Anticipated

CLASS	COMPOSITION BALANCED	BALANCED COMPOSITION ROUNDING RESULTS	COMPOSITION DSP	|DIFFERENCE| (ABSOLUTE)
S_1	624,085	624	624	0
S_2	822,018	822	822	0
S_3	818,113	818	818	0
S_4	679,179	679	679	0
S_5	416,022	416	416	0
S_6	144,157	144	144	0
Total	3,503.4	3503	3503	0

(Source: Researcher)

Table 2.4 shows that the composition of officers in a balanced state resulting from *goal programming*, when vacancies are anticipated, has a very small deviation compared to the composition of officers in a balanced state resulting from historical data. The absolute deviation can be zeroed.

Achieving an optimal composition will affect the transition period for officers to reach a certain rank. Using the P* matrix from *goal programming*, the MDDP and MDP are obtained as shown in Table 2.5.

Table 2.5 Average MDDP and MDP Results from *Goal Programming*

RANK	MDDP	MDP
Second Lieutenant	4.18375	
First Lieutenant	7.739938	4.18375
Captain	9.23361	9.076057
Major	17.543859	19.871629
Lieutenant Colonel	13.774104	22.14839
Colonel	6,858710	64.757816

(Source: Researcher)

From the MDDP and MDP calculations from the P* matrix processed using *Goal Programming* as shown in Table 2.5, it can be seen that the MDDP for Navy officers resulting from *Goal Programming* will be longer than the MDDP from the anticipated vacancy matrix at the rank of First Lieutenant. This is because the *Goal Programming* results are certainly more accurate in calculating the new matrix. If historical data is used, an officer will remain at that rank for an even longer period. Similarly, the Officer Service Period (MDP) will require an officer to serve longer in the TNI, but this is not possible as it is limited by age.

3. SWOT Analysis

The SWOT analysis produced 16 strategic factors:

a. **Strengths (S):** the existence of DSP, a strict recruitment and selection system, tiered education, and historical personnel data.
b. **Weaknesses (W):** budget-based recruitment, disproportionate distribution of positions, inconsistent promotions and transfers, and uneven quality of human resources.
c. **Opportunities (O):** quantitative methods (Goal Programming), defense policy reform, international education and cooperation, benchmarking with other countries' navies.
d. **Threats (T):** budget constraints, geopolitical dynamics, career stagnation for colonels, pension regulations.

The total scores for IFE (**2.92**) and EFE (**3**) indicate that the Navy Corps is positioned in **Quadrant I (Growth Strategy/Aggressive)**, meaning that the organization has significant internal strengths to take advantage of external opportunities.

Table 3.1 IFAS and EFAS Matrix. SWO

NO	IFAS	Weight	Rating	Score
S	STRENGTH			
1.	(S1) Clear DSP (Personnel List)	0.16	4	0.593
2.	(S2) A strict recruitment and selection system.	0.16	4	0.593
3.	(S3) Tiered education and career development.	0.13	3	0.397
4	(S4) Historical personnel flow data available	0.13	3	0.397
	Total Strength			**1,980**

W	**WEAKNESS**			
1.	(W1) Recruitment is more influenced by budget ceilings	0.10	2	0.240
2.	(W2) Job distribution is not yet proportional	0.10	2	0.240
3	(W3) Promotions and transfers are not consistent	0.10	2	0.240
4.	(W4) The quality of human resources is not yet consistent across regions.	0.10	2	0.240
	Total Weaknesses			**0.961**
	TOTAL	**1.000**	S+W	2,941
NO	**EFAS**	**Weight**	**Rating**	**Score**
O	**OPPORTUNITY**			
1.	(O1) Utilization of quantitative methods and analytical technology	0.16	4	0.576
2.	(O2) Defense policy and bureaucratic reform	0.14	3	0.476
3	(O3) Enhancement of education and training, including international cooperation.	0.13	3	0.386
4.	(O4) Adopting educational models and best practices from other countries' navies.	0.14	3	0.476
	Total Opportunities			**1,914**
T	**THREATS**			
1.	(T1) Defense budget constraints	0.10	2	0.23
2	(T2) Geopolitical dynamics and OMSP demands	0.13	3	0.39
3	(T3) Career stagnation and bottlenecks at the Colonel level	0.10	2	0.23
2	(T4) Changes in retirement regulations (Law 34/2004)	0.10	2	0.23
	Total Threats			**1,086**
	TOTAL	**1,000**	O+T	3

(Source: Processed by researchers)

Based on Table 3.1, the IFAS and EFAS results are obtained and then presented in a SWOT quadrant graph or Cartesian diagram. The points on the X-axis represent internal factors (IFAS), while the points on the Y-axis represent the values of external factors. A line is then drawn where the two axes intersect. This graph shows the position or status that influences the Factors Affecting Acceptance and Career Development in the Indonesian Navy, as shown in Figure 3.1.

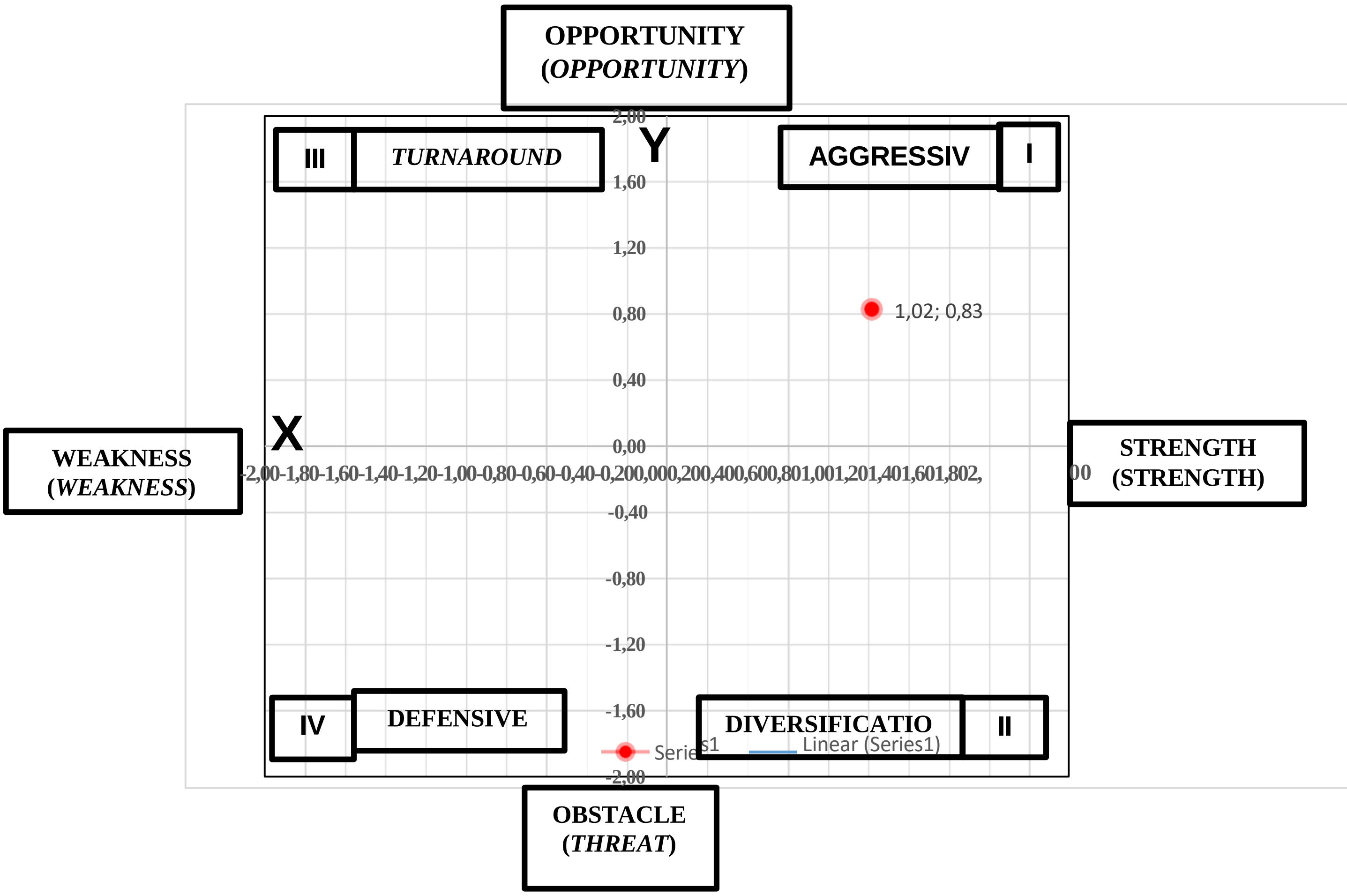

Figure 3.1 Strategic position
(Source: Processed by researcher)

Based on the results of processing the IFE and EFE matrices, a total IFE score of 1.02 and a total EFE score of 0.82 were obtained. The IFE value is above average (2.50), indicating that the internal strengths of the Indonesian Navy are more dominant than its weaknesses. Meanwhile, the EFE value above 2.50 also indicates that external opportunities are greater than threats. If these results are plotted on a SWOT quadrant diagram, the Indonesian Navy Seafarers Corps is positioned in Quadrant I (*Growth* Strategy/Aggressive). This quadrant describes an organization that has solid internal strengths and faces significant external opportunities. In other words, the organization is in a relatively advantageous position to develop its capacity.

The priority strategy chosen is **the WO Strategy (Turnaround Strategy)** with a score **of 6.80**. This strategy emphasizes improving internal weaknesses by taking advantage of external opportunities. Other strategies remain relevant as supporting strategies:

a. **SO Strategy:** integrating strict recruitment and selection and tiered education with quantitative methods and international cooperation.
b. **WO Strategy (Priority):** improving job mismatches and distribution through DSP-based planning, job redistribution, a merit system, and strengthening international education.
c. **ST Strategy:** using tiered education and a merit system to address the threats of budget constraints, career stagnation, and geopolitical dynamics.
d. **WT Strategy:** reforming job distribution, controlling promotion flows, and adjusting pension policies to prevent long-term mismatches.

CONCLUSION

This study analyzes the recruitment and career development system for officers in the Indonesian Navy in order to improve organizational efficiency. The results show that the current composition of officers is unbalanced, with an excess of personnel at the Second Lieutenant and Colonel levels and a significant shortage at the middle levels (First Lieutenant to Lieutenant Colonel). This imbalance has led to problems such as dual positions at the lower levels, the existence of colonels outside the formation, career stagnation, and reduced organizational effectiveness.

Cross-sectional analysis successfully mapped out the imbalance in personnel flow, while *Goal Programming* optimization showed that the ideal intake requirement is 106 Second Lieutenants per year in order to achieve a balanced DSP structure by 2050. Meanwhile, SWOT analysis places the Navy Corps in the growth strategy quadrant, which means that the organization has significant internal strengths and external opportunities to develop adaptive and sustainable career development strategies.

Thus, systematic recruitment planning, transparent career management, and alignment with organizational needs are key to improving organizational efficiency. Recommendation: further research could develop this model by considering dynamic factors such as changes in defense policy, technological developments, and regional security dynamics. In practical terms, policymakers need to implement DSP-based personnel planning, strengthen merit-based promotion systems, and enhance international cooperation in officer education to ensure the long-term effectiveness of the Indonesian Navy.

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