

INDIVIDUAL RETURNS OF EDUCATION LEVELS

EĞİTİM KADEMELERİNİN BİREYSEL GETİRİSİ¹

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Abstract

It is generally accepted that the investment in education has individual and social benefits and differs according to education levels. The aim of this study is to investigate whether investing in a profession at a higher education level can yield returns by examining the professions at different educational levels according to the rate of return. In this context, officer who graduated with a bachelor's degree, non-commissioned officers with associate degrees and sergeants who graduated from high school were investigated in Turkey. The return of the education level was calculated using the internal rate of return and investment rate. The internal rate of return is calculated by the earnings and costs of the occupations. The central bank's lending interest rate was used as investment return ratio. The survey concluded that the officers had individual returns according to the non-commissioned officers, but that the non-commissioned officers had no individual returns according to the Sergeant.

Keywords: The internal rate of return, officer, non-commissioned officers, sergeant.

Özet

Eğitime yapılan yatırımın bireysel ve toplumsal getirilerinin olduğu, eğitim kademelerine göre farklılık gösterdiği genel olarak kabul edilmiştir. Bu araştırmanın amacı, farklı eğitim kademelerindeki mesleklerin içsel getiri oranına göre incelenerek, bir üst eğitim kademesinde bulunan mesleğe yatırım yapmanın getiri sağlayıp sağlamadığını araştırmaktır. Bu kapsamda Türkiye'deki lisans mezunu subaylar, önlisans mezunu astsubaylar ve lise mezunu uzman çavuşlar incelenmiştir. Eğitim kademesinin getirisi, içsel getiri oranı ve yatırım getiri oranı kullanılarak hesaplanmıştır. İçsel getiri oranı mesleklerin kazanç ve maliyetleriyle hesaplanmıştır. Yatırım getiri oranı olarak Merkez Bankasının borç verme faiz oranı kullanılmıştır. Araştırmada subayların astsubaylara göre bireysel getirisinin olduğu, ancak astsubayların uzman çavuşlara göre bireysel getirisinin olmadığı genel sonucuna ulaşılmıştır.

Anahtar Kelimeler: İçsel getiri oranı, subay, astsubay, uzman çavuş.

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INTRODUCTION

It is a fact accepted by everyone that change in our world has become very quick. There are different disciplines of this change. One of such disciplines is education. People's self-renewal and development efforts are based on rapid changes in education. There has been a great increase in the time people spend in school. Worldwide, as of 2013, the amount of time a person spends in school was 7.7 years. However, putting the compulsory education period into consideration, the time to be spent in school by new entrants is likely to be 12.2 years. (UNDP, 2014, p.34). The situation in Turkey is similar to that in the world. As of the year 2012, the amount of time a person spent in school was 7.6 years. However, putting compulsory education into consideration, new school starters will spend 14.4 years in school. (UNDP, 2014, p.161). With increase in the time spent in school, there will also be an increase in the educational levels of people graduating.

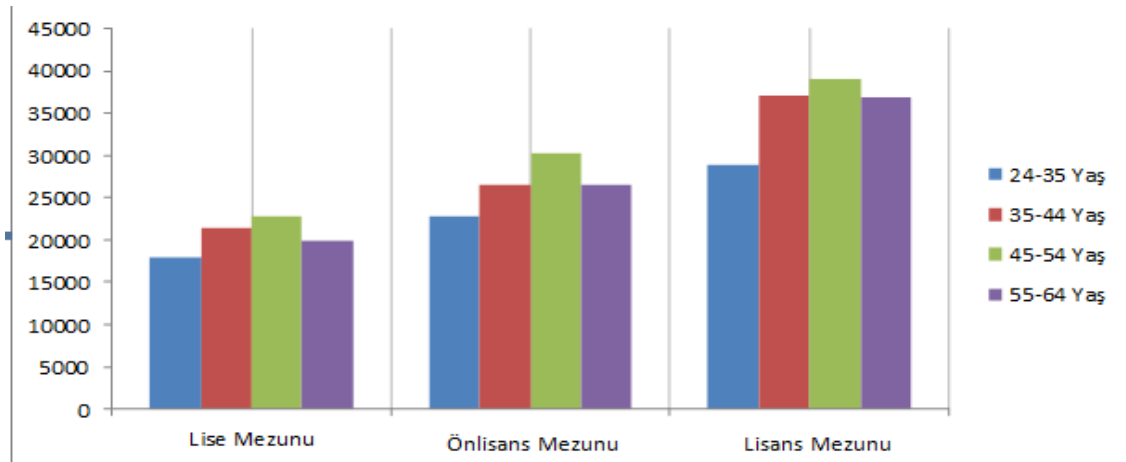
There is an increment in the enrollment rates in our country just like in the whole world. In Turkey, enrollment rates of people in the 15-19 age range are as follows; in 28% in 2000, 41% in 2005, 56% in 2012 and it was 59% in 2010, meanwhile the enrollment rates of people in the 20-29 age range were seen as follows; 5% in 2000, 10% in 2005, 20% in 2010 and 24% in 2012 (OECD, 2014). The increase in enrolment rates in primary education and the elimination of the contribution of open learning in 2012 (BKK, 2012) have increased the demand for higher education. This increase in demand has also been followed by critical efforts to improve the education levels of people.

Educational Levels

The graduation levels of education create differences in individual and social returns. In primary and secondary education levels, social returns are more evident, while individual returns come to the fore in tertiary education. (Woodhall, 1987; Blau, 1996). In this respect, increased investment in education will increase individual and social returns. (Psacharopoulos and Woodhall, 1985; Fernandez and Rogerson, 1995; Psacharopoulos and Papakonstantinou, 2005).

Barrup, Brimley and Garfield (1996) have investigated the earnings according to education in USA. In this research, it is observed that higher levels of education are reflective of an increase in the average annual earnings as shown in table 1 below.

Table 1. *Earnings by Education Level in the United States*



Source: *Burrup, Brimley and Garfield, 1996.*

Human Capital

The aftermath of World War II witnessed a number of aspects including the development of the concept of investment in human capital, education and economic revival of relations as well as a rapid increase in the number of research and publications on this issue. Shultz (1961) and Becker's (1964) analysis of rates of returns in investment in training played an important role in human capital theory. Shultz, Becker, Blaug, Bowman and Denison have investigated issues such as the contribution of education to economic growth, the profitability of investment in education, costs and expenses related to training, and educational income distribution. According to human capital theory; all kinds of activities that increase the efficiency of an individual can be thought to be in human capital. The main theme of education and training processes and efficiency in the realm of the human capital theory, is the idea of making educational expenses and other similar activities with a view of raising people's levels of education and their future lifetime earnings. Investment in education can be evaluated with achievement of greater efficiency and higher profits.

According to Erdoğan (1999), human capital, can be adopted as the most important determinant of economic growth and per capita income differences. Human capital lies at the core of education levels and work experience. According to Tansel (1994), 50% of changes in employees' income can be explained by the variables in basic human capital model and that education returns increase with the level of education, whilst the highest return has been determined as university education.

The purpose of this study was to investigate the return on investment for professions in different levels of education according to the internal rate of returns. In this context, earnings and the costs of National duty officer at the Defense Ministry who began with a bachelor's degree, non-commissioned officers with associate degrees and sergeants who graduated from high school were investigated. There are two stages in the research. In the first phase, high school graduate sergeants were evaluated with associate degree holding non-commissioned officers while in the second phase associate degree holding noncommissioned officers were evaluated with bachelor's degree.

Statement of the Problem

Is there a difference in individual education returns of undergraduate, associate degree and high school levels?

Research Questions

1. Is there a difference in individual education returns of high school graduate sergeants and associate degree graduate non-commissioned officers?
2. Is there a difference in individual education returns of associate degree graduate non-commissioned officers and bachelor's degree graduate officers?

METHODOLOGY

In this study, literature review and document analysis methods were used. Primary and secondary sources were used for literature review as ascertained by Fraenkel and Wallen (2006). The main purpose in document review is the analysis of written materials containing information about the targeted phenomenon or phenomena in the research (Yıldırım and Şimşek, 2006).

Since a screening model was used in the research, population and sampling techniques were not designated. Calculations based on 2014 data were used. According to the 926th Turkish Armed Forces Personnel Law, officers are from four-

year colleges at least, sergeants must be graduates from two-year colleges at least. According to the 3269th Expert Lance Law, a Corporal NCO should be at least a high school graduate or its equivalent. In this context; earnings and costs are calculated in terms of evaluating the levels of education with a bachelor's degree for officers, associate degree for non-commissioned officers and high school for sergeants.

Earnings are calculated basing on the monthly schedules related to the 926th and 3269th Laws. The net earnings were assessed basing on salaries of Officers, non-commissioned officers and specialist sergeants working at the headquarters without considering any additional revenue; age restrictions, mandatory or retirement from service, and so on. Assuming that to be the case, therefore, this research has been done basing on the net salary of new employees to the profession.

Costs; have been examined in two categories including direct and indirect costs. Earnings and costs obtained in fractional numbers were rounded to whole numbers. Internal rate of returns (r); is calculated using earnings and costs data (Cohn, 1979; Akalın,1980).

$$0 = \sum [\text{Total Individual Returns} / (1+r)]^t - (\text{Total Individual Cost})$$

Educational level returns (p); is calculated via the internal rate of returns (r) with the rate of investment returns (i) (Ataç,1978).

$$P = i / r$$

In August of 2014, the Central Bank borrowing interest rate was 7.5%, and the interest rate lending was 11.25%. The lending interest rates of the Central Bank were used as the Investment rate of returns

FINDINGS

Earnings

Earnings have been calculated using the TSK Personnel Law No. 926 and No. 3269 Expert Lance Corporal Rules of the Act in respect of pensions. The net salary of August for officers, non-commissioned officers and sergeants who started working in 2014, was considered in principle. It was considered that employees will work for 40 years and there won't be any change in salary.

a. The net salary for a sergeant in 2014 was ₺2361. Individual earnings (K_{UC});
(K_{UC}) = A high school graduate sergeant's net salary X 12 months X 40 years

$$K_{UC} = 2361 \times 12 \times 40 = \text{₺}1133280$$

b. The net salary for a non-commissioned officer in 2014 was ₺2441.
Individual earnings (K_{ASTSB});

(K_{ASTSB}) = Associate degree graduate non-commissioned officer's net salary X 12 months X 40 years

$$K_{ASTSB} = 2441 \times 12 \times 40 = \text{₺}1171680$$

c. The net salary for an officer in 2014 was ₺2973. Individual earnings (K_{SB});
(K_{SB}) = Bachelor's degree graduate officer's net salary X 12 months X 40 years

$$K_{SB} = 2973 \times 12 \times 40 = \text{₺}1427040$$

Individual returns of an associate degree graduate non-commissioned officer and a high school graduate sergeant are presented in table 2. In table 3 the calculations of individual returns are done according to a bachelor's degree graduate officer and an associate degree graduate non-commissioned officer.

Table 2. *Individual Earnings: Non-commissioned Officer – Sergeant Example.*

Serial No.	Year s	Non-commissioned Officer's Net Salary	Sergeant's Net Salary	Individual Earnings
1.	2015	29292	28332	960
2.	2016	58584	56664	1920
3.	2017	87876	84996	2880
4.	2018	117168	113328	3840
5.	2019	146460	141660	4800
6.	2020	175752	169992	5760
7.	2021	205044	198324	6720
8.	2022	234336	226656	7680
9.	2023	263628	254988	8640
10.	2024	292920	283320	9600
11.	2025	322212	311652	10560
12.	2026	351504	339984	11520
13.	2027	380796	368316	12480
14.	2028	410088	396648	13440
15.	2029	439380	424980	14400
16.	2030	468672	453312	15360
17.	2031	497964	481644	16320
18.	2032	527256	509976	17280
19.	2033	556548	538308	18240
20.	2034	585840	566640	19200
21.	2035	615132	594972	20160
22.	2036	644424	623304	21120
23.	2037	673716	651636	22080
24.	2038	703008	679968	23040
25.	2039	732300	708300	24000
26.	2040	761592	736632	24960
27.	2041	790884	764964	25920
28.	2042	820176	793296	26880
29.	2043	849468	821628	27840
30.	2044	878760	849960	28800
31.	2045	908052	878292	29760
32.	2046	937344	906624	30720
33.	2047	966636	934956	31680
34.	2048	995928	963288	32640
35.	2049	1025220	991620	33600
36.	2050	1054512	1019952	34560
37.	2051	1083804	1048284	35520
38.	2052	1113096	1076616	36480
39.	2053	1142388	1104948	37440
40.	2054	1171680	1133280	38400

Table 3. *Individual Earnings: Officer – Non-commissioned Officer Example.*

Serial No.	Years	Officer's Net Salary	Non-commissioned Officer's Net Salary	Individual Earnings
1.	2015	35676	29292	6384
2.	2016	71352	58584	12768
3.	2017	107028	87876	19152
4.	2018	142704	117168	25536
5.	2019	178380	146460	31920
6.	2020	214056	175752	38304
7.	2021	249732	205044	44688
8.	2022	285408	234336	51072
9.	2023	321084	263628	57456
10.	2024	356760	292920	63840
11.	2025	392436	322212	70224
12.	2026	428112	351504	76608
13.	2027	463788	380796	82992
14.	2028	499464	410088	89376
15.	2029	535140	439380	95760
16.	2030	570816	468672	102144
17.	2031	606492	497964	108528
18.	2032	642168	527256	114912
19.	2033	677844	556548	121296
20.	2034	713520	585840	127680
21.	2035	749196	615132	134064
22.	2036	784872	644424	140448
23.	2037	820548	673716	146832
24.	2038	856224	703008	153216
25.	2039	891900	732300	159600
26.	2040	927576	761592	165984
27.	2041	963252	790884	172368
28.	2042	998928	820176	178752
29.	2043	1034604	849468	185136
30.	2044	1070280	878760	191520
31.	2045	1105956	908052	197904
32.	2046	1141632	937344	204288
33.	2047	1177308	966636	210672
34.	2048	1212984	995928	217056
35.	2049	1248660	1025220	223440
36.	2050	1284336	1054512	229824
37.	2051	1320012	1083804	236208
38.	2052	1355688	1113096	242592
39.	2053	1391364	1142388	248976
40.	2054	1427040	1171680	255360

Costs

Costs have been examined under the headings of direct and indirect costs with an assumption that there were no changes in the salaries for two years. Results were evaluated according to students who participated in exams for placement in cadet schools, faculties or colleges that supply officers and vocational schools that supply noncommissioned officers (higher education transition exams and graduate placement test).

Direct costs (M_1)

Direct special account costs, are calculated by considering data on Grant amounts given to students (Psacharopoulos and Papakonstantinou, 2005), expenses incurred for higher education examinations, textbooks, tuition, housing, meals and transportation expenses (Turkmen, 2009). However; in the framework of current legislation, cadets' food, clothing, personal rights, slab-stock costs as well as education and training costs are met by the state in accordance with the Faculty and High Schools Regulation on Military Commanders and student Officers (1977) and the High School Chief Warrant Officer Profession Regulation (2003). In this regard, students bound to be military officers or noncommissioned officers, meet no costs except for direct costs for higher education exams.

Köprülü (2012), states that the expenditure on higher education exams for students in the last class cost between 1700 and 5600 US dollars. A student's higher education exam preparation costs, is calculated by taking the average of the 1700 and 5600 figures. (3650 USD). According to the central bank data, in August 2014 the US dollar is equivalent to 2.16 Turkish Lira (CBRT, 2014).

Costs in preparing a student for Higher education in 2014 (MYHM);

$$M_{YHM}; 3650 \times 2,16 = \text{₺}7884$$

The indirect costs for officers and non-commissioned officers are only reflected in expenses on preparation for higher education;

$$\text{Direct costs } (M_1) = \text{₺}7884.$$

Indirect costs have been calculated with the assumption that sergeants have no preparation for higher education.

Indirect costs (M_2)

Indirect costs were examined in two stages. The first stage is for high school graduate sergeants with associate degree graduate non-commissioned officers, the second stage is for associate degree graduate non-commissioned officers with graduate level officers.

I. Non-commissioned officers - sergeant indirect cost (M_{2AU}):

It is assumed that a student who prefers to become a non-commissioned officer, or a sergeant has a foregone salary. The two year salary for a sergeant thus will be;

$$M_{2AU} = 2361 \times 12 \times 2 = \text{₺}56664$$

The indirect costs for a non-commissioned officer are $\text{₺}56664$. There are no direct costs for a sergeant.

II. Officer – non-commissioned officer direct cost (M_{2SA}):

It is assumed that a student who prefers to be an officer or a non-commissioned officer, has a foregone salary. The two year salary for him/her will be;

$$M_{2SA} = 2441 \times 12 \times 2 = \text{₺}58584$$

An officer's direct cost is 58584₺. There are no direct costs for a non-commissioned officer.

Total costs (M_T)

Total costs consist of the sum of direct and indirect costs. The total cost was examined in two stages. The first stage is for high school graduate sergeants with associate degree graduate non-commissioned officers, the second stage is for associate degree graduate non-commissioned officers with graduate level officers.

I. Non-commissioned officers - sergeant total cost (M_{TAU}):

In this stage it is assumed that there is no indirect salary for sergeants; thus the total cost presented is reflective of the total of the indirect costs of non-commissioned officers.

$$M_{TAU} = M_1 + M_{2AU} = 77884 + 56664 = 134548$$

II. Officer – non-commissioned officer total cost (M_{TSA}):

Since the indirect costs of Officers and non-commissioned officers are the same, an evaluation of costs was not undertaken. In this stage, the total cost is equal to the indirect cost of Officers.

$$M_{TSA} = M_{2SA} = 58584$$

Internal Rate of Return (IRR)

According to Cohn (1979), the internal rate of return is the discount rate used to synchronize the cost of the gain. The formula for the internal rate of returns;

$$0 = \sum_{T=18}^{58} [\text{Individual Return} / (1+r)]^t - (\text{Individual Cost})$$

Internal rate of return formula is an equation of the 40th degree. Because it is extremely difficult to find the roots of an equation, attempts have been made by different values of r . Interpolation is carried out to find such rates (Akal, 1980).

Internal rate of return was examined at two levels. In the first stage the internal rate of returns for high school graduate sergeants with associate degree graduate non-commissioned officers has been computed while in the second stage the internal rate of returns for associate degree graduate non-commissioned officers with graduate officers has been computed.

Non-commissioned officers-sergeant internal rate of returns (RA)

In this stage the total individual returns for non-commissioned officers is 38400, while the total individual cost is 134548. It can be seen that the costs are more than the returns. According to the internal rate of return formula, in case of costs being greater than the returns, the internal rate of return will be calculated as a negative number, there is no need to experiment with different values to r .

Officer – non-commissioned officer internal rate of return (RA)

In this stage the total individual returns for officers is 255360, while the total individual cost is 58584. In this context, putting into consideration officers bound to retire in 40 years' time, the internal returns of non-commissioned officers would show the following values in table 4.

Table 4. *Internal Rate of Returns: Officer – Non-commissioned Officer Example.*

Years	Individual Returns	r: 30%	BD1	r: 40%	BD2
1.	6384	0,7692308	4910,769427	0,7142857	4559,999909
2.	12768	0,591716	7555,029888	0,5102041	6514,285949
3.	19152	0,4551661	8717,341147	0,3644315	6979,592088
4.	25536	0,3501278	8940,863501	0,2603082	6647,230195
5.	31920	0,2693291	8596,984872	0,1859344	5935,026048
6.	38304	0,2071762	7935,677165	0,1328103	5087,165731
7.	44688	0,1593663	7121,761214	0,0948645	4239,304776
8.	51072	0,1225895	6260,890944	0,0677604	3460,659149
9.	57456	0,0942996	5418,077818	0,0484003	2780,887637
10.	63840	0,0725382	4630,838688	0,0345716	2207,050944
11.	70224	0,0557986	3918,400886	0,024694	1734,111456
12.	76608	0,042922	3288,168576	0,0176386	1351,257869
13.	82992	0,0330169	2740,138565	0,012599	1045,616208
14.	89376	0,0253976	2269,935898	0,0089993	804,3214368
15.	95760	0,0195366	1870,824816	0,0064281	615,554856
16.	102144	0,0150282	1535,040461	0,0045915	468,994176
17.	108528	0,0115601	1254,594533	0,0032796	355,9284288
18.	114912	0,0088924	1021,843469	0,0023426	269,1928512
19.	121296	0,0068403	829,7010288	0,0016733	202,9645968
20.	127680	0,0052618	671,826624	0,0011952	152,603136
21.	134064	0,0040475	542,62404	0,0008537	114,4504368
22.	140448	0,0031135	437,284848	0,0006098	85,6451904
23.	146832	0,002395	351,66264	0,0004356	63,9600192
24.	153216	0,0018423	282,2698368	0,0003111	47,6654976
25.	159600	0,0014172	226,18512	0,0002222	35,46312
26.	165984	0,0010901	180,9391584	0,0001587	26,3416608
27.	172368	0,0008386	144,5478048	0,0001134	19,5465312
28.	178752	0,000645	115,29504	0,000081	14,478912
29.	185136	0,0004962	91,8644832	0,0000579	10,7193744
30.	191520	0,0003817	73,103184	0,0000413	7,909776
31.	197904	0,0002936	58,1046144	0,0000295	5,838168
32.	204288	0,0002259	46,1486592	0,0000211	4,3104768
33.	210672	0,0001737	36,5937264	0,0000151	3,1811472
34.	217056	0,0001336	28,9986816	0,0000108	2,3442048
35.	223440	0,0001028	22,969632	0,0000076	1,698144
36.	229824	0,0000791	18,1790784	0,0000054	1,2410496
37.	236208	0,0000608	14,3614464	0,0000039	0,9212112
38.	242592	0,0000468	11,3533056	0,0000028	0,6792576
39.	248976	0,0000359	8,9382384	0,0000019	0,4730544
40.	255360	0,0000276	7,047936	0,0000014	0,357504
			92187,18099		55858,97218

The acronyms and abbreviations for finding the internal rate of return by applying the interpolation formula are shown below.

The total present value of 1 (TBD1) = 92187,

The total present value of 2 (TBD2) = 55858,

Total individual cost according to non-commissioned officers (MTSA) = 58584,

r: 30% value (r_{30}) = 30,

r: 40% value (r_{40}) = 40,

We tried to find by interpolation for internal rate of return (r) = r.

With these abbreviations, our formula for the internal rate of return;

$$(T_{BD1} - T_{BD2}) / (M_{TSA} - T_{BD2}) = (r_{30} - r_{40}) / (r - r_{40})$$

$$(92187 - 55858) / (58584 - 55858) = (30 - 40) / (r - 40)$$

$$36329 / 2726 = -10 / (r - 40)$$

$$r = 39.25$$

As a result of the calculations, the internal rate of returns for a graduate officer is 39.25%. The central bank lending interest rate of 11.25% was used as an investment rate of return.

Returns of educational level (p); Internal rate of returns (r) with the rate of investment (i) is calculated in this form;

$$P = i / r$$

$$= 11.25 / 39.25$$

$$= 0.286$$

This study has been conducted on graduate officers, associate degree graduate non-commissioned officers and high school graduate sergeants working in the Turkish Armed Forces structure. The study was conducted in two stages: a comparison of non-commissioned officers and high school graduate sergeants as well as non-commissioned officers and graduate officers. According to the findings of the study;

a. No individual returns were ascertained for associate degree graduate non-commissioned officers in relation to high school graduate sergeants.

b. Officers' internal rate of returns in relation to non-commissioned officers is 39.25%. According to this rate of interest (11.25%) being too high, there are individual returns for graduate officers in relation to associate degree graduate non-commissioned officers.

CONCLUSIONS AND RECOMMENDATIONS

After evaluating the findings of this study, the results of the research are as follows;

a. Given the high rate of individual returns for officers in relation to non-commissioned officers and sergeants, students are likely to choose being officers in the military profession. Premised on this reputation, in order to apply for the intensively demanded officer's position, the quality of students will become very high.

b. There is a likelihood of having more officers due to the high demand for as well as higher reputation of officers in the community compared to non-commissioned officers and sergeants. The non-commissioned officers and sergeants may lose motivation at

the work place from the first day they start operations once they observe those at the level of officers.

c. For a non-commissioned officer to become an officer, there is need to complete undergraduate education and be 27 years of age (Kanun, 1967). The performance of people with these terms will always be better. The performance of a non-commissioned officer who has made the age of 27 is likely to drop whilst the motivation will be intermediate.

d. Non-commissioned officers with a certain level of experience but nursing a low level of motivation and individual returns, will seek to cross over to other professional areas. The transition to other professional areas would bring a quick parallel insufficiency in circulation of experienced staff in the organization.

The recommendations of this study are as follows;

a. In order to provide attractiveness to the position of non-commissioned officers and sergeants, professional publications and presentations should be made at different times and places.

b. In order to increase the reputation of non-commissioned officers and sergeants, as a priority, the personnel holding responsibility in the profession should be given training and supported to love the profession.

c. In order to increase the motivation of non-commissioned officers as well as avoiding a fall in their performance, the age for transition to the profession of officers should be increased.

d. It was also found appropriate to raise the salaries of higher education graduate non-commissioned officers.

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