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Ilksen Gorkem
*Old Dominion University*

Resit Unal
*Old Dominion University*

Pilar Pazos
*Old Dominion University*



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# KEY FACTORS DRIVING PERSONNEL DOWNSIZING IN MULTINATIONAL MILITARY ORGANIZATIONS

**Ilksen Gorkem**
**Resit Unal**
**Pilar Pazos**
**Old Dominion University**

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## Abstract
Although downsizing has long been a topic of research in traditional organizations, there are very few studies of this phenomenon in military contexts. As a result, we have little understanding of the key factors that drive personnel downsizing in military setting. This study contributes to our understanding of key factors that drive personnel downsizing in military organizations and whether those factors may differ across NATO nations' cultural clusters. The theoretical framework for this study was built from studies in non-military contexts and adapted to fit the military environment.

This research relies on historical data from one of the largest multinational coalition forces worldwide. Time series cross-sectional dynamic panel data from 28 NATO countries over 23 years (1990-2012) were gathered. A series of analyses by using Arellano-Bond Generalized Method of Moments (GMM) one-step difference method with robust standard errors were conducted in two steps. For the first step, an inspection of the key factors that drive personnel downsizing was analyzed by using Stata '*xtabond*' estimation. For the second step, an analysis of whether or not the key factors differ across NATO nations' cultural clusters was conducted.

The findings from this research contribute to the discipline of engineering management by providing a model to improve our understanding and ability to predict future personnel downsizing decisions and to increase our understanding of military governance not only NATO wide but also worldwide. Differences found across cultural clusters make this study more noteworthy.

## Keywords
Personnel downsizing, military restructuring, cultural clusters, NATO, time series.

## Introduction
Changes in the external environment of military organizations drive the need for organizational change and often result in downsizing (James, 2008). A number of NATO nations' armed forces have been downsizing for several decades. For instance, Canada's number of active military personnel went from 88,000 in 1989 to 69,950 in 1999 and 65,700 by the end of 2010. France's numbers were reduced from 554,000 in 1989 to 332,250 in 2011 (The World Bank, 2014).

The purpose of this study is to investigate key factors that drive personnel downsizing in NATO nations' military organizations (armed forces) and to determine whether those factors may differ across cultural clusters based on quantitative analysis of the data.

## Literature Review
Downsizing is sometimes used as a synonym for decline, but they are two different terms. Downsizing is typically aimed at improving efficiency while a decline typically is naturally occurring and has no aim of improving efficiency. Decline is the result of a combination of organizational factors and environment (Freeman & Cameron, 1993).

### Military Downsizing
Military downsizing is a strategic redesign to adapt to a changing security environment aimed at increasing readiness for foreseeable missions, optimizing the entire organization, and increasing performance levels by reducing personnel numbers, bases, facilities, or by enhancing the hierarchical organization, the work process,

equipment, and weapon systems (Cameron, 1994; Cameron & Freeman, 1994 ; Cascio, 1993; McCune, Beatty, & Montagno, 1988; McKinley, Sanchez, & Schick, 1995; Thomchick, Young, & Grenoble, 1999).

**Key Factors That Drive Downsizing**

The possible key factors that drive personnel downsizing were borrowed from previous studies done in non-military contexts and adapted to fit a military environment.

**Chief of General Staff.** The personality traits and backgrounds of CEOs have been found to influence downsizing in personnel numbers (Useem, 1993). It has been found that downsizing rates were higher when CEOs had financial backgrounds than when they did not (Budros, 1999). Thus, the Chief of General Staff could be a key factor that drives personnel downsizing in military organizations.

**National Military Strategy Directive.** The National Military Strategy Directive is linked to the national defense strategy and the national security strategy (Hesterman, 2014). In 1994, a public law (No. 101-510) established in the United States directed a reduction of over 30% of the United States' military personnel by 1996 (Cameron, 1998). Based on these examples, the National Military Strategy Directive could be another key factor.

**Military Expenditure.** In most cases, a military organization's total personnel number, force structure, equipment, and weapon systems directly affect military expenditure. For instance, in 1994, the United States estimated a savings of 40% in military expenditure by reducing over 30% of its total active military personnel (Cameron, 1998). Thus, military expenditures are thought to be a key factor driving personnel downsizing in military organizations.

**Other Possible Key Factors.** There might be several other factors that drive personnel downsizing, but this study attempts to determine only the most influential factors.

**Modified Cultural Clusters of NATO Countries**

A cultural cluster is a group of countries with similar cultural characteristics (House, 2004; Russo, 2000). In this study, 28 NATO countries are grouped according to their cultural clusters. The Global Leadership and Organizational Effectiveness (GLOBE) project studied 62 nations worldwide (House, 2004). A later study examined 25 of those 62 nations (Chnokar, Brodbeck, & House, 2009). However, none of the two aforementioned studies included 12 NATO nations, namely Belgium, Bulgaria, Croatia, Czech Republic, Estonia, Iceland, Latvia, Lithuania, Luxemburg, Norway, Romania, and the Slovak Republic. Further research was conducted to determine whether the aforementioned 12 nations can be associated to the existing cultural clusters as defined in prior research. Modified cultural clusters of NATO countries are shown in Exhibit 1.

**Exhibit 1.** Modified Cultural Clusters of NATO Countries [Adapted from (Chnokar et al., 2009)]

| Cultural Clusters | NATO Countries (28 Nations) |
|---|---|
| 1<br>Anglo | USA, Canada, United Kingdom (3 nations) |
| 2<br>Germanic Europe | Germany, Netherlands, *Belgium, Luxemburg* (4 nations) |
| 3<br>Latin Europe | Italy, Spain, Portugal, France (4 nations) |
| 4<br>Eastern Europe | Poland, Greece, Hungary, Albania, Slovenia, *Czech Republic, Latvia, Croatia, Bulgaria, Estonia, Lithuania, Romania, Slovak Republic* (13 nations) |
| 5<br>Middle East | Turkey (1 nation) |
| 6<br>Nordic Europe | Denmark, *Iceland, Norway* (3 nations) |

Italics indicate nations that were not originally part of the cultural clusters in the Globe research (House, 2004).

## Methodology

The analyses in this study were broken down into two main steps. In the first step (overall analyses), an inspection of the key factors that drive personnel downsizing in the overall sample of 28 nations was conducted. In the second

step (cultural clusters analyses) analyses to investigate whether the key factors differ across cultural clusters were performed. The research questions that the study addresses were:
Question 1. What are the key factors that drive personnel downsizing in military organizations of NATO nations?
Question 2. Do those key factors differ across NATO nations' cultural clusters?

**Hypotheses in Alternative Form.** Next, we present the hypotheses in the alternative form. The hypotheses were grounded from previous studies' findings.
$H_A1$: Military Expenditure (% of GDP) has a statistically significant relationship with downsizing.
$H_A2$: Turnover in the Chief of General Staff has a statistically significant relationship with downsizing.
$H_A3$: Modification of the National Military Strategy Directive has a statistically significant relationship with downsizing.
$H_A4$: The relationship between Military Expenditure (% of GDP) and personnel downsizing differs across NATO nations' cultural clusters.
$H_A5$: The relationship between the Chief of General Staff and personnel downsizing differs across NATO nations' cultural clusters.
$H_A6$: The relationship between the National Military Strategy Directive and personnel downsizing differs across NATO nations' cultural clusters.

**Population and Rationale.** Data was collected for 23 years (1990-2012) annually from all 28 NATO nations. The number of total observations was 2423 (only 153 missing, 5.94%). The Stata 13.1 (Serial number: 301309290450) statistical tool was used in this research.

**Data Analysis Technique**
Time Series Cross-Sectional Analysis Technique method has been previously suggested as appropriate for longitudinal research designs that involve repeated measures taken on the same subject overtime at regular intervals (Salkind, 2010). Time series cross-sectional dynamic panel data is typically characterized by time series data collected at the same time or during the same time period for all the dependent and independent variables (Holtz-Eakin, Newey, & Rosen, 1988).

**Arellano-Bond Generalized Method of Moments Model.** The Arellano-Bond Generalized Method of Moments (GMM) model is a regression model used to analyze the causal relationship between dependent and independent variables that conform with time series cross-sectional dynamic panel data.

**Variables, Indicators and Metrics.** The Total Active Duty Personnel number was considered the dependent variable. Military Expenditure, the Chief of General Staff, and the National Military Strategy Directive were considered independent variables. Year and Nation were considered dummy variables. Cultural Clusters was considered a categorical variable. Any reduction in Total Active Duty Personnel quantity was considered an indicator of personnel downsizing, whereas an increase was considered upsizing. Total Active Duty Personnel is to show numbers as they were for each NATO nations' armed forces. Military Expenditure (% of GDP) represents the annual military expenditure of a NATO nation as the percentage of its GDP (Gross Domestic Product). In the data set, military expenditure is to show 14 decimal places. Chief of General Staff represents the number of years the Chief of General Staff of a NATO nation was on duty. In other words, it is tenure of the Chief of General Staff. The first year of tenure was coded as '1', the second year was coded as '2', and the third year was coded as '3' and so on. National Military Strategy Directive (NMSD) represents the number of years the National Military Strategy Directive of a NATO nation was in effect. In other words, it is NMSD maturity. The years from 1990 through 2012 were considered. Years were coded by their number. 28 NATO nations were considered. Nations were coded by their name. Cultural Clusters were considered a categorical variable.

## Analysis And Findings

The unit of analyses was nations' military organizations. Data was collected for 23 years (1990-2012) annually, with the size of the panels [$N$ = 28 (28 NATO nations) and $T$= 23 (23 years)]. Each data point (each line in the data set) in this study represented Nation, Year, Total Active Duty Personnel number, Military Expenditure (% of GDP), turnover in the Chief of General Staff, and modification of the National Military Strategy Directive

### Pre-estimation Diagnostic Tests

In order to ensure that the data set fits with the requirements of the Arellano-Bond GMM model, several pre-estimation diagnostic tests were performed before the analyses.

**Random Effect / Fixed Effect Test.** In order to determine if the data set has Random Effect or Fixed Effect, the Random Effect (RE) / Fixed Effect (FE) estimation test was performed. The Random / Fixed Effect Test Results are shown in Exhibit 2.

**Exhibit 2.** Random / Fixed Effect Test Results

| | Coefficients | | | |
|---|---|---|---|---|
| | (b) fixed | (B) random | (b-B) Difference | sqrt(diag(V_b-V_B)) S.E. |
| milex | 38457.03 | 39392.87 | -935.8378 | 266.1941 |
| chiefogs | -287.6966 | -292.6547 | 4.958102 | 25.39243 |
| nmsd | 1931.627 | 1958.296 | -26.6688 | 35.44969 |
| chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 12.38<br>Prob>chi2 = 0.0062 | | | | |
| *Note*. b = consistent under Ho and Ha; obtained from xtreg<br>B = inconsistent under Ha, efficient under Ho; obtained from xtreg<br>Test: Ho: difference in coefficients not systematic. Significant at Prob < 0.05 level. | | | | |

The null hypothesis for the test defines the Random Effect as consistent (Torres-Reyna, 2007). In Exhibit 2, (*Prob > chi2* = 0.0062) means that there was enough evidence to reject the null hypothesis suggesting that the model is appropriate for the Fixed Effect estimation.

**Arellano-Bond Zero Autocorrelation Test.** The Arellano-Bond GMM requires exogeneity, which means unobserved instruments should not be correlated with other covariates in the data set (Drukker, 2008). The Arellano-Bond GMM model assumes that there is no serial correlation in the idiosyncratic errors but does not assume independence over time periods (Arellano & Bond, 1991). Exhibit 3 displays the Arellano-Bond Zero Autocorrelation Test results.

**Exhibit 3.** Arellano-Bond Zero Autocorrelation Test Results

| Arellano-Bond test for zero autocorrelation in first-differenced errors | | |
|---|---|---|
| Order | z | Prob > z |
| 1 | -2.0733 | 0.0381 |
| 2 | .07433 | 0.9407 |
| *Note*. Ho: no autocorrelation. | | Significant at p < 0.05 level. |

In Exhibit 3, it was expected that the first differences in the first row usually reject the null hypothesis ($H_0$ = there is no autocorrelation), since the differences include the errors (Wooldridge, 2010). The second row was more important since it was designed to detect autocorrelation in lagged values. In the second row, the (*Prob > z* 0.9407) supports $H_0$ = no autocorrelation with a value above the significance level of (*Prob* < 0.05) (Torres-Reyna, 2007). The test showed that $H_0$ cannot be rejected ($z$ = 0.07433). Therefore, the data set used in this study had no autocorrelation, and it was strictly exogenous. The data set met the requirements of the Arellano-Bond GMM model.

**White Heteroskedasticity Test.** The White Test has a null hypothesis, which states that the variance is constant and there is homoskedasticity (Chen, 2003; Greene, 2003). The White Heteroskedasticity Test results are shown in Exhibit 4.

**Exhibit 4.** White Heteroskedasticity Test Results

| White's general test statistic | | | | | | |
|---|---|---|---|---|---|---|
| Number of obs | = 553 | | | | | |
| F( 3, 549) | = 10.78 | | | R-squared | = 0.3286 | |
| Prob > F | = 0.0000 | | | Root MSE | = 2.8e+05 | |
| totaladp | Coef. | Robust Std. Err. | t | P>\|t\| | [95% Conf. Interval] | |
| milex | 200438.8 | 37338.93 | 5.37 | 0.000 | 127094.1 | 273783.4 |
| chiefogs | 978.1836 | 6826.96 | 0.14 | 0.886 | -12431.98 | 14388.34 |
| nmsd | 9907.811 | 4732.28 | 2.09 | 0.037 | 612.2197 | 19203.4 |
| White's general test statistic : 315.5751 Chi-sq( 9) p-value = 1.3e-62 | | | | | | |
| *Note*. Significant at p < 0.05 level. | | | | | | |

With respect to heteroskedasticity, the *p*-value (*Prob* > *F* = 0.0001) indicates that $H_0$ was rejected. The White Heteroskedasticity Test results showed strong evidence that the data was heteroskedastic.

**Post-Hoc Tests**

**Interaction Between Independent Variables Tests.** Multicollinearity occurs when there is a high level of correlation between an independent variable and another independent variable or a set of independent variables (Wooldridge, 2010). The Variance Inflation Factor (VIF) is used to assess whether multicollinearity is a problem or not for independent variables and, if so, to what extent. The results for the interaction test appear in Exhibit 5.

**Exhibit 5.** The Results of the VIF Test

| Variable | VIF | 1/VIF |
|---|---|---|
| milex | 1.05 | 0.953296 |
| nmsd | 1.03 | 0.973278 |
| chiefogs | 1.02 | 0.979021 |
| Mean VIF | 1.03 | |

If VIF is more than 10 for any variable, there is a multicollinearity problem (Acock, 2010). The mean VIF value for independent variables was 1.03. There was enough evidence to conclude that there was no interaction between one independent variable and another independent variable or a set of independent variables.

**Pesaran's and Frees' Cross-Sectional Independence Test.** The Pesaran cross-sectional dependence test, also called contemporaneous correlation, investigates the presence of a correlation between the residuals and different entities that can yield biased results (Torres-Reyna, 2007). The data set hosts for (N=28) NATO nations and (T=23) years. The null hypothesis (H0) is that residuals are not correlated (H0 = cross-sectional independence) for ($N \rightarrow \infty$) and T is sufficiently large (De Hoyos & Sarafidis, 2006). The test results are displayed in Exhibit 6.

**Exhibit 6**. Cross Sectional Independence Test Results

| Pesaran's Test of Cross Sectional Independence | | |
|---|---|---|
| Pesaran's test of cross sectional independence = 15.573, Pr = 0.0000 | | |
| Average absolute value of the off-diagonal elements = 0.420 | | |
| **Frees' Test of Cross Sectional Independence** | | |
| Frees' test of cross sectional independence = 1.544 | | |
| Critical values from Frees' Q distribution | | |
| alpha = 0.10 | 0.5822 | |
| alpha = 0.05 | 0.8391 | |
| alpha = 0.01 | 1.4211 | |
| Note. Pesaran's Test $H_0$ = cross-sectional independence. | Frees' test α value: Significant at α < 0.05 level. | |

The Pesaran's test strongly rejected the null hypothesis with the results of (*Pr* = 0.0001) and an average absolute correlation value of 0.420. Results showed enough evidence to assess that there was cross-sectional dependence. Therefore, there were enough common units to implement analyses. Frees' test also rejects (for $\alpha = 0.05 : 0.8391$) the null hypothesis. However, "for small values of (*T*= 23) the normal approximation to the *Q* distribution is poor" (De Hoyos & Sarafidis, 2006, p. 7). On the other hand, for *T* as large as 30, the approximation does well. There

was enough evidence to suggest that the model had enough cross-sectional units with common points in time to be able to implement the analyses (De Hoyos & Sarafidis, 2006). The Pesaran's test strongly rejected the null hypothesis ($H_0$ = cross-sectional independence) and "rejecting the null hypothesis in all subsets would serve as an indication that there is cross-sectional dependence in the disturbances that needs to be taken into account" (De Hoyos & Sarafidis, 2006, p. 490). In conclusion, there is cross-sectional dependence in data and the size of the panels ($N$ = 28 and $T$ = 23) demonstrate that cross-sectional dependence is not a problem in the study.

**R-Squared Test.** R-squared ($R^2$) is the coefficient of determination and shows how much of the variance of the dependent variable is explained by the correlation of independent variables. It is between [0 and 1]; the larger the number means the correlation is stronger (Pollock, 2006). Exhibit 7 shows the results for $R^2$.

**Exhibit 7.** Results of $R^2$ Test

Fixed-effects (within) OLS regression

| | | | |
|---|---|---|---|
| Fixed-effects (within) regression | Number of obs | = | 553 |
| Group variable: nation_n | Number of groups | = | 28 |
| R-sq: within = 0.1513 | Obs per group: min | = | 4 |
| Between = 0.4225 | avg | = | 19.8 |
| overall = 0.3285 | max | = | 23 |
| | F(3,522) | = | 31.02 |
| corr(u_i, Xb) = 0.4989 | Prob > F | = | 0.0000 |

| totaladp | Coef. | Robust Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| milex | 38457.03 | 4004.509 | 9.60 | 0.000 | [30590.1 | 46323.96] |
| chiefogs | -287.6966 | 1723.159 | -0.17 | 0.867 | [-3672.876 | 3097.483] |
| nmsd | 1931.627 | 1338.45 | 1.44 | 0.150 | [-697.7834 | 4561.038] |
| _cons | 124301.6 | 11011.01 | 11.29 | 0.000 | [102670.3 | 145932.9] |
| sigma_u | 305331.16 | | | | | |
| sigma_e | 55490.782 | | | | | |
| rho | .96802675 | (fraction of variance due to u_i) | | | | |

F test that all u_i=0: F(27, 522) = 498.34 Prob > F = 0.0000

The overall R-sq ($R^2$) value is 0.3285 meaning approximately 33% of variation in the Total Active Duty Personnel number was explained by Military Expenditure, turnover in the Chief of General Staff, and modification of the National Military Strategy Directive. In this study, the *rho* value is 0.97, which means that 97% of the variance is due to differences across the panels. However, ''In the presence of heteroskedasticity, the R-squared from an OLS (fixed effect) regression is meaningless'' (Wooldridge, 2010, p. 81). In addition, the R-square measure is not valid for all panel data regression techniques (Buse, 1973). In order to test goodness-of-fit of the data set and the Arellano-Bond GMM model a series of tests were performed. First, the Arellano-Bond zero autocorrelation test result proved that there is no autocorrelation, and the data set was a good to fit the Arellano-Bond GMM model. Second, the data set needed to be heteroskedastic to fit the Arellano-Bond GMM model and the White heteroskedasticity test result proved that the data set was a good fit with the model. Third, there should be no interaction between one independent variable and another independent variable or a set of independent variables, and the VIF test results proved the data set to fit this requirement. Finally, "There must be enough cross-sectional units with common points in time to be able to implement the test" (De Hoyos & Sarafidis, 2006, p. 490). Pesaran's and Frees' cross-sectional independence test proved that the data set had enough cross-sectional units to implement the test.

## Conclusion

For the first step (Step 1: overall analyses), an inspection of the key factors that drive personnel downsizing in NATO nations' military organizations was analyzed. For the second step (Step 2: cultural clusters analyses), an analysis was performed to determine if the key factors differ across NATO nations' cultural clusters.

### Step 1: Overall Analyses

Exhibit 8 depicts the results of Step 1: Overall Analyses.

**Exhibit 8.** Overall Analyses Results

| $H_A$# | Hypothesis in Alternative Form | Coefficient Value and Inference | Summary of Findings and Inference |
|---|---|---|---|
| **$H_A$1** | Military Expenditure (% of GDP) has a statistically significant relationship with personnel downsizing. | (-6967.631)<br>One percent change in Military Expenditure (% of GDP) drives personnel **downsizing** of 6967 military personnel. | ($p$ = 0.102)<br>Not significant with a negative value<br>*Not Supported* |
| **$H_A$2** | Turnover in Chief of General Staff has a statistically significant relationship with personnel downsizing. | (-2306.316)<br>A one-year of additional tenure of Chief of General Staff drives personnel **downsizing** of 2306 military personnel. | ($p$ = 0.039)<br>**Significant with a negative value**<br>***Supported*** |
| **$H_A$3** | Modification of the National Military Strategy Directive has a statistically significant relationship with personnel downsizing. | (1679.392)<br>A one-year of additional maturity in the National Military Strategy Directive drives personnel **upsizing** of 1679 military personnel. | ($p$ = 0.032)<br>**Significant with a positive value**<br>***Supported*** |

Turnover in the Chief of General Staff was found to be significant, and one year of additional tenure of the Chief of General Staff proved to drive 2306 Active Duty Personnel downsizing. This finding showed that turnover in the Chief of General Staff is a key factor that drives personnel downsizing in 28 NATO nations' military organizations. Modification of the National Military Strategy Directive was found to be significant; however, one year of additional maturity in the National Military Strategy Directive proved to be driving personnel upsizing of 1679. Hence, it was determined that NMSD is not a factor that drives personnel downsizing in military organizations.

Scholars provide evidence of a relationship between an organization's budget and personnel downsizing (Prindle, 2005). According to Gardner (2002), "budgets and politics have directly contributed to downsizing decisions of the Post-Cold War period" (p. 41). Military Expenditure (% of GDP-Gross Domestic Product) was found to be statistically non-significant as a factor driving personnel downsizing in the study. Contrary to general belief and local findings, when 28 NATO nations were considered altogether, Military Expenditure was not a factor that drives downsizing in military organizations.

All those findings lead the researcher to investigate whether Step 1's results differ across NATO nations' cultural clusters.

**Step 2: Cultural Clusters Analyses**

The same method of statistical analysis was applied to Cultural Clusters 1, 2, 3, and 4. Cultural Cluster 5 (Middle East) only contained Turkey, while Cultural Cluster 6 (Nordic Europe) included Denmark, Iceland, and Norway. However, Iceland was missing data necessary to the use of the model. In other words, from a data perspective, Cultural Cluster 6 had only two nations. The model was constructed to measure time-series cross-sectional dynamic panel data, and it was not possible to measure Cultural Clusters 5 and 6 in the model. A series of comparison tests were performed to investigate the factors that drive personnel downsizing in Cultural Clusters 5 and 6. Exhibit 9 depicts the results of Step 2: Cultural Clusters Analyses for Cultural Clusters 1-4.

**Exhibit 9.** Step 2: Cultural Clusters Analyses Results (CulturalCls 1-4)

| $H_A$# | Hypothesis in Alternative Form | Coefficient Value and Inference | Summary of Findings and Inference |
|---|---|---|---|
| **$H_A$4** | The relationship between Military Expenditure (% of GDP) and personnel downsizing differs across NATO nations' cultural clusters. | *In Cultural Cluster 3 (Latin Europe)*<br>(35330.57)<br>One percent change in Military Expenditure (% of GDP) drives personnel **upsizing** of 35330 military personnel. | ($p$ = 0.037)<br>**Significant with a positive value**<br>***Supported*** |
| **$H_A$5** | The relationship between Chief of General Staff and personnel downsizing differs across NATO nations' cultural clusters. | *In Cultural Cluster 2 (Germanic Europe)*<br>(-7379.043)<br>A one-year of additional tenure of Chief of General Staff drives personnel **downsizing** of 7379 military personnel. | ($p$ = 0.005)<br>**Significant with a negative value**<br>*Not Supported*<br>*(Similar result to 28 NATO nations)* |
| **$H_A$6** | The relationship between the National Military Strategy Directive and personnel downsizing differs across NATO nations' cultural clusters. | *In Cultural Cluster 1 (Anglo)*<br>(3078.029)<br>A one-year of additional maturity in the National Military Strategy Directive drives personnel **upsizing** of 3078 military personnel. | ($p$ = 0.03)<br>**Significant with a positive value**<br>***Supported*** |

In Cultural Cluster 3 (Latin Europe), Military Expenditure had a strong relationship with the Total Active Duty Personnel number; however, it did not prove to drive personnel downsizing. On the contrary, it proved to be driving personnel upsizing. This was more likely to happen if Military Expenditure was rising in Cultural Cluster 3, and the Total Active Duty Personnel number was either rising in parallel or not changing significantly. In Cultural Cluster 2 (Germanic Europe), turnover in the Chief of General Staff was found to be significant, and one year of additional tenure of the Chief of General Staff drives 7379 active duty personnel downsizing. This finding showed that turnover in the Chief of General Staff was a key factor that drives personnel downsizing in Cultural Cluster 2 (Germanic Europe) nations' military organizations. It yielded similar results to Step 1: Overall analyses and means that the Chief of General Staff as a key factor in 28 NATO nations did not differ in the Germanic Europe cluster. In Cultural Cluster 1 (Anglo), the National Military Strategy Directive had a strong relationship with the Total Active Duty Personnel number; however, it did not drive personnel downsizing. On the contrary, it proved to drive personnel upsizing. In Cultural Cluster 4 (Eastern Europe), there was no significant *p* value for any of the independent variables. One potential explanation for the non-existent relationship between the Total Active Duty Personnel number and the independent variables was that Cultural Cluster 4 was either missing some identifying data or was not homogenous as a different culture. This cluster might have some more sub-clusters, or some of the nations might be members of other Cultural Clusters.

In order to make an estimation of Cultural Clusters 5 and 6, ANOVA and Tukey's Honest Significant Difference tests were performed and displayed in Exhibit 10. The aim was to find unknown parameters by comparing known parameters.

**Exhibit 10.** Overall ANOVA & Tukey's HSD Test Results for Clusters 5 and 6

| | **Cluster Number & Significant Variable** | **ANOVA *F*** | **ANOVA *Prob* > *F*** | **Tukey's HSD-test** | **Differs** |
|---|---|---|---|---|---|
| *Cultural Cluster 5 (Middle East)* | # 3 & Military Expenditure | 26.54** | 0.0001 | 9.1552** | Yes |
| | # 2 & Chief of General Staff | 7.58** | 0.0610 | 4.9927** | Yes |
| | # 1 & National Military Strategy Directive | 0.82 | 0.3644 | 1.7178 | No |
| | # 1 & Total Active Duty Personnel | 0.93 | 0.3341 | 1.8128 | No |
| *Cultural Cluster 6 (Nordic Europe)* | # 3 & Military Expenditure | 2.90 | 0.0893 | 2.2790 | No |
| | # 2 & Chief of General Staff | 0.16 | 0.6893 | 0.5089 | No |
| | # 1 & National Military Strategy Directive | 0.84 | 0.3600 | 1.1821 | No |
| | # 4 & Total Active Duty Personnel | 2.64 | 0.1047 | 18.6951 | No |

*Note.* ** Related variable is significantly different.

It was found that there was no significant difference between Cultural Cluster 5 (Middle East) and 1 (Anglo) with respect to values of modification of the National Military Strategy Directive and the Total Active Duty Personnel number. However, it did not necessarily mean that the relationship between the National Military Strategy Directive and the Total Active Duty Personnel number was almost identical in Cultural Cluster 1 (Anglo) and 5 (Middle East).

The Total Active Duty Personnel trend was very similar for Cultural Cluster 6 (Nordic Europe) and Cultural Cluster 4 (Eastern Europe). Cultural Cluster 6 was a divergent cluster because its Military Expenditure trend was similar to Cluster 3 (Latin Europe), its trend for turnover in the Chief of General Staff was similar to Cluster 2 (Germanic Europe), and its trend for modification of the National Military Strategy Directive was similar to Cluster 1 (Anglo). However, Cultural Cluster 6 Total Active Duty Personnel trend was found to be different from Cultural Clusters 2, 3, 1 and 5. The Cultural Cluster 6 Military Expenditure trend differs from Cultural Clusters 1, 4, and 5. It was anticipated that the Cultural Cluster 6 Chief of General Staff trend would differ from Cultural Clusters 3, 4, and 1. It was predicted that the Cultural Cluster 6 National Military Strategy Directive trend would differ from Cultural Cluster 4. Most likely, those results were related to the amount of missing data. It was not possible to estimate which Cultural Cluster was characteristically similar to Cultural Cluster 6. In conclusion, Cultural Cluster 6 test results proved that Cultural Cluster 6 was different from 28 NATO nations.

There was enough evidence to conclude that the relationship between Military Expenditure, turnover in the Chief of General Staff, modification of the National Military Strategy Directive, and personnel downsizing differs across NATO nations' cultural clusters.

## Conclusion

It was found that turnover in the Chief of General Staff was a key factor that drives personnel downsizing in 28 NATO nations' armed forces. In contrast, modification of the National Military Strategy Directive was a key factor that drives personnel upsizing. On the other hand, reduction in Military Expenditure was generally declared the reason for military personnel downsizing. In this study, it was found that Military Expenditure was not a factor that drives Active Duty Personnel downsizing; instead, the Chief of General Staff was found to be the key player. Military expenditure might have been used as justification for the Chief of General Staff's downsizing decisions.

This study showed that the main player in Active Duty Personnel downsizing implementation is the Chief of General Staff, neither Military Expenditure, nor NMSD. Even though Military Expenditure can drive a military organization to downsize, the Chief of General Staff can delay or cancel the actual implementation. Even though there seems to be a sufficient Military Budget to hold all Active Duty Personnel for a certain period of time, a Chief of General Staff may also decide to downsize for other reasons. However, all these inferences are subject to change when applied to different Cultural Clusters of NATO nations. The analysis results of Step 1 of this study looked at the overall NATO group as a whole. However, in one culture, when a Chief of General Staff directs his command to perform personnel downsizing of the Total Active Duty Personnel number, his / her staff may obey the rules and work very hard to meet the commander's order as soon as possible. Inversely, in another culture, the staff may request to know the rationale of the personnel downsizing order before implementing the directive. The staff may request to work on possible risks, mitigations, and opportunities. In the end, they may either support or not support the Chief of General Staff's decision by providing detailed rationale. To conclude, it was found that the key factors that drive personnel downsizing differ across NATO nations' cultural clusters.

The National Military Strategy Directive might reflect the ideal defense power that a nation desires to have; however, the Chief of General Staff, when faced with the realities of defense planning with limited resources including personnel and budget, might act differently. That might be the reason why NMSD is a key factor in triggering personnel upsizing rather than downsizing. The Chief of General Staff might need to find a rationale for personnel downsizing decisions in order not to be blamed for layoffs and might use a declining military budget as justification for personnel downsizing. In agreement with this view, Scott (1998) anticipated that some firms might use poor economic conditions as a rationale for closing unsatisfactory divisions of the organization. In this study, it was found that Chief of General Staff is the key factor driving personnel downsizing in military organizations of NATO nations. On the contrary, the news frequently declares that due to the declining military budget the armed forces are performing layoffs. However, in this study it is found that Military Expenditure is not a significant factor that drives personnel downsizing in military organizations.

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