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ELEMENTS OF SOCIAL SUSTAINABILITY IN NATO MEMBER COUNTRIES

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Abstract:

The Human Development Reports (HDR) are publications of the United Nations Development Programme. Each year the HDR is ranking more than 180 countries according to the Human Development Index (HDI). This is a composite index comprising 3 dimensions – Life expectancy index, Education index, and GNI index. Among the data from the HDR 2020 we can find, as part of the Social sustainability, the Military expenditure (as percentage of the GDP), and the Ratio of education and health expenditure to military expenditure. We took into consideration for this paper also one of the indices from the Economic sustainability – the Research and Development expenditure (as percentage of the GDP). We have analyzed this 3 indices for the NATO Member Countries.

Key words: HDI; military expenditures; ratio of education and health expenditure to military expenditure; research and development expenditure

1. Introduction

The NATO Member Countries for which we have analyzed the elements of social sustainability are, in alphabetical order: Albania (AL), Belgium (BE), Bulgaria (BG), Canada (CA), Croatia (HR), Czechia (CZ), Denmark (DK), Estonia (EE), France (FR), Germany (DE), Greece (EL), Hungary (HU), Iceland (IS), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Montenegro (ME), Netherlands (NL), North Macedonia (MK), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Turkey (TR), United Kingdom (UK), United States (US). For the rest of this paper we will use the 2 letters country code.

2. HDI Rank

In Table 1, 2, and 3 below we have presented the HDI ranks for the NATO Member Countries, as extracted from the Human Development Report 2020. Romania is on 49th place. On the 1st place is Norway.

HDI rank									
AL	BE	BG	CA	HR	CZ	DK	EE	FR	DE
69	14	56	16	43	27	10	29	26	6

Table 1 HDI ranks AL-DE



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HDI rank									
EL	HU	IS	IT	LV	LT	LU	ME	NL	MK
32	40	4	29	37	34	23	48	8	82

Table 2 HDI ranks EL-MK

HDI rank									
NO	PL	PT	RO	SK	SI	ES	TR	UK	US
1	35	38	49	39	22	25	54	13	17

Table 3 HDI ranks NO-US

In Table 4 below we have synthesized the Countries in 5 intervals in accordance to the HDI ranks – intervals of 10 units. Romania is on the same interval as Hungary, Croatia, Montenegro, Turkey, and Bulgaria.

HDI Ranks	Countries	No of Countries
under 20	NO, IS, DE, NL, DK, UK, BE, CA, US	9
[20-30)	SI, LU, ES, FR, CZ, EE, IT	7
[30-40)	EL, LT, PL, LV, PT, SK	6
[40-50)	HU, HR, ME, RO, TR, BG	6
over 50	AL, MK	2

Table 4 Synthetized HDI ranks

a. Military expenditure 2015-2018

The next indicator that we have synthesized in Table 5 below is Military expenditure 2015-2018, as percentage of GDP.

Military expenditures are *all current and capital expenditures on the armed forces, including peacekeeping forces; defense ministries and other government agencies engaged in defense projects; paramilitary forces, if these are judged to be trained and equipped for military operations; and military space activities.*

Romania is on the same interval with Croatia (1.5%), United Kingdom (1.8%), Portugal (1.8%), Bulgaria (1.7%), Norway (1.6%), and Montenegro (1.5%) with 1.9% of GDP allocated for this type of expenditure.

The majority of NATO Member Countries – 12 – have between 1% and 1.5% of GDP allocated for this indicator: North Macedonia (1%), Slovenia (1%), Italy (1.3%), Spain (1.3%), Canada (1.3%), Netherlands (1.2%), Germany (1.2%), Slovakia (1.2%), Denmark (1.2%), Albania (1.2%), Czechia (1.1%), and Hungary (1.1%).

Military expenditure 2015-2018 % of GDP	Countries	No of Countries
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under 1	BE, LU	2
[1-1.5)	MK, SI, IT, ES, CA, NL, DE, SK, DK, AL, CZ, HU	12
[1.5-2)	HR, RO, UK, PT, BG, NO, ME	7
[2-2.5)	EL, FR, EE, LV, PL, LT	6
over 2.5	US, TR	2

Table 5 Military expenditure

b. Research and Development expenditure

Research and development expenditure are *current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture and society, and the use of knowledge for new applications. Research and development covers basic research, applied research and experimental development.*

The situation for the Research and Development expenditure is presented in Table 6. Romania has 0.5% of GDP allocated for this chapter, in the same interval as Latvia (0.6%), Bulgaria (0.8%), Slovakia (0.8%), and Lithuania (0.9%). The highest values are in Belgium (2.8%), United States (2.8%), Denmark (3.1%), and Germany (3.1%).

Research and Development expenditure 2014-2018 % of GDP	Countries	No of Countries
under 0.5	AL, MK, ME	3
[0.5-1)	RO, LV, BG, SK, LT	5
[1-1.5)	TR,HR,EL, PL, LU, ES,PT, IT, EE	9
[1.5-2)	HU, CA, UK, CZ, SI	5
[2-2.5)	IS, NO, NL, FR	4
over 2.5	BE, US, DK, DE	4

Table 6 Research and Development expenditure

c. Ratio of education and health expenditure to military expenditure

Ratio of education and health expenditure to military expenditure is *the sum of government expenditure on education and health divided by military expenditure.*

The Ratio of education and health expenditure to military expenditure is only 5.7 in Romania, and 18.3 in Belgium, and 19.5 in Luxembourg. For this indicator we didn't have the data for all the 30 countries.

Ratio of education and health to military expenditure	Countries	No of Countries
under 10	EE, RO, PL, US,HR,LT,BG,LV,PT,UK,IT,SK	12



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[10-15)	NO, HU, ES,CZ,CA,SI,DE,NL,DK	9
over 15	BE, LU	2

Table 7 Ratio of education and health to military expenditure

3. Bi-dimensional analysis

For a more complex analysis of the 3 indicators presented above, we created 3 bi-dimensional tables and we applied the χ^2 test in order to see if there is a direct connection between the HDI ranks, Military expenditure, Research and Development expenditure.

$$\chi^2_{calc} = \sum_{i=1}^p \sum_{j=1}^q \frac{(n_{ij} - nt_{ij})^2}{nt_{ij}}$$

HDI Ranks / Mil expend	under 1	[1-1.5)	[1.5-2)	[2-2.5)	over 2.5
under 20	BE	DE, NL, DK, CA	NO, UK		US
[20-30)	LU	SI, ES, CZ, IT		FR, EE	
[30-40)		SK	PT	EL	
[40-50)		HU	HR, ME, RO, BG	LT, PL, LV	TR
over 50		AL, MK			

Table 8 HDI ranks and Military expenditure

HDI Ranks / R&D	under 0.5	[0.5-1)	[1-1.5)	[1.5-2)	[2-2.5)	over 2.5
under 20				UK, CA	NO, IS, NL	DE, DK, BE, US
[20-30)			LU, ES, EE, IT	SI, CZ	FR	
[30-40)		LT, LV, SK	EL, PL, PT			
[40-50)	ME	RO, BG	HR, TR	HU		
over 50	AL, MK					

Table 9 HDI ranks and Research and Development expenditure

Mil expend/ R&D	under 0.5	[0.5-1)	[1-1.5)	[1.5-2)	[2-2.5)	over 2.5
under 1			LU			BE
[1-1.5)	MK, AL	SK	IT, ES	SI, CA, CZ, HU	NL	DE, DK
[1.5-2)	ME	RO, BG	HR, PT	UK	NO	
[2-2.5)		LV,LT	EL, EE, PL		FR	
over 2.5			TR			US

Table 10 Military expenditure and Research and Development expenditure

The statistical hypothesis:

H₀ – we don't have any statistical connection between the indicators

H₁ – we have a statistical connection between the indicators



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After making all the calculations for the data in Table 8, 9, and 10 we find out that we don't have any statistical connection between the indicators presented.

4. Conclusion

Military expenditure, and Research and Development expenditure, as part of social sustainability and economic sustainability are not directly influencing the Human Development Index, from a statistical point of view. But for sure are influencing the day to day live of the citizens.

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