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TERRITORIAL DESIGN OPTIMIZATION MODEL AT NUTS 2 LEVEL IN ROMANIA

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Abstract: European Union's policy on territorial units for statistics (NUTS) regards implicitly the Romanian political space in search of a formula to generate systemic functionality. The current eight regions were too large and with a territorial structure and design more or less anchored in the geopolitical reality of EU's peripheral space. Through this study we propose a version connected to the specific of the Romanian territorial and political space realities and to the contiguous space. In the new version, were proposed ten regions equivalent to NUTS2 structured on the existing counties. The new regions are characterized by enhanced functionality driven by optimal territory and population and especially traditional local and regional links.

Key words: NUTS 2, Romania, Regionalisation, Development regions

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INTRODUCTION

The Romanian political space in the twentieth century saw profound changes in structural aspect situations caused by the global and the European situation. If before the World War II, traditional Romanian political-administrative system had a specific structure, after the establishment of the socialist system, succeed a chain of experiments until 1968, when were established the counties and the municipalities. After 1990, and especially after 2007, when Romania joined the EU, new European specific space structures were designed so-called statistical regions NUTS on five levels. They had the aim of creating in all EU Member States relatively uniform structures for the main purpose of managing EU funds. Gradually, especially in the former socialist states of Central and Eastern Europe has triggered a wide-ranging search for optimal solutions for each entity. The general rule was that each new structure to include optimum space and population, having internal or external connections, within a framework

determined by the existence of a state defined as "an independent political unit occupying a defined territory permanently inhabited, with full sovereignty over its internal and external affairs" (Bodocan, 1997, 58).

Methodology. Based on the experience of the "old Europe" correlated with last versions of the new states included in the EU from Central and Eastern European area, but also with existing situations in the states' space and in the contiguous Eastern EU periphery, we suggest a structural territorial division of Romanian political space at NUTS 2 level. Using tools and specific elements of such approach (Wendt, 2003; 2004; Wilk, 2006; Ilieş et all, 2011a; 2012), examining the specific geographical, economic (Topaloglou et all., 2005), demographic, social and other type of each county territorial structure (Johnson et all., 2011b; Wendt, 2012), a comprehensive statistical database of the number of indicators in terms of official authenticity of data, resulting amount of underlying indicators shaping a new political territorial design at NUTS 2 level. In parallel, are analyzed the indicators that constituted the basis of the similar structures in neighboring states, especially "recipes for success" in Poland, Slovakia, Hungary and Bulgaria.

Framework analysis. Administrative-territorial organization and implicitly the form of statistical regions based on a set of key factors to create a functional mechanism in terms of technical equipment of the territory in question based on: the surface area determined, landscape morphology, site of activities and population, the layout lines of communication, the existence of universities as centers of polarization that forms on one hand territorial diffusion of strategies and ideas, generating sustainable development and balance of the territory. The European Union has taken a first step by introducing in its entirety political space, across all its Member States (27), a system of statistical units (NUTS)[i1] to create a uniform system of reporting key indicators in each of the functional mechanism, folded generally on the existing traditional structures. In some cases, such as Romania's have been created intermediate levels such as NUTS 2 regions based on national restructuring, as in most countries newly acceding from Central and Eastern Europe. According to EUROSTAT and national sources we noticed the administrative reform in Poland, Slovakia, Hungary, Bulgaria etc and more NUTS 2 new structures of states that include the eastern periphery of the EU are very similar in structure and extension of those from contiguous countries such as Belarus, Ukraine, Russia and Serbia.

To highlight the existing situation for the year 2012 we will analyze the neighboring states of Romania (Ilieş et all., 2011), adding Poland and Slovakia considerate as successful models. The states such as Poland have taken into account a number of factors such as: natural environment; geopolitical circumstances – the necessity of formation of administrative units along the state borders; economic factors; historically shaped settlement and transport systems (Stasiak, 1999, 31).

In the case of Romania, the eight regions created in 2007, we consider them to be the best territorial construction, assertion based on a series of arguments such as a reduced cross-border external cohesion potential, generated by a cross-border asymmetry, regional distortions, demographic and territorial asymmetries, the lack of natural connections etc, all reflected in the results generated by the "poles of management" in which, the cities such as Cluj and Iasi mainly, developed as hypertrophies, generating a phenomenon of "social and economic desertification" around them.

Figure 1.a. NUTS 2 units and equivalent at the external border of EU and Romanian situation: actual (1.a) and new proposal units (1.b)
(Data source: Eurostat, 2012)

Diagnostic analysis at the level of the European space

For an approached territorial diagnosis as most specific for the realities of Central and Eastern European political space we analyze in comparison with the Romanian space, the case of Poland, Slovakia, Hungary and Bulgaria space in the EU. At the NUTS 2 level (Table 1, Figure 1) the Polish political space is divided into 16 Voivodeships, the Slovak in four regions (oblast), seven statistical regions in Hungary, Bulgarian space is divided into seven regions/planning districts and the Romanian space into eight statistical regions. The NUTS 2 system, which includes 270 regions at EU NUTS 2 level (2012) was designed as a hierarchical system with regional, territorial and economic division of EU territory to carry out EU's regional policies and which are identified with regions eligible for attracting structural funds, collection of statistics, socio-economic analysis and to develop cohesion reports (according to EUROSTAT).

Figure 1.b NUTS 2 units and equivalent at the external border of EU and Romanian situation: actual (1.a) and new proposal units (1.b)
(Data source: Eurostat, 2012)

Table 1 presents the structures of supra- and sub-regional level of NUTS 2 corresponding to the names of the country of origin. In a scenario where all 5 countries would be a political territorial unit with a total area of 803,632 sqkm, to the 41 NUTS 2 units would return an average of 19,601 sqkm. If we exclude the 5 regions including the 5 state's capitals for reasons of discrepancies between the surface and the related population on the one hand and between them and the other regions on the other hand, the average rises to 20,085 sqkm (Table 2 and 3). To these values, we notice differences within each state between their regions (Table 2) both in terms of territorial extension and the number of inhabitants. Of the 36 units analyzed (Table 2; without those of capital), the smaller regions in terms of territorial extension are in Poland (Świętokrzyskie with 11,711 sqkm) and Hungary (Central Transdanubia with 11,117 sqkm) while the opposite are units in Romania (North-East Region of 36,850 sqkm). In terms

of human resources the most sparsely populated unit is in Bulgaria (North-West Region of 0.88 million inhabitants) and the most populous unit is in Poland (Śląskie 4.6 million).

Table 1. NUTS system at the level of eastern periphery of EU
(source: Eurostat, 2012)

	NUTS 1		NUTS 2		NUTS 3		LAU 1		LAU 2	
BG	Райони (Rajoni)	*2*	***Райони за планиране (Rajoni za planirane)***	***6***	Области (Oblasti)	28	Общини (Obshtini)	264	Населени места (Naseleni mesta)	5329
HU	Statisztikai nagyrégiók	*3*	***Tervezési-statisztikai régiók***	***7***	Megyék + Budapest	20	Statisztikai kistérségek	174	Települések	3154
PL	Regiony	*6*	***Województwa***	**16**	Podregiony	*66*	Powiaty i miasta na prawach powiatu	379	Gminy	2479
RO	Macroregiuni	*4*	***Regiuni de dezvoltare***	***8***	Judeţ + Bucureşti	42	-		Comune + Municipiu + Oraşe	3181
SK	-	1	***Oblasti***	***4***	Kraje	8	Okresy	79	Obce	2928

At the state level (Table 2 and 3), in terms of territorial extension, from the five member states group, we notice an area extension over the average of the analyzed areas, in Romania (33,796 sqkm) with even double the value of Slovakia (15,662 sqkm) and Hungary (14,352 sqkm). With a total superior area, Romania and Poland have harmonized the NUTS 2 system units to fall around an average of 18,000 sqkm, a situation also found in Bulgaria. The situation is similar in the number of inhabitants (average) in the Romanian regions with an average of 2.76 million people, which are over the Polish (2.2 million inhabitants) and a value almost to triple to those of Bulgaria (1 mil. inhabitants). Both indicators analyzed (area and population) are extremely important in the shaping of territorial design overlay of NUTS system for Member States. Furthermore, we noticed that all the other countries analyzed have some "compatible" regional structures with EU contiguous states, such as Russia (Kaliningrad case), Belarus or Ukraine.

Table 2. Morphometric and demographic features at NUTS 2 level for EU Member States at the eastern external border
(data sources: Eurostat, 2012)

No	Cod	Country / NUTS 2	Area (sqkm)	Population	Density (inhab/sqkm)
	PL	**POLAND / POLSKA**	312,697	38,538,400	123
1	PL11	Łódzkie	18,219	2,533,700	139
2	PL12	Mazowieckie (Warsaw)	35,558	5,285,600	149
3	PL21	Małopolskie	15,183	3,346,800	220
4	PL22	Śląskie	12,333	4,626,400	375
5	PL31	Lubelskie	25,122	2,171,900	86
6	PL32	Podkarpackie	17,846	2,128,700	119
7	PL33	Świętokrzyskie	11,711	1,278,100	109
8	PL34	Podlaskie	20,187	1,201,000	59
9	PL41	Wielkopolskie	29,826	3,455,500	116
10	PL42	Zachodniopomorskie	22,892	1,722,700	75
11	PL43	Lubuskie	13,988	1,023,200	73

12	PL51	Dolnośląskie	19,947	2,916,600	146
13	PL52	Opolskie	9,412	1,014,000	108
14	PL61	Kujawsko-Pomorskie	17,972	2,098,400	117
15	PL62	Warmińsko-Mazurskie	24,173	1,452,500	60
16	PL63	Pomorskie	18,310	2,283,500	125
		AVERAGE (16 units)	**19,542**	**2,408,663**	**123**
		Average without capital (15 units)	***18,476***	***2,216,853***	***120***
	SK	**SLOVAKIA / SLOVENSKO**	**49,037**	**5,392,446**	**110**
1	SK01	Bratislavský kraj / Bratislava Region	2,053	628,666	306
2	SK02	Západné Slovensko / West Slovakia	14,993	1,866,652	125
3	SK03	Stredné Slovensko / Central Slovakia	16,263	1,350,492	83
4	SK04	Východné Slovensko / East Slovakia	15,728	1,589,443	101
		Average (4 units)	**12,259**	**1,348,112**	**110**
		Average without capital (3 units)	***15,662***	***1,587,926***	***101***
	HU	**HUNGARY / MAGYARORSZÁG**	**92,505**	**9,985,722**	**108**
1	HU10	Közép-Magyarország / Central Hungary	6,393	2,971,246	465
2	HU21	Közép-Dunántúl / Central Transdanubia	11,117	1,124,395	101
3	HU22	Nyugat-Dunántúl / Western Transdanubia	11,328	1,112,984	98
4	HU23	Dél-Dunántúl / Southern Transdanubia	14,169	983,612	69
5	HU31	Észak-Magyarország / Northern Hungary	13,430	1,281,040	95
6	HU32	Észak-Alföld / Northern Great Plain	17,729	1,547,003	87
7	HU33	Dél-Alföld / Southern Great Plain	18,339	1,360,214	74
		Average (4 units)	**13,215**	**1,318,223**	**100**
		Average without capital (3 units)	***14,352***	***1,169,079***	***81***
	RO	**ROMANIA / ROMÂNIA**	**238,391**	**21,413,815**	**90**
1	RO11	North-West Region	34,159	2,495,247	73
2	RO12	Central Region	34,100	2,251,268	66
3	RO21	North-East Region	36,850	3,148,578	85
4	RO22	South-East Region	35,762	2,399,602	67
5	RO31	South – Muntenia Region	34,453	2,998,643	87
6	RO41	South-West Region	29,212	1,977,993	68
7	RO42	West Region	32,034	1,729,379	54
8	RO32	Bucureşti – Ilfov Region	1,821	2,042,266	1122
		Average (8 units)	***33,796***	***2,676,726***	**79**
		Average without capital (7 regions)	***29,799***	***2767,364***	***93***
	BG	**БЪЛГАРИЯ / BULGARIA**	**111,002**	**7,504,868**	**68**
1	BG31	North-West Region / Северозападен	19,070.3	886,911	47
2	BG32	North Central Region / Северен централен	14,974	901,885	60
3	BG33	North-East Region / Североизточен	14,487.4	982,559	68
4	BG34	South-East region / Югоизточен	19,798.7	1,106,448	56
5	BG41	South-West Region / Югозападен	20,306.4	2,113,555	104
6	BG42	South Central Region / Южен централен	22,365.1	1,513,510	68
		Average (6 units)	***18,500***	***1,250,811***	**79**
		Average without capital (5 regions)	***18,139***	***1,078,263***	***93***

Regarding that at the Romanian NUTS 2 space level, the territorial structure can be considered oversized, we propose a review of the 8 regions and thus a redraw of 10 regions and a reallocation of counties (NUTS 3) through the use of indicators in size, number of inhabitants, centers of polarization, economic and social disparities between existing centers and managed areas connections and a balanced distribution system of communications and transport routes, the territorial distribution of the core polarization university centers for training highly skilled human resources and territorial dispersion research results, evidenced primarily by producing theoretical models of

territorial development with high functionality and system integration, etc. Thus, our approach is based on the idea of deciphering a territorial system (NUTS 2) component, providing enhanced functionality (optimal size and population), culminating with the results (new design territory) to highlight that "*a territorial system is essential in defining a certain type of territorial development, which aims to achieve socio-economic and cultural results*" (Cunha, 1988, 181-198; Ianos, 2000, 21).

Table 3. Morphometric and demographic particularities at NUTS 2 level for EU Member States at the Eastern external border. Average, minimum and maximum values
(Are excluded from the calculation of average values the regions that include capitals; Data sources: Eurostat, 2012)

	Country	No and name of NUTS 2 Units		Inhabitants (Average)		Area (Average; sqkm)	
				min	max	min	max
1	Poland	16	*Województwa*	**2,216,853**		**18,476**	
				1,014,000	4,626,400	11,711	29,826
2	Slovakia	4	*Oblasti*	**1,587,926**		**15,662**	
				1,350,492	1,866,652	14,993	16,263
3	Ungaria	7	*Tervezési-statisztikai régiók*	**1,169,079**		**14,352**	
				983,612	1,547,003	11,117	18,339
4	Romania	8	*Regiuni de dezvoltare*	**2,767,364**		**33,796**	
				1,729,379	3,148,578	29,212	36,850
5	Bulgaria	6	*Райони за планиране (Rajoni za planirane)*	**1,078,263**		**18,139**	
				886,911	1,513,510	14,487	22,365
TOTAL				**1,765,697**		**20,085**	

New territorial design at NUTS 2 level

Starting from the assertion, using tools and methods of analysis certificated in the geographic literature (Cocean, 1995; Wendt, Ianoş, 2000; Ilies, 2003; Ilies et all., 2009, 2010, 2012 etc.), based on territorial realities offered by the Romanian political space, we propose a NUTS 2 territorial structure consisting of 10 regions (Figure 2 and 3). Each of the new proposed regions, except that including the capital Bucharest, fall within an average value generated by a territorial analysis at the level of other EU countries neighboring Romania (Bulgaria and Hungary) or contiguous external EU border countries such as Poland and Slovakia. Mean number of inhabitants including Bucharest region is about 2.1 million or 2.0 million inhabitants at the level of other 9 regions (fig. 3). If now the largest region has 36,850 sqkm (North-East), in the new version the maximum value is 32,000 sqkm as well if the number of inhabitants from a region with a maximum value of 3.1 million inhabitants (North-East) in the new variant the most populous reach 2.2 million inhabitants (South Moldova) or the Bucharest 2.7 million inhabitants.

From Table 4 and Figure 2 an 3 we can see territorial balanced distribution spacing between 1.39 million inhabitants and 2.2 million people and the territorial extension between 21,144 sq km and 32,034 sq km. At the same time the 10 regional centers proposed: Bacau, Brasov, Bucharest, Oradea, Cluj-Napoca, Constanta, Craiova, Iasi, Pitesti and Timisoara are traditional centers of convergence for subordinated areas. Also the number of units associated to NUTS 3 is between 4 (7 regions) and 5 (two regions) units. The tenth region encompasses the area of the capital Bucharest, Ilfov and Prahova counties. Another advantage of these new structures derives from the compatibility with the Romanian contiguous cross-border regions.

Table 4. Morphometric and demographic particularities at NUTS 2 level in Romania. Actual (8 units) and proposal (10 units) NUTS 2 versions
(Data sources: Eurostat, 2012)

		Actual NUTS 2	Area	Population	Proposal NUTS 2	Area	Population
1	1	North-West Region	34,159	2,495,247	Crişana-Maramureş	22,130	1,558,016
	2				Transylvania	24,985	1,795,835
2	3	Central Region	34,100	2,251,268	Carpatica	21,144	1,392,664
3	4	North-East Region	36,850	3,148,578	North Moldova	24,911	2,189,842
	5				South Moldova	27,386	2,221,272
4	6	South-East Region	35,762	2,399,602	Lower Danube	29,877	1,680,785
5	7	South – Muntenia Region	34,453	2,998,643	Muntenia	20,196	1,719,021
6	8	Bucureşti – Ilfov Region	1,821	2,042,266	Bucharest	6,537	2,778,129
7	9	South-West Region	29,212	1,977,993	Oltenia	29,212	1,997,973
8	10	West Region	32,034	1,729,379	Banat	32,034	1,729,379
Average		**8 units**	***29,799***	***2,676,726***	**10 units**	**23,839**	**2,141,382**
		without capital 7 units	***33,796***	**2,767,364**	***without capital 9 units***	***25,761***	***2,070,631***

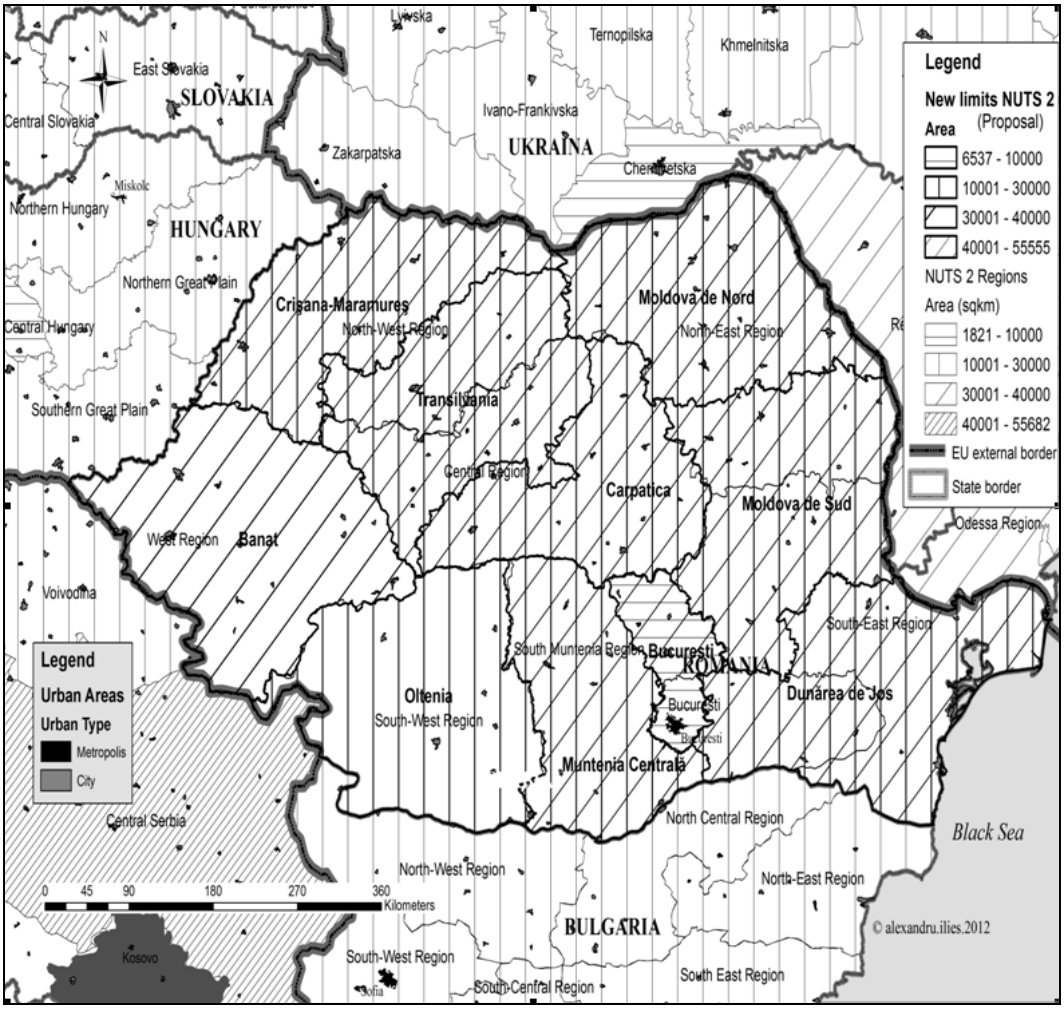

Figure 2. NUTS 2 units of Romania: actual and proposal version and situation in neighbours states (according with areas)
(Data source: Romanian National Statistic Institute, 2012; Eurostat, 2012)

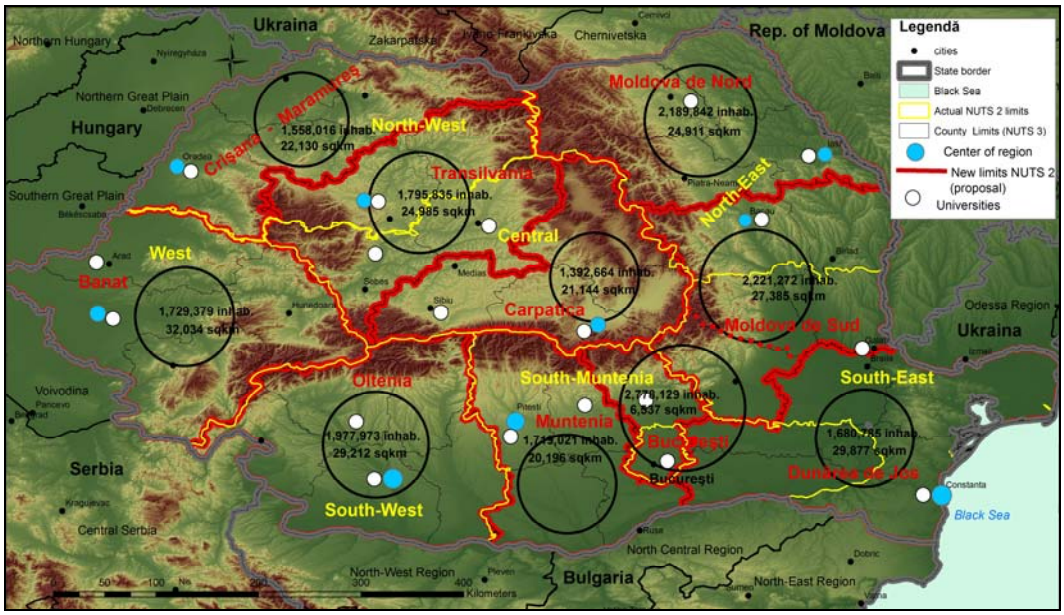

Figure 3. NUTS 2 Units of Romania: actual and proposal version
(area and population; included NUTS 3 units)
(Data source: Romanian National Statistic Institute, 2012)

CONCLUSIONS

The need to reconsider the territorial design at the NUTS 2 level is due to circumstances arising from the current system of eight regions that within 7 years from the implementation in Romania did not generate the expected results. The anachronistic situations are those in the North-West or North-East where such as the two centers of polarization, Cluj-Napoca and Iasi, on some indicators resulted in economic and social discrepancies between them and the neighboring units (figure 2 and 3). In contrast to this situation, according to the same figures, we see a balance in the Western Region where the transition from Timis, encompassing Timisoara as regional center, and the neighboring counties (Arad, Hunedoara and Caras-Severin) is gradual. In parallel, we can see a strong rift between Cluj as a center of the region and the other 5 counties of the same structure. A similar situation is at the level of North East region with the center in Iasi. Therefore, optimization would occur by reducing territorial and demographic dimensions of existing areas and new regions anchoring the local realities. An example of this is the replacement of the North-West and Centre regions with 3 suggestively titled regions of Crisana-Maramures, Transylvania and Carpathia. On the same line we score the redrawing boundaries of the two regions of Moldova on the area of four counties and not six. Every new proposed region is characterized by territorial balance, demographic and systemic functionality.

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1. The Nomenclature of Territorial Units for Statistical Purposes (NTS) is a list of names of territorial units and their territorial symbols organized into different levels of territorial division of the country used in the process of collecting statistical data, storage, processing and analysis of collected data as well as publication and dissemination of statistical information in territorial breakdown (Eurostat).

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