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INTERNAL/EXTERNAL LEVEL OF CONNECTION OF ADMINISTRATIVE DIVISIONS AT THE EXTERNAL BORDER OF EU IN POLISH AND SLOVAK SECTORS

1. INTRODUCTION

After the fall of the Soviet socialist system, and in particular the EU and NATO expansion to Central and Eastern Europe, the new realities imposed the prospection, reassessment and reconsideration of the interstate relations, especially the role and functions of the state border. Due to the new conditions, the political environment, seen as a support for the development of a spatial order (Forster 2000, p. 11), has radically reviewed and diversified the conditions and prospects of cross-border co-operation. In this context of continuous changes of the role and functions of the border states of the two members of EU, NATO and Schengen Space (Poland and Slovakia), as well as three members of the non EU area adjacent to the external border and located 'outside' of it (Belarus, Ukraine and Russia by European exclave Kaliningrad), the identification of a stable territorial structure and common features are key to our approach, as well as to the relations that generate useful tools and features for cross-border co-operation strategies and the definition of the cross-border systems.

When identifying natural morphological features that support the state border, they have a major effect on the process of increasing the differentiation / smoothing of the gaps between neighbouring territorial systems and the increasing inter and intra-systemic connections across the border. In these circumstances, border areas are looking for models and strategies applicable to cross-border territorial systems transforming them into systems with higher degree of functionality (Ilieș et al., 2010, 2012). Apart from the basic theoretical and practical concepts and principles, an important role in the development of the

cross-border strategies and inter-regional cross-border co-operation is provided by the typology of administrative-territorial organisation of the neighbouring states and the practical potential of cross-border connection. The main objective is to define the contiguous cross-border subsystems juxtaposed with a cross-border system with higher degree of total connections and functionality. Thus, our scientific approach corresponds to a complex space generated by municipalities close to 4 interstate border sectors: Polish-Russian, Polish-Belarusian, Polish-Ukrainian and Slovak-Ukrainian (Fig. 1). Throughout this study, we propose an instrument for analysis (Index of internal/external connection) based on local realities, which reflects objectively the real interconnectivity potential of different administrative-territorial structure levels, their locations and the inward extension of the generated cross-border systems.

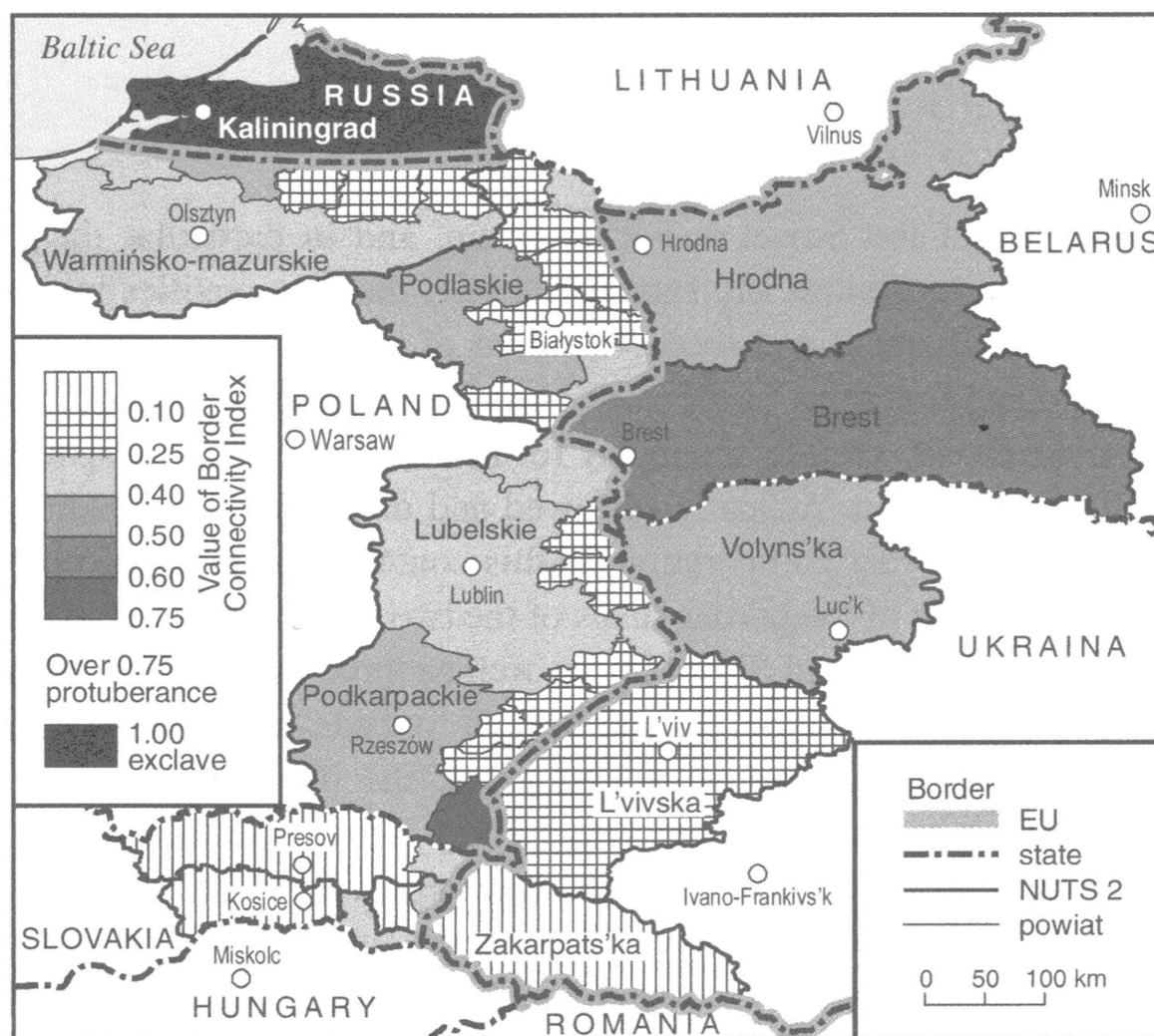


Fig. 1. Values of Internal/External Connection Index at NUTS 2 and 4 levels contiguous with external border of EU in Polish and Slovak sectors

Source: authors' own elaboration

An important issue for a complex geographical study is the need to analyse natural and administrative frameworks jointly, and never separately. The analysis of the administrative aspects without natural support, and especially the

morphological features, may generate erroneous conclusions in terms of the real potential for interconnection between two contiguous territorial systems (Ilieş et al. 2011, 2012). Landscape morphology, superficial morphological features of lake beds, rivers and streams, the special features of transverse and longitudinal profiles (Ilieş and Grama 2010a, 2010b), the landscape diversity, the demography, the economy and political features are the most important elements specific to a geographical study that relates to this objective. In a mountainous area, the presence of depressions and valley corridors results in landscape variety whose value is enhanced by the diversity and richness of the elements that compose them.

Administratively, the equivalent administrative units from the five states along a sinuous border of 1,284 km are considered main actors. The NUTS 2 and 4 presents a typological diversity embodied by incompatibilities between the two EU members and the neighbouring three non-EU states. The differences are caused by their areas, number of inhabitants and decision-making bodies from each territorial system they belong to. Specific tools and methods can be used to decipher the complex mechanism that generates cross-border territorial systems such as the scientific approach with marked geographical openness to interdisciplinarity. Based on the tools and methods from the scientific literature and the management, location and morphography of administrative territorial units, as well as their border connections, we propose a typology of borderlands, considered as a useful step in developing strategies and inter-regional cross-border co-operation.

2. METHODOLOGY

By defining the features of the local administrative units (ATU), their morphometric, morphographical and morphofunctional features, we identify the key to this kind of scientific approach that will underpin the modelling of a territorial border system with a higher/lower degree of internal/external connection, resulting in the creation of cross-border territorial functionality of such systems. Meanwhile, the obtained rank values define the border position and the cross-border connection degree of administrative units contiguous to or in proximity of the border.

To achieve these goals, an important role is played by the use of diverse, official and complex databases that are to be interpreted correctly. In this study, we focus on administrative units whose boundary coincides with the boundary of the state sector (the border) in terms of accessibility to existing and potential

centres that can provide connections between contiguous border territorial systems. The elements taken into account in determining the types and hierarchy of 'border accessibility' and 'cross-border connection' are based on: the (geographical) absolute position and the relative position (the location of the unit in a territorial structure of higher rank and size) of the administrative-territorial unit and its location, its distance to the border, lengths of internal and external border/limits, type of border sectors: internal EU, inter-state, inter-regional (intra-state), the border's morphometric features (Ilieş and Grama 2010a, 2010b, Grama 2012), etc.

In terms of 'importance' of local actors, we can add to these elements the human and economic potential, the role of and the unity rank in national, regional and local hierarchy. By combining these elements, we are given a series of indicators that can help in ranking administrative units of the same role (NUTS 2-5), the real border position and accessibility. These indicators can play a major role in the development of strategies and the definition of key cross-border interconnection poles. On the other hand, the method can be applied when developing strategies for inter-county or inter-communal co-operation. If a border with such a role and function is the complex external border of the EU and NATO, the cross-border interconnection strategies require the creation of a methodology to identify and prioritize local and regional actors in terms of cross-border accessibility. Also, in defining the typology of border areas adjoining the administrative criteria we also take into account their inwards extension up to 25-30 km in width (Lichtenberger 2000, Bufon 2002, Ilieş et al. 2009).

3. BORDER TERRITORIAL SYSTEMS AND SUBSYSTEMS: AN ANALYSIS

In structuring a territorial system, the natural and anthropic environment are interrelated and overlapped with respect to the definition of relation systems underlying its functionality. Using the principles, methods and tools tested in literature (Foucher 1988, Martinez 1994, Ianoş 2000, Sobczyński 2000, Suli-Zakar 2000, Ilieş 2003, Wendt 2003, Ianoş et al. 2011, Johnson et al. 2011, Ilieş et al. 2009, 2011, 2012, Wendt 2012, etc.), our approach is based on scientific methods that seek answers to the questions of 'where?', 'why?' and 'how?'. The administrative-territorial organisation and human resources, in terms of quantity and quality, combined with a system of communication and efficient transport routes are pillars in shaping systems whose functionality derives directly from efficiently applied geographical management (Ilieş et al. 2009, p. 168, Grama

2012), and whose purpose is identified by the idea that 'a territorial system is essential to define a certain type of territorial development, which aims to achieve a socio-economic and cultural goal' (Cunha 1988, pp. 181-198, Ianoş 2000, p. 21). The typology of cross-border systems correlated with the 'state border' status in relation to the external border of the EU also plays an important role in defining the functionality of the determined border areas (Ilieş and Grama 2010a).

3.1. Delimitation and design of border areas according to the level of internal/external connection of border's administrative territorial units (NUTS 2-3 level or equivalent)

The determination of cross-border territorial systems with high functionality derives on one hand from the historical and geographical features of the area and, on the other, from the freedom of movement of people and goods that ease the penetration of state border barriers. In order to identify the degree of functionality of a borderland, the first step is 'to decipher its internal structure by identifying the main components and their role in defining its status' (Ianoş 2000, p. 21), all of which contribute to delimiting the area of polarisation and its limits. The border can be defined 'inward' based on several criteria such as: the extension of border counties; a strip parallel to the border at a distance of 25-30 km (Lichtenberger 2000, Ilieş and Grama 2010a, Ilieş et al. 2011); the rings that consist of contiguous territorial administrative units of local rank (cities, towns and villages, equivalent to NUTS 5) (Ilieş and al. 2012), etc. The typology of borderlands and cross-border systems (Sobczyński 2006, Topaloglou et al. 2005) in relation to the external EU border also play an important role in defining the functionality of border areas. To exemplify this, we analyse different scenarios of the Eastern sector of the external border.

3.2. Borderland design according with ATU (NUTS 2)

The borderland in question is a part of the EU's eastern periphery and is located along the Polish and Slovak eastern external borders in the administrative-territorial units of each country: Warmińsko-Mazurskie, Podlaskie, Lubelskie and Podkarpackie Voievodships, with a total area of 86,050 square km (27.55% of Poland) and an EU's external border of 924.44 km in length, composed of two sectors: one with Russian exclave of Kaliningrad and the second with Belarus and Ukraine; Prešov and Košice regions in Slovakia with 15,583 square km (31.8% of Slovakia) and 90.5 km of EU's external border. On

the other hand, the contiguous area of the non-EU periphery is composed of the border subsystems of Belarus: Brest and Hrodna regions/oblasts with an area of approximately 57,138.34 square km and 346.2 km of EU's external border; the Ukrainian side extends to 3 regions/oblasts: Volynska, Lvivska and Zakarpatska with an area of 54,206 km and 732.2 km of EU's external border (including the sections shared with Hungary and Romania) (Tab. 1 and Fig. 1). By its status, the Russian exclave of Kaliningrad border is entirely part of the EU's external border with Poland, Lithuania, with a maritime section. All EU members along the 1.283 kilometres of EU external's border were added during the 2004 expansion.

To highlight the compatibility degree of the contiguous cross-border administrative systems, we focused on the calculation and interpretation of the Internal/External Connection Index (Ilieş and Grama 2010a, Ilieş et al. 2011, 2012).

Table 1. Administrative Territorial Units (ATU) at NUTS 2 and NUTS 4 levels corresponding to Polish and Slovak external terrestrial EU border (2012) and external/internal Connection Index

Country/ ATU (NUTS 2)	ATU NUTS 4	ATU External EU border (km)	ATU Internal EU border (km) / Interstate border non EU	ATU National/Internal limit of ATU	Total perimeter of ATU	Ic (only EU sectors) of ATU	Ic (total border sectors) of ATU
POLAND							
<i>Warmińsko-Mazurskie</i>		238.0	0	560.0	798.0	0.30	0.30
1	Braniewo	43.6		145.4		0.30	0.30
2	Bartoszyce	59.1		146.3		0.40	0.40
3	Kętrzyn	23.6		140.9		0.17	0.17
4	Giżycko	38.6		179.5		0.21	0.21
5	Olecko	41.6		163.8	205.4	0.20	0.20
<i>Podlaskie</i>		222.4	93.5	440.8	756.7	0.29	0.42
6	Suwałki I		38.2	144.6	182.8	0.21	0.21
7	Sejny	6.0	39.0	85.0	130.0	0.34	0.34
8	Augustów	24.0		191.0	215.0	0.11	0.11
9	Sokółka	61.7		183.7	245.4	0.25	0.25
10	Białystok I	34.8		322.1	356.9	0.10	0.10
11	Hajnówka	78.1		135.0	213.1	0.37	0.37
12	Siemiatycze	19.2		184.2	203.4	0.09	0.09
<i>Lubelskie</i>		329.0	0	552.5	881.5	0.37	0.37
13	Biała Podlaska I	80.3		198.6	278.9	0.29	0.29
14	Włodawa	43.9		137.5	181.4	0.24	0.24

15	Chełm I	48.5		216.0	264.5	0.18	0.18
16	Hrubieszów	93.1		143.7	236.8	0.39	0.39
17	Tomaszów Lubelski	40.0		205.5	245.5	0.16	0.16
<i>Podkarpackie</i>		<i>221,2</i>	<i>118.2</i>	<i>470.2</i>	<i>809.6</i>	<i>0.27</i>	<i>0.42</i>
18	Lubaczów	43.4		150.0	193.4	0.22	0.22
19	Jarosław	8.7		183.2	191.9	0.04	0.04
20	Przemyśl	49.3		145.4	194.7	0.25	0.25
21	Ustrzyki Dolne	115.3	32.2	92.0	239.5	0.48	0.61
SLOVAKIA							
<i>Presov</i>		<i>34.0</i>	<i>320.1</i>	<i>289.2</i>	<i>643.3</i>	<i>0.05</i>	<i>0.50</i>
22	Snina	31.7	31.8	77.1	140.6	0.13	0,45
<i>Kos ice</i>		<i>63.5</i>	<i>168.6</i>	<i>310.21</i>	<i>542.3</i>	<i>0.12</i>	<i>0.55</i>
23	Trebisov	5.5	72.6	120.7	198.8	0.03	0,39
24	Michalovce	14.7		168.6	183.3	0.08	0.08
25	Sobrance	41.3		70.1	111.4	0.37	0.37
UKRAINA							
<i>Zakarpattia</i>		<i>248.7</i>	<i>0</i>	<i>443.0</i>	<i>691.7</i>	<i>0.56</i>	<i>0.56</i>
<i>Lvivska</i>		<i>146.9</i>	<i>0</i>	<i>539.6</i>	<i>686.5</i>	<i>0.21</i>	<i>0.21</i>
<i>Wołyńska</i>		<i>141.7</i>	<i>191.8</i>	<i>453.9</i>	<i>787.4</i>	<i>0.18</i>	<i>0.42</i>
BELARUS							
<i>Brest</i>		<i>148.0</i>	<i>354.6</i>	<i>226.7</i>	<i>729.3</i>	<i>0.20</i>	<i>0.69</i>
<i>Hrodna</i>		<i>501.3</i>	<i>0</i>	<i>586.6</i>	<i>1087.9</i>	<i>0.46</i>	<i>0.46</i>
RUSSIA							
<i>Kalin i grad</i>		<i>530.0</i>	<i>0</i>	<i>0</i>	<i>530.0</i>	<i>1.0</i>	<i>1.0</i>

Source: Polish, Slovak, Belarusian and Ukrainian National Statistic Institutes; ESRI 2010: http://ec.europa.eu/eurostat/ramon/nuts/home_regions_en.html).

Internal/External Connection Index (Ic) - in the case of a sinuous border and natural or anthropogenic barriers, we may determine the administrative-territorial unit connected to the national territory or to the upper regional level. The value of this indicator results from the ratio between the state border length (L_{SB}) and the total length of the administrative unit boundary (perimeter) (P). The formula is: $Ic = L_{FT}/P$. Depending on the values we obtain, we may have the following situations:

- 0 - no border connections/ total internal connection;
- under 0.10 - the ATU has a dominant internal connection;
- from 0.11 to 0.30 - the ATU has a normal internal connection;
- from 0.31 to 0.40 - the ATU has a regressive internal connection;
- from 0.41 to 0.49 - the ATU has a low internal connection;
- 0.50 - equal internal and external connections;

- from 0.51 to 0.60 - the ATU has a low external connection;
- from 0.61 to 0.74 - the ATU has a dominant external connection;
- over 0.75 - the ATU has a tendency of protuberance;
- 1.0- the ATU is an exclave / enclave.

This indicator can be used when developing cross-border spatial planning strategies and it reflects the relative position of each ATU in relation to the political system to which it belongs. A value above 0.51 means that the ATU has 'external' connection to the dominant political system it belongs to and its 'internal'¹ contiguity is inferior to the 'external' contiguity². This indicator may be used in developing cross-border spatial planning strategies and it reflects the intensity of how each ATU is involved in the management of the border area and the organic link between the ATU and the country it belongs to.

In the analysed external border sector of the EU, i.e. the Polish and Slovak NUTS 2 or equivalent structures as seen in figure 1 and table 1, linked only to the external EU border, their contiguous administrative units are as follows: those with a high degree of connection are Hrodna (0.46) in Belarus region/oblast and the Polish voivodeships, with values between 0.27 and 0.37; the Slovak regions, defined by special morphology and perpendicular disposal to a short sector of EU external border fall among those with strong internal connection; the only territorial unit with a value of more than 0.5 is the Ukrainian region/oblast of Transcarpathia (Zakarpatska) with a low external connection (0.56), also due to the parallel border position of this ATU.

If we analyse the border as a whole, including inter-state sectors inside and outside the EU, we will notice some significant differences at the level of the administrative-territorial units that include such border sectors. Moreover, we can demarcate the border administrative units into two categories: 'indoor* ATUs, whose only connection is that with the external border of the EU: Lubelskie and Warmińsko-Mazurskie in Poland and Lvivska in Ukraine, and the remaining 'corner' ATUs that also include border sectors other than those with the external border of the EU. We thus notice that the smaller the ATU, the more likely it is to be an 'indoor' unit, which is obvious in the case of lower-level administrative units.

If we look at the values in table 1 as compared with the total border sectors included within the analysed administrative units, we notice that a number of members of the EU and Schengen area have reduced the state border functions

¹ The ATU perimeter with one or more neighbouring ATU from the same system (country, region, county).

² The sector from the ATU perimeter which serves as a state border.

and the connectivity degree. These are the cases of the Slovak regions with values of 0.50 (Presov) and 0.54 (Kosice), which places them in the category of low external connection by assigning them the role of an external border of the EU and the Schengen area. These regions have reduced the I_c to 0.05 and 0.12, changing their status and thus transforming them into ATUs with a strong 'internal' EU connection (not national). This also applied to the Polish voivodeships of Podlaskie from 0.42 to 0.29 and Podkarpackie from 0.42 to 0.27.

We may also observe a different situation for Belarusian and Ukrainian regions. When compared to the interstate and EU border, one can find 'external' connection ATUs like Brest (0.69) and Volynska (0.42).

With regard to the low level administrative structures, in the case of 21 Polish poviats (NUTS 4) and 4 Slovak *krajs*, the situation is reflected in the figure 1 and table 1: the two contiguous structures on the Slovak-Polish border and one on the Slovak-Hungarian border that includes the external border with Ukraine have the most complex situations. Thus, considering the total length of the state border, all three structures have an I_c over 0.39, exceeding 0.60 in Ustrzyki Dolne, with a pronounced external connection character. By reducing the role and functions of the EU's internal border, the connection index of the three structures related to the external EU border is reduced in Trebisov from 0.39 to 0.03 and Snina from 0.45 to 0.13 (both with strong internal EU connectivity). If this Polish unit went from 0.61 to 0.48 it means that it passed from a dominant external connection with protuberance tendencies to a moderate degree of internal connection. The other 22 poviats are grouped as follows (Fig. 1 and Tab. 1): 4 with regressive degree of connection (0.31 to 0.40), 14 with strong internal connection (0.11 to 0.30) and 4 with strong connection (below 0.1).

4. CONCLUSIONS

These indicators are useful tools in developing strategies and plans for territorial management, since their values truly reflect the territorial reality and prevent possible errors caused by superficial interpretation and a the lack of comprehensive cartographic material (relief, hydrography, settlements' distance from the border, road access, road network configuration, etc.), as it happened in most cases of defining the status of border administrative units.

The EU's external border in Poland (including Russia, the Kaliningrad exclave) and the Slovakian state border spanning over one thousand kilometres highlight the importance of morphography, morphology and position of the administrative units with regard to border management and border structures that

can generate functional cross-border territorial systems. The analyses conducted on the contiguous 12 NUTS 2 administrative units inside and outside the EU, as well as on 25 NUTS 4 administrative units of the EU periphery were based on a more accurate interpretation of the local realities linked to the border position. When applying the internal connection index, the main objective was to increase the range of tools used in planning strategies and policies at regional, borderland and cross-border level.

Thus, borderlands and cross-border systems play an important role in terms of social and economic integration and in the process of eliminating the traditional functions of a political border that generate juxtaposed territorial structures.

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