

# Spatial patterns of Facebook social network service: the case of Poland, Ukraine and Belarus

Serhii Puhach

Lesia Ukrainka Volyn National University, Faculty of Geography, Volya Avenue 13, 43025 Lutsk, Ukraine, e-mail: [puhachserhiy@gmail.com](mailto:puhachserhiy@gmail.com), <https://orcid.org/0000-0002-3738-7961>

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**Abstract.** The phenomenon of social network services (SNSs), investigated by numerous scientific disciplines, can hardly be overestimated in today's globalised world. However, there is a lack of studies focused on the spatial aspects of SNS development and operation. This article deals with peculiarities of the current distribution and main spatial tendencies of the SNS Facebook's development in Central and Eastern Europe on the examples of Poland, Ukraine and Belarus. The spatial distribution of Facebook has the following patterns in the studied area: a relationship between the type of development of the country and the level of Facebook penetration (i.e., the "Facebook Divide"); an increase in number of users and penetration rate in developed areas (capital regions, major socio-economic centres); a progressive increase in the share of users from east to west; a large concentration of users in capitals and regional centres; the filter function of the state border.

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## 1. Introduction

Against the background of modern globalisation processes and communication-driven transformation of the world into the “global village” (McLuhan, 1964), state borders are often treated as anachronisms that are quickly losing their former significance and that will disappear altogether in the future. At the same time, the monumentalisation of borders is an opposite trend observed in some regions of the world, e.g., the construction of the wall between the United States and Mexico (on D. Trump's initiative) to stop massive illegal migration or the strengthening of Poland's eastern border to counter Russian aggression.

The common understanding of borders as imaginary lines on the surface of the earth that separate the territory of one State from that of another (Parry et al., 2009) are dissonant with the basic notions of Internet space, in which borders are unthinkable in principle. Ideally, information and ideas should be distributed via the Internet without obstacles and regardless of state borders. That is, the Internet should be an environment homogeneous to penetration. However, reality does not meet these expectations. The Internet is not as influential in our lives as some authors (Castells, 2001; Schmidt & Cohen, 2013) would argue. Humans continue to be humans, and the Internet is only a continuation (projection) of our consciousness and communications across the entire surface of the Earth. Basing on McLuhan's conception of media (McLuhan, 1964), the global Internet network may be considered as the next stage in the evolution of the media space (that has progressed through oral communication to writing, printing, newspapers, radio, television, to the Internet).

In addition, the Internet is not an area free of control where ideas can be freely distributed and individuals can develop without restrictions. Today, we observe how some countries (China, Russia, Iran, etc.) are quite successful in controlling the Internet in their own territory. Today, the Internet is not only a messenger and spreader of news, but also a powerful instrument for propaganda, the manipulation of consciousness and the creation of fakery.

The Internet network, including social networking services (SNSs) as one of its manifestations, does not exist in any abstract virtual reality: ideas of how the Internet functions and develops are carried by individuals living on a certain territory. The modern human being is merely split between the two worlds: the real physical world and the virtual world of SNSs. Today, spatial aspects of SNS functioning in Central and Eastern Europe have not

been sufficiently revealed in the scientific literature, which makes this research topic extremely relevant.

Therefore, in our study, we attempted to identify the spatial patterns of the Facebook SNS in Poland, Ukraine and Belarus. The article investigates the spatial distribution of the Facebook SNS based on an analysis of the number of Facebook users across the administrative units of Poland, Ukraine and Belarus.

## 2. A geographic view of the role of online social networks

Human geography is undergoing significant changes in terms of expanding the research field. Virtual geography, cyber geography, and Internet geography account for a significant share of studies, and focus on the localisation dimension in real space at different scales (urban, regional, national) while also reflecting the degree of adaptation and use of the Internet, mobile phones and other communication tools and technologies (Kellerman, 2016). Therefore, it is relevant not only to study the spread and use of the Internet at the level of countries and macro-regions, but also to disclose their geographies at the local scale (Kitchin et al., 2017).

SNSs do not simply present spatial information but mediate a diverse set of socio-spatial practices – communications, interactions, transactions – that extend beyond the representational practices and work of traditional maps. It has been argued that they constitute a set of spatial media (Elwood & Leszczynski, 2013).

A wide literature is devoted to the study of the spatial distribution of different SNSs. In particular, these include: theoretical research into online social networks from the social geography view (Ter Wal & Boschma, 2009; Glückler & Doreian, 2016); the influence of distance on the intensity of connections in SNSs (Lengyel et al., 2015); processes of interaction between SNSs and Geographical Information Systems (GIS) (Sui & Goodchild, 2011; Andris, 2016); the influence of geographical distance, national boundaries, language and frequency of air travel on the formation of social ties on Twitter (Takhteyev et al., 2012); and the relationship between distance and intensity of online interaction on the example of the Spanish SNS Tuenti (Laniado et al., 2017).

Particularly significant from a geographical point of view is data analysis of Facebook in the United States by economists from Harvard, Princeton and New York Universities (Bailey et al., 2018) showing the decisive influence of distance

in the formation of social connections of network users. In addition, it is shown that administrative boundaries continue to exist in the virtual world of social media. Social connectedness in fact repeats the contours of administrative-territorial divisions, and virtual connections are mostly a duplication of communications in the real world.

In Ukraine, SNSs were studied mainly by sociologists analysing the mere phenomenon of the SNS itself, aspects of their impact on society and some of its age categories (primarily children and adolescents) and the possibility of using SNSs in political technologies, education and training. Periodically, the media publish reviews of various quantitative technical characteristics of SNSs performed by IT specialists. Such studies often do not consider the spatial aspects, or they cover them only very superficially. Among the studies of the spatial patterns of SNS distribution in Ukraine, we should first of all mention: the comprehensive study of Ukrainians on social networks performed by Yandex (2014); the study of spatial features of SNS use in war conditions in eastern Ukraine by Dobysh (2019); and research on the main SNSs in western Ukraine (Puhach & Mezentsev, 2021), Volyn (Puhach & Mytchuk, 2018; Puhach & Maister, 2020), and Chernivtsi (Puhach, 2020) regions.

The research into SNSs in the other countries under investigation is in a similar condition. These are mostly national-scale statistical databases of the distribution of SNSs in Poland (Alexa, 2019c; SimilarWeb, 2019; StatCounter, 2019; Statista, 2018; Steckman & Andrews, 2017) and Belarus (Alexa, 2019b; Digital, 2018; Stepanov, 2013; Targeting, 2017). Studies of internal spatial differences in the spatial distribution of SNSs within these countries are unavailable.

There is an extremely wide scientific literature on the issues of classification, development and functioning of various borders (e.g., Kolosov & Mironenko, 2001; Taylor, 1989). Some aspects of the influence of state borders on SNS functioning are found in the works of Laniado et al. (2017) and Takhteyev et al. (2012). However, the lack of studies focusing on the impact of state borders on the distribution of SNSs in Central and Eastern Europe explains the relevance of this study.

### 3. Research materials and methods

There are some difficulties with the collection of primary statistical information regarding SNS users. First, user accounts contain personal information that the company is not entitled to disclose without

the consent of the owner. An example might be the current Facebook-related scandals on the use of personal data in the political technologies during the US presidential election and Brexit (BBC, 2018; Sanders & Patterson, 2019; Wong & Morris, 2018). Secondly, SNSs have become big business projects with revenues directly proportional to the size of the network, so services often overestimate the number of their own users. Thirdly, one user may have multiple accounts, some of them being of little or no use for some reason. Fourthly, many bots, i.e. special programs that carry out certain actions through an interface designed for people, are hidden under some SNS accounts. Based on the above, we may speak only about the estimated number of SNS users.

To determine the number of Facebook users (Facebook, 2019), we have used the targeting tool, an advertising mechanism that allows only the portion of visitors or target audience that fits certain criteria to be picked out from the total Internet audience. The criterion we chose was spatial (territorial) coverage.

To do this, we chose “Advertising – Create an Ad – Reach – Set Up Ad Account” on our Facebook page. In the “Placements” section, “Edit Placements” was selected; only “Facebook” was selected among “Platforms”. In the Audience section, we set the following parameters: “People who live in this location”, “Age” – from “13” to “65+”, “Gender” – “All”.

Directly in the map window (“Locations”), the administrative unit was allocated by looking for its name in the case of the region/voivodeship. For districts/powiaty in Poland and Ukraine, we searched by postal codes (for Belarus, Facebook search by postal code is unavailable). Very often, the service provided insecure information (numbers of users below 1000). In this case, the “Drop Pin” tool was used: the territory of the powiat or district was “covered” with circles of different radii.

Data collection in the districts of Brest region of Belarus should be noted separately. The number of users required to display the exact number (more than 1000) is met only in the cities of Brest, Baranovichi and Pinsk (search by name was used). Among administrative districts, a significant number of users was registered only in the Kobrin district (search using the “Drop Pin” tool). In the rest of the districts, the number of users was below 1000. Therefore, we determined the number of users in each district by distribution (proportionally to the total population) of the difference between the number of users in Brest region and the total

number of users in the cities of the regional subordination and the Kobrin district.

Primary statistics of the number of SNS users in the study area were collected in the second half of February 2019.

In addition to the total number of users, we used the SNS penetration rate indicator calculated by the formula:

$$P_{sns_i} = (N_i / P_i) * 100,$$

where  $P_{sns_i}$  – penetration rate of the SNS in the  $i$ -territory, %;  $N_i$  – number of SNS users within  $i$ -territory, thousands.;  $P_i$  – total population of  $i$ -territory, thousands.

The population for January 1, 2019 was taken from the sites of state statistics services of Poland (Statistics Poland, 2019), Ukraine (State Statistics Service of Ukraine, 2019; Main Department of Statistics in Volyn region, 2019) and Belarus (National Statistical Committee of the Republic of Belarus, 2019; Main statistical department of Brest regions, 2019).

The study of the influence of state borders on Facebook penetration for the Polish–Ukrainian–Belorussian borderland was carried out on three spatial levels. At the national scale, the analysis was performed in terms of the whole states. At the regional scale, the analysis was performed in terms of the first-order administrative units (voivodeships, regions). The analysis at the local scale covers the Facebook network in terms of second-order administrative units (powiats, districts) located at the junction of the Polish, Ukrainian and Belarusian borders.

#### 4. Main findings

Facebook is one of the largest segments of the Internet, with a number of users exceeding 2.3 billion (Alexa, 2019a). The efficiency of the network is largely determined by its size. In the case of Facebook, this means the possibility of broader engagement with specific individuals around the world. During its rapid development in 2010, Facebook supplanted many national social networks of this type (e.g., Nasza-klasa in Poland [Wikipedia, 2019]). However, in countries with authoritarian regimes, this did not happen. State boundaries become an insurmountable obstacle to SNS expansion.

#### 4.1. National scale

Poland, Ukraine and Belarus are located in Central and Eastern Europe. Actually, the borderline junction of Lubelskie voivodeship (Poland), Volyn region (Ukraine) and Brest region (Belarus) is located on the Western Bug River. These regions are not characterised by high levels of socio-economic development within their own states (with the exception of Brest region). Until 1991, there was a state border of the USSR, which imprinted on the spatial development due to the restriction of economic activity near the border, the significant concentration of troops, etc. Even now, almost 30 years after the collapse of the USSR, this factor has a certain impact on the socio-economic development of the area.

Here we are going to consider the spatial penetration of Facebook users in the Polish–Ukrainian–Belarusian borderland to identify “obstacles” to the dissemination of ideas on the Internet.

First of all, it is noteworthy that Facebook has the highest penetration in Poland, somewhat less in Ukraine, and little in Belarus (Fig. 1). There is a link between the Facebook penetration rate and the vector of national development: Poland is a country with a market economy and liberal values, Ukraine is a country trying to integrate into the Western world, while Belarus is a country that remains in the zone of Russian influence.

The analysis of Facebook spatial distribution reveals a clear tendency towards increasing numbers of users and penetration rates from east to west in Poland and Ukraine. In Belarus, this trend is not followed due to the small number of users.

Another regularity is the increased share of users in socio-economically developed areas (capital regions, major socio-economic centres), which generally corresponds to the Growth Pole Theory (Perroux, 1967).

Our analysis starts with *Poland*, a member of NATO and the EU, and the most closely integrated into the global economy of the three. In Poland, Facebook dominates among social networks, as indicated in numerous sources (Alexa, 2019c; SimilarWeb, 2019; StatCounter, 2019; Statista, 2018). However, it is conspicuous that, according to Alexa Internet (Alexa, 2019c), VKontakte (abbreviation Vk) is the second most popular SNS. In addition, the top 50 sites in Poland include several Russian sites. This indirectly indicates the presence in Poland of a significant number of people from the former USSR that continue to enjoy their familiar social media. Simultaneously, it is important not to



lose sight of the fact that VKontakte is controlled by Russian special services and is a powerful source of Russian state-influenced information (Grove, 2017). The total number of Facebook users in Poland is 17.3 million, representing 44.9% of the total population (Fig. 1).

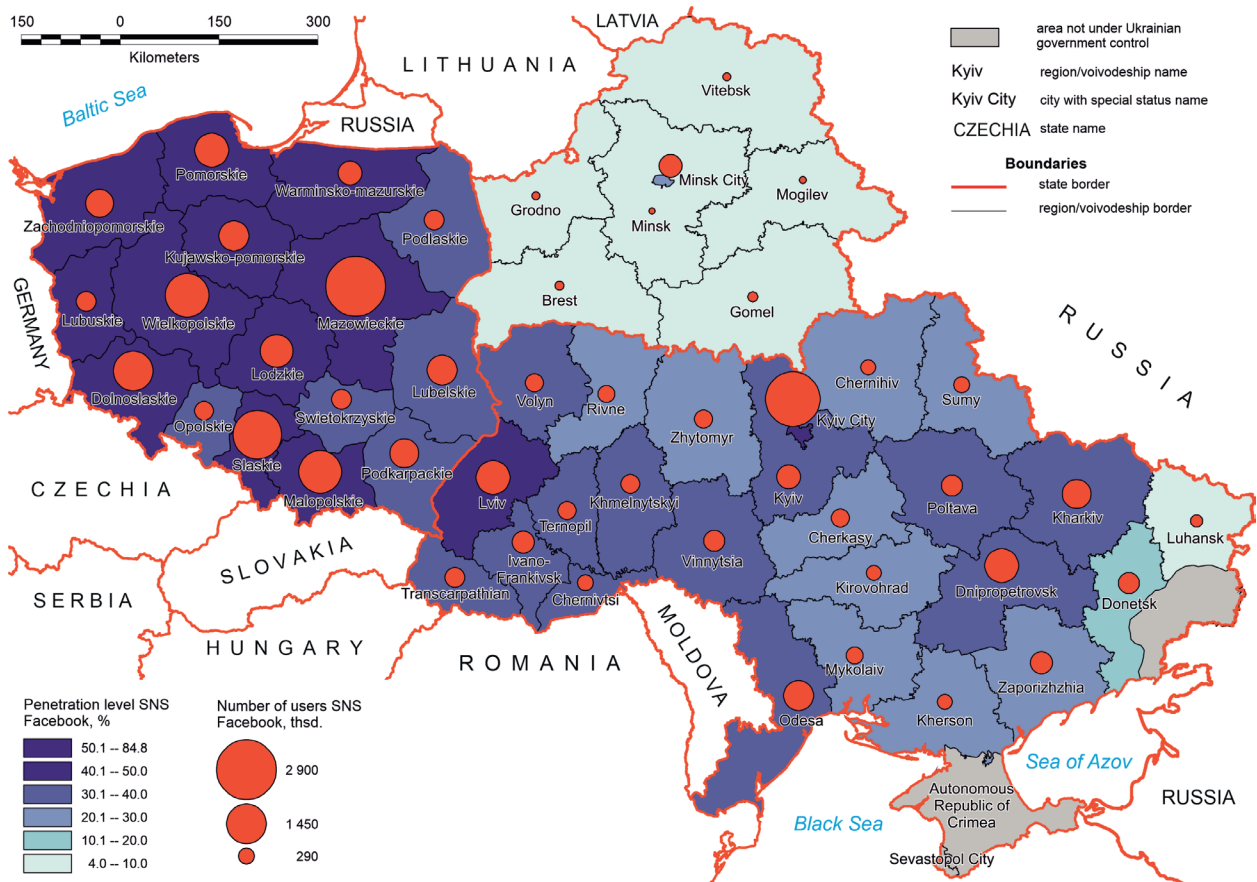
In *Ukraine*, Russian SNSs (VKontakte, Odnoklassniki) are currently being gradually squeezed out by global SNSs (Facebook, Instagram, Twitter). The main gain in Facebook user numbers took place after 15.05.2017 with the enactment of the Presidential Decree *On the Application of Personal Special Economic and Other Restrictive Measures (Sanctions)* (President Ukraine, 2017), widely known as the “Decree on the blocking of Russian sites and social networks”. Just before, the number of Ukrainian Facebook users had not exceeded 8.3 million (PlusOne, 2019), and directly before the Russian aggression of 2014 it was 3.2 million (Yandex, 2014).

VKontakte continues to be the most popular SNS in Ukraine (Alexa, 2019d), but there are many indications that Facebook may outstrip Russian

social media. The process of transition from one SNS to another is a long and not always painless process. By 2014, in Ukraine, VKontakte had formed a powerful network with extremely branched connections. For many people, especially in the eastern part of the country, VKontakte remains the main online social network.

The total number of Facebook users in Ukraine is 13.9 million, which is 32.8% of the total population (Fig. 1).

Facebook is poorly represented in *Belarus*. According to Alexa Internet, Facebook is only 26<sup>th</sup> in the ranking of the most popular sites in Belarus (Alexa, 2019b). For comparison: VKontakte is 3<sup>rd</sup>, Odnoklassniki is 10<sup>th</sup>, Instagram is 15<sup>th</sup> (as of 10.05.19). There is a total dominance of Russian SNSs. Noteworthy is the predominance of Instagram over Facebook. Our research (coming soon) shows that young people (pupils and students) in Volyn region prefer Instagram to other SNSs (simpler interface, convenient use of smartphones, much less politics in the content). Obviously, a similar situation is observed in Belarus. Western influences



**Fig. 1.** Number of users and penetration rate of Facebook SNS in Poland, Ukraine and Belarus  
 Source: Own author's draft basing on data from Facebook and State statistics services of Poland, Ukraine, Belarus

on Belarusian youth manifest through the use of Instagram. The total number of Facebook users in Belarus is only 1.1 million, which is 11.5% of the total population.

#### 4.2. Regional scale

*Poland* is characterised by the most even distribution of Facebook users at the regional (voivodeships) level in the study area. The capital, Warsaw, concentrates 9.3% of users (1.6 million). The share of Facebook users in Warsaw is almost double the city's share of Poland's total population (4.7%).

The largest number of users and the highest penetration rate of the Facebook network is observed in the most developed regions of Poland, located in the centre of the country (Mazowieckie, Wielkopolskie) and in the south (Dolnośląskie, Małopolskie). A high level of penetration is also characteristic for the northern Pomorskie voivodeship. These voivodeships include the largest cities in Poland, namely Warsaw, Poznan, Wrocław, Krakow and Gdansk, which concentrate population and innovations, and are the main centres of Internet activity. The capital region (Mazowieckie voivodeship) with the highest penetration rate of 53.9% is especially notable.

The lowest penetration rate for Facebook (less than 40%) is observed in the least developed eastern voivodeships – Lubelskie, Podkarpackie, Podlaskie, Świętokrzyskie.

In general, Poland has the lowest fluctuations in the Facebook penetration rate in the study area. The amplitude (difference between the largest and the smallest values) is 18.6%.

In *Ukraine*, there is a general increasing trend in the Facebook penetration rate in an east to west direction. In the capital city of Kyiv, 18.1% of users (2.5 million) are concentrated; the share of Facebook users here is almost 2.5 times greater than the share of the city in the total population of Ukraine (7.0%). The highest values are reached in the western regions: Lviv, Ivano-Frankivsk, Transcarpathian and Ternopil. Other centres of high concentration of users are the most developed regions (Odessa, Dnipropetrovsk, Kyiv, Kharkiv), where the largest cities (Odessa, Dnipro, Kharkiv) are located.

The lowest level of penetration is typical for the regions of Donbas – Donetsk and Luhansk regions, where the armed conflict continues and which are partly under the control of Russia. Russian SNSs dominate in these regions.

The lack of data on the Autonomous Republic of Crimea and the city of Sevastopol is due to

the fact that, since February 2018, paid services (including targeting function) became inaccessible via the Facebook network in Crimea, which made it impossible to collect data about user numbers.

Another peculiarity of Facebook distribution in Ukraine is its lowered share in the north of Ukraine (excluding Kyiv and surrounding region). This is due to a noticeable Russian influence, including through the territory of Belarus. In addition, the northern border areas have always had close socio-economic, historical, cultural, family-friendly contacts with the neighbouring areas of Belarus and Russia. This is facilitated by the presence of relatives abroad, frequent trips, socio-cultural proximity, etc. This is precisely the explanation for the reduced percentage of Facebook users in the specified areas.

In contrast to Poland, a significant amplitude in the Facebook penetration rate is observed in Ukraine: the penetration rate in the city of Kyiv is ten times higher than in Luhansk region. This points to significant socio-cultural differences between the Ukrainian regions and indirectly indicates that Ukraine is now a sphere of conflict between the interests of Western and Russian civilisations.

In *Belarus*, due to the low level of penetration (only 11.5%) and its minor fluctuations, it is not feasible to talk about spatial features of Facebook distribution (Fig. 1). The largest number of users (560,000, 51.1% of the total in Belarus) and the highest level of penetration (28.2%) are observed in the capital city of Minsk. The main role here is played by the capital's status, which affects the number and composition of residents, their educational level, social ties, etc. In the rest of the country, the penetration rate does not exceed 9%.

#### 4.3. Local scale

The local level, in the context of powiats (Lubelskie voivodeship) and districts (Volyn and Brest regions), shows a similar situation to the regional level (voivodeships and regions). On the example of the Polish–Ukrainian–Belarusian borderland, we observe a similar situation on three levels: the macro-level (country), the meso-level (voivodeships/regions) and the micro-level (powiats/districts). The given regions (except for Brest region) are characterised by low socio-economic development within their countries and, therefore, somewhat lower results should be expected compared with the country average.

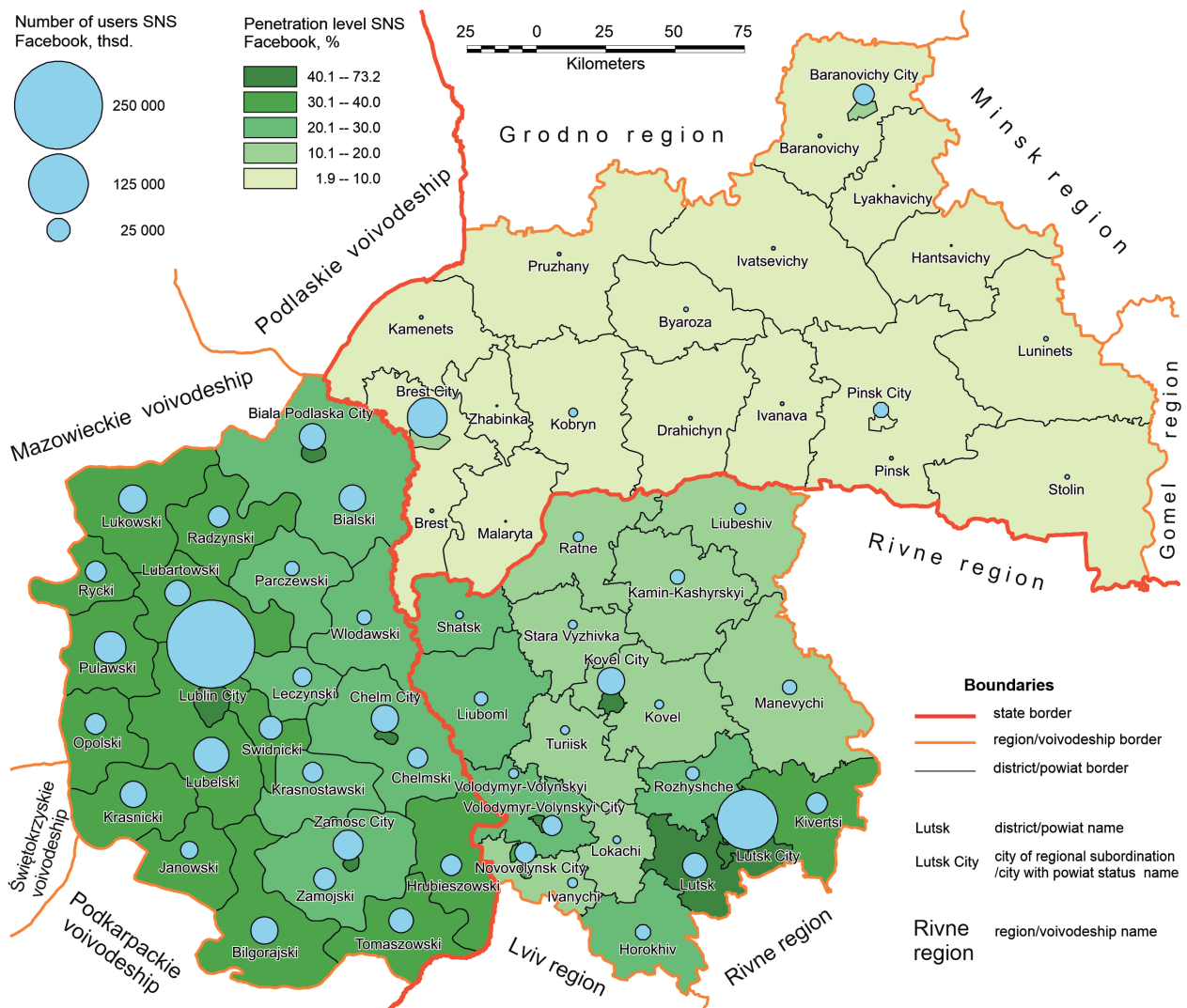
*Lubelskie voivodeship* is the most developed part of the Polish–Ukrainian–Belorussian borderland. However, Facebook penetration rate (39.5%) is

lower than the average for Poland (44.2%). The city of Lublin concentrates 29.5% users of the voivodeship (Fig. 2). The proportion of Facebook users is almost double the share of the city in the total voivodeship population (15.9%). The city of Lublin has also the highest Facebook penetration rate in the region – 73.2%.

The above-mentioned pattern – increase in the penetration from east to west, as well as around large cities and the main poles of socio-economic development, is clearly traced in Lubelskie voivodeship (Fig. 2). The Facebook pattern duplicates the features of voivodeship economy. Western powiats have higher indicators of socio-economic development compared to bordering eastern powiats (Markowski & Rogalińska, 2018).

As mentioned above, the reason for this is that the “Iron Curtain” passed along the Western Bug River and was not a favourable factor for development.

The highest level of penetration was also found in cities with powiat status: Zamość, Biała Podlaska, Chełm. The smallest proportion of Facebook users in relation to the entire population was observed in powiats adjacent to cities with powiat status: Bialski, Chełmski and Zamojski. As a result of such administrative division at the local level, two territorial units arise: a developed core (city with powiat status) and an agrarian underdeveloped periphery (powiat). It looks as if a city “draws off” a significant part of the population and economic activity from a district.



**Fig. 2.** Number of users and penetration rate of Facebook SNS in Lubelskie voivodeship (Poland), Volyn region (Ukraine) and Brest region (Belarus)

Source: Own author’s draft basing on data from Facebook and State statistics services of Poland, Ukraine, Belarus

The amplitude of Facebook penetration rate among the powiats is 52.0%, which indicates significant differences in the levels of development. Thus, in general, in Lubelskie voivodeship, Facebook penetration rate reflects the level of economic development.

In *Volyn region*, 344,100 Facebook users are registered, representing 33.2% of the region's population. This is close to the average for Ukraine. Compared to previous research (Puhach & Mytchuk, 2018), Facebook penetration rate in Volyn region increased by 4.1% in 1.5 years. This indicates the transformation of the preferences in the region and the transition from Russian SNSs VKontakte and Odnoklassniki to the global SNS (PlusOne, 2019).

The spatial distribution of Facebook users in Volyn region demonstrates a trend towards the concentration of accounts in large cities (Fig. 2). The largest cities (Lutsk, Kovel, Novovolynsk, Volodymyr-Volynskiy) account for 60.4% of users from Volyn region – in particular, 37.8% are concentrated in Lutsk. These same cities, which are called “cities of regional subordination”, have the leading positions by penetration rate (more than 40%). They are regional centres – focus areas of social activity and economic development.

The east to west increase in the network's penetration rate in the Volyn region is less clear than in the Lubelskie voivodeship. The reason for this is that the main economic centres of the Volyn region are located mainly in its southern part. In contrast to the Lubelskie voivodeship, here the level of development is growing from north to south. Therefore, among administrative districts, Lutsk and Kivertsi have the highest penetration rate (41.0% and 31.2%, accordingly). This is due to the fact that they border the regional centre (Lutsk), which has long had “urban sprawl” beyond its borders to the surrounding areas.

Relatively high penetration rates are also typical for western districts adjacent to the Polish border, where the population is actively engaged in labour migration, including across the border. This is in line with previous studies in which E. Tranos discovered a positive effect on the proliferation of Internet infrastructure and regional connectivity of border regions (Tranos, 2013). The lowest share of Facebook users was registered in the northern and north-eastern parts of the region. This can be explained by the strong influence of Belarus, where Russian SNSs dominate.

Thus, the distribution of Facebook in Volyn region confirms the two abovementioned patterns: an increase in the penetration rate of the network from east to west and increased concentration of

users around the main socio-economic centres. The level of Facebook penetration in Volyn region is 49.4%, which is comparable to Lubelskie voivodeship.

*Brest region*, as well as Belarus in general, is an area where Russian SNSs totally dominate. The penetration rate for Facebook is very low and constitutes only 7.9% (110,000 users), which is lower than the national average.

The three largest cities – Brest, Baranovichi and Pinsk – account for 84.5% of all users in Brest region, including 55.4% of the accounts concentrated in the regional centre, the city of Brest. However, the number of Facebook users in Brest is one quarter that of Lublin and half that of Lutsk. In most administrative districts (with the exception of Kobrin), the number of users is less than 1000, which does not allow spatial regularities to be ascertained.

The highest level of Facebook penetration in Brest region is observed in Brest and is only 17.6%. For comparison, in Volyn region it would be quite a low value, while in Lubelskie voivodeship the minimum registered value is higher and constitutes 21.1% (Fig. 2).

## 5. Conclusions and discussion

Over the past 20 years, the global “market” of SNSs has gone from “free competition” (great diversity in different countries of the world) (Boyd & Ellison, 2007) to “oligopoly” (dominance of a few big players) (Statista, 2022). Facebook is today one of the largest means of communication in the world. During its rapid development in 2010s, it displaced many national social networks of this type, but this progress has stalled as it has come into contact with areas where Russian SNSs prevail.

The example of the Polish–Ukrainian–Belarusian borderland demonstrates a relationship between the type of development of the country and the level of Facebook penetration. Belarus, an authoritarian state belonging to the sphere of Russian influence, has a minimal penetration of the network. Ukraine, being a country that is trying to get out of Russia's influence and to integrate more closely into the international institutions of the EU and NATO, has average penetration rates. Poland, a country of democracy and liberal values, has the largest penetration of Facebook. Results similar to ours, namely the “Facebook Divide” between different types of countries, can be seen in the research of A. Yung (2017).



The spatial distribution of Facebook in Central and Eastern Europe reveals a clear increasing trend in the number of users and the penetration rate of network users in socio-economically developed areas (capital regions, major socio-economic centres), which generally corresponds with the Growth Pole Theory (Perroux, 1967). Accordingly, underdeveloped agricultural areas are characterised by low Facebook adoption. This is in line with other research. For example, J. Pick et al. (2015, 2019) analysed the spatial distribution and socio-economic determinants of social media use in 3,109 counties of the United States and found sharp contrasts between metropolitan and rural counties (Pick et al., 2015; Pick et al., 2019).

Another general regularity is the increase in share of users progressively from east to west. This trend is not obvious in Belarus due to the small number of users. In Poland, this regularity can be explained by the growth in the level of development in the indicated direction, and in Ukraine by the growth of pro-European views among the population.

One more pattern of Facebook spatial distribution is a large concentration of users in capitals and regional centres (Puhach & Mezentsev, 2021). Thus, the city of Lviv concentrates about 19% of Facebook users in Western Ukraine (the share of the city in the population Western Ukraine is 8.2%).

High concentrations of users near state borders are poorly traced in the study area. This is not in line with findings concerning the positive effect of border regions for virtual communications (Tranos, 2013).

Administrative boundaries continue to exist in the virtual world of social networking services. Social connectedness recreates the contours of the administrative-territorial division (Bailey et al., 2018). The penetration of the Facebook SNS in the Polish–Ukrainian–Belarusian borderland illustrates the filtering function of the state border, which restricts certain types of interaction (in our case, Facebook). When crossing the Polish–Belarusian border (and, to a lesser extent, the Ukrainian–Belarusian border), there is a rapid decrease in the Facebook penetration rate. In terms of the distribution of Facebook, the border with Belarus can be considered a frontier – the edge of the developed territory, an outer boundary of a large entity. Unlike the physical geographical border, the virtual frontier seems to be facing outwards (Taylor, 1989). Certain favourable political conditions (change of power regime and geopolitical course) could induce a sharp increase in the Facebook penetration rate in Belarus. In Ukraine, until 2014, there was a total domination of Russian SNS

Vkontakte and Odnoklassniki; however, now, in many regions Facebook and Instagram predominate.

The current literature contains relatively few findings on spatial aspects of the functioning and development of SNSs. The lack of interest from geographers on this issue is surprising given the constantly increasing localisation of SNS via the geolocation function (Sui & Goodchild, 2011). The study of the spatial aspects of the functioning of SNSs and cyberspace in general could be a possible way out the substantive crisis faced currently by human geography.

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