

Serhii Puhach¹, Andrii Maister²

¹ Lesya Ukrainka Eastern European National University, Faculty of Geography, Volya Avenue 13, 43025 Lutsk, Ukraine; e-mail: puhachserhiy@gmail.com

² Lutsk Institute of Human Development of the University “Ukraine”, Department of Information Activities and Tourism, Heorhii Honhadze str. 5, 43020 Lutsk, Ukraine; e-mail: maister89@ukr.net

Spatial features of the distribution of social network services in Volyn region of Ukraine

Pugacz S., Majster A. **Cechy przestrzenne rozmieszczenia sieci społecznościowych w obwodzie wołyńskim na Ukrainie.** Rozpowszechnienie serwisów społecznościowych Facebook i Instagram w obwodzie wołyńskim odpowiada hierarchicznemu modelowi dyfuzji przestrzennej. Obserwuje się tendencję do koncentracji użytkowników w dużych miastach. Najwyższy poziom penetracji serwisów społecznościowych jest zlokalizowany w dużych miastach, zwłaszcza w Łucku i Kowlu. W rejonach administracyjnych liczba ta jest znacznie niższa. Wysoki odsetek użytkowników można prześledzić w zachodnich i północnych rejonach obwodu, a niski wskaźnik penetracji – w środkowej części regionu.

Пугач С., Майстер А. **Пространственные особенности распространения социальных интернет-сетей в Волинской области Украины.** Распространение социальных сетей Facebook и Instagram в Волинской области соответствует иерархической модели пространственной диффузии. Прослеживается тенденция к концентрации пользователей в крупных городах. Наивысший уровень проникновения социальных сетей в крупных городах, особенно в Луцке и Ковеле. В административных районах этот показатель значительно ниже. Высокая доля пользователей прослеживается в западных и северных районах области, низкий уровень проникновения – в центральной части области.

Key words: social networking service (SNS), penetration rate of the SNS, Facebook, Instagram, Volyn region

Słowa kluczowe: serwis społecznościowy, wskaźnik penetracji sieci, Facebook, Instagram, obwód wołyński

Ключевые слова: социальная интернет-сеть, уровень проникновения сети, Facebook, Instagram, Волинская область

Abstract

The distribution of social network services Facebook and Instagram in the Volyn region is in line with the hierarchical expansion form of spatial diffusion. It was confirmed that higher users concentration is typical for the biggest cities. The highest SNS penetration rate is observed in large cities (first of all in Lutsk and Kovel). In administrative districts, the rate is much lower. High user share is in the western and northern districts, and the lowest penetration – in the central part of region.

Introduction

Social networking services, including Facebook and Instagram, are a real phenomenon in the field of human communications today. SNSs are based on the World Wide Web and cell phones. A person is engulfed by the communication field, which has increased significantly with the advent and wide distribution of social networking services. Social communications have reached a new level and embraced the entire world. Unprecedented opportunities are opening before humanity. However, the spatial aspects of social networking services research in Ukraine have not

received sufficient attention. This determines the relevance of this study.

The main task of this study was to identify the spatial distribution of the number of users of social networking services Facebook and Instagram in the context of administrative districts and large cities of the Volyn region.

Theoretical basis and methods

Wide literature is devoted to the study of spatial distribution of different SNS. In particular, influence of distance on the intensity of connections in SNS was investigated by LENGUEL et al. (2015); analysis of various-scale geographic patterns resulting from the interaction of SNS users is given in MENEZES and ROTH (2017); influence of geographical distance, national boundaries, language and frequency of air travel on the formation of social ties in Twitter was considered by TAKHTEYEV, GRUZD and WELLMAN (2012); relationship between distance and intensity of on-line interaction on the example of the Spanish SNS Tuenti was studied by LANIADO et al. (2017).

In the Ukrainian modern scientific literature, social networking services are mainly researched by sociologists, analyzing the phenomenon of the on-line social networks, aspects of their impact on society, certain age categories of the population (especially children and adolescents), the possibility of using services in political technologies, educational sphere, etc. In geographical studies, the problems of social networking services have not received sufficient coverage. There are some geographical aspects in the surveys "Review of Social Networking Services and Twitter in Ukraine..." (Yandex, 2014), "Facebook and Instagram in Ukraine (September 2019)" (PlusOne, 2019). Also, there are investigations of the spatial features of using SNS in the war conditions in the east of Ukraine (DOBYSH, 2019), the distribution of social networking services in the Volyn region (PUHACH, MYTCHYK, 2018) and in Ukraine (PUHACH, MYTCHYK, 2017).

There are some difficulties with the collection of primary statistical information regarding social networking service's users (PUHACH, MYTCHYK, 2018). We may speak about the approximate number of SNS users. To determine the number

of Facebook and Instagram users, we used the targeting tool, an advertising mechanism that allows picking out from the total Internet audience only the portion of visitors or target audience that fits certain criteria (Facebook, 2020). The criterion we chose was territorial coverage.

Primary statistics of the number of SNS users in the study area was collected in the first half of February 2020.

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 – the number of SNS users within i -territory, thous.; P_i – total population of i -territory, thous.

The population for October 1, 2019 was taken from the site of Main department of statistics in Volyn region of State Statistics Service of Ukraine (Main Department..., 2020).

Results and discussion

Volyn region is a territory in the north-west of Ukraine, which borders with Poland in the west, Belarus – in the north, Rivne region – in the east and southeast, Lviv region – in the south. The favorable transport-geographical and border position combined with peripherally, imprint on the socio-economic processes of the territory. The distribution of social networking services has its own peculiarities here.

Facebook is a social networking service, originally developed as a means of communication between Harvard University students. It has gained immense popularity and is currently the largest social networking service in the world. According to official statistics, more than 2.45 billion people have already registered their accounts there (Zephoria, 2019). A lot of companies or firms, especially those entering the international market, considers it their duty to have Facebook's page.

Facebook is one of the most popular social networking services in Ukraine. The average monthly audience of the network in Ukraine is 14.0 mil-

lion users (Facebook, 2020), which is 33.4% of the country's population (at the beginning of 2020). There are 363.9 thousand users in the Volyn region, which is 35.3% of the region's population and 2.6% of all Ukrainian network users (the region's share in the country's population is 2.5%). Therefore, the penetration rate of the SNS in the Volyn region is slightly higher than in the whole country.

Analysis of the spatial distribution of Facebook users in the context of the administrative-territorial units of Volyn region shows a tendency towards concentration of the majority of accounts in the largest cities: Lutsk (180 thous.), Kovel (52 thous.), Volodymyr-Volynskiy (23 thous.), Novovolynsk (20 thous.) (table. 1, fig. 1).

These four cities of regional subordination have 75.8% users from Volyn. 49.6% of accounts are concentrated in the regional center city of Lutsk. This finding is in line with other studies, in particular, the significant predominance of the Internet in large metropolitan areas (WARF, 2017). Volyn region has a low level of urbanization (52.2%). In many villages, especially in the northern Polissya part, there is no wired Internet, and the quality of signal from mobile operators does not allow using social networking services. Therefore, the hierarchical model of spatial diffusion of cultural innovations can be clearly observed, when the largest cities of the territory are regional centers of innovation (HÄGERSTRAND, 1967).

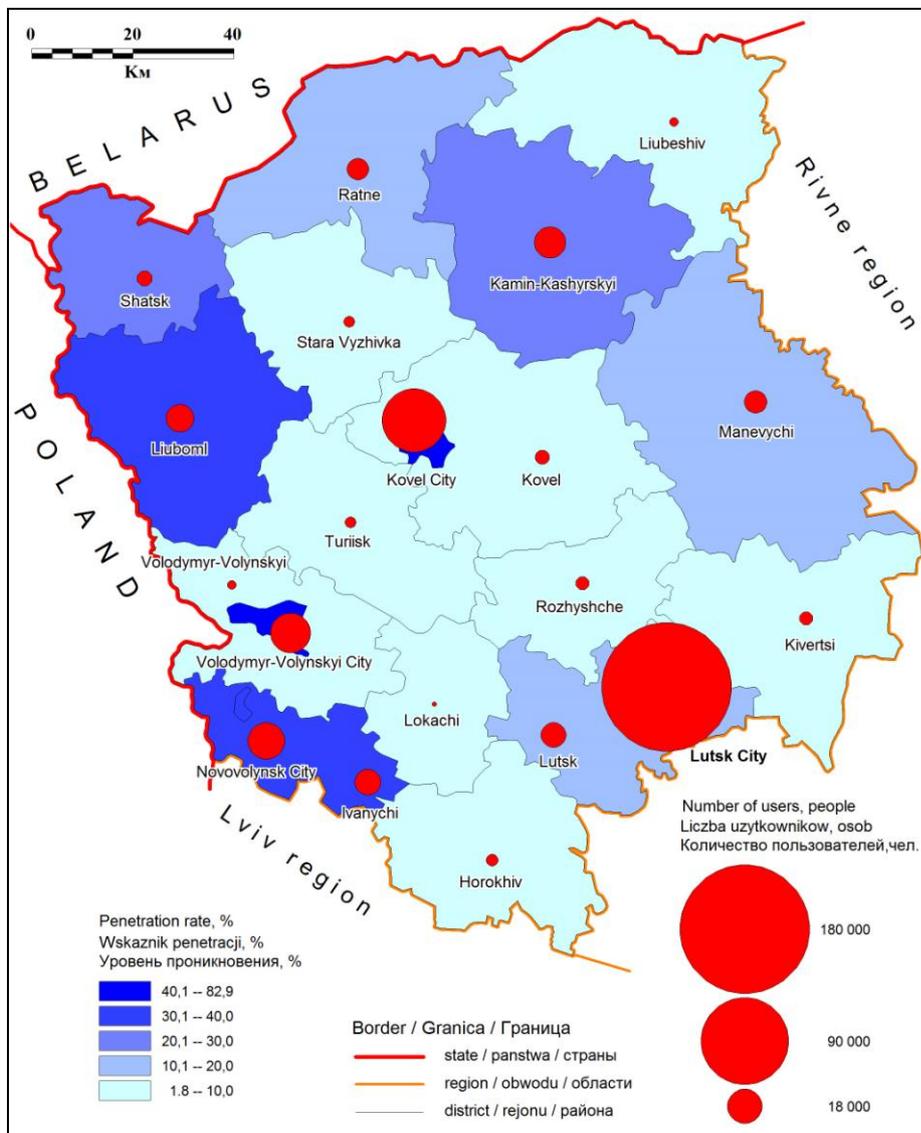


Fig. 1. The number of users and the penetration rate of the Facebook SNS in Volyn region, at the beginning of 2020

Rys. 1. Liczba uzytkownikow i wskaźnik penetracji serwisu społecznościowego Facebook w obwodzie wołyńskim na początku 2020 r.

Рис. 1. Численность пользователей и уровень проникновения социальной интернет-сети Facebook в Волынской области, по состоянию на начало 2020 г.

Table 1. The number of users and the penetration rate of Facebook SNS and Instagram SNS in Volyn region, at the beginning of 2020

Tabela 1. Liczba użytkowników i wskaźnik penetracji serwisów społecznościowych Facebook i Instagram w obwodzie wołyńskim na początku 2020 r.

Таблица 1. Численность пользователей и уровень проникновения социальных интернет-сетей Facebook и Instagram в Волинской области, по состоянию на начало 2020 г.

№	Districts (cities with district status) / Rejony (miasta na prawach powiatu) / Районы (города областного подчинения)	Population / Ludność / Население (1.10.2019)	Number of users (thous.) / Liczba użytkowników (w tys.) / Количество пользо- вателей (тыс.)		Penetration rate / Wskaźnik penetracji / Уровень прони- кновения (%)	
			Facebook	Instagram	Facebook	Instagram
1	Lutsk City	217 258	180.0	120.0	82,9	55,2
2	Volodymyr-Volynskiy City	38 396	23.0	16.0	59,9	41,7
3	Kovel City	68 324	52.0	40.0	76,1	58,5
4	Novovolynsk City	55 738	20.0	11.0	35,9	19,7
5	Volodymyr-Volynskiy	24 602	1.5	0.4	6,1	1,6
6	Horokhiv	50 294	2.8	2.7	5,6	5,4
7	Ivanychi	31 296	11.0	6.8	35,1	21,7
8	Kamin-Kashyrskiy	63 960	15.0	15.0	23,5	23,5
9	Kivertsi	63 607	3.2	5.5	5,0	8,6
10	Kovel	40 410	3.6	3.6	8,9	8,9
11	Lokachi	21 654	0.4	0.8	1,8	3,7
12	Lutsk	66 782	10.0	10.0	15,0	15,0
13	Liubeshiv	35 175	1.7	3.8	4,8	10,8
14	Liuboml	38 644	12.0	9.5	31,1	24,6
15	Manevychi	53 539	8.4	6.7	15,7	12,5
16	Ratne	51 854	7.6	7.6	14,7	14,7
17	Rozhyshche	38 431	3.2	3.4	8,3	8,8
18	Stara Vyzhivka	29 705	2.2	2.9	7,4	9,8
19	Turiisk	25 912	2.2	2.1	8,5	8,1
20	Shatsk	16 597	4.1	3.3	24,7	19,9
	Volyn region	1 032 178	363.9	271.1	35,3	26,3

Source: elaborated by the authors on the basis of / Źródło: opracowanie własne na podstawie danych / Источник: составлено авторами на основе: *Facebook, 2020; Main Department...*, 2020

Among the administrative districts in terms of the number of users (more than 10 thous. people) are distinguished districts with a large population: Kamin-Kashyrskiy, Liuboml, Ivanychi, Lutsk, Manevychi, Ratne. Facebook is the least used in the Liubeshiv, Volodymyr-Volynskiy and Lokachi districts. Volodymyr-Volynskiy and Lokachi districts have the least population in the Volyn region. The small number of users in the Liubeshiv region is explained by its peripheral

position and the low level of socio-economic development.

An important indicator for analyzing the distribution of a service is the penetration rate of the SNS, which is calculated as the ratio of the number of users in a certain territory to the population that lives in it. This indicator is the highest in cities of regional subordination (more than 35%). Lutsk City (82.9%) and Kovel City (76.1%) are especially different (table 1). Such high rates are achieved both due to the population of

the city registered in the SNS, and due to the accounts of various companies and stores. Urban users are also included residents of surrounding villages. These villages form a single settlement system with the city near which they are located.

In administrative districts this figure is much lower and does not exceed 36%. A relatively high proportion of network users (over 20%) are in the western areas adjacent to Poland, such as Ivanychi, Liuboml, Shatsk. This can probably be explained by intensive cross-border communications via social networking services, which are free of charge and are an alternative to mobile communication. This helps to increase the number of SNS users in this territory. On the territory of Kamin-Kashyrskyi district is located the largest city in the northern part of the Volyn region, Kamin-Kashyrskyi, which claims to be the regional center.

Low share of users (less than 10%) was recorded in Kovel, Turiisk, Rozhyshche, Stara Vyzhivka, Volodymyr-Volynskyi, Horokhiv, Kivertsi districts. Geographically, it is mainly the central part of the region. These districts are characterized by an average level of socio-economic development. Kovel and Volodymyr-Volynskyi districts are adjacent to cities of regional subordination. They are characterized by an increased proportion of the rural population (low level of urbanization) and concentration of socio-economic and political life in Kovel City and Volodymyr-Volynskyi City, which are not territorially belong to them. Cities of regional subordination seem to “pull” SNS users from the districts.

Particularly low penetration rate of the SNS (less than 5%) is in Liubeshiv and Lokachi districts (table 1, fig. 1). These are the least developed and depressed territories within the region. Liubeshiv district is characterized by peripheral location and geographical disadvantage. The features of Lokachi district are small area, small population, location between the largest economic centers of the region (cities Lutsk, Volodymyr-Volynskyi, Novovolynsk). These cities concentrate a significant part of the socio-economic activity of the Volyn region, leaving Lokachi district “in the shadow”.

In the Volyn region, the penetration rate of the Facebook SNS is 35.3%: for administrative districts – an average of 13.5%, for cities of regional subordination – 63.7%. This reaffirms the role of major cities as centers of innovation and the uneven distribution of users in urban and rural areas.

Instagram is a social online network for sharing photos and videos that allows users to take photos and videos, apply filters to them, and distribute them. The total number of users of this SNS is more than 1 billion people (*Statista*, 2020). In Ukraine, its average monthly audience is 11.0 million users (*Facebook*, 2020), which is 26.2% of the country's population (at the beginning of 2020).

Analyzing the regional distribution of Instagram users, it should be noted that in Volyn region there are 271.1 thous. users (*Facebook*, 2020), which is 26.3% of the region's population. The share of users from the Volyn region is 2.5% of all Ukrainian SNS users, which corresponds to the average Ukrainian indicators.

In the spatial distribution of Instagram users, one can trace the same trends as for Facebook (table 1, fig. 2), namely the concentration of most accounts in major cities. Thus, there are 120 thous. users in Lutsk City, 40 thous. users in Kovel City, 16 thous. users in Volodymyr-Volynskyi City, 11 thous. users in Novovolynsk City. These four largest cities have 69.0% of users. In the regional center Lutsk City is concentrated 41.3% accounts. Among the administrative districts by number of users distinguish Lutsk district (has the largest population in the Volyn region), Kamin-Kashyrskyi district (has the largest population in the northern part of the region) and Liuboml district (located in the west, which has an advantageous geographical location on the border with Poland).

In terms of penetration rate of SNS Instagram, the leading positions are occupied by cities of regional subordination Kovel City (58.5%), Lutsk City (55.2%), Volodymyr-Volynskyi City (41.7%). Noteworthy is the low level of Instagram penetration in Novovolynsk City (only 20.0%). Among the administrative districts, Liuboml, Kamin-Kashyrskyi, Ivanychi districts stand out against others (Instagram penetration rate is over 20%).

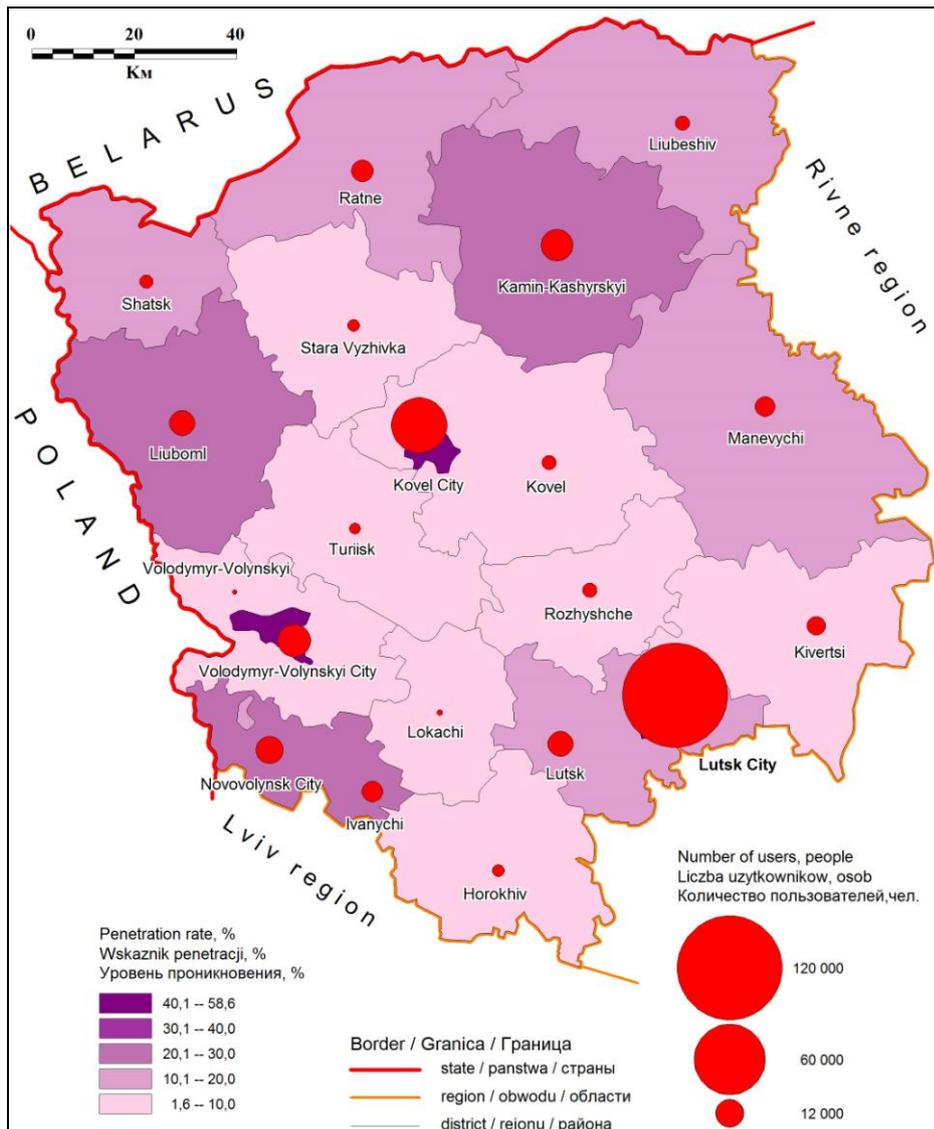


Fig. 2. The number of users and the penetration rate of the Instagram SNS in Volyn region, at the beginning of 2020

Rys. 2. Liczba użytkowników i wskaźnik penetracji serwisu społecznościowego Instagram w obwodzie wołyńskim na początku 2020 r.

Рис. 2. Численность пользователей и уровень проникновения социальной интернет-сети Instagram в Волинской области, по состоянию на начало 2020 г.

Shatsk, Lutsk, Ratne, Manevychi, Liubeshiv districts also have relatively high levels of penetration (10–20%). The lowest share of users (less than 10%) was recorded in Stara Vyzhivka, Kovel, Rozhyshe, Kivertsi, Turiisk, Horokhiv, Lokachi and Volodymyr-Volynskiy districts (table 1, fig. 2).

In the Volyn region, the penetration rate of the Instagram SNS is 26.3%: for administrative districts – an average of 12.3%, for cities of regional subordination – 43.8%.

Therefore, the social networking service Instagram is inferior to Facebook in terms of development in the Volyn region. Its main users are mostly young people.

Conclusions

Based on the above, we can draw the following conclusions about the general patterns of spatial distribution of social networking services Facebook and Instagram in the Volyn region:

- concentration of users in large cities;
- the number of users in general is proportional to the population in a territorial unit;
- a few users and a low penetration rate of the SNS in the districts adjacent to the cities of regional subordination;
- low penetration rate of the SNS in the central part of Volyn region;
- increased concentration of users near the border. This is in line with previous studies, both in the world when E. TRANOS (2013) discovered a positive effect on the proliferation of In-

ternet infrastructure and regional connectivity of border regions and in Ukraine – in the Volyn region (PUHACH, MYTCHYK, 2018).

It is advisable to focus further studies of the spatial distribution of social networking services on analyzing its dependence on the characteristics of the age, gender, ethnic structure and other social categories.

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