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## HOW BIG IS THE DIGITAL DIVIDE BETWEEN RURAL AND URBAN AREAS IN POLAND?

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**Abstract:** In view of the development opportunities, the rural areas have a lower potential when compared to cities and towns. This disadvantage is caused mainly by smaller population densities, greater distances from urban markets as well as information, work, education, and most other resources. Seen from the perspective of the rural areas the Internet means a possibility of equal development chances between the rural and city inhabitants. Access to the Internet means availability of work (telework), administration, education, services offered on-line that are impossible to obtain elsewhere, of different kinds of databases, entertainment as well as contact with other users. Thus, both social and economic aspects can be distinguished. These aspects can be studied in the digital divide context, which the authors try to investigate in this paper.

**Keywords:** information society, digital divide, Internet, rural areas.

### Introduction

The analyses of the Internet-related issues in the context of their ‘rurality’ are most often conducted from the perspective of the differences between rural areas and urban areas in access to the Internet and its usage. This is one of the basic aspects of spatial variation of the widely-discussed phenomenon of the *digital divide*. The phenomenon is a subject of various spatial analyses which focus on the infrastructure, the social and economic structure of the Internet users (Schwanen and Kwan 2008; Stephens and Poorthuis 2015; Warf 2001), and the uneven distribution of access to the Internet between rural and urban areas and between regions and countries (Chakraborty and Bosman 2005; Grubestic 2006; Grubestic and Murray 2002; Whitacre and Mills 2007). The digital divide is subject to constant changes amid the rapid development of the Internet and the increasing importance of the Web in everyday life. With the growing universality of Internet access, it is the other factors that determine who enjoys the full benefits of the Internet and who is excluded from the digital realm. Beyond the access, what is important is how the Internet is used and by what kind of users — *the user type divide* (Brandtzæg et al. 2011).

The simple division between those who have and those who do not have access to the Internet has been widely criticized by scholars who argue that research on the Internet should focus on patterns of usage (DiMaggio and Hargittai 2001; Hargittai 2001 Li and Wang 2014; Lee et al. 2015).

Considering the above, the objective of this article is to present the *digital divide* in Poland taking account of the differences between rural and urban areas. In the present work the analysis is based on selected examples of the digital divide which enable the authors to show the size of this phenomenon in Poland (in comparison between the rural and the urban areas). It also helps to show the evolution of how this concept is understood in the context of the emerging *user type divide*. It must be stressed that any discussion about the Internet in the rural areas and comparing them with the cities should take into account the specificity of these areas and the importance of the Internet as the factor of socio-economic growth seen against the background of the differences in the functioning of the cities and of the rural areas.

### How we can understand the digital divide

The notion of the *digital divide* is most often understood as disparities between persons who have regular access to *Information & Communication Technologies* (ICTs) (including electronic devices connected to the Internet) and know how to use the Internet and those who do not have access to the Internet. Initially, the research focused mainly on the aspect of physical access to technology. As time went by, researchers began to consider also the scope of skills and resources necessary to use the technology. E. Hargittai (2001) has introduced the notion of the “*second level*” *digital divide* (coincident with the *user type divide*) and within this notion he analyses the level of Internet skills, in particular, the ability to search for information. This is quite an important extension of the concept of the *digital divide*, because the Internet access cannot be treated as synonymous to the Internet usage (DiMaggio and Hargittai 2001). Various authors also point out to other skills which should be considered when analysing the *digital divide*. J.A.G.M. Van Dijk (2005) systematizes these different approaches and presents four levels of access to new technologies:

- motivation to use new technologies,
- physical access (access to a computer, access to the Internet),
- skills (strategic, informational, operational),
- usage (different ways of using the Internet).

A fundamental but not an obvious issue here is the motivation to use the Internet. A large part of the population does not see any need to use it because they lack information on the benefits from access to new technologies. Moreover, a number of users have appeared who made an attempt to use the Internet and abandoned it later because their expectations were not fulfilled. These frustrated expectations resulted most often from the lack of knowledge on how to best use the advantages and avoid the disadvantages of the digital world.

Once the motivation is there, the most common issue which arises is the access to the computer and the Internet at home or at work. At present, having a computer or another device with Internet access is not such a problem as the Internet coverage and the related

quality of service. Together with the technological progress new issues come into play such as the speed of connection (e.g. Priegler 2003; Philip et al. 2015) or a possibility to freely use the devices and the Internet also out of home.

The third level is competence and relates to the competences necessary to draw benefits from usage: starting from the most basic skills such as using a computer, software and the Internet to more advanced ones such as the ability to search for information on the web, to assess its credibility and usefulness, and to be able to process it and use it for one's own purposes. The most advanced level of competence allows to use the existing tools in order to create and publish contents on the Internet.

The last level of access concerns the impact of using the Internet on the socio-economic situation of the users. The impact can be positive such as new work opportunities (Di Martino and Wirth 1990) or developing social relations (Wellman et al. 1996) but it can also be harmful to the user (e.g. the Internet addiction, e.g. Young 1998). Obviously, both the positive and adverse impact depends on many factors, one of them being the geographic location of the user household. It is important to note here that the Internet access creates different threats and different opportunities for the cities and for the rural areas.

Moreover, it should be stated that the *digital divide* is not only related to access or skills but also to individual motivations and socio-cultural preferences, which can also be observed in the different manner of using the Internet. What is important, along with the growing Internet access, the social disparities translate into disparities related to the Internet usage (van Deursen and van Dijk 2014). For instance, better educated individuals are more likely to use the Internet for the purpose of personal development rather than for entertainment. This and other similar dependencies (see: Davison and Cotten 2003; Taipale 2013) lead to an obvious finding: the *digital divide* is tantamount to social exclusion, the lack of possibility of full participation of all members of the society in the social and economic life.

Referring to the aspect of geographic location of the user household it must be observed that rural areas have a generally lower development potential than cities. Businesses based in the rural areas face two major challenges – distance from urban centers and the low population density. As it was observed by E.J. Malecki and B. Moriset (2008), the remoteness from cities means markets and production factors that are more difficult to access, as well as costly and time-consuming business trips. Lower population density translates into dispersed local resources – especially human resources (human capital – knowledge resources) and dispersed markets in which goods can be sold. The scattered nature of farms and agricultural production leads to their peripheralization in terms of access to traditional sources of knowledge (schools and resources made available through libraries and other institutions). Information and telecommunications technologies make it possible to expand one's knowledge and to acquire the necessary information while alleviating unfavorable location conditions (spatial isolation). It is not a coincidence that since the beginning of the widespread use of the Internet, it has been perceived as an instrument of overcoming the hindering influence of distance on economic and social human activity (Gannon 2006). The significance of the Internet can be perceived in other forms of economic activity in the rural areas: teleworking, e-commerce and facilitating connections with other entities (Janc and Czapiewski 2014). Companies can, on the one hand, use the Internet to collect information on suppliers (service providers) and, on the

other hand, can use it to gain clients through a new promotion channel. They can choose passive promotion which is posting information on a website or active promotion on thematic web portals. As shown by A. Jasiński (2015) in his research, the owners of agrotourist holdings point to the Internet as the most frequently used form of promoting their services. The Internet is the main promotion tool especially for individuals who have only just started such business activity. In times of growing interest in the local culture (regional products, cultural events) the Internet becomes the main medium for promoting such activities on a supra-local scale.

It is important to note that based on the review of scientific literature on the significance of ICT in rural areas performed by K. Salemin et al. (2015) the principal thematic areas of conducted analyses are: telecommunications markets (rural area high-cost markets with little opportunity for telecommunications companies); technologies in rural areas (the lack of availability and the resulting technological constraints in rural areas); regional development (the Internet gives the possibility of growth); policy and regulation (minimizing regional-spatial disparities); diffusion theory (remoteness of rural areas puts rural communities at the end of the diffusion stage); digital inequalities (low educational levels and skill levels in rural areas are considered a problem); digital inclusion policy (generic policies are incapable of reducing inequalities). The issues related to the ICT in rural areas are therefore discussed from many different angles. The reason for this is the great importance of the Internet in terms of developmental chances of these areas. Hence, making the right use of the Internet is a great challenge faced by the inhabitants of rural areas.

### Access to the Internet in Poland

According to the recent surveys by CBOS<sup>1</sup>, nearly two-thirds of adults (64%) in Poland use the Internet on a regular basis. For several years now there has been a systematic, though slight, increase in this indicator. The surveys show that the main reason behind the lack of access to the Internet lies in the lack of motivation. This has become more evident with time. In the last edition of the survey (*Social Diagnosis 2015*), more than a half of households with no Internet access stated that the main reason was they did not need it. Purely technical barriers, lack of proper equipment or high costs were pointed out three times less often, while several years ago these reasons were indicated significantly more often.

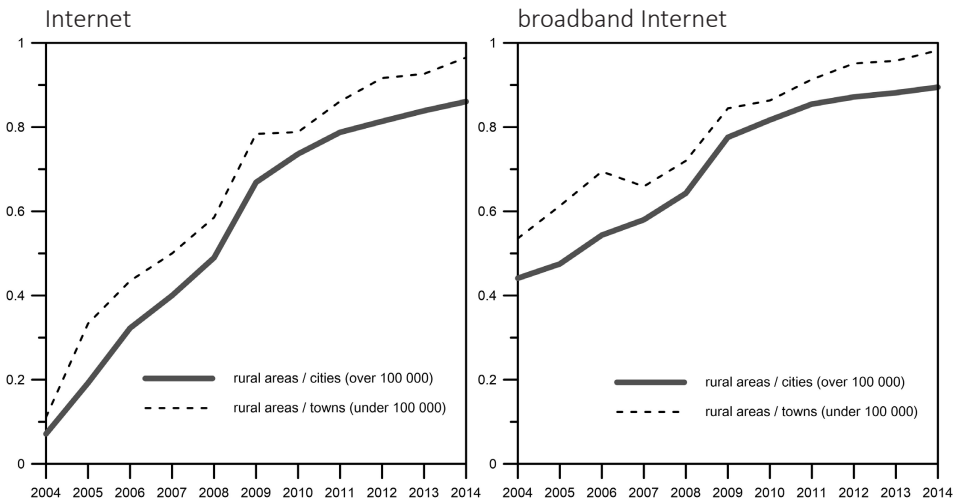
The analysis of the criteria of Internet exclusion shows that, apart from the lack of motivation, such factors as age<sup>2</sup>, educational background and financial situation play the most important role. The geographical factor is also of significance, although it is less differentiating than the ones mentioned above. According to the survey, the percentage of the Internet users in rural areas, in towns with no more than 20,000 inhabitants and in towns of 20,000-99,000 inhabitants is rather similar – 56%, 60% and 61%, accordingly. A clear change is visible only within the next size-class of population, that is for towns and cities of 100,000-499,000 inhabitants and cities of 500,000 or more inhabitants, where

<sup>1</sup> Report from the survey by CBOŚ No. 90/2015, Internauci 2015. Fundacja Centrum Badania Opinii Społecznej (Foundation of the Public Opinion Research Center), Warsaw.

<sup>2</sup> The meaning of digital exclusion among the elderly brought about the term *grey divide* (e.g. Millward 2003).

this percentage is 75% and 86%, respectively. On the other hand, *Social Diagnosis* (2015), using a similar classification by size of locality, shows that these differences are even smaller – access to the Internet is declared by 67.5 percent of respondents in rural areas and by 82.3 percent in cities of 500,000 or more inhabitants.

The dynamics of this phenomenon is also worth observing. The cities are saturated with services offering the Internet access and thus the dynamics of growth is presently not that fast anymore. According to the surveys conducted by World Internet Project Poland between 2010 and 2012<sup>3</sup> in various types of settlement units, the highest increase in Internet access was recorded precisely in rural areas. This survey also shows that the coverage of Internet access in rural areas drew close to that of towns of 20,000 and 50,000 inhabitants. As a consequence, the gap between cities and rural areas continuously decreases (Fig. 1). In order to illustrate this problem a simple measure has been assumed. It is a relation of the quality of a given feature in rural areas to that same quality in towns (both in big ones with over 100,000 inhabitants and the smaller ones – under 100,000 inhabitants) in the same year. The higher the value of the so calculated measure, the smaller the distance from rural areas to towns (the perfect situation is when the value equals 1 – that is the same level in all areas).



**Fig. 1.** Access to the Internet in Poland during years 2004-2014<sup>4</sup>

Source: own elaboration based on the data from the Central Statistical Office of Poland.

The availability of Internet access may be also shown within a spatial system, based on the Internet penetration in buildings (Fig. 2). The Internet penetration in buildings, whether taking the mobile network into account or not, exceeds 90 percent in the majority of rural or urban communes. The data, which include mobile network operators as the Internet providers, show the lowest values for the rural areas in central Poland – mainly in the Mazowieckie, Łódzkie and Świętokrzyskie Voivodeships. In the southern and western

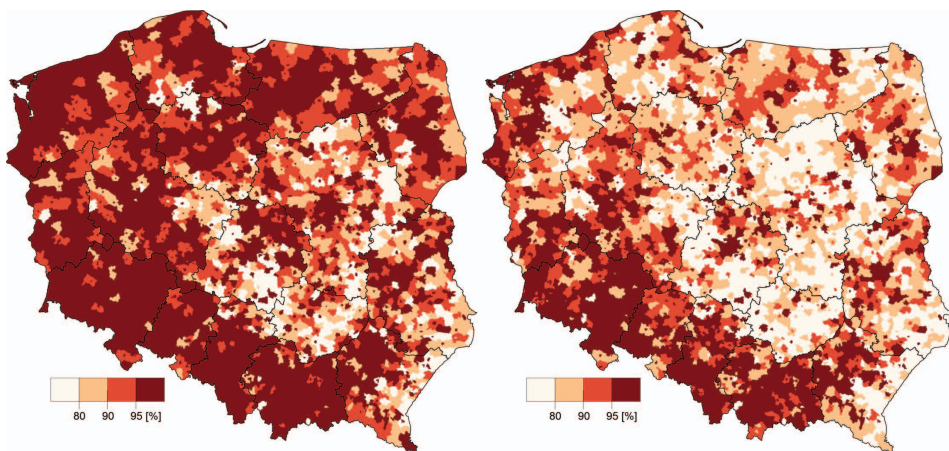
<sup>3</sup> <http://biuroprasowe.orange.pl/biuroprasowe/pr/2320/world-internet-project-%E2%80%93-wyniki-iii-polskiej-edycji-swiatowego-badania/>[19.11.2015]

<sup>4</sup> The figure is an updated version of a similar comparison used in the publications by Janc and Czapiewski (2013, 2014).

parts of the country the Internet coverage is nearly complete. This spatial pattern is the same when mobile network operators are not included, although the contrast between the most and the least densely covered areas is more evident. This reflects the structure of the settlement network in Poland – although the three voivodeships mentioned above have the highest density when it comes to rural settlements (on the average 2-3 villages per 10 sq km), such settlements are usually small, mainly with no more than 200 inhabitants (Bański 2006). Among the villages without cable or wireless network coverage (including no mobile networks), over 4,600 of them are villages of under 100 inhabitants (20 percent of all villages in this size category; 99 percent of all villages without Internet access). Apart from this size category, among villages without Internet access there are also 47 villages with 101-500 inhabitants. Thus, the problem of the lack of Internet access concerns the smallest villages where there are too few potential users. This shows a clear correspondence with the last mile problem, that is high costs of connection to the Internet network at its final section, which makes it less profitable to invest in Internet infrastructure in sparsely populated areas with a scattered settlement structure.

The potential availability of access to ‘fast’ Internet is another important parameter. In Poland, the Internet penetration in buildings with connections of 2Mb/s minimum capacity is at the level of 61 percent, with the highest values for the Dolnośląskie Voivodeship – 75 percent, and the lowest, 44 percent, for the Podkarpackie Voivodeship.

According to the recent data published by the Polish Office of Electronic Communications (UKE) (*Raport pokrycia...* 2015), it should be stated that access to the Internet of at least 30Mb/s capacity is available for over 30% of buildings in villages/towns of more than 5,000 inhabitants. In nearly 10,500 towns/villages there are almost 90,000 optical nodes. Taking into account the percentage share of those towns/villages where no provider declared coverage with landline or radio network, the worst situation has again been recorded in the Świętokrzyskie Voivodeship. In over 17 percent of towns/villages in this region no Internet access is available. The best situation in this respect has been recorded in the Dolnośląskie Voivodeship (under 3%).



**Fig. 2.** Internet penetration in buildings 2012  
A – with mobile operators; B – without mobile operators.  
Source: Janc and Czapiewski 2014.

It should also be emphasized here that the role of mobile devices in providing the Internet access will become more and more important. According to the surveys done by CBOS<sup>5</sup>, the number of Internet users using mobile devices has in the recent years nearly doubled (from 45% to 79%). The coverage with the 3G mobile network providing Internet access through mobile devices is over 94 percent. According to the surveys of CBOS<sup>6</sup>, 37 percent of Poles surf the Web using their mobile phones (smartphones). 28 percent of respondents check their e-mails this way and 22 percent visit social networks. 12 percent of respondents use their mobile devices to perform more demanding activities, such as shopping or booking tickets for various events (such as cultural events). However, one has to remember that such activities are possible only with the new generation phones, the so-called smartphones, in use by 45 percent of Poles.

The above analyses show that the lack of physical Internet access has ceased to be an actual barrier to the Internet use. With every year both the coverage with services offering the Internet access and their quality will increase. When added to the fact that the Internet will be available through a growing array of varied devices (tablets, TV sets, watches), it seems evident that those 'soft' factors will play a more and more important role.

### How the Internet is used

Computers (or mobile devices), as well as the Internet, may be used in various ways and the effects of such usage may also be different depending on the user. Because of that the earlier-mentioned term *user type divide* (the third level access according to the classification by van Dijk, (2004) has been gaining popularity. The term is applied to analyse various digital competences and especially the ability to search for information, which may also be differentiated with regard to urban or rural areas.

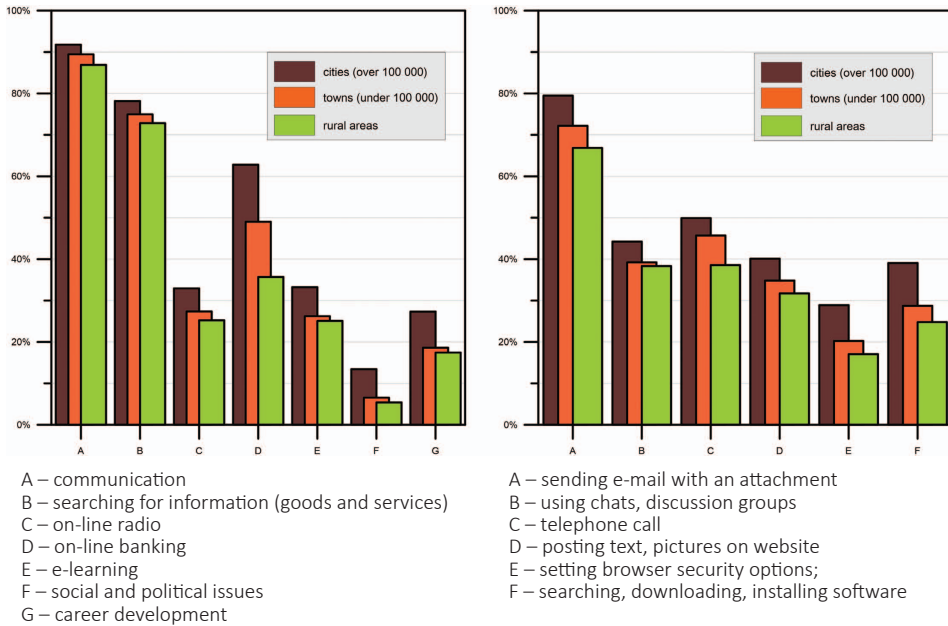
Studies on the Internet competences and the manners of usage conducted by the Central Statistical Office (Fig. 3) have shown significant differences in at least several important parameters. Firstly, the inhabitants of the largest cities have the advantage over the rest of the population in nearly all aspects. With regard to the analysed parameters the rural areas are not "outliers" when compared to the cities of below 100,000 inhabitants. Obviously, it partially results from considering the rural areas in their totality regardless of their character and location with regard to large cities. The second significant phenomenon is that there is little difference between the analysed categories of areas in terms of competences and activities not requiring any greater knowledge or not making part of comprehensive skills offering some advantage in the labour market.

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<sup>5</sup> Report on the survey by CBOŚ No. 90/2015, Internauci 2015. Fundacja Centrum Badań Opinii Społecznej (Foundation of the Public Opinion Research Center), Warsaw.

<sup>6</sup> How mobile phones are used, Report on the survey No. 125/2015, <http://www.cbos.pl/PL/publikacje/raporty.php> [19.11.2015]





**Fig. 3.** Internet skills and purpose of Internet usage in 2014 (persons aged 16-74 who have used the Internet in the last three months)

Source: own elaboration based on Central Statistical Office of Poland data.

The last level of exclusion described by J.A.G.M. van Dijk (2005) concerns the usage of the Internet which translates into tangible socio-economic effects for the user. The mere fact of having motivation, access and skills does not necessarily equate with usage. In addition, we should be aware that the effects of the Internet usage may be different. The number of potential ways of usage of computers or other mobile Internet-connected devices increases every year.

The last edition of the *Social diagnosis* (2015) study included an interesting analysis in this field. The study introduced the three following categories of Internet usage:

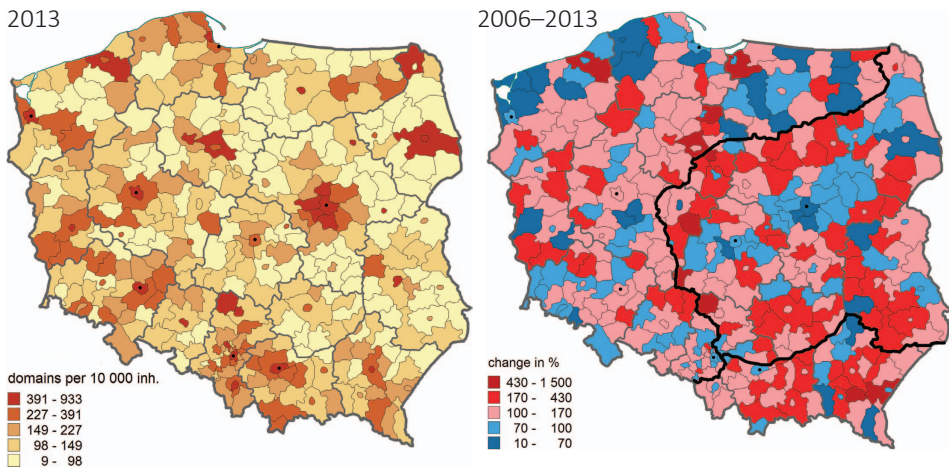
- comprehensive and advanced usage – creative activity such as running a blog, on-line shopping at foreign stores, paying for web content
- communication and basic usage of the Internet – the use of electronic mail, instant messengers, searching the Internet for useful information, online shopping at Polish internet stores only
- entertainment – online gaming and using the social network services, downloading films and music, streaming, listening to the music and the radio online

In the case of the Polish users of the Internet the following pattern was observed: the higher the population density of a given area, the greater the usage of the Internet in the first two categories. Rural areas demonstrate a converse tendency than the largest cities: individuals use the Internet more frequently for the purpose of entertainment than for other purposes.

Subsequent analyses allow to draw conclusions concerning the spatial aspect, taking better account of the specificity of rural areas. The first analysis focuses on Internet domains registered by natural persons. For this purpose, only the .pl domains names

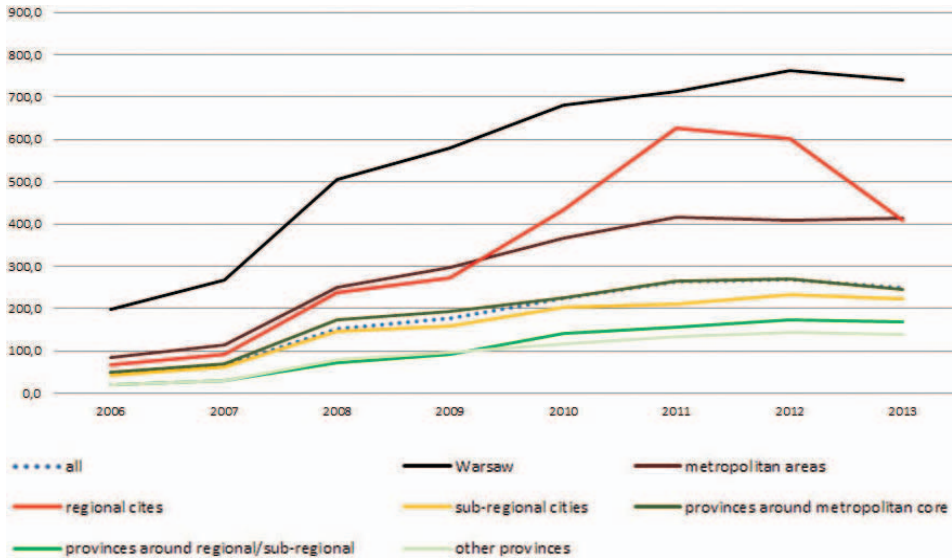


registered by private individuals were taken into account (over 80 percent of all domains registered in Poland). There may be different reasons behind starting a website and buying a domain. These may include the wish to share one's knowledge, interests, hobby activity, opinions or just presenting oneself e.g. as a local politician. This enables us to treat this variable not only as an expression of a greater competence in new technologies but also an expression of a wish to get actively involved in creating online content. This issue is important in the context of the so-called geography of participation (Graham et al. 2015) in which the number of registered domains may be equated with the WWW content production and treated like a content production index. It is a very important aspect, because it is precisely by enriching the Internet content that users cease to be passive recipients of services and become active creators. The spatial distribution of this index (Fig. 4) presents the image of a fairly visible distinction between cities and other areas. In the case of larger cities one can observe the results of the spillover effect of this phenomenon around the largest cities such as: Warsaw, Poznań, Wrocław, Kraków. The spillover effect benefits the rural areas located closest to these largest cities. There is also a group of provinces from the areas which are more remotely located with regard to the large cities (mostly provinces with high share of rural population), which also have a large number of registered domains (for example suwalski, białostocki, łębski, tczewski, kołobrzeski, mławowski province). One of the possible explanations is tourist attractiveness of these areas and a high Internet activity of persons running agro-tourist holdings, that is the need for business promotion.



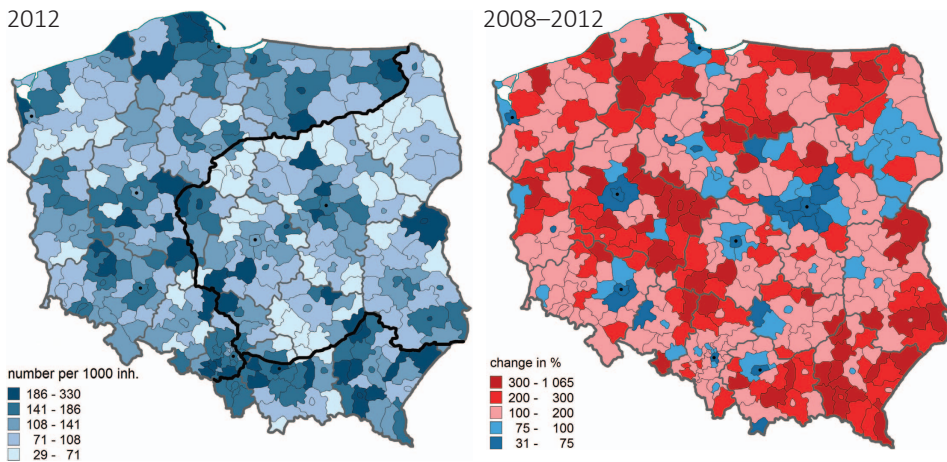
**Fig. 4.** Non-commercial domain names  
Source: own elaboration based on NASK data.

The analysis with regard to specific types of areas (Fig. 5) confirms the domination of provinces around a metropolitan core. In these types of areas the arithmetic mean was even higher than in sub-regional cities. Their proximity to large cities is crucial here.



**Fig. 5.** Non-commercial domain names (average values) in Poland, 2013  
Source: own elaboration based on the NASK data.

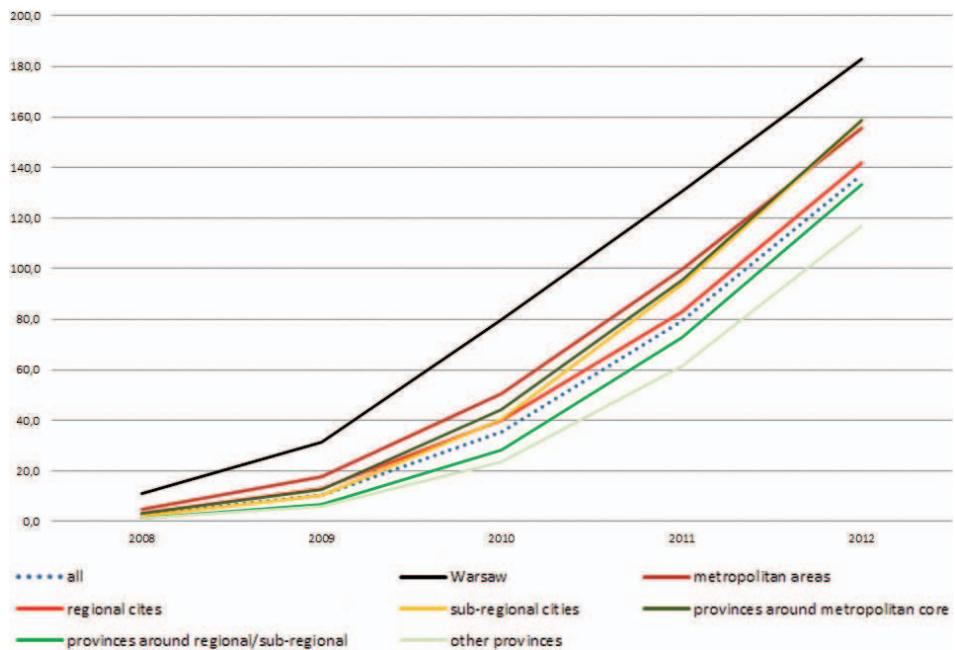
Another important skill is using the Internet for dealing with State administration (Fig. 6). Based on the data on the number of taxpayers who submitted their PIT tax return form online<sup>7</sup> one may determine the tendency among inhabitants of specific areas to develop and then make use of their digital competence.



**Fig. 6.** Personal income tax forms submitted online.  
Source: own elaboration based on the data from the Ministry of Finance.

<sup>7</sup> PIT forms may be submitted via an electronic system. The analysed data are for year 2012 (the data published by the Polish Ministry of Finance). The possibility of submitting such forms online was first introduced in 2008. At present, nearly 25 million Poles have the obligation of submitting PIT forms. In 2008, 80,000 persons submitted their PIT forms online, and in 2012 – over 4.5 million (Grodzka 2009).

The spatial distribution of this feature indicates that the domination of the largest cities is not that high. In some provinces with mostly rural areas high results were also recorded, including the following provinces: *dębicki*, *oleski*, *pucki*, *ostrowski*, *bechatowski*. Among voivodeships, there are some positively surprising data for the *Podkarpackie*, *Małopolskie* or *Pomorskie Voivodeship*. One may also note that this activity is less popular in the provinces once belonging to the Russian Empire. The analysis of average values (Fig. 7) demonstrates that, similarly as in the case of Internet domains, the higher values were found for the provinces around a metropolitan core, rather than for regional cities. This clearly indicates that inhabitants of rural areas in the proximity of the largest cities have more opportunities to acquire digital competence.



**Fig. 7.** Personal income tax forms submitted online (average values) in Poland  
Source: own elaboration based on the NASK data.

The analyses presented above show that digital competence and the varied ways of using the Internet are more common in urban areas than in rural areas. The following relation was also confirmed: high indicators are observed in rural areas located close to the largest cities, although there are also areas which defy this scheme.

## Conclusions

The digital divide is one of the most important problems resulting from developing ICT and its growing importance for society. There is no doubt that unequal access to, and use of, such technologies contribute also to a growing social exclusion. That is why it is so vital to undertake activities in order to mitigate the negative consequences of such divide and

to make use of the possibilities offered by modern technologies to overcome the barriers. However, this will not be possible without a thorough knowledge of this phenomenon in Poland.

Hence, it should be noted that at present the Internet access itself has ceased to be the greatest problem. With significant financial means assigned for development of the existing infrastructure that provides Internet access, the promise of the Polish Office of Electronic Communications made as part of the National Broadband Plan – namely that by 2020 broadband data transmission (30Mb/s) will be available across the entire Poland – is likely to be kept. Moreover, the growing popularity of mobile devices which offer various possibilities of using the Internet has made the issues of concern, once associated with digital divide, less significant. The fact of being fully equipped with ICTs is not a development enabler by itself, although the lack of such equipment undoubtedly constitutes a barrier. The analyses presented above clearly show that in Poland the infrastructure aspect of the digital divide has ceased to be that important – in this regard the ‘gap’ between rural and urban areas is small. However, there is a visible distance in terms of the user digital divide.

Therefore, the future discussions or research into the digital divide should focus more on the analysis of the users’ digital competence and how it is put to use. The skill of using modern technologies in various areas of life is a basic parameter confirming the level of inclusion of individuals in the process of shaping the information society, and hence of taking advantage of the possibilities offered by the Internet, which may contribute to the social and economic development of certain regions.

The presented analyses demonstrate that there are differences in digital competence between rural areas and cities/towns, however, it is a more complex issue which requires further research. There are certainly various challenges and problems on every level of analysing Internet access. This is most evident when looking at the manner in which the Internet is used, with inhabitants of rural areas using the Internet more often as a source of entertainment than as a source of self-development, which could be more beneficial for them in terms of broadening knowledge or improving personal competences. This is particularly alarming since research generally demonstrates that using modern technologies should improve the user’s situation on the job market. The role of the Internet is of particular importance when we analyse it in the long-term perspective, that is in relation to structural changes on the job market. New professions appear, such as blogger or on-line marketing specialist, which require fast adaptation to the changes taking place. Such adaptation may be facilitated with certain social and economic factors, such as training or business contacts – and these are still easier to find in towns/cities. Thus, a clear tendency to use the Internet in rural areas in a limited manner, in comparison to what it offers, may cause an even greater social divide. This means that the authorities face an even greater challenge as this competence is part of the human/cultural capital, passed on between generations, and thus overcoming these barriers will require actions aimed at persons in various age groups. This process will be problematic in rural areas, due to the difficulties with achieving economies of scale for training and consulting activities. That is why grassroots work is so vital, with the involvement of both the central authorities, through national large-scale projects, as well as of the regional and local bodies.

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