
Information Society - Poland in Comparison with the European Union

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Wiesław M. Maziarz¹

Abstract:

Purpose: The purpose of this paper is to analyse the level of development of the information society in Poland in the context of the development of this phenomenon in EU countries and to identify areas requiring intervention by state and local government bodies.

Design/Methodology/Approach: The following research methods were used to achieve the stated aim of the paper: critical analysis of the literature on the subject, causal analysis method, comparative analysis method and case study method.

Conclusions: The analysis conducted shows that the basic indicators characterising the information society in Poland do not differ from the level of the EU countries. The problem that will determine further development is the existence of a relatively large percentage of people who do not use the Internet and do not have basic digital skills. This state of affairs makes it impossible for these people to fulfil their social and economic functions and thus to participate actively in the information society.

Practical implications: The results of the study can provide important information for state and local authorities and the regulator of the electronic communications market in Poland, shaping activities in the development of the information society.

Originality/value: The research conducted in this article contributes to the discussion on the formation of the information society in Poland and the directions of its further development.

Keywords: Information society, internet, digital literacy.

JEL classification: A14, P52, R11.

Paper type: Research article.

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¹Ph.D., University of Szczecin, Institute of Spatial Management and Socio-Economic Geography, wieslaw.maziarz@usz.edu.pl;

1. Introduction

The modern world is undergoing very dynamic changes of a social, economic, cultural, technological and political nature. These changes should be linked to the emergence and development of the information society, which in its essence is the next civilisational formation in the development of humanity, after the agricultural and industrial ones.

The term information society has not found a generally accepted definition in the literature. A review of existing definitions of this phenomenon (problem) shows that it is understood and defined in very different ways.

This is a consequence of the fact that the information society is a very complex, multidimensional, multifaceted and interdisciplinary matter, which is not subject to unifying processes. It should also be borne in mind that the concept of the information society is undergoing a process of permanent evolution, leading to a significant broadening of the material scope of the term.

As a consequence, individual definitions begin to explain only a selected part of the term. As a result, it is not possible to describe the information society by a single definition. For the purposes of this article, it has been assumed that the term information society is broadly defined as:

- a society in which the quality of life and the prospects for social change and economic development are increasingly dependent on information and its use. In such a society, standards of living, patterns of work and leisure, and the education system are heavily influenced by information and the knowledge it generates (Arent, 2009),
- a media society with a more integrated telecommunications and information technology sector and an open, global media system characterised by a borderless flow of diverse content (Januszko, 2001),
- based on advanced information and communication technologies, the use of which determines the functioning and development of civilisation in all its aspects (Maziarz, 2013).

To sum up the definitions presented above, it can be said that the information society is the foundation of social and economic life of modern civilisation, based on widespread social participation in the processing and use of information, conditioned by the use of information and communication network infrastructure and electronic services that enable people to function efficiently and effectively in virtually all spheres of their life activities.

On the basis of the statements made, it can therefore be assumed that the information society consists of the following elements:

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- ICT infrastructure and related technologies,
 - online public services resulting from the practical application of ICT solutions in various areas of society,
 - widespread public participation in the processing and use of information, both for professional purposes and for individual life needs.

Information and communication infrastructure and related technologies have been one of the key drivers of the transition from an industrial to an information society. Today, its importance is not diminishing, as it is considered to be the foundation of the emerging digital civilisation, the main element driving its expansion and the factor shaping the direction of the information society.

Information and communication technologies are already ubiquitous in almost every aspect of everyday social and economic life. It is clear, therefore, that every country today is striving to create a spatially accessible and technologically advanced information and communication infrastructure, aware of the benefits that can be derived from its use.

A very important element in the development of the information society is the different types of public services provided online. They are de facto electronic equivalents of public services previously provided in physical space. Public services delivered online mainly include services in socially important areas such as access to national and local government administration, education and health care. It should be emphasised that modern technologies guarantee a high level of security for such communication between the state and the citizen (Budziewicz-Guzlecka and Drab-Kurowska, 2020).

Widespread public participation in the processing and use of information is a prerequisite for a society to be considered informational (Maziarz, 2020). Widespread participation in this case can be said to exist when a critical mass of citizens using information and communication devices is exceeded, who have sufficient information literacy to actively handle and use information in a practical manner.

It is therefore important to ensure that citizens, regardless of their age, place of residence, education or occupation, are trained in the use of ICT devices. The information society will only benefit countries, social groups and individual citizens if it permeates human existence to the greatest extent possible. It is important that users have access to different sources of market information. Even partial use of this information strengthens each user's knowledge (Czaplewski, 2016).

The level of development of the elements shaping the information society outlined and discussed above indicates how advanced it is in meeting the social and economic needs of citizens, economic actors, institutions and organisations of various kinds. It also indicates the extent to which the state has moved away from

traditional ways of operating in the social and economic spheres to more utility-enhanced and less costly and time-consuming electronic forms.

The dynamics of moving to ever higher levels of development in the information society and adapting to the changes that are taking place are now a prerequisite for the success and development of individuals as well as entire communities. It is therefore worth knowing where the country stands in terms of the design and development of the information society in order to be able to take the necessary measures if required.

2. Research Methodology

The main sources of data used in the article are materials based on research and reports from the EU European Commission, Eurostat, the Central Statistical Office, the Office of Electronic Communications, the Polish Chamber of Information Technology and Telecommunications, ManpowerGroup, the Polish Agency for Enterprise Development and the Digital Economy Lab of the University of Warsaw for 2019-2022.

The theoretical considerations were based on the available literature dealing with the issues of the information society and information and communication technologies. In order to achieve the aim of the paper, the following research methods were used: critical analysis of the literature on the subject, the method of cause-effect analysis, the method of comparative analysis and the method of case analysis.

3. Data Analysis

The information society is a very complex and multifaceted matter, so that its comprehensive analysis requires a large number of reference systems. Due to the length of the article, the number of indicators to be analysed has been limited.

Access to the Internet and mobile telephony should be considered as basic indicators of the information society. Table 1 shows the availability of the Internet and mobile telephony in Poland and selected EU countries.

Table 1. Internet and mobile telephony availability in Poland and selected EU countries in 2021

No.	State	Household access in the UE		No.	State	Market penetration of fixed Internet services
		In cities	In rural areas			
1.	Netherlands	99%	98%	1.	France	47.7%
2.	Luxembourg	99%	97%	2.	Denmark	44.4%
3.	Finland	99%	97%	3.	Germany	43.9%
4.	Spain	97%	93%	4.	Malta	42.2%
11.	Poland	95%	93%	5.	Belgium	42.1%

	EU average	94%	90%		EU average	35.4%
26.	Croatia	91%	81%	26.	Latvia	25.5%
27.	Greece	90%	76%	27.	Poland	22.4%

Source: Telekomunikacja w 2021, GUS; Raport o stanie rynku usług telekomunikacyjnych w 2021, UKE.

The data presented in Table 1 indicate that households' access to the Internet in Poland is higher than the average for the countries of the European Union and does not differ significantly from the countries that took the top positions in the ranking. It should also be noted that rural households are only slightly less likely to have access to the Internet than urban households.

This means that there are no significant differences by place of residence in the potential opportunities for households to use ICT solutions and participate in the information society. Access to the Internet is provided by fixed (wired) and wireless technologies. A further analysis of the data in Table 1 shows that Poland ranks last in terms of fixed access, penetration of services Poland is in last place with a value of only 22.4%.

The European Union average in this service area is 35.4% and France, which leads the ranking, has a fixed Internet penetration rate of 47.7%. The advantage of fixed Internet is high throughput and more stable connections that are less sensitive to external interference, such as weather conditions, terrain or building density. As a result, the fixed Internet is largely used by so-called demanding users, institutions and businesses.

Today, however, wireless access technology is becoming increasingly sophisticated, and the shortcomings of wired Internet can be overcome by various wireless forms. For this reason, it would be appropriate to analyse the possibility of using the Internet provided under mobile conditions. Table 2 presents data on the penetration of mobile telephony and mobile Internet services in selected EU countries in 2021.

Table 2. Penetration of mobile telephony and mobile Internet services in selected EU countries in 2021

No.	State	Penetration of mobile telephony services	No.	State	Market penetration of mobile Internet services
1.	Estonia	149.1%	1.	Poland	199.8%
2.	Cyprus	148.7%	2.	Estonia	160.1%
3.	Slovakia	135.1%	3.	Finland	155.6%
4.	Lithuania	133.7%	4.	Latvia	138.7%
5.	Poland	132.1%	5.	Denmark	136.9%
	EU average			EU average	111.0%
26.	Hungary	105.5%	26.	Malta	80.4%
27.	Belgium	101.1%	27.	Hungary	79.5%

Source: Telekomunikacja w 2021, GUS; Raport o stanie rynku usług telekomunikacyjnych w 2021, UKE.

On the basis of Table 2, it can be concluded that Poland is at the top of the rankings in terms of penetration of mobile telephony and mobile Internet services. Of particular note is the level of penetration of mobile Internet services in Poland, which is significantly higher than in other European Union countries. Such a high level of mobile Internet use is probably compensating for the relatively low level of interest in fixed-line Internet.

However, two points should be made in this context. Firstly, it should be noted that access to mobile Internet access can be realised through a dedicated mobile access service provided without a mobile phone. Dedicated Internet penetration in Poland was at 23.5% in 2021 (UKE, 2021). Secondly, it is worth noting that anyone with a mobile data package is considered to be using the mobile Internet. There is no certainty that all people with data packages are actually using the Internet.

Another measure that is important for effective functioning in the information society is Internet speed. Table 3 shows the speed of fixed and mobile Internet in Poland and selected EU countries in 2022.

Table 3. Fixed and mobile Internet speeds in Poland and selected EU countries in 2022

No.	State	Fixed Internet speed	No.	State	Mobile Internet speed
1.	Luxembourg	131.95 MB/s	1.	Belgium	91.45 MB/s
2.	France	120.01 MB/s	2.	Lithuania	87.9 MB/s
3.	Spain	115.61 MB/s	3.	Croatia	79.4 MB/s
4.	Netherlands	113.98 MB/s	4.	Bulgaria	79.1 MB/s
5.	Romania	112.39 MB/s	5.	Sweden	72 MB/s
6.	Malta	107.70 MB/s	6.	Netherlands	70.85 MB/s
18.	Poland	55.82 MB/s	16.	Poland	38.9 MB/s
26.	Slovakia	21.19 MB/s	26.	Romania	32.3 MB/s
27.	Croatia	20.74 MB/s	27.	Hungary	30.37 MB/s

Source: www.cable.co.uk/broadband-speed-league; www.rtbenchmark.eu/en/quality-and-speed-of-mobile-internet-in-europe-h2-2022

In addition to the data in Table 3, it is worth noting that the highest Internet speeds in Europe can be found in telecom markets outside the EU: Liechtenstein - 21126 MB/s and Iceland - 191,83 MB/s. The data presented in Table 3 place Poland in further positions in terms of Internet speed, which are significantly different from the values obtained by the leaders of the telecommunications market in the European Union. It should be added that the results shown in the table are the results of individual choices made by the units using Internet access.

They themselves decide which parameters of Internet speed they want to buy, based on their needs and financial possibilities. The latter may be a determining factor in the choice of a particular Internet access option, so it is worth paying attention to the indicator related to the cost of using the ICT network.

This is a particularly important for countries with a significant proportion of people with relatively low financial capability. Data on the average cost of 1 GB in Poland and other European Union countries are presented in Table 4.

Table 4. Average cost per GB in USD in selected EU countries

No.	State	Average cost per GB (USD)	No.	State	Average cost per GB (USD)
1.	Italy	0.12	9.	Austria	0,94
2.	France	0.23	16.	Sweden	1.88
3.	Poland	0.41	17.	Netherlands	1.90
4.	Denmark	0.43	23.	Belgium	3,00
5.	Romania	0.45	24.	Czech Republic	3,01
6.	Spain	0.60	25..	Portugal	3.67
7.	Montenegro	0.60	26.	Greece	5,30
8.	Bulgaria	0.90	27.	Cyprus	5,34

Source: www.cable.co.uk/uk/mobiles-data-pricing

The data presented in Table 4 shows that the average cost of 1 GB of telecommunications services in Poland is one of the lowest in the European Union. Of course, the figures presented are relative, as they do not take into account the purchasing power of the population in individual EU countries. Nevertheless, such low costs should certainly have a positive impact on citizens' decisions to use ICT solutions and thus to participate in the information society.

Another important aspect related to the functioning of the information society is information on the extent to which Polish and EU citizens use Internet services. Data on this subject are presented in Table 5.

Table 5. Use of Internet services in Poland and the European Union

	Poland	EU
People who have never used the	15%	9%
Internet users	78%	85%
News	75%	72%
Music, films and games	75%	81%
Video on demand	15%	31%
Video calls	60%	60%
Social networks	66%	65%
Participation in an online course	7%	11%
Banking	59%	66%
Shopping	66%	71%
Internet sales	17%	23%

Source: *Digital Economy and Society Index (DESI 2020)*,

When analysing the use of online services by Polish citizens, it should be noted that

22% of citizens do not use the Internet, and as many as 15% have no experience in this area, as they have never tried to take an interest in this medium. Expanding on this issue, it should be added that only 43% of Polish citizens have at least basic digital skills, while the average for European Union countries is 54% (DESI, 2022).

This problem can be seen as a fundamental obstacle to the universal participation of Polish citizens in the information society. Looking at the rest of the data in Table 5, it can be seen that Poland differs from the average level of the European Union countries in most of the services analysed. Exceptions are services related to news, social networking and video calls. According to the DESI report (from which Table 5 is taken), Poland ranks 23rd in the use of Internet services.

An important aspect of citizens' participation in the information society is the use of the Internet for interacting with public authorities. Data on this issue is presented in Table 6.

Table 6. *Individuals using the Internet to interact with public authorities in 2021*

No.	State	Indicator	No.	State	Indicator
1.	Denmark	92.25%	9.	Latvia	77,43%
2.	Ireland	91.2%	10..	Austria	72,77%
3.	Sweden	90.63%		Euro Area	60.63%
4.	Finland	89.39%		EU average	58.50%
5.	Netherlands	87.27%	23.	Poland	47.50%
6.	Estonia	61.93%	25.	Italy	33.97%
7.	France	80.66%	26.	Bulgaria	26,60%
8.	Luxembourg	78.2%	27.	Romania	14,65%

Source: <https://ec.europa.eu/eurostat/web/products-datasets/-/TIN00012>

In the above ranking, Poland is well below the average of the European Union countries. Taking into account the fact that the electronic form of contact with public authorities offers many advantages, such as saving time and money, accessibility to public administration from practically any place, the results presented are not encouraging.

Firstly, some citizens, especially the elderly and those living in non-urbanised areas, still use the traditional form of contact with public authorities. Secondly, this makes it necessary for government and local authorities to maintain a large proportion of administration in the traditional form.

The information on the use of the Internet by citizens in their contacts with public authorities is complemented by data on the extent to which individual public services are used. This data is presented in Table 7.

Table 7. Use of digital public services in Poland and the European Union in 2022

	EU	Poland
Pre-filled forms	74%	64%
Digital public services for citizens	57%	75%
Open data	95%	81%

Source: Digital Economy and Society Index (DESI 2022),

The data presented in Table 7 shows that in Poland the use of pre-filled forms and access to open data, i.e. information made available free of charge by public authorities, is particularly high (well above the average for EU countries). Interest in using digital services offered to citizens is well below the European Union average.

An important area of analysis of Poland's adaptation to the information society is electronic civic and political participation in the countries of the European Union. Data on this matter is presented in Table 8.

Table 8. Electronic civic and political participation in Poland and the European Union in 2022

No.	State	Indicator	No.	State	Indicator
1.	Slovenia	30%	15.	Estonia	19%
2.	Malta	28%	16.	Bulgaria	18%
3.	Italy	27%	17.	Greece	18%
4.	Denmark	26%		EU average	18%
5.	Finland	26%	22.	Poland	14%
6.	Hungary	25%	24.	Croatia Belgium	17%
7.	Cyprus	23%	25.	Czech Republic	16%
8.	Netherlands	23%	26.	Germany	9%

Source: Civil and political participation 2022, Eurostat, <https://ec.europa.eu>

Civic and political activity via the Internet includes expressing opinions on civic issues on websites or in electronic media, participating in consultations and voting online. In Poland, only 14% of citizens% in European Union countries. The clear leader in the ranking is Slovenia with 30 % of civic and political activity online.

One of the most important indicators of the level of development of the information society is the digital literacy of citizens. Table 9 shows the digital skills of Polish citizens in relation to the average of European Union countries.

Table 9. Digital skills in Poland and EU countries in 2022

No.		Poland	EU
1.	At least basic digital skills	43%	54%
2.	Beyond basic digital skills	21%	26%

Source: Digital Economy and Society Index (DESI 2022)

The level of digital skills among the Polish population is well below the European

Union average. This is particularly visible and acute for universal participation in the information society in the case of the indicator on at least basic social skills. The value of the indicator at the level of 43% clearly proves that the majority of Polish citizens are not able to function in the digital reality.

4. Discussion

The level of development of the information society in Poland, as shown by the data presented above, varies greatly. There are areas where Poland is an absolute leader (penetration of mobile Internet services) and areas where it deviates significantly from the values of the indicators for the countries of the European Union and occupies the last positions (penetration of fixed Internet services). For this reason, the assessment of the level of progress of the information society will be the result of many service sectors.

A key factor in the emergence and development of the information society is access to information and communication technologies, in particular the Internet. In the case of Poland, its penetration rate indicates that it is an available and widely used tool in both urban and rural areas. Nevertheless, there is a significant proportion of people who do not use the Internet (22%).

In principle, it can be concluded that the Internet is not accessed by people who are uninterested, socially withdrawn, lack basic skills, not only technical, but also general, and those who have financial problems. The latter aspect relates not only to the question of financing Internet access, but also to the purchase of equipment to use it. It is safe to say that the problem of lack of Internet access in Poland mainly affects the elderly.

According to data from 2020, only 43% of people in the 65-75 age group in Poland use the Internet, while the European Union average is 61% (www.ec.europa.eu). According to another study, as many as 54.4% of people in this age group have never used the Internet (UKE, 2021). The problem is particularly acute in rural areas, where more than 55% of people who have never used the Internet live (FS).

Research shows that 66% of those who do not use the Internet cite a lack of need, despite the fact that, depending on the socio-demographic group, 20-45% of them have a device that allows them to access the Internet (Bartol, Herbst, Pierscińska, 2021). This largely explains the phenomenon of over 90% of households in Poland having access to the Internet. The issue of digital exclusion of older people is particularly important as age and health often limit the ability to meet many needs in traditional ways, while the Internet offers the prospect of alternative access to health care, government and local administration, as well as news or entertainment.

When analysing Polish citizens' access to the Internet, it is important to pay attention to its technical parameters, especially its speed. This indicator for both fixed and

mobile Internet differs significantly from the average of the European Union countries. In the case of fixed-line Internet, the lack of coverage of FTTH networks, which ensure high transmission speeds, in Poland is at the level of 47%, while the average of EU countries is at the level of 57% (www.ftthcouncil.eu).

On the other hand, the technical parameters of the mobile Internet do not differ substantially from the indicators obtained in countries that are more advanced in the development of the information society. The only explanation for the use of low transmission speed parameters is the low expectations of subscribers or their relatively modest financial resources. This is despite the fact that the prices of Internet access in Poland are relatively low compared to those in Europe. The level of prices for mobile telephony services and the tariff options generally chosen by Poles is illustrated by the fact that the average monthly revenue per subscriber in Poland is the lowest in the European Union and amounted to EUR 6.3 in 2001.

The average monthly revenue per subscriber in Poland is the lowest in the European Union and amounted to EUR 6.3 in 2001, with the average in the European Union being EUR 13.4 (UKE, 2021). Low prices are also reflected in the high penetration of mobile telephony and mobile Internet services. The level of use of Internet services by Polish citizens also mostly deviates in level from the average of the European Union countries.

This is particularly evident in the areas of banking services, online shopping and sales, and participation in online training. The use of the Internet for these areas of social activity allows significant savings in terms of time, financial resources and, in the case of some services, also any time. It should be assumed that such a low level of Internet use in these service areas is a consequence of the relatively high proportion of people who do not use the Internet. This situation is also likely to be the case when individuals interact with public authorities or participate in civic and political life electronically.

Despite the obvious benefits of both forms of social activity, their implementation in Poland is far from the average of the European Union countries. It should be in the interest of the state to promote the forms of public e-services outlined above, as a higher level of social participation in electronic public services is associated with lower costs than in their traditional counterparts. It seems that the state, in its well-understood interest, should also influence the level of digital literacy of its citizens, as this is one of the most important factors determining their active participation in the information society.

However, the use of basic electronic public services and many application forms that facilitate citizens' daily personal and professional activities requires at least a minimum level of skills related to functioning in the online world. And while the level of infrastructure for access to the digital world in Poland is above the average for the countries of the European Union, the lack of basic digital skills and, as a

result, incomplete social participation means that the country is lagging behind in the development of the information society.

5. Conclusion

The information society is one of the greatest challenges facing national governments today. The measures they take in response to its requirements are implemented with varying intensity, so that the level of information society development varies from country to country. The comparative analysis carried out in the article with other countries of the European Union shows that the level of development of the information society in Poland varies in its individual areas.

Access to Internet services, especially mobile Internet, is the most popular among subscribers and is the basis for widespread participation in the information society. This compensates to some extent for the relatively low level of fixed Internet. The main advantage of access to Internet services in Poland is the relatively low price, while the disadvantage is the low transmission speed offered and used by subscribers.

The main problems are related to a relatively high proportion of people not using the Internet and a significant lack of basic digital skills. This state of affairs makes it impossible for these people to fulfil their social and economic functions and thus to participate actively in the information society. In fact, one can speak of their exclusion from the community. It is therefore necessary for the state to intervene in this area, possibly through local authorities, as the problem affects a large number of people, mostly elderly and living in non-urbanised areas.

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