

Aldona FRĄCZKIEWICZ-WRONKA, prof. Ph.D.

University of Economics, Katowice
e-mail: afw@ue.katowice.pl
ORCID: 0000-0002-7077-1068

Maria ZRAŁEK, Ph.D.

Humanitas University, Sosnowiec
e-mail: maria.zralek@humanitas.edu.pl
ORCID: 0000-0001-7904-8485

Sabina OSTROWSKA, Ph.D.

University of Economics, Katowice
e-mail: sabina.ostrowska@uekat.pl
ORCID: 0000-0001-7434-3549

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**DIGITAL EXCLUSION OF SENIORS AS A BARRIER
TO LEADING A PRODUCTIVE LIFE
IN THE FOURTH INDUSTRIAL REVOLUTION¹**

Summary

Purpose – Analysis of the reasons for cyber exclusion of the elderly and a statistical illustration of this phenomenon in Poland

Research method – Literature review, analysis of current statistical data, synthesis.

Results – The introduction of modern ICT-based solutions can significantly help older people to remain independent and maintain a high quality of life. This is facilitated by strategic initiatives funded by the European Union, encouraging public units to take action to increase digital competences in society.

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Originality/value/implications/recommendations – Highlighting the role of public governance units in creating an ecosystem of support for building access to ICTs and increasing digital competence.

Keywords: digital exclusion of seniors, education and increasing digital competence, public management.

JEL classification: H40, H 400, I24

1. Introduction

The acceleration of the ageing process affects the size, structure and scope of societal needs, but it also forces authorities to look for new ways to provide public and social services efficiently [www 1]. As a consequence of recognising the demographic threats to the effective functioning of countries, the WHO prepared a new strategy document called Healthy Ageing and declared 2020–2030 as the Decade for Healthy Ageing [www 2, www 3]. The provisions of the indicated strategy are supposed to lead to the intensification of activities aimed not only at improving the quality of life of the elderly currently living, but also to urge governments of individual countries to undertake activities aimed at preparing the next generations for healthy old age. Measures to prevent discrimination, social exclusion and marginalisation of older people have been identified as most important. It is also crucial to increase their empowerment and presence in society and to improve the care and services offered to this age group. Solutions resulting from digitalisation and digitisation typical of the Fourth Industrial Revolution were identified in the Healthy Ageing Strategy as having a significant impact on the efficiency of public and social service delivery.

Digital technologies, especially technologies such as computers, smartphones, tablets and the Internet, have increasingly permeated all aspects of human life for more than two decades now. The problem, however, is that different age groups use them with different intensity [Hunsaker, Hargittai, 2018; Seifert, Rössel, 2019]. This raises the question of why older adults use the Internet rarely or not at all [Schulz et al., 2015]. An explanation for this phenomenon is increasingly being sought by more and more researchers not only in the endogenous determinants that characterise the elderly population, but also in the exogenous ones – pointing to the role of public governance units in counteracting, mitigating and preventing digital exclusion of people in this age group. Early research on digital exclusion emphasised the importance of

endogenous factors, i.e. mainly psychological factors, arguing that older adults are less likely to use the internet and other ICTs because they show higher levels of computer anxiety [Cattaneo et al, 2016; Charness, Boot, 2009; Lee et al, 2011; Neves et al, 2013; Silver, 2015], frustration with the difficulty of using user interfaces [Damodaran et al, 2013; Gatto, Tak, 2008; Hussain et al, 2017], negative attitudes towards technology [Kamin et al, 2017; Reisdorf, Groselj, 2017], and concerns about online safety, mainly in relation to the appropriation of personal data [Gatto, Tak, 2008; Hussain et al, 2017; Lee et al, 2011]. The main determinants preventing the use of ICT in older age [Bakaev et al., 2008; Charness, Boot, 2009] categorised as endogenous, also included health-related barriers, e.g. poor eyesight, hand tremor or cognitive impairment, making ICT use difficult and sometimes even impossible [Charness, Boot, 2009; Cresci et al, 2010; Damodaran et al, 2013; Gatto, Yes, 2008; Hussain et al, 2017; Lee et al, 2011; Lelkes, 2013], as well as low education and income [Charness, Boot, 2009; Cresci et al, 2010; Lelkes, 2013; Neves, Amaro, 2012]. Some studies even suggest that it is not the age alone, but rather a combination of experience and education level that determines the level of computer anxiety among older people [Fernández-Ardèvol, Ivan, 2015]. The last finding emphasizes the role of different forms of education as an opportunity to increase Internet use among older people. While research has identified many endogenous factors that explain why older adults do or do not use the Internet and other ICTs, less attention has been paid to examining the extent and effects of interventions to support the digital inclusion of older people by public management units, i.e. exogenous determinants. For a long time, research on such interventions has focused on online or traditional (face-to-face) training as essential activities for supporting older people in their use of the Internet [Černá, Svobodová, 2018; Damodaran et al, 2013; Esteller-Curto, Escuder-Mollon, 2012; Fernández et al, 2016; Kokol, Stiglic, 2011; Sitti, Nuntachompoo, 2013; Yamauchi et al, 2008] which has led to personalised learning being seen for many years as the most commonly used strategy to prevent digital exclusion in older age. However, such individualised accounts of Internet use and non-use in older age are being increasingly questioned. One of the more critical approaches to this topic has been framed as the so-called material praxeology of ageing with technologies [Wanka, Gallistl, 2018, p. 14]. It assumes that the use or non-use of ICTs in old age is not the result of a conscious decision or an individual learning process, but depends on a variety of factors operating within the citizen's social field, mainly the activity of public governance units, the content of discourses and the availability of digital technologies. From this perspective, not using the Internet and other ICTs

in old age is not an individual process, but a “co-constituted process in a social field, composed of actors, discourses and power relations” [Wanka, Gallistl, 2018, p. 14]. The above statement implies that public governance units can significantly influence the elimination of cyber-exclusion of older people and thus contribute to increasing their use of social services provided such as using the Internet and other ICTs. At the same time, it is important to note that while production systems are changing and adapting rapidly to the challenges of digital transformation, redistribution/social care systems dependent on limited public funding – are poorly innovative. Firstly, digital transformation is creating a new era of industrial production (Industry 4.0/Industry 4.0), which strongly influences the social sphere and builds a rudiment for the development of Government 4.0, Healthcare 4.0, Welfare 4.0 or Society 5.0. The above-mentioned phenomenon may be called an external modernisation effect of states and their public management entities. Secondly, the digitalisation of the state and the public service sector produces internal modernisation effects. These are related to the digitisation of processes related to the labour market, social welfare or health care, among others, and the technical environment, such as the spread of Internet connections and the expansion of broadband. In addition, internal modernisation consists of institutional support for the development of individual skills and abilities that digitisation requires in order to participate in social and professional life. Related to this is the question of how the state and its public governance units will deal with digital exclusion – and what public policy solutions can be identified to counter the effects of digital exclusion among older people in particular. In order to seek an answer to the problem formulated in this way, it is necessary to define the phenomenon of digital exclusion and characterise its level.

2. Digital exclusion – the concept

Digital exclusion is a relatively new concept that has emerged as a side-effect of the effects of the third industrial revolution, particularly evident now during the fourth industrial revolution. Every industrial revolution affects relations in society and causes a transformation of its social structures. The first and second revolutions were a long-term process (the first one started at the end of the 18th century, the second, at the turn of the 20th century). The next two (the third, in the 1970s and 1980s, the fourth is ongoing) are characterised by a rapid acceleration of change in the economic and social spheres. J. Rifkin [Rifkin,

2001, p. 86] stated that the third industrial revolution occurred “immediately after the Second World War and has had a significant impact on the way societies organise their economic activities since the early 1990s”. The advent of computers in the 1960s and the development of computerisation introduced large-scale automation of production and radical changes in the labour market, which contributed to the formation of the information society. As a consequence of the third revolution, in addition to the economic transformation, significant changes in the social sphere concerning the functioning of individuals, social groups and entire societies became a reality. The rapid technical progress associated with computerisation and informatisation revolutionised everyday life. Digital technologies have begun to permeate business activities and almost all aspects of daily and public life causing many activities to move into the digital space. The development of information and communication technologies has led to knowledge and information becoming strategic resources, rather than labour and capital as before. The computer, the Internet and various digital techniques for producing, collecting and using information have underpinned the creation of the information society [Maier, Emery, Hilliard, 2001, pp. 107–109].

The fourth industrial revolution currently underway is characterised by the explosion of the ubiquitous and mobile Internet, the formation of the cyber-physical system, the emergence of new developments such as the Internet of things, the Internet of services, the Internet of all things and the possibility of cloud computing (so-called clouds) [Schwab, 2018, pp. 17–21]. As M. Szpunar [Szpunar, 2018, p. 194] emphasises, for an information society living in the era of the fourth industrial revolution, the Internet has become the dominant technology that determines the course of a number of socio-cultural processes. It is also the main source of knowledge distribution and the primary tool for social interaction.

Many researchers [Ampuj, Koivisto 2014, pp. 447–463] argue that, according to D. Bell’s conception, the development of ICT in the information society makes knowledge a common good of the whole society, and free and equal access to it is the basis of democracy. The democratisation of knowledge allows all people to benefit from it without any restrictions. The ease of access to information creates the conditions for greater diffusion of knowledge, as the necessary information can be easily and affordably obtained electronically. In reality, however, the situation is much more complicated, as emphasised by D. Batorski [2009, p. 224] stating that “not everyone has access to new technologies and not everyone can benefit from them. With the growing importance

of computers and the Internet in practically all spheres of life, those who cannot or will not be able to use these technologies will become increasingly disadvantaged and excluded from social life”.

The development of the information society generates digital exclusion, which is a specific form of social exclusion. Due to the complex nature of the phenomenon of social exclusion, its unambiguous definition poses a number of difficulties. Common to various definitions is the emphasis that it is a complex, multi-causal and multidimensional phenomenon involving a lack of resources and rights. Ch. Gore and J.B. Figueiredo [2003, p. 18] emphasise that social exclusion can be considered as a condition (equated with relative deprivation), but also as a process that makes it difficult for a part of society to access economic resources, social goods and institutions that affect its destiny. As with the term social exclusion, the concept of digital exclusion is also difficult to define unambiguously. Ł. Arendt [2010, p. 28] defines this phenomenon as the occurrence of “inequalities in various levels of access to computers and the Internet and the use of the possibilities of information and telecommunication technologies for personal and professional purposes, conditioned by the level of information skills of the individual and/or the organisation”. The notion of digital exclusion is defined somewhat more broadly by D. Batorski and A. Płoszaj [2012, p. 8]. The cited authors draw attention to the occurrence of “differences between people who have regular access to information and communication technologies and are able to use them effectively and those who do not have such access. These differences are related both to physical access to the technologies and more broadly to the skills and resources needed to use them. The problem of digital exclusion is not about the use of technology per se, but rather about the differences in life chances, labour market situation, and opportunities to participate in social and cultural life that emerge between users and non-users or those with insufficient skills of use.” The characteristics of social and digital exclusion were presented by Ł. Tomczyk [2013, p. 118], attributing specific characteristics and the consequences associated with them to each of the mentioned disadvantageous social phenomena (Table 1).

Analysing the designations of digital exclusion proposed by Ł. Tomczyk, it can be noted that the development of modern technologies may in many cases become a factor generating or deepening the stratification of societies. J. van Dijk [2005, p.16] emphasises that “social equality is under threat, as some groups of people participate more in the information society than others. Some take advantage of the opportunities it creates, others are unable to do so. Technology enables a better distribution of knowledge, but its complexity and cost may exacerbate

existing inequalities and even create large groups of ‘misfits’ who do not fit into the information society”; he also points to the need to intensify efforts directed at education and the growth of digital skills and competences.

TABLE 1**Digital exclusion and social exclusion**

Social exclusion	Digital exclusion
Downgrading material, unemployment.	Lack of employment opportunities in a growing IT sector, inability to work in a position requiring IT skills.
Disrupted communication with the public.	Inability to connect with members of the public through available synchronous (instant messaging, chat rooms) and asynchronous (e-mail, discussion forums, communication tools).
Limitation or inability to use public institutions	Lack of opportunity to use e-government services (e.g. Internet voting, administrative support – submitting applications and requests via the network).
Discrimination.	Lack of regulations with effective practical transfer to minimise: white spots related to the access and education of non with IT expertise.
Lack of market access to universal services and trade	Deprivation of the ability to purchase goods online and to use other e-services (e.g. e-banking, e-health, e-libraries).
Cultural absenteeism	Limited access to Internet-generated culture (music, artistic creations, e-literature).

Source: [Tomczyk, 2013, p. 118].

3. Internet use by senior citizens in Poland

Population groups at risk of being digitally excluded are heterogeneous communities. There are many typologies of factors differentiating digital exclusion, but practically all of them point to age, education level and place of residence as important. Referring to the characteristics of the digitally excluded by age, it can be noted that older people are in the most difficult situation. This is confirmed by the results of research conducted by both the Central Statistical

Office [www 5, www 6] and CBOS [www 7]. Although the percentage of seniors using the Internet is systematically increasing, it is still significantly lower than among the general population. While in 2015 there were 21.3% of Internet users aged 65+ in this age group, 6 years later this number increased to 58.3%. The digital divide between the generations is significant and increases with age. The gap in Internet use is particularly evident in relation to young people. In the 16–24 age group, the share of Internet users in 2021 was 98.4%. There is therefore a clear generation gap in terms of the skills needed to use the Internet (Table 2).

TABLE 2

Internet users

Persons by total age group	age	16–24	25–54	55–64	65–74
	%	100.0	100.0	100.0	100.0
Internet users in the age group		98.4	97.6	81.9	58.3
Persons never using the Internet in the age group		1.6	2.4	18.1	41.7

Source: [www 6. Part 2 Table 4].

Frequency of Internet use in the last 3 months indicates that for the vast majority of users aged 16–24 it is a tool used daily or almost daily (97.5%). J. van Dijk [van Dijk, 2005, p.13] calls this group of users the information elite. As people get older, Internet use becomes less intensive and of those aged 65–74 using the Internet in the last 3 months, only 31.3% do so daily or almost daily. In addition, given that almost 42% of older people do not use the Internet at all, the scale of digital illiteracy among older people calls for action at various levels to include older people and develop their digital competences. People in the 55–64 and 65–74 age groups indicate [www 6, Part 2, Table 5] various reasons for not using the Internet, including the lack of need to use it (regarding the age group: 16.0% and 32.4%), lack of appropriate skills (13.4% and 27.1%), lack of appropriate equipment (3.6% and 8.%) and the fact that other people do it for them (3.5% and 7.5%). At the same time, it should also be noted that the most frequently used equipment is a smartphone or mobile phone, much less so a laptop or desktop computer. Older people most often used the Internet to communicate,

to participate in various forms of entertainment and to seek information about their own or their loved ones' health.

TABLE 3

Purpose of Internet use for private matters in the last 3 months

Persons by age group using the Internet in the last 3 months	age	16–24	25–54	55–64	65–74
	%	98.4	96.8	75.0	49.5
Communicating, including sending/receiving emails, telephone calls, social networking, use of instant messaging services e.g. Viber, Snapchat, Massanger, WhatsApp		98.2	91.6	61.8	37.3
Creativity in the sense of uploading one's own texts, photos, music, films on websites or through the application		41.6	19.4	5.8	3.5
Online reading of newspapers or magazines and searching for information about goods and services		89.2	88.0	67.6	43.5
Entertainment		90.0	72.3	37.7	19.9
E-health		36.3	55.3	42.7	29.9
Services, including the sale of goods and services via websites, online banking and use of travel-related services		47.9	69.3	39.6	19.3

Source: www 6, part 2 Table 8.

In each of the distinguished areas of Internet activity, the groups of people aged 55–64 and 64–74 show a significantly lower level of use of opportunities to satisfy their needs using modern technologies. The analysis of the data in Table 3 also reveals a low level of Internet use for dealing with administrative matters by people both in the 65–74 age group (15.8%) and by people from the so-called 'pre-old age' in the 55–64 age group (35.0%), while for 62.3% of the population aged 25–54 it is an obvious medium of communication with institutions [www 6, Part 2, Table 11]. As E. Ziemia and T. Papaj [2023, p. 362] write “currently, digitisation is coordinated with the goals and tasks set by the eGovernment Action Plan, and above all the closely related Operational Programme Digital Poland (POPC)”. In the POPC for 2014–2020, the digitisation of public management is dedicated to Priority Axis II, e-government and open government, including four measures:

Measure 2.1 High availability and quality of public e-services; Measure 2.2 Digitisation of back-office processes in government administration; Measure 2.3 Digital availability and usability of public sector information; Measure 2.4 Creation of services and applications using public e-services and public sector information. Many activities of the European Union are in line with the indicated trend, including, among others, the increase of financial resources for ICT development in the last programming periods under the cohesion policy (2006–2013, 2014–2020, 2021–2027) and the redefinition of objectives in the pro-development strategies of the Member States in force. The strategy ‘Digital Compass for 2030 The European Way in the Digital Decade’ [www 4] presented in March 2021 by the European Commission provides a vision and directions for digital transformation for the next 10 years in Europe. The main objective of the strategy is to build (1) a digitally skilled society and highly skilled digital professionals; (2) a secure, efficient and sustainable digital infrastructure; (3) the digital transformation of businesses; and (4) the digital transformation of public services.

4. Summary

Access to digital devices and digital literacy support people’s independent functioning in both economic, administrative, public and social spaces. However, the digital revolution can mean potential problems in accessing a variety of services, including public and social services for many people. The effective delivery of these to citizens is an issue facing decision-makers in governments implementing the welfare model. Changes in social structures and institutions, growing aspirations and needs of the society, changes in lifestyles and work, development of technologies and new forms of professional and social activities, changes within the family and interpersonal relations, growing willingness of citizens to participate and co-determine in decision-making processes, result in a growing demand for wide access to developed services provided also with the use of ICT. However, even the best-prepared IT infrastructure support will not be effective if its addressees do not see the benefits of digitisation and are not digitally literate. The IT revolution and the emergence of new communication tools create unlimited opportunities for accessing different types of information and services, but they also increase the risk of a “communication gap”, which particularly affects older people. Older people are less responsive to changes in the way their needs are met and find it more difficult to adapt to new requirements (e.g. e-registration or e-prescriptions), which means they are also at a greater risk of digital exclusion. The low participa-

tion of older people in using the Internet may be due to the presence of so-called 'hard barriers' and/or so-called 'soft' barriers. Hard barriers, i.e. financial barriers, coverage barriers and equipment barriers, i.e. those related to the lack of access and usability, are less and less decisive for digital exclusion. Soft barriers, on the other hand, are increasingly decisive factors for not using the computer and the Internet. They include, above all, the lack of skills to use new technologies, the lack of knowledge about what opportunities are offered by computers and the Internet, fears related to the use of the Internet, the lack of interesting services and content, the lack of interest in modern technologies and the need to use the Internet and the related self-exclusion. This manifests itself in an aversion to novelty and change and in the belief that learning new skills only lasts until a certain age [www 8]. The main barriers in not using the Internet [www 2, CSO 2021b] in the pre-old age group (55–64) and among the elderly (65–74) are soft barriers – the lack of appropriate skills – 13.4% and 27.1%, respectively, and the lack of need to use the Internet – 16.0% and 32.4%, respectively. In the sphere of hard barriers, health problems preventing the use of equipment unsuitable for the limited capabilities of seniors dominate [www 2, CSO 2021b]. As mentioned earlier, a number of strategic initiatives have emerged in recent years that have been directed at taking action to reduce digital exclusion, particularly for older people. Of course, strategies will only achieve their objectives if people are willing to change their behavioural patterns and the public sector undertakes initiatives aimed at counteracting digital exclusion, especially among older people. To sum up the discussion, it should be noted that the use of digital technologies by older people is important for their use of goods and services. Combating digital exclusion of seniors is therefore not only one of the factors of building the so-called silver economy, but also moving towards social welfare.

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