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Digital Inclusion in Old Age in Lithuania: Multiple Inequalities?

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Older adults in Lithuania are among the least technologically skilled compared to other social groups in the country and older adults in other countries. In this paper, we aim to investigate socio-demographic factors that facilitate digital inclusion in old age in Lithuania. We employ quantitative research methods and the data of the European Social Survey. We determined six significant factors of digital inclusion in old age: age, education, place of residence, economic activity, health, and Internet access at home. Considering all the factors of Internet use, we observe that older Internet users tend to be more privileged than non-users. They tend to be younger, have the highest education, live in urbanised areas, are employed, have access to the Internet at home, and have better health. Consequently, digital exclusion deepens the current cultural, social and economic exclusion of some older adults.

Keywords: digital inclusion, European Social Survey (ESS), information and communication technologies (ICT), Internet, older adults

INTRODUCTION

As European and world populations are aging, more attention is given to the social inclusion of older adults, in particular in relation to technology use. It has long been argued that digital literacy and ICT (Information and Communication Technologies) use positively affect the quality of life of older adults, by reducing depression, social isolation (Cotten et al. 2014), strengthening feelings of empowerment and independence (Hill et al. 2015). Despite the evidence about the effectiveness of technology on alleviating loneliness being contradictory (Beneito-Montagut et al. 2018), as some studies found no relationship between technology use and levels of reported loneliness (Burholt et al. 2020), most recent systematic literature review studies have further confirmed that (Nedeljko et al. 2021; Sen et al. 2022). In particular, ICT use facilitates communication between family members and the broader social network, thus limiting the likelihood of loneliness and reducing social isolation (Nedeljko et al. 2021; Sen et al. 2022). Furthermore, technologies could help meet the social needs of older adults with special needs, in cases with reduced mobility (Bruggencate et al. 2018), replace lost social connections after retirement or bereavement (Cornwell et al. 2008), help nursing home residents experiencing social isolation risk (Neves et al. 2015). The need for digital literacy in old age is also intensified by the shift in care, where the use of welfare technologies is increasing (Kamp

et al. 2019; Grosen, Hansen 2021). The COVID-19 pandemic, when increasingly more aspects of public life, as well as social services, have moved to the virtual sphere, has also created the context in which older adults face an even higher risk of social exclusion.

ICT use can be influenced by various socio-demographic factors: income, age, gender and race (Van Dijk, Hacker, 2003). However, most studies confirm the technological exclusion of older adults (He et al. 2022) as age was found to be a more important factor in digital inequalities than race, gender, and other socio-demographic characteristics (Cotten et al. 2011). Even among the older population, age continues to play an important role as the use of ICT among people aged 75 years is even lower than among those aged 65–74 (Crouch, Gordon 2019; Hargittai, Dobransky 2017; Matthews et al. 2019; Vulpe, Crăciun 2020; Yoon et al. 2020). In terms of intersecting inequalities, digital exclusion in old age is associated with gender (higher risk for women), lower socio-economic status, economic deprivation (Hargittai et al. 2019; He et al. 2022; Matthews et al. 2019), lower education (Hargittai, Dobransky 2017; Greenstein et al. 2024), poor health and disability (Matthews et al. 2019), widowhood and household composition (Lee 2024; Scholz et al. 2017). A recent study from North Tyneside (Wilson-Menzfeld et al. 2023), besides gender, age, educational level and employment status, found the presence of individuals aged 18–59 in a household with a self-reported disability and particular geographical locations as determinants of digital exclusion. The urban-rural digital divide is especially deep in old age (He et al. 2022; Greenstein et al. 2024). Less is known, however, about sociodemographic factors facilitating ICT use in old age, especially in the context of Eastern and Central European countries.

Older adults in Lithuania are among the least technologically skilled compared to other social groups in the country and older adults in other countries. In 2021, 56% of 65–74-year-olds in Lithuania used the Internet in the last 12 months compared to 90–100% of older adults in the majority of Northern and Western European countries (EUROSTAT 2022). Previous research in Lithuania has also shown that older adults, together with unemployed persons and residents in rural areas, experience a digital divide on multiple levels (Šuminas et al. 2018; Žilinskas 2011). Moreover, age appears to be the most important factor in Lithuania (Liubinienė, Thunqvist 2015). Geographic disparities and groups differentiated by age, income and socioeconomic status have been identified as particularly vulnerable to digital exclusion in the review of national social policy documents from 2001–2014 (Manžuch et al. 2018). The absence of Internet infrastructure, a lack of digital skills and limited understanding of the benefits of digital technologies remain key reasons for the digital divide, mostly affecting older adults, residents of rural areas, people experiencing homelessness and people with disabilities (Kasperė, Horbačauskienė 2023). The lack of digital skills among older adults and need for digitalisation of social services are stressed as current challenges for social policy (Žemaitaitytė et al. 2024). Recent research on older ICT users investigated their attitudes towards daily smartphone use and experiences in the study process in the Third Age Universities (Žemaitaitytė, Katkonienė 2019; Žemaitaitytė, Balčiūnaitė 2018); barriers to and facilitators of Internet use; the importance of intergenerational support; older adults' motivations and their attitudes towards online communication (Gedvilaitė-Kordušienė, Rapolienė 2023, 2024; Rapolienė et al. 2024 a; Rapolienė et al. 2024 b). To our knowledge, the social-demographic characteristics of Lithuanian older ICT users have not been explored.

In this paper, we aim to investigate what social demographic factors facilitate digital inclusion in old age in Lithuania. We use quantitative research methods and base our analysis

on the data of the European Social Survey. We use the indicator of Internet use as a proxy for digital literacy/digital inclusion, as is common in similar research.

DATA AND METHODOLOGY

Our study is based on the data of the European Social Survey (ESS). The ESS is a cross-national survey conducted around Europe since 2001. The Survey is administered by the European Research Infrastructure Consortium (ESS ERIC), which subscribes to the Declaration on Ethics of the International Statistical Institute. As we used secondary, freely available data, an additional ethical review was not required. More information about the ESS can be found on the official page of the Consortium (ESS ERIC, n.d.-a).

All the data used for this study are openly available in the EES Data Portal (ESS ERIC, n.d.-b)., links to specific datasets are provided in the references section ((ESS ERIC) ESS10 2023; ESS9 2023; ESS8 2023; ESS5 2023) and information on the respective sample sizes is given in Table 1. The question on the frequency of Internet use was included in the ESS waves 5, 8, 9 and 10 conducted in Lithuania in the years 2010, 2016, 2018 and 2020, respectively. In the 8th, 9th and 10th waves, there is an additional question on the amount of time (hours and minutes) spent daily on the Internet. Having these four data points in time has allowed us to assess how Internet use practices of older Lithuanians (60+ years old) have developed during the last decade.

For the analysis of factors associated with digital inclusion in old age in Lithuania, we used the ESS 10th wave. In addition to being one of the newest available data sources on Internet use, this wave also includes a rotating module (G1-G61) on digital social contacts in work and family life, which covers questions related to Internet access and skills, general perceptions of digital technologies, communications with family members and with work relations, etc. To ensure that results are representative of the national adult population, we used the ESS-recommended post-stratification weight (*pspwght*), which incorporates the design weight and adjusts the sample to match the Lithuanian population distribution. The use of this weight led to a small reduction in the number of cases due to missing values on the weight variable: the initial sample had 602 cases of 60+ individuals and the weighted sample had 519. Additionally, there were missing values on some of the predictors, which resulted in the final analytic sample of 494 cases.

We employed the binary logistic regression. The dependent variable was constructed from question A2: *People can use the Internet on different devices such as computers, tablets and smartphones. How often do you use the Internet on these or any other devices, whether for work or personal use?* Based on the answers, we distinguished two groups of older Lithuanians (60+ years old) – Internet users and non-users. Following the established protocol in similar research (e.g. Schnell et al. 2017; Hage, Noseleit 2018), we considered as non-users those who replied that they never use the Internet. We considered as users those who indicated that they use the Internet at least occasionally (occasionally, a few times a week, most days, and every day). Although the number of older adults who use the Internet in the Lithuanian sample is not large, it is sufficient to identify the key links between technology use and socio-demographic factors. Differences were considered statistically significant when $p < 0.05$.

Several various characteristics were used as independent variables: sociodemographic (age, gender, education, ethnicity and place of residence), socioeconomic (main activity last 7 days, feeling about household's income nowadays), family circumstances (has children/children living in the same household), health status (self-perceived general health) and availability of Internet access (being able to use the Internet at home). Age was the only continuous independent variable. All other variables were categorical. The variable of education was recoded

into three categories: 1) secondary and lower education (ES-ISCED 1–3); 2) post-secondary non-tertiary education (advanced vocational, sub-degree) (ES-ISCED 4); 3) tertiary education (bachelor level and above) (ES-ISCED 5). The question of the first language most spoken at home was used as a proxy for ethnicity, it was recoded into two categories: 1) Lithuanian; 2) Russian or Polish. We decided not to use question C25 – *Do you feel you are part of the same race or ethnic group as most people in [country]*? – as an indicator of ethnicity, because only very few people replied 'no'. This might be explained by the fact that the majority of Lithuanians are white; also the discourse on national identity appears to be changing in Lithuania as Lithuanian citizens of Russian or Polish ethnicity are increasingly referred to as Lithuanians in the public domain, thus transforming the formerly ethnic concept of 'Lithuanians' to a nation/citizenship-based one. Consequently, we consider the question of languages spoken at home to be a better indicator of ethnicity. The socioeconomic variable of the main activity last 7 days was also recoded into three categories: 1) paid work; 2) other (unemployed, permanently sick or disabled, housework/looking after children/others, other); 3) retired. The variable of family/household composition in terms of having children was comprised by combining the G10 and G13 questions, which asked how many children aged 12 or over the respondent had and if they lived in the same household. The variable on the place of residence was derived from question F14, where respondents could describe the area where they live: 1) a big city/the suburbs or outskirts of a big city; 2) a town or a small city; 3) a country village/a farm or home in the countryside.

DESCRIPTIVE ANALYSIS

The share of older adults in Lithuania who frequently use the Internet has increased 4.4 times from 2010 to 2020, from 8.6 to 38.4%, respectively (Table 1). However, the share of younger than 60 active Internet users has also significantly increased during that time period, reaching 85.7% in 2020. Thus, the digital inclusion gap between younger and older generations has become even larger at 47%.

When we look closer at the 60+ year-olds in the newest wave, we see that a significant proportion of them (35.1%) never use the Internet (Table 2). Among those who use the Internet, 26.4% use it only occasionally or a few times a week. Active users, who use the Internet most days or every day, make 38.4% of the group. In total, 64.9% of the 60+ year-olds can be considered Internet users.

Table 1. **Sample statistics of different ESS waves and the share of frequent Internet users by age groups**

ESS wave	ESS 5 (2010)	ESS 8 (2016)	ESS 9 (2018)	ESS 10 (2020)
Sample size (N)	1677	2122	1835	1659
Number and share of 60+ year-olds in the sample	681 (40.6%)	726 (34.2%)	871 (47.5%)	519 (31.3%)
Number and share of 60+ year-olds who use the Internet most days or daily	58 (8.6%)	110 (15.2%)	215 (24.8%)	200 (38.4%)
Number and share of younger than 60 who use the Internet most days or daily	499 (50.8%)	1007 (72.2%)	761 (79.1%)	974 (85.7%)

Table 2. **Number and share of 60+ year-olds by Internet use intensity in the 10th ESS wave**

	Non-users	Users			
Intensity of Internet use	Never	Only occasionally	A few times a week	Most days	Every day
Number of 60+ year-olds in the sample	183	94	43	55	145
Share of 60+ year-olds (%)	35.1%	18.2%	8.2%	10.5%	27.9%
Total N (%)	183 (35.1%)	336 (64.9%)			

There are significantly more 60+ women (62.8%) in the sample than men (37.2%) (Table 3), which represents the gender disparity in longevity on a population level – women's life

Table 3. **Sociodemographic characteristics of 60+ year-old Internet (non)-users (percent)**

	Non-users	Users	Total
Gender			
Male	29.1	41.5	37.2
Female	70.9	58.5	62.8
Education			
Secondary and lower education	81.7	51.2	61.9
Post-secondary non-tertiary education	12.2	23.2	19.3
Tertiary education	6.1	25.6	18.8
Age group			
60–69	33.3	70.2	57.2
70–79	42.6	25.3	31.4
80–90	24.1	4.5	11.4
First language most spoken at home			
Lithuanian	95.6	91.8	93.2
Russian or Polish	4.4	8.2	6.8
County			
Vilnius County	14.3	29.6	24.2
Kaunas County	20.3	14.0	16.2
Klaipėda County	8.2	14.0	12.0
Panevėžys County	7.1	5.4	6.0
Šiauliai County	17	11.0	13.2
Alytus County	11.5	9.6	10.3
Telšiai County	4.9	3.3	3.9
Utena County	2.7	5.1	4.3
Tauragė County	0.5	1.5	1.2
Marijampolė County	13.2	6.6	8.9

expectancy in Lithuania is around 10 years longer than men's. As of 1 January 2022, the number of retirement-age women is almost double that of the number of retirement-age men, 403,289 and 210,075, respectively (Statistics Lithuania 2022). However, men are more likely than women to be internet users, and this gender difference is statistically significant (as measured with Pearson Chi-Square).

All other sociodemographic differences, except for ethnicity, were also statistically significant. Users tend to be younger – the majority of them fall into the age group 60–69 (70.2%), whereas among the non-users the largest age group is 70–79 (42.6%), with the oldest age group – 80–89 (24.1%), also representing quite a large proportion. Among users, there is also a larger share of those who have obtained post-secondary non-tertiary and tertiary education (48.8%), among non-users, the majority had only secondary or lower education (81.7%). In terms of ethnic background, users had a slightly higher share of those who speak Russian or Polish as their first language at home compared to non-users. The majority of users (57.6%) live in the counties of the 3 major Lithuanian cities of Vilnius, Kaunas and Klaipėda. Most non-users (56.9%) reside in other, more peripheral, less populated and less economically advanced counties (counties of Šiauliai, Panevėžys, Telšiai, Alytus, Utena, Tauragė and Marijampolė).

Table 4. **Internet access in various locations. Share of 60+ individuals (percent) who have access**

	Non-users	Users	Total
At home	17.5	89.3	64.0
At workplace	0.0	18.5	11.9
On the move	0.0	18.4	11.9
At some other place (such as a café or a friend's house)	0.5	19.6	12.9

Having Internet access is the main precondition for its use. When asked at which locations respondents could access the Internet if they wanted to, only 64% of older adults indicated they could do so at home (Table 4). Among those who never use the Internet, the small minority of 17.5% have access to it at home; in comparison, of those who use the Internet, the majority – 89.3% – have access at home. The non-users also indicated that they cannot access the Internet in any other place – at work, a café, a friend's house, etc. This might be an indication that some older adults do not use the Internet not because they do not want to, but because they have no access to it, due to whatever other reasons – lack of finances, knowledge, equipment, skills, support, and living in remote rural areas. On the contrary, among those who use the Internet, some have access to it not only at home but also at the workplace, other places, and even on the move. We can conclude that access to digital technology and/or Internet connectivity is unequally (socially, economically and geographically) distributed among the older population in Lithuania.

FACTORS OF DIGITAL INCLUSION

Six sociodemographic factors were statistically significant in the final model: age, education, subjective general health, place of residence, economic activity, and Internet access at home (Table 5). As expected, as age increases, the odds of being an Internet user decrease. Higher

Table 5. **Results of the binary logistic regression***

	Exp(B)	Sig.
Sociodemographic characteristics		
Age	**0.921**	**0.003**
Gender (ref. male)	0.944	0.866
Ethnicity (ref. speaks Lithuanian most time at home)	1.308	0.699
Education (ref. secondary and lower education)		
post-secondary non-tertiary education (advanced vocational, sub-degree)	1.277	0.575
tertiary education (bachelor level and above)	**4.840**	**0.008**
Place of residence (ref. a country village/a farm or home in the countryside)		
a town or a small city	0.879	0.724
a big city/the suburbs or outskirts of a big city	**3.461**	**0.024**
Family characteristics		
Having children (ref. has no children)		
has children who live separately	0.435	0.64
has children who live in the same household	0.795	0.719
Health		
Subjective general health (ref. very good/good)		
fair	1.518	0.312
bad/very bad	**0.304**	**0.028**
Socioeconomic characteristics		
Main activity last 7 days (ref. paid work)		
other	0.415	0.215
retired	**0.217**	**0.008**
Feeling about household's income nowadays (ref. living comfortably on present income)		
coping on present income	1.987	0.322
finding it difficult or very difficult on present income	1.960	0.359
Internet access availability		
Access to the Internet at home (ref. does not have)		
Has access at home	**51.454**	**0.000**
Cases included in analysis	**494**	
Nagelkerke R Square	0.72	

* Statistically significant results presented in **bold**.

education appears to be one of the most important factors of Internet use – those who have a tertiary education are 5 times more likely to use the Internet than those who have secondary or lower education. However, the positive effect of post-secondary non-tertiary education on Internet use is not statistically significant. Place of residence also plays an important role – older adults living in a big city, or the suburbs of a big city, are 3.5 times more likely to

use the Internet than those who reside in a rural area. Interestingly, those who live in a town or a small city have slightly lower odds of Internet use than those who live in rural areas, but the difference is not statistically significant.

We expected that having children and especially living with them in the same household might increase the odds of Internet use as (adult) children might help their older parents with technology. However, the opposite is the case – childless older adults have higher odds of Internet use, both compared to older adults who live with their children in the same household and those who live separately from their children. Yet, this difference was not statistically significant.

Out of the two socioeconomic characteristics that we evaluated, the first one was statistically significant – the main activity during the last 7 days. Older adults who are still employed have almost 80% higher odds of internet use than retired. This is expected, as a socioeconomic gradient usually plays an important role in most sociological research in Lithuania. Earning higher income, being in better economic circumstances also increases the chances of having the necessary technology for Internet access. However, the fact that the perception of current household income was statistically insignificant indicates that being active in the labour market is more important for Internet use than living comfortability financially.

We also considered health as a possible determinant of Internet use. This factor appeared to be statistically significant. Older individuals who evaluated their general health as bad or very bad have 70% decreased odds of Internet use compared to those who evaluated their health as good or very good. The 'in-between' category of 'fair' health was not statistically significant.

The last and most important factor of Internet use in old age is having access to the Internet at home. Those who indicated that they could use the Internet at home if they wanted to are 51 times more likely to use the Internet than those who do not have this possibility. It appears that unequal (social, economic and geographical) access to digital technology and/or network connectivity could be the main factor of digital exclusion in old age in Lithuania.

Nagelkerke R Square is 0.72, thus, the model exhibits a very good fitness.

DISCUSSION

The article aims to explore social demographic factors that facilitate digital inclusion in old age in Lithuania. For analysis, various sociodemographic characteristics (age, gender, education, ethnicity, and place of residence), family, socioeconomic, health, and Internet access circumstances were evaluated. In the final logistic regression model, six factors were statistically significant: age, education, place of residence, main activity last 7 days, subjectively perceived health, and access to the Internet at home. We will discuss them separately.

As age increases, the probability of using the Internet in Lithuania decreases. This is in line with most research on digital inclusion in old age. A review examining the state of research of Internet use among older adults has found that almost universally 'old-old' are less likely to use the Internet than 'young-old' (Hunsaker, Hargittai 2018). Also, in line with other studies (Gallistl et al. 2020), the level of education is significant – older adults with a tertiary education in Lithuania are more likely to use the Internet than those with a secondary or less than secondary education.

In line with other studies that found women to have a higher risk of digital exclusion (Matthews et al. 2019; Gallistl et al. 2020), gender was a significant factor in our descriptive analysis. However, after taking into account other factors in the logistic regression, even though men were still slightly more likely to use the Internet, this difference was no longer statistically significant. Our result contributes to studies indicating that, in contrast to age, 'gender

differences are not as clear-cut' (Hunsaker, Hargittai 2018: 13). Earlier studies suggested that Internet use was seen as a male-dominated activity, because ICT-related occupations were stereotypically masculine (Margolis, Fisher 2003). However, later studies showed that there were no gender differences in Internet performance tests, rather, women tended to underestimate themselves in self-assessments (Van Deursen, Van Dijk 2010). Thus, gender stereotypes do not appear to prevent older adults from using ICT in Lithuania.

In terms of other sociodemographic characteristics, the results are again mixed. In Lithuania, ethnicity was not important, though it has been shown to be significant in other studies (Chang et al. 2015; Yoon et al. 2020). This could be due to the fact that Lithuania is mostly homogeneous, especially in terms of race (mostly white), and ethnic differences are less pronounced. Whereas elsewhere, in particular in research coming from the US, ethnicity often refers to race, and findings suggest that the racial/ethnic minority status becomes a determinant of the digital divide in combination with the lower socioeconomic status (Yoon et al. 2020). In our study, the socioeconomic status as measured by economic activity is also an important source of digital exclusion.

However, the main factor associated with the likelihood of Internet use among older adults in Lithuania is access to it at home. Elderly people who do not have Internet access at home have very low chances of using it. The importance of the presence of a computer at home for the older population to access the Internet has been shown elsewhere (Chang et al. 2015), as well as the fact that the majority of the older population accesses the Internet only from a single location (Hargittai et al. 2019). In the descriptive analysis, we showed that this is also the case for Lithuania – most Internet users have access to the Internet at home, only around one-fifth have access in other places (work, library, café, etc.). At the same time, only a minute proportion of non-users indicated that they could access the Internet at home if they wanted to, and none indicated they could access it elsewhere. Combined with the fact that the place of residence is a statistically significant determinant of Internet use – living in rural areas decreases the chances of Internet use compared to those living in big cities and their suburbs – these findings raise important questions about regional inequalities in Internet access. Urbanisation is a known factor of Internet use in other countries (Gallistl et al. 2020), and other studies in Lithuania have also found a high degree of the digital divide between the country's regions (Žilinskas 2011). Is this the issue of Internet technology coverage over different areas of Lithuania, too high financial costs for older adults to install it at home, or a lack of motivation and/or knowledge to do so?

CONCLUSIONS

Considering all the statistically significant factors of Internet use together, we can conclude that older Internet users in Lithuania tend to be more privileged than non-users. They tend to be younger, have the highest education, live in urbanised areas, are employed, have access to the Internet at home, and have better health. In other words, digitalisation benefits older adults who already possess cultural, social and economic resources – the 'rich-get-richer' effect, as was noted by Anderson (2001), while the situation of those at risk of social, cultural and economic exclusion is further worsened by digital exclusion. Consequently, these findings call for targeted social policy measures aimed at improving the digital inclusion of multiply excluded older adults, such as economically deprived older adults in rural areas without Internet access at home.

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Vyresnio amžiaus žmonių skaitmeninė įtrauktis Lietuvoje: daugialypės nelygybės?

Santrauka

Vyresnio amžiaus suaugusieji Lietuvoje yra tarp mažiausiai technologiškai įgudusių, palyginti tiek su kitomis socialinėmis grupėmis šalyje, tiek su vyresniais suaugusiaisiais kitose valstybėse. Šiame straipsnyje siekiama išanalizuoti sociodemografinius veiksnius, skatinančius skaitmeninę įtrauktį vyresniame amžiuje Lietuvoje. Remiantis Europos socialinio tyrimo duomenimis, nustatyti šeši reikšmingi skaitmeninės įtraukties senatvėje veiksniai: amžius, išsilavinimas, gyvenamoji vieta, ekonominis aktyvumas, sveikata ir interneto prieiga namuose. Įvertinus visus interneto naudojimo veiksnius, pastebėta, kad vyresnio amžiaus interneto naudotojai yra labiau privilegijuoti nei jo nenaudojantys: jie dažniau būna jaunesni, turintys aukštesnį išsilavinimą, gyvenantys urbanizuotose teritorijose, yra ekonomiškai aktyvūs, turi prieigą prie interneto namuose ir pasižymi geresne sveikata. Taigi skaitmeninė atskirtis pagilina esamą kultūrinę, socialinę ir ekonominę kai kurių vyresnių suaugusiųjų atskirtį.

Reikšminiai žodžiai: skaitmeninė įtrauktis, Europos socialinis tyrimas (EST), informacijos ir komunikacijos technologijos (IKT), internetas, vyresnieji suaugusieji