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Digital Engagement of Older Adults in Lithuania: Obstacles and Support Opportunities

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Summary. While Lithuania advances rapidly in the ICT sector, a digital divide persists among older adults. A study of 289 elderly Internet users highlighted key barriers and facilitators in digital engagement. Motivation stemmed from personal qualities like curiosity and past work experience with digital tools. Major barriers included language challenges, technical jargon, limited support, device comprehension issues, and emotional factors. Formal and informal training, peer support, gaming's role, and family, particularly younger members, emerged as crucial learning aids. The study underscores the need for strategies tailored to enhance digital inclusion of older people in Lithuania.

Key words: digital inclusion, older adults, barriers and facilitators of digital inclusion

Skaitmeninis vyresnio amžiaus žmonių įsitraukimas Lietuvoje: barjerai ir pagalbos galimybės

Santrauka. Lietuvoje informacinių komunikacinių technologijų (IKT) sparti kaita vyksta paraleliai su gana dideliu vyresnio amžiaus žmonių skaitmeninio dalyvavimo atotrūkiu. Remiantis Kebede ir kt. (2022) apibendrintu teoriniu modeliu, straipsnyje siekta ištirti vyresnio amžiaus žmonių skaitmeninio įsitraukimo kliūtis ir jį lengvinančius veiksnius. Buvo atlikta vyresnio amžiaus interneto vartotojų nereprezentatyvi internetinė apklausa (N=289). Remiantis tyrimo rezultatais, asmeninės savybės, tokios kaip smalsumas ir ryžtas, buvo didžiausia paskata mokytis IKT. Ankstesnė darbo su skaitmeninėmis priemonėmis patirtis palengvino jų naudojimą vyresniame amžiuje. Tyrimo duomenų analizė parodė, kad dominuojančios kliūtys naudotis IKT susijusios su reflektyvios motyvacijos ir galimybių kategorijomis. Anglų kalbos nemokėjimas ir techninio žargono nesupratimas buvo pagrindinės kliūtys. Kiti reikšmingi barjerai – ribota techninė pagalba, įrenginių veikimo principų supratimo problemos, mentorystės trūkumas. Emocinės kliūtys, tokios, kaip klaidų baimė,

nesaugumas ir mokymosi sunkumai, taip pat kėlė iššūkių. Skaitmeninį įtrauktumą skatinančių veiksnių analizė atskleidė formalaus ir neformalaus mokymo svarbą, bendraamžių pagalbos, žaidimų vaidmenį mokyme. Šeima, ypač vaikai ir anūkai, vaidino esminį vaidmenį mokantis. Nors asmeninė motyvacija yra svarbus veiksnys, išoriniai ištekliai ir parama yra būtini. Tyrime pabrėžiamas vyresnio amžiaus žmonėms pritaikytų strategijų poreikis, siekiant gerinti skaitmeninę įtrauktį Lietuvoje.

Pagrindiniai žodžiai: skaitmeninė įtrauktis, vyresnio amžiaus žmonės, skaitmeninės įtraukties barjerai ir pagalba

Introduction

Poor digital skills is a significant risk indicator of the digital exclusion in old age (Rene-land-Forsman, 2018; Schirmer et al., 2022). The lack of digital skills might limit older adults' possibilities to access and manage their data, as well as participate in online activities (Takagi et al., 2014). The notion of digital skills, according to updated Digital Skills Indicator, is not limited to use of digital devices; it includes information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving (European Commission, 2022). Thus, digital skills refer not only to the ability to find and evaluate information on the Internet, but also to social skills as ability to communicate online, which are fundamental civic skills in a rapidly digitalizing society (Ilomäki, et al., 2016).

Previous literature reveals technological, sociocultural, and economic barriers for older people to use various kinds of technologies, e.g., mobile phones (Schaar et al., 2012). Age-related learning problems or poor learning memory is a major concern for older people handling a variety of available applications (Börsch-Supan et al., 2013; Morris et al., 2012; Dumas, 2017), together with aging body-related issues like hand tremors when using touch screens, prolonged search for icons, delays in deciding which of them to choose, quickly forgetting the points learnt (Hardill, 2012; Lelkes, 2013; Hoogendam et al., 2014), vision and hearing problems (Michalowsky et al., 2019). Insufficient technological literacy (Takahashi et al., 2014; Lelkes, 2013), as well as lack of English knowledge, predominant negative attitudes toward the use of mobile phones, inability to upgrade the software and high costs are also found to be important factors (Navabi et al., 2016, Van Deursen & Helsper, 2015). Negative attitudes are associated with computer and Internet anxiety (Durndell & Haag, 2002). Fear of cybercrime and fraud contributes to negative attitudes among older people (Peek et al., 2014; Samantha et al., 2013). Another source of negative attitudes – previous experiences with viruses, data loss, and inability to cope with these difficulties – prevents older adults from using the Internet (Dutton & Blank, 2013). Difficulties with using devices are intertwined with psychological aspects, like increased anxiety, which might manifest itself as apprehension, nervousness, and general discomfort (Gelbrich & Sattler, 2014). Finally, research suggests that ageism also influences technology adoption: people experiencing ageism are less willing to use the Internet, perceiving it as unhelpful rather than beneficial for older people and finding it more difficult to use (Choi et al., 2020).

According to Kebede et al. (2022), past research has heavily focused on the individual's motivational behavior, including views on outcomes, perceived value, and beliefs

about abilities like perceived utility and ease of use (Chung et al., 2020., Davis, 1989), however, to bridge the age-related digital divide, it is essential to extend understanding beyond just motivation and consider all other influencing factors. Moreover, there is a lack of understanding of how the complexity of obstacles manifests in local contexts. Lithuania represents a case in the Central and Eastern Europe region where the digital divide among older adults is particularly pronounced. Šuminas et al.'s (2018) analysis of the socio-demographic groups experiencing the digital divide in Lithuania revealed that older adults are among the most digitally excluded (Šuminas et al., 2018). Other areas of research on the topic include strategic priorities and specific measures for reducing digital exclusion (Manžuch et al., 2018), the digital divide in Lithuanian regions (Žilinskas, 2011), ICT users with disabilities (Viluckienė, 2015), and the organization of public electronic services in rural areas (Aleksandravičius, 2017). Mikulionienė et al. (2018) addressed digital literacy in Lithuania within the EU context as one of the factors contributing to the social exclusion of older people. While the issue of digital exclusion has been explored by researchers, a more detailed examination of the Internet use patterns and factors that hinder and facilitate ICT learning among older adults is needed.

Lithuania is renowned for its rapidly advancing information and communication technologies (ICT) sector. This progress is propelled by factors such as high-speed internet and a favorable tax system that attracts entrepreneurs from around the world. This has resulted in the establishment of prominent companies in software development, game development, artificial intelligence solutions, and fintech industries within Lithuania. However, despite the overall growth in ICT ownership and usage among the Lithuanian population, there is a significant generation gap when it comes to digital inclusion. Unfortunately, the rapid development of the ICT sector has left older adults behind in terms of digital inclusion. In 2022, the usage of smartphones among older adults (aged 65–74) stood at a mere one-third (34.5%) compared to the younger population (aged 16–34), where the vast majority (98–99.8%) were equipped with these devices (Official Statistics, 2022). Similarly, in 2022, over 99% of the youngest age groups (16–34) were using the Internet. The proportion of 65–74-year-olds was significantly lower, i.e. 57.1%.

This paper addresses the problem that we still lack a comprehensive approach and knowledge regarding the factors hindering digital inclusion among older adults in Lithuania, focusing on the perspective of older individuals. Based on an online survey of older Internet users, this article aims to uncover the Internet use patterns, motivating factors that influence digital involvement, and explore the barriers older adults face while learning ICT. Hence, the novelty of this paper lies in its focus not only on barriers but also on motivating factors and facilitators, providing insights from the perspective of older individuals who have successfully overcome the obstacles and learned to navigate the Internet. By addressing these barriers and leveraging the identified facilitators, efforts to enhance digital inclusion for older adults in Lithuania can be significantly improved.

1. Theoretical background:
factors and barriers using ICT in older age

In this paper, we apply a theoretical model suggested by Kebede et al. (2002) on the basis of Capability, Opportunity, Motivation and Behaviour (COM-B) and Theoretical Domains Framework (TDF) models. This comprehensive framework was chosen for the analysis because it encompasses both intrinsic elements related to an individual's capabilities and motivations, as well as extrinsic elements associated with social, technological, and environmental factors (Kebede et al., 2022). The COM-B model provides a holistic framework for examining the interplay between an individual's capability, the opportunities available, their motivation, and how these factors collectively shape behavior (Michie, 2011). The Theoretical Domains Framework (TDF) provides a structured approach to analyzing factors influencing behavior (French et al., 2012). The TDF identifies 14 theoretical domains, each representing a distinct aspect of behavior change. These domains include knowledge, skills, social and professional roles, beliefs about capabilities and consequences, motivation and goals, memory, attention, and decision processes, environmental context and resources, social influences, emotions, behavioral regulation, nature of the behavior, and goals. The combination of TDF and COM-B provides a comprehensive and systematic approach to understanding of behavior. TDF offers a detailed exploration of theoretical domains, while COM-B provides a broader perspective on capability, opportunity, and motivation. Together, they enable a thorough analysis of the factors influencing digital involvement among older adults. TDF allows for a detailed examination of various psychological and environmental factors that might affect behavior. COM-B, with its focus on capability, opportunity, and motivation, complements this by providing a holistic view of the contextual and individual determinants. The integration of both frameworks ensures a nuanced understanding of the multifaceted influences on digital involvement. Kebede et al. (2022) in the scoping review suggested applying both approaches to synthesize the barriers and facilitators of older people's digital engagement.

The digital involvement of older adults can be viewed through a three-phase progression: nonengagement, initial adoption, and consistent usage (Kebede et al., 2022). Digital tools that are cost-effective, user-friendly, and valuable, especially those that cater to the unique needs and capabilities of seniors, play a significant role in enhancing their digital engagement. Furthermore, the expertise and ability to navigate digital platforms are crucial elements. Implementing interventions specifically designed for older individuals, focusing on their skills, incentives, and chances, is essential for promoting their active participation in the digital realm. Kebede et al. (2022) provide a summarizing theoretical framework segmented into three core elements based on the COM-B and TDF models:

- *Physical and Psychological Capacities.* This covers areas such as skills, awareness, memory, focus, and the decision-making process.
- *Motivation (Automatic and Reflective).* The automatic and reflective motivation domain refers to the intrinsic processes for behavior and decision-making. Automatic motivation refers to the behaviors that are driven by immediate reactions,

impulses, or deeply ingrained habits that don't involve deliberate thinking, while reflection involves conscious decision-making and active self-reflection. Thus, this domain delves into the intrinsic cognitive processes steering behaviors and decisions, be they conscious or unconscious. Factors incorporated here include beliefs about one's abilities, optimism, perceived outcomes, intentions, objectives, reinforcements, and emotions.

•   *Opportunity.* This dimension encompasses the environmental setting and societal impacts.

This conceptual framework, based on both the COM-B model and TDF, draws on elements from both social and computer sciences. The integration of these frameworks allows us to bridge psychological and social context factors, providing a holistic understanding of the complex dynamics influencing digital involvement among older adults. The COM-B model leans towards a more positivist perspective, emphasizing measurable elements such as capabilities, opportunities, and motivations. On the other hand, the TDF accommodates a broader spectrum, including social and environmental influences, which aligns well with a more constructivist perspective. To contextualize this framework within a broader theoretical landscape, it is essential to recognize its interdisciplinary nature. While rooted in psychological and behavioral theories, the framework also embraces insights from sociology, technology studies, and environmental psychology. This interdisciplinary approach enriches our understanding of the multifaceted factors impacting digital involvement. By identifying specific theoretical domains through TDF and understanding the core components of behavior change with COM-B, interventions can be designed to address the identified barriers and leverage motivating factors, improving the effectiveness of initiatives aimed at enhancing digital involvement among older adults. In summary, the combined use of TDF and COM-B offers a synergistic approach, allowing for a detailed examination of motivation constructs, contextual factors, and the core components of behavior change. It helps researchers and practitioners to consider not only the individual factors but also the broader contextual aspects that contribute to or hinder digital involvement.

2. Methodology

Description of survey, recruitment, and sample. The primary aim of our research is to understand the factors that encourage and hinder seniors from using ICT, with a specific focus on those who are already engaged in internet usage. By targeting older adults with digital literacy skills, we aim to gain insights into the experiences, motivations, and barriers faced by individuals who have successfully navigated the digital landscape. These participants can provide valuable information on what encourages and hinders digital engagement among older adults who have overcome initial barriers and are actively using ICT. Their experiences may provide indirect insights into the challenges faced by those without such skills.

Table 1. **Socio-demographic characteristics of respondents.**

	N	%
Gender		
Male	21	7.3
Female	268	92.7
Age		
50–64	15	5.7
65–69	120	45.3
70–74	86	32.5
75–79	31	11.7
80+	13	4.9
Place of living		
5 biggest LT cities	154	53.3
Towns	93	32.2
Villages and small towns	42	14.5
Education		
Higher (university)	197	68.6
Tertiary	85	29.3
Secondary	6	2.1
Ethnicity		
Lithuanian	275	95.2
Russian	8	2.8
Polish	1	0.3
Other	4	1.4
Occupational status		
Works	46	15.9
Pensioner	241	83.4
Marital status		
Nonmarried (single)	25	8.9
Married	127	45.2
Divorced	38	13.5
Widower	85	30.2
Other	6	2.1
Living arrangement		
With children	27	10.3
Without children	234	89.7

The decision to employ a nonrepresentative online survey was guided by the specific research objective of understanding the factors influencing digital inclusion among older adults actively engaged in Internet usage. A previous qualitative study involving Internet users helped identify categories that we aimed to quantify through this survey. Semis-tructured interviews were conducted between April and May 2022 with older Internet users (N=36) and their facilitators (N=9). Practical considerations, including the accessibility of the target population, as well as the need for a study that could be conducted quickly, also factored into the choice of research design.

An online nonrepresentative survey (N=289) was conducted between February and March 2023 using the SurveyMonkey platform. Respondents were recruited via convenience sampling, primarily from the Third Age University departments in Lithuania and through social networks. The main criteria for participation were active Internet usage and being of an older age. Although our target was primarily those aged 65 and above, we also received responses from individuals aged 50 and above. Although the digital inclusion of the 50+ age group, as compared to the 65+ group, is slightly higher, the difference is not significant. Given that both groups likely encounter similar challenges when learning ICT, we included the younger respondents in our analysis.

Females constitute the majority of the sample (92.7%), reflecting both the demographic age structure of the older population and gender tendencies in survey participation (Table 1). The predominant age brackets are 65–69 (45.3%) and 70–74 (32.5%). Over half (53.3%) of the respondents live in Lithuania's five largest cities, while 32.2% reside in towns. Educationally, 68.6% of the sample have a university-level education. In terms of ethnicity, Lithuanians are predominant (95.2%). By occupational status, 83.4% of the sample are pensioners. Marital status is diverse with 45.2% being married and 30.2% comprised of widowers. Living arrangements indicate that 89.7% live independently of their children, while 10.3% live with their adult offspring.

Research ethics. In adherence to rigorous research ethics, the questionnaire provided participants with a comprehensive understanding of the study's purpose, emphasizing the voluntary nature of participation. Participants were reassured that they could withdraw from the study at any point without facing any consequences. The principles of confidentiality and anonymity were diligently upheld throughout the survey, ensuring that participant responses would be treated with the utmost privacy and that no personally identifiable information would be disclosed.

Variables and data analysis. The patterns of Internet usage were measured by the following variables adopted from the European Social Survey instrument:

- Frequency of Internet usage: *People can access the Internet on different devices such as on computers, tablets, and smartphones. How often do you use the Internet for work or personal matters?*
- Predominant technology devices: *What devices do you use most often? Please mark all suitable answer options.*
- Experience with Internet technologies: open-ended question.
- Reasons for using the Internet: *Please mark all applicable answers to indicate the purposes for which you use the Internet.*

As mentioned earlier, the categories used to measure the factors influencing digital inclusion were derived from our previous qualitative study. The variables assessing factors that fostered learning, main barriers, and facilitating factors were measured through the following questions:

- Motivations for ICT learning: *People learn to use ICT for different reasons. Please indicate the importance of each listed reason for learning to use ICT by marking whether it was important or not important to you* (categories are provided in Diagram 1).
- Barriers to learn ICT: *People encounter various challenges when learning to use ICT equipment. For each row in the table below, please indicate the challenges you faced while learning to use new tools such as computers, tablets, and smartphones* (categories are provided in Diagram 2).
- Facilitating factors: *Some aspects make the learning process easier. How important were factors such as work experience, help from close people, personal qualities, etc. for you in the learning process? Please indicate whether each was important or not important.*

Descriptive statistical methods were utilized for data analysis with SPSS Statistics 20 package.

3. Results

Before delving into the factors that facilitate ICT learning and the prevalent barriers, it is crucial to first examine the user profile: understanding the frequency of Internet use, identifying which devices are most commonly used, and determining the primary activities older adults engage in.

3.1. Internet usage habits

Frequency of Internet use. The majority of our sample are highly engaged with the Internet, as demonstrated by the frequency of the usage. A significant 81.9% of the respondents use the Internet every day, indicating a high level of reliance and comfort with digital connectivity among the older generation. A smaller but still notable 9.8% access the Internet on most days, further solidifying the trend of regular usage. The usage of few times per week is seen among 5.92%, suggesting that while these users do not engage daily, they still maintain a regular connection to the online world. Only a minimal 2.4% of older users access the Internet occasionally.

Predominant technology devices. The devices used to access the Internet offer insights into the preferences and habits of the users of our sample. Smartphones have emerged as the most popular device with 86.8% of the users leveraging them for Internet access. This highlights the convenience and portability smartphones offer, making them the top choice. Computers closely follow at 81.5%, showing that traditional computing devices remain significant in the lives of older users, perhaps due to their familiarity and

versatility for varied tasks. Tablets, used by 27.2% of the respondents, also have a presence but are less dominant. Their larger screens may offer a more accessible experience for some users compared to smartphones. Smart TVs are used by 20.2% of the older users. While this is the least popular device on the list, it is evident that a portion of the older generation is adapting to the latest technology trends and using TVs for more than just traditional broadcasts.

Experience with Internet technologies. The average (mean) experience with Internet technologies among older users stands at 20 years, with the median (Mdn) also being 20 years. This indicates a substantial period of familiarity and engagement with the Internet, suggesting that many older users may have adopted Internet technologies around their middle age or earlier. The consistency between the mean and median values suggests a relatively even distribution in experience, meaning there are not major outliers skewing the data. The majority of older users have been online for about two decades, emphasizing acclimation to the digital world.

Internet activities. The primary reason older adults in Lithuania use the Internet is to read the news, with a significant 94.1% of them engaging in this activity online (Table 2). A substantial part, 81.6%, use the Internet to pay utility bills, highlighting the importance of online platforms in managing household expenses. Additionally, 63.5% of older adults utilize the Internet to register with a doctor, indicating a trend toward digital health services. 81.3% of the respondents use the Internet to find information, including checking maps and locations, showing the reliance on digital tools for daily navigation and knowledge. Communication with family and relatives online is prominent, with 73.6% of the participants doing so. More than a half (67.0%) use the Internet to communicate with friends and acquaintances, further indicating the role of the Internet in maintaining social connections. In addition, 57.6% of older adults engage in social networks, showcasing the adaptation of the older generation to social media platforms. Listening to video or music recordings is an activity for 50.4% of the respondents, signifying the Internet's role in leisure and entertainment. Less than a half (41.0%) of the older adults buy or sell food or other goods online, emphasizing the growing trend of e-commerce among this age group. A slightly more than one third (35.8%) of the participants use the Internet to engage in the activities of various groups, organizations, or parties. However, only a small proportion, 7.0%, use the Internet to get to know new people, suggesting that the older generation might still prefer traditional methods or might be cautious about meeting new individuals online.

The results demonstrate that respondents of our sample have embraced the Internet as an integral part of their daily lives. The most dominant activities are related to news consumption, utility payments, and information seeking. Meanwhile, communication, both with family and through social networks, is also a substantial part of their online routine. The least preferred online activity among older adults appears to be meeting new people.

Table 2. **Internet activities among older adults in Lithuania (percentage).**

To read the news	94.1
To pay utility bills	81.6
To find information, location (maps)	81.3
To communicate with family, relatives online	73.6
To communicate with friends, and acquaintances online	67.0
To register with a doctor	63.5
To communicate in social networks	57.6
To listen to video/music recordings	50.4
To buy (or sell) food or other goods	41,0
To participate in the activities of groups, organizations, parties	35.8
To get to know people	7.0

3.2. Perceived benefits of Internet use

Understanding the driving forces behind the acquisition of information and communication technology (ICT) skills provides valuable insights into the motivations that shape learning behaviors. All the reasons that were indicated in the quantitative study were found to be important in the learning process. The overwhelming agreement on the importance of ICT for everyday life (91.3%) reflects the growing integration of technology into various aspects of routines (Diagram 1). This result underscores the recognition that ICT has become a fundamental tool for functioning effectively in today's interconnected world. The high percentage of agreement that an important reason to learn ICT because of opportunities to access diverse information (89.9%) underscores the role of ICT in democratizing information access. The emphasis on convenience (88.5%) suggests that respondents appreciate the ease that ICT brings to various tasks. From online shopping to paying taxes, ICT simplifies otherwise time-consuming and cumbersome processes. The results on the opportunities provided by ICT (87.5%) demonstrate that older internet users of our sample are aware of the opportunities that ICT offers beyond just necessity. The importance of the opportunities to communicate and share (86.5%) reflects the social aspect of ICT.

In summary, the data suggests a multifaceted motivation for learning ICT. Although practical reasons like work-related needs and convenience play a vital role, respondents also recognize the broader benefits ICT brings to their lives. This includes opportunities for enrichment, connection, and access to diverse information. These results highlight the increasingly integral role of ICT in both professional and personal contexts. Analysis of factors fostering digital learning among respondents received from the open question also highlights a blend of both professional and personal motivations:

> *I knew how to use it at the workplace, in retirement I improved my knowledge in order **to better communicate** with loved ones, to be more aware of "**what/where/when**", to **make the***

purchase of services and goods easier, and I also found inexhaustible layers of *video lectures/ excursions/shows/films* that interested me, etc.
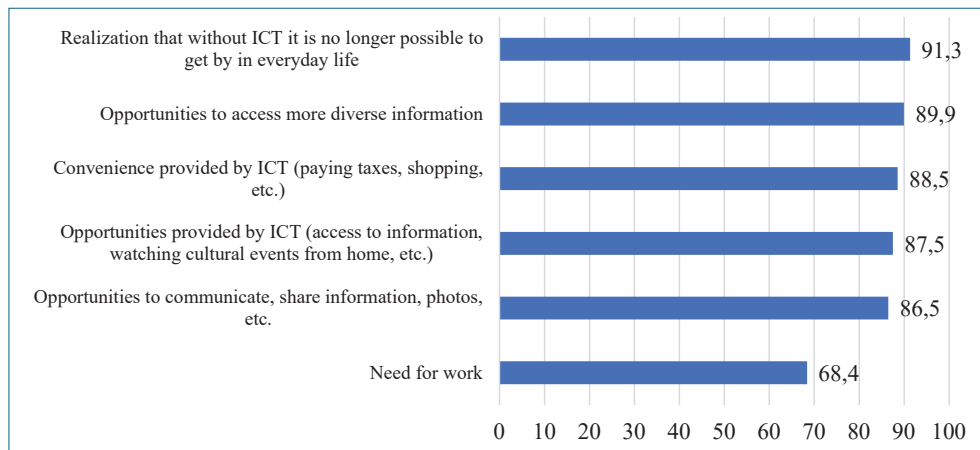

Diagram 1. **Factors that fostered ICT learning (percentage).**

There is an evident desire to be informed and connected („more aware of what/where/ when"), making everyday tasks such as purchasing goods and services more convenient. The respondent also points to the vast world of digital content, from video lectures and excursions to shows and films, as a source of motivation. This emphasizes the richness of the Internet as a learning and entertainment platform.

Some answers point out to the necessity due to digitalization. The shift in banking services to digital platforms, particularly e-banking, is a clear motivator. The respondent feels „forced" due to the essential nature of these services and the need for digital identity verification (“*By force, because without e-banking we can't do anything about banking anymore, because you need to prove your identity*”). This response underscores how societal shifts to digital platforms can drive the need for digital literacy, even if somewhat reluctantly. The rhetorical question „And how to do/live without IT?" underscores the ubiquity and indispensability of digital technology in modern life. The respondent acknowledges the omnipresent role of IT, suggesting that not engaging with it might lead to feeling left out or disadvantaged.

Specific institutions mentioned in the answers like the „Third age university" and the „Akmene District Municipal Library" have played a role in fostering digital learning. Such institutions potentially offer structured learning environments, resources, and support, making the digital learning journey more accessible and engaging.

Migration and the resultant geographical separation from family members, particularly children and grandchildren, act as a strong motivator. The need to maintain close family ties across regional and international borders pushes respondents to embrace digital communication tools. Finally, personal aspirations were also mentioned in the answers. „The desire to keep up" is an expression of personal aspiration. With 11 respondents

mentioning this, it is evident that staying updated and not feeling left behind in the digital age is a significant driving factor for many.

The factors fostering digital learning among respondents are multifaceted, ranging from personal desires to societal necessities. The overarching sentiment is clear: in the digital age, embracing technology is not just beneficial, but often essential.

3.3. Barriers to digital literacy among older adults

Language difficulties and challenges in understanding technical terms emerged as predominant barriers for over half of the older adults. Especially for non-English speakers or those not familiar with the predominant language in the ICT world, language barriers (59.4%) can pose challenges in using and understanding technology. Likewise, it is difficult to understand technical terms (59.4%) because of technical jargon and complex language used in ICT. It can be overwhelming and confusing for older adults, making it harder for them to engage with technology.

Additional obstacles, ranging from 30% to 50%, included limited technical support, difficulties in comprehending device operations, a lack of mentors, and insufficient access to devices. The absence of readily available technical support (45.2%) can be frustrating for older users when encountering issues with ICT devices or software. Understanding the underlying principles of how devices function (38.4%) may be also a challenge, especially if they have little previous exposure to technology. Without someone to guide them and provide support (38.1%), older adults may struggle to learn how to use ICT devices effectively.

Lack of devices (computer, smartphone, etc.) (37.4%) due to financial constraints can be a significant obstacle for older adults who want to use technology. Psychological issues (such as fear, insecurity, and impatience) and learning difficulties (such as memory impairments and slower perception) affected approximately one-third of the sample. Emotional barriers (27,4%) such as fear of making mistakes, feeling insecure about technology, or experiencing impatience with the learning process, can discourage seniors from using ICT. Learning difficulties (27.0%) such as age-related cognitive changes, including poorer memory and slower processing, can affect the ability to learn and retain new information related to ICT usage.

Among the barriers identified, difficulty getting used to an unusual way of using devices (such as mouse control and touch screens), vision problems, lack of motivation to learn, and difficulty in operating devices due to health problems (such as shaky hands) were found to be the least prevalent obstacles. Older adults who were not exposed to technology at a younger age may find it challenging to adapt to unconventional ways of interacting with devices, such as using a mouse or touch screen (20.3%). Visual impairments (15.7%) can be a significant barrier, as small fonts and icons on screens may become difficult to read or recognize, limiting the overall usability of ICT devices. Some older adults may lack the motivation (10.7%) to learn new technologies, possibly due to the perception that it is unnecessary or too complex for their needs. Lastly, physical

health issues, such as shaky hands or other motor impairments (3.9%), can hinder the ability to interact with small buttons or touchscreens, making it challenging for seniors to operate ICT devices effectively.
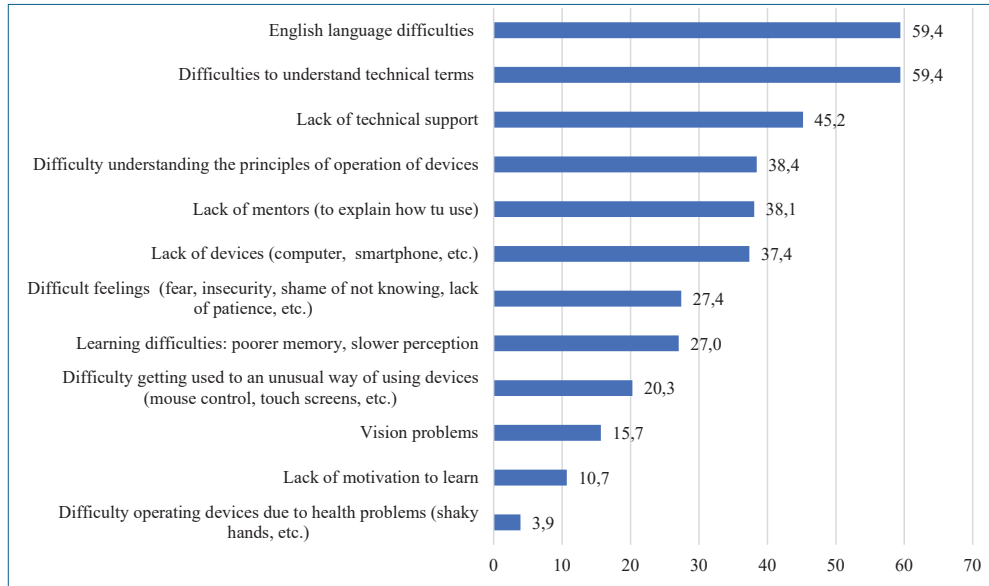

Diagram 2. **Barriers to digital literacy among older adults (percentage).**

In conclusion, the barriers identified in the empirical results provide concrete examples that support and correspond with Kebede et al.'s (2022) theoretical model. The model's components of physical and psychological capacities, automatic and reflective motivation, and opportunity can be used as a lens to understand and analyze the individual challenges faced by older adults in adopting and effectively using ICT. Integrating the model's concepts into the discussion of each barrier demonstrates an understanding of how these factors influence older adults' engagement with ICT. Addressing these barriers requires a combination of accessible and user-friendly technology, digital literacy training tailored for older adults, and support networks to encourage and assist seniors in embracing ICT for improved digital inclusion and enriched lives.

3.4. Overcoming the barriers in the process of learning: what factors were significant?

Participants in the survey were asked to evaluate factors that made it easier for them to learn ICT in their later years. The results were then collated and ranked by prevalence (Diagram 3). The highest ranking factor was personal qualities (89.5%) such as curiosity, determination, and patience to learn on one's own. This emphasizes the significant

role that intrinsic motivation and personal characteristics play in older adults' ability to navigate the digital world (or presumably points to the lack of available support). The second most prevalent factor was previous work experience (77.7%), referring to a background that involved exposure to digital tools or concepts. This suggests that those who had some foundational knowledge or even just the basic familiarity with technology found it easier to build upon these skills as they aged. Nearly three-quarters of respondents reported that pride and a feeling of accomplishment (74.2%) after mastering a new ICT skill spurred their learning. This aligns with pedagogical models that emphasize the role of positive reinforcement and the ‚reward' feeling in learning. Formal or informal training sessions (72.8%), be it at workplaces, libraries, or community centers, played a critical role for many older adults. These structured environments likely provide a systematic introduction to ICT, making the learning process more navigable. Intergenerational support (58.5%) also emerged as a significant factor. This underscores the role of family, especially the younger generation, in aiding their older relatives. The interactive and often hands-on nature of this assistance can be particularly effective in demystifying technology. While children and grandchildren were the primary family support for many (58,5%), other relatives also contributed (23.3%), though to a lesser extent. This further emphasizes the importance of the familial network in the learning process. Peer support, either from fellow older adults or from others in their social network (30.3%) also featured prominently. This suggests that shared experiences and challenges can foster a collaborative learning environment, give a sense of belonging, thus prevent social isolation and help older adults better accept digital technologies (Åberg, 2016; Tsai et al., 2017).
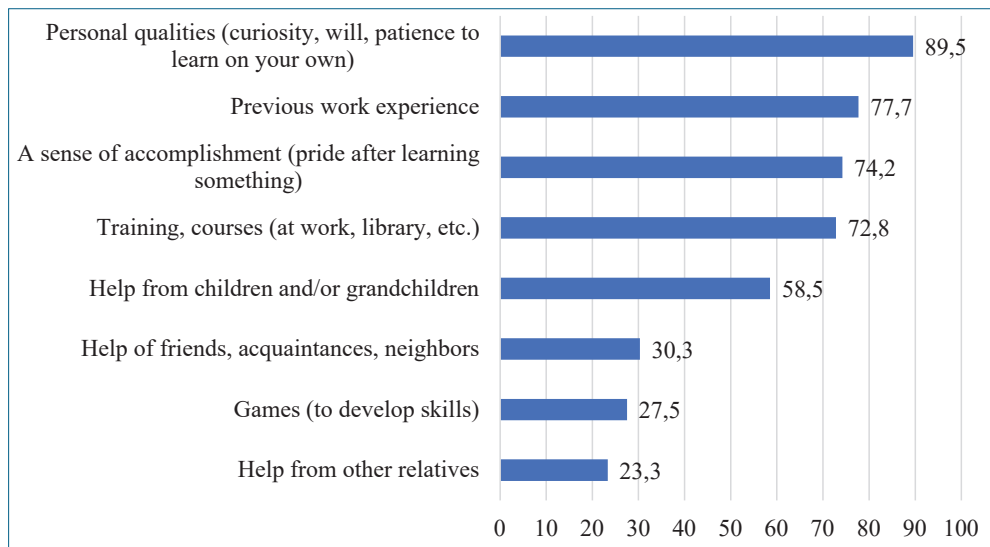

Diagram 3. **Factors that made the process of learning ICT easier in older age (percentage).**

The role of games (27.5%) in developing skills might seem minor compared to other factors, but it highlights the potential of gamification as a learning tool for older adults. Games can make learning more engaging and less intimidating, offering a fun gateway into the world of ICT.

The survey results shed light on a mix of intrinsic and extrinsic factors that facilitate ICT learning in older adults. Personal qualities and intrinsic motivations topped the list, but the significant roles of previous experiences, formal training, and family support cannot be understated. This analysis underscores the importance of a multifaceted approach to promoting digital inclusion, blending personal initiative with external resources and support networks.

Conclusions

The rapid digitalization of society and daily activities have made digital engagement essential for citizens of all ages. Older adults, however, often face unique barriers that can impede their digital inclusion. Based on a nonrepresentative online survey, the findings reflect a high degree of Internet integration into the daily lives of older users in our sample. They are not only frequent users but also utilize a range of devices to access the Internet, with smartphones and computers leading the way. The survey results shed light on a mix of intrinsic and extrinsic factors that facilitate ICT learning in older age. Personal qualities and intrinsic motivations topped the list, but the significant role of previous experiences, formal training, and family support cannot be understated. The barriers identified in the empirical results provide concrete examples that support and correspond with COM-B, TDF theoretical model, applied in Kebede et al.'s (2022) scoping review in the field of digital inclusion of older adults. The barriers mostly aligned with capacities and opportunity domains from the barriers scheme which may also affect motivation. This analysis underscores the importance of a multifaceted approach to promoting digital inclusion, blending personal initiative with external resources and support networks. This study underscores the urgent need for tailored interventions and programs to ensure that the older population remains connected and empowered in an increasingly digitalized world.

Discussion

Referring to the findings in conjunction with Kebede et al.'s scoping review (2022) and the COMB-B and TDF models, we can categorize the identified barriers and facilitators into three key domains: Capabilities, Motivation, and Opportunity.

Capabilities: In the TDF model, the lack of English knowledge falls under the domain of Knowledge. While Kebede et al.'s scoping review mentions this barrier in only one study, it may be more prominent in non-English-speaking countries like Lithuania. Other prevalent obstacles, such as difficulties in understanding technical terms, lack of technical support, challenges in grasping device operation principles, and absence of mentors, predominantly fall within the skills or knowledge domains. Notably, previous

experience in the ICT field emerged as a predominant facilitator, aligning with the knowledge domain, along with training.

Motivation: Our study highlights a predominance of aspects from the automatic reflection domain in the Motivation category. Fear and insecurity align with the psychological capacities aspect of the model within the automatic reflection domain, as does a lack of motivation expressed as limited or no interest. The predominant facilitator in our study falls within the reflective motivation domain, labeled as Optimism in Kebede et al.'s scoping review. A significant majority of the sample emphasized the importance of personal qualities such as curiosity, will, and patience to learn independently. The sense of accomplishment, another predominant facilitator, aligns with the domain of Beliefs about capabilities within the reflective motivation group, relating to self-efficacy, confidence, and esteem. Lastly, enjoyable games, representing the automatic reflection group, were selected as a facilitator by about one-third of the sample.

Opportunity: Barriers such as a lack of devices fall within the domain of Environmental context and resources in the TDF model, related to physical infrastructure access. While represented by only one study in Kebede et al.'s scoping review, our sample indicates that more than one-third of respondents view this as an obstacle. Difficulty adapting to an unusual way of using devices (e.g., mouse control, touch screens) is another aspect of the Environmental context and resources domain that is relevant to our sample. Facilitators in this group include social influences, such as family and peer support, which, although to a lesser extent compared to other facilitating factors, are still relevant for the respondents.

Based on research findings, context-specific barriers, notably a deficiency in English skills (a common challenge among older generations in Lithuania) and difficulties comprehending technical jargon, were prevalent in our sample. The notable absence of support, as evidenced by frequent mentions of the lack of mentors and challenges in grasping technical terms, highlights potential avenues for providing assistance and guidance. Literature reveals that digital support in older age predominantly comes from outside of formal education, i.e. it is provided by warm experts – children, grandchildren, and friends (Gallistl et al., 2020). However, digital support from warm experts or other younger people not always meets the needs of older adults in terms of pace, way of learning, terminology, etc. (Mehraeen, 2017; Korpela et al., 2023). Researchers conclude that informal support cannot replace formal training for the acquisition of new digital skills (Gallistl et al., 2020). Addressing barriers requires a combination of accessible and user-friendly technology, digital literacy training tailored for older adults, and support networks to encourage and assist seniors in embracing ICT for improved digital inclusion and enriched lives. Thus, we recommend encouraging ICT courses specifically tailored to older adults at libraries, community centers, and workplaces; promoting intergenerational learning programs where younger family members can assist their older relatives. We also recommend exploring the potential of gamified learning tools tailored to the interests and needs of older adults; and encouraging peer support groups, where older adults can share their experiences and learn from each other.

In the exploration of factors promoting digital engagement, our paper adopts a two-fold approach. Firstly, we delve into the motivational forces propelling older adults to acquire information and communication technology (ICT) skills, as analyzed in Section 3.2. Here, we unravel the multifaceted motivations that shape learning behaviors among older internet users. This section sheds light on the diverse and complex reasons that drive seniors to engage with ICT, encompassing practical needs, social aspects, and the evolving landscape of digitalization. Additionally, our study addresses the factors that facilitate the learning of ICT skills in older age, as detailed in Section 3.4. This segment focuses on understanding what makes the learning process more navigable for older adults. By evaluating these facilitating factors, we provide valuable insights that extend beyond motivation to the practical aspects of learning. This dual perspective contributes to a holistic understanding of the challenges and opportunities in promoting digital inclusion among older adults.

We believe that the information gleaned from our analysis, particularly in Section 3.4, holds practical implications for practitioners involved in implementing learning programs for nonusers. Recognizing the intrinsic and extrinsic factors that ease the learning journey for older adults is pivotal in designing effective and targeted interventions. This nuanced understanding can inform the development of learning programs that align with the diverse motivations and needs of older individuals, ultimately enhancing their digital literacy and fostering meaningful engagement with ICT.

The primary limitation of the study is its nonrepresentative sample, which precludes us from generalizing the findings to the entire population of older adults in Lithuania. Additionally, the sample is skewed towards respondents with higher education levels, which may account for findings that personal qualities, such as curiosity and determination, were top motivators for ICT learning. For a more comprehensive understanding of the factors influencing digital inclusion among Lithuanian older adults, future research with representative samples is recommended. Moreover, it is essential to acknowledge that the research design of this study is focused exclusively on Internet users among older adults. While the study provides valuable insights into the experiences of those with digital literacy skills, it is imperative to recognize the limitations of the sample. Future quantitative research studies targeting older adults who lack digital skills and are digitally excluded would contribute to a more comprehensive and nuanced understanding of the factors influencing digital inclusion in this demographic.

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