

# SYNTHESIS REPORT - WORKING GROUP #3: Digitalization and Health of Older Workers

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## Introduction

The overall aim of Working Group 3 (WG3) is to examine the positive and negative impacts of digitalization on the health of older workers from various angles, including work-family reconciliation, re-employment opportunities, physical workload reduction, social support, and technostress. Additionally, the members of this working group aim to identify the occupational and sociodemographic groups most affected by digitalization and ascertain what employers can do to improve or maintain the health of employees in the workplace. WG3 includes members from 35 different countries, all contributing to understand the impact of digitalization on the health of older workers in these rapidly changing times. Out of 123 members, approximately 30 are actively collaborating and conducting researching on various topics related to the health of older workers. Currently we have one leader (Jeroen Spijker, Ph.D., researcher at Centre for Demographic Studies, Spain) and one co-leader (Cristina Maria Tofan, Ph.D., researcher at Gh. Zane Economics and Social Research Institute, Romania).

There are several activities initiated within the group: monthly meetings, visibility of results within the group, theoretical research projects (i.e., integrative review, scoping review, registration of research protocols), and empirical research initiatives to assess the impact of digitalization on the health of older workers. Below we have synthesized the ongoing work within the group:

1. Scoping review on Social Support (Led by Cristina Tofan in collaboration with 11 members). Currently in the drafting stage. The manuscript is to be submitted to *BMC Public Health* before the end of the year.
2. Impact of working from home/hybrid working on health (Led by David Lain in collaboration with 8 members). Still in the conceptual stage.
3. Digi impact on the health of older workers – a scoping review (Led by Jeroen Spijker in collaboration with approximately 15 members) The scoping review has been registered, and a protocol has been published. The process of article screening and selection will start soon.
4. Qualitative research on older workers (Hande Barlin, Nilufer Korkmaz, Murat Mercan). Still in the conceptual stage.
5. Country reports on health and digitalization for older workers using secondary data analysis (Led by Cristina Tofan in collaboration with approximately 18 members). In drafting stage.
7. Are older people less likely to be in a sector changed by digitalization? /Do sectors dominated by ICT lead to early retirement among older workers? (Idea proposed by Eda Orhun with 6 members interested in collaborating. Still in the conceptual phase).
8. Digitalization and healthcare workers/market (Led by Teresa Magalhães).
9. Academic Older Workers, Digital Difficulties and Possible Solutions: Portugal, Turkey and Croatia, Serbia and Romania Example” (Led by Maria Brandao with 7 collaborators).

Below we describe the most important outcomes related to these initiatives (including those already completed).

# The quality of the working life of older workers - Integrative Review

As a result of the training school organized within the Digi-net Cost Action (2023), three members collaborated on writing a synthesis regarding how digitalization impact the quality of the working life for older workers. This paper has been published: Nedeljko, M., Gu, Y. & Bostan, C.M. (2023 online first) The dual impact of technological tools on health and technostress among older workers: an integrative literature review. *Cogn Tech Work* **26**, 47–61 (2024). <https://doi.org/10.1007/s10111-023-00741-7>. The article explores how the increasing use of technology affects older workers. As the global workforce ages and life expectancy rises, technological advancements play a critical role in shaping the quality of working life for this demographic. The study applies an integrative literature review, analysing data from multiple scientific sources and identifies two major themes: the impact of technology on the health of older workers and the phenomenon of technostress.

Regarding the health theme, technological tools have shown both positive and negative outcomes. While digital platforms and health-monitoring devices can enhance work flexibility, improve health, and support behavioural changes, such as improving sleep quality or promoting physical activity, some studies have reported negative effects. For instance, digital work intensification can lead to deteriorating mental health and reduced workability in older workers. On the other hand, technostress, which refers to the stress caused by technology, is highlighted as a significant challenge. Older workers often experience technostress through factors like techno-complexity, techno-invasion, and techno-uncertainty, though some dimensions like techno-overload appear less relevant.

The article emphasizes that while technology has the potential to improve the working lives of older employees, it is also under-researched. Future studies should focus on developing effective interventions to mitigate the negative impacts of technostress and further explore how technology can support the health and productivity of older workers in an increasingly digital work environment.

## The impact of digitalization on the social support at work for older workers – A scoping review

Cristina Tofan and 11 other members from WG3 are currently drafting the paper "The Effect of Digital Technologies on the Social Support of Older Workers: A Scoping Review". Between July 2023 and September 2024, they conducted a scoping review to identify how older workers use digital tools for social support, which types of support are most common, and how these tools impact their health and ability to stay in the workforce. The members worked close together and met regularly online, sometimes weekly, to discuss the results.

Specifically, the scoping review identifies studies that examined the social health of older workers in the context of digitalization, exploring how digital tools impact the social support systems of older workers in an increasingly digitized work environment. With the aging workforce presenting a significant demographic challenge, digital technologies offer new ways to enhance social support and well-being. .

The article identifies several key forms of social support facilitated by digital tools: emotional support, instrumental support, informational support, and social integration. Emotional support involves encouragement and care, while instrumental support refers to practical help, such as using digital tools to aid in daily tasks. Informational support includes sharing advice and guidance, and social integration is about maintaining a sense of belonging through digital communication.

Digital tools like teleworking platforms, mobile health applications, and ICT systems offer both explicit and implicit forms of social support. Explicit support includes structured interventions, such as digital coaching apps that promote healthy aging, whereas implicit support is embedded in the everyday use of remote work technologies that facilitate professional relationships and knowledge sharing. However, challenges remain, as some older workers experience technostress and isolation in remote work environments.

The article emphasizes the need for further research to explore the balance between the benefits and challenges of digital tools for older workers, aiming to promote their long-term well-being and work participation. It also highlights the importance of addressing the digital divide, where unequal access to technology can exacerbate social inequalities in the workplace. Overall, the review provides a comprehensive look at the evolving role of digital tools in shaping social support for older workers, suggesting that with proper implementation, these technologies can enhance their work experience and health outcomes. In support of this collaboration, Cristina Tofan was awarded a Virtual Mobility Grant in 2023 to organize, support, and disseminate the main findings.

## The impact of digitalization on the physical health of older workers

As a result of monthly meetings and collaboration, Jeroen Spijker and about 15 members of the group are conducting research regarding one of the most important topics related to health of older workers. This research project is structured in three phases:

i) Research Protocol– The protocol has been written up and published in a peer-reviewed online journal (Spijker J, Barlin H, Grad DA, Gu Y, Klavina A, Korkmaz Yaylagul N, Kulla G, Orhun E, Ševčíková A, Unim B, Tofan CM (2024). The Impact of Digital Technology on the Physical Health of Older Workers: Protocol for a Scoping Review. *JMIR Research Protocol* 13:e59900. <https://doi.org/10.2196/59900>). The purpose of a research protocol for a scoping review is to provide a clear and structured plan for how the review will be conducted. A protocol serves several key purposes: Transparency and rigor by outlining the specific methodology and steps that will be followed; Provide guidance throughout the review process to ensuring consistency and adherence to predefined criteria, thereby minimising bias; Clarification of scope and objectives; Data collection and analysis plan; Collaboration and peer review to enhance its credibility, e.g. by registering the protocol; and Accountability (so researchers stick to their original plan).

ii) Registration of scoping review protocol after publication of protocol. Following the publication of the protocol, it has been registered and is available on the OSF online platform (<https://doi.org/10.17605/OSF.IO/DJ34A>)

iii) Scoping review – this work is in progress: As outlined in the published protocol, the aim of the planned scoping review entitled "The Impact of Digital Technology on the Physical Health of Older Workers: Protocol for a Scoping Review" is to assess how digital technologies affect the physical health of older workers. The research team seeks to summarize the current evidence on this topic, addressing an important gap in understanding the physical health implications of digitalization in the workplace for workers aged 50 and above. The focus will be on health outcomes such as vision loss, musculoskeletal disorders, migraines, and cardiovascular issues, all of which can be influenced by digital technologies like computers, teleworking tools, and robotic systems. The review excludes studies focused solely on mental health impacts (as there are already existing reviews on this topic), to ensure a dedicated exploration of physical health concerns.

The review will follow the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews) guidelines and utilize databases such as MEDLINE, Cochrane, and Scopus. A systematic approach will be used for study selection and data extraction, including peer-reviewed studies in English, and all studies will be reviewed by multiple researchers to resolve any conflicts. The results, expected in 2025, aim to provide a comprehensive overview of the physical health challenges older workers face due to workplace digitalization and to identify research gaps that need to be addressed in future studies. This protocol emphasizes the growing importance of addressing both the positive and negative effects of workplace digitalization on older workers' physical health, in line with the global trend of an aging workforce.

## Country Profiles

# Health of Older Workers in the Context of Digitalization

The group has used a mixed-method approach to draft both findings based on international representative data for each country and available literature at the national level. The research design outlined for this study focuses on analysing the effects of digitalization on older workers using data from the European Social Survey (ESS) Round 10, covering the period from September 2020 to August 2022. The research aims to explore four key research questions, all focusing on older workers (50 years and above) who are involved in paid work, particularly looking at their subjective health, the impact of digital tools, and the influence of the pandemic on work practices. The design is comparative, requiring participants from different countries to interpret and summarize national data provided by ESS. These participants will compare national findings with existing international or national data from various sources, including scientific literature and national statistics.

The four main research questions focus on (1) the characteristics of older workers, (2) their subjective health, (3) the impact of digitalization on work during the pandemic, and (4) how digital tools affect social ties at work. The descriptive data provided in ESS are presented in percentages for categorical variables and averages with standard deviations for continuous ones, allowing for comparisons across different countries. Participants will create country profiles that interpret these data in relation to broader trends in the digitalization of the workplace, addressing shifts in work from office to home, the role of digital communication tools, and their effects on workers' personal lives. The project encourages collaboration among country-specific teams to ensure data consistency and comprehensive analysis.

The members of WG3 have met online from February 2024 till October 2024 and drafted a unique country profile report. In September 2024 12 members met face-to-face and 10 members participated online in a hybrid meeting held in Iasi. A total number of 14 country reports were presented and discussed. 31 country report from ESS dataset was presented and highlights for each main research questions was presented. We discussed types of available resources that can be used and how grey literature can be used for drafting a general overview for the countries. A country profile for older workers was suggested. Research ideas were explored based on dataset and other resources from platforms and limitations of the mixed-method approach were discussed.

Regarding the main aims of the working group, there are some important highlights from results:

### **(1) the characteristics of older workers**

The data from the European Social Survey (ESS) Round 10 (during 2020-2022) reveal significant variations between countries in terms of workforce composition, subjective health, the effects of remote work during the pandemic, and the influence of digital tools on social ties.

In terms of workforce characteristics, Germany and Sweden are notable for their high participation rates of older employees in high-skilled, white-collar occupations, with Sweden also displaying a higher proportion of workers aged 65 and over compared to other countries. Greece shows a distinct pattern, with almost half of the older workforce being self-employed, and a predominance of medium-education, lower-skilled white-collar workers. In Ireland, older workers are mainly engaged in agriculture and private services, with a high reliance on state pensions, while Portugal presents a workforce with lower levels of education and a higher concentration in the tertiary and quaternary sectors. Latvia reports high unemployment among older workers, with a significant portion engaged in public services.

In Italy, the employment rate of older workers (50+) showed a significant gender gap, with 54% of men employed compared to 37% of women. Most workers were engaged in the tertiary (37%) and quaternary sectors (34%). Women tended to have shorter and more fragmented working careers, largely due to caregiving responsibilities, leading to later retirement ages compared to men. In Portugal, older workers, particularly women, had a high participation rate, with 732,663 employed women over the age of 50. The educational divide was notable, with a significant portion of older workers having low education levels (57%). Romania showed a similar trend of a significant older workforce, particularly due to economic necessity. A high percentage of older Romanian workers were compelled to continue working despite declining health, largely due to low incomes and a lack of social support. Czechia reported that 39.4% of older employees worked in the tertiary sector, with women making up a significant proportion of this workforce. In Serbia, the employment of older workers was concentrated in lower-skill sectors, and many workers were also involved in the informal economy.

## **(2) their subjective health**

Regarding the subjective health of older employees, Ireland and Sweden report generally positive health outcomes, with nearly 90% of older workers in Ireland and a majority in Sweden describing their health as good or very good. Conversely, Germany and Portugal show more concerning results, with Germany having one of the highest percentages of older workers reporting poor health (7.9%), and less than half of older workers in Portugal reporting good or very good health. Latvia and Greece display mixed outcomes, with Latvia showing significant health challenges, while most workers in Greece report good health, which may be due to a relatively younger demographic in the older worker category.

Subjective health outcomes varied significantly across countries. In Italy, 79% of older workers reported their health as "very good" or "good," a finding that aligns with research linking digitalization to improved well-being, despite the overall reduction in public health expenditure. In Portugal, 48.4% of older workers rated their health positively, though the economic necessity to work often outweighed the impact of health issues. Romania exhibited a paradox: despite reporting poor overall health, older workers demonstrated one of the lowest percentages of work limitations due to health, driven by the need to maintain employment. This is consistent with findings that economic necessity can override health challenges, particularly in lower-income settings. In Serbia, 49.8% of older workers also rated their health positively, with only a small percentage reporting poor health, but this still reflects the vulnerability of older workers to health challenges that can affect productivity and quality of life.

### (3) the impact of digitalization on work during the pandemic

The impact of digitalization on work during the COVID-19 pandemic varies widely. Germany and Sweden show a high adaptation to remote work, with over 50% of German older workers transitioning to working from home more frequently. Ireland benefits from higher-than-average digital skills, enabling many older workers to transition smoothly to remote work, although digital exclusion remains an issue for some. In contrast, Greece, Portugal, and Latvia show limited shifts to remote work, with the majority of older workers in these countries continuing their pre-pandemic work arrangements and experiencing fewer changes in work practices due to digitalization.

The pandemic dramatically altered work patterns across all countries, with varying levels of adaptation to digitalization. In **Portugal**, only 17.6% of older workers reported working from home during the pandemic, a relatively low number compared to other European countries. Despite the pandemic's push toward digitalization, many older Portuguese workers found digital tools challenging, particularly in terms of work productivity. **Italy** saw limited changes in remote work patterns, with 73% of older workers reporting that they never worked remotely or only did so infrequently. In contrast, **Romania** experienced a rapid shift toward telework, though the country's general low digital literacy posed significant challenges for older workers, who struggled to adapt to new technologies. **Czechia** followed a similar pattern, where the majority of older workers were employees rather than self-employed, which created challenges in adapting to the sudden shift to digital tools and remote work. In **Serbia**, digitalization was a double-edged sword, with many older workers facing difficulties in adjusting to new tools while others found them beneficial for work coordination and flexibility.

### (4) how digital tools affect social ties at work.

The role of digital tools in maintaining social ties also differs across countries. Germany and Sweden report strong positive impacts of online communication tools in enhancing social connections among colleagues, although both countries also report significant intrusion of work into personal life. Ireland displays similar trends, although digital exclusion is a barrier for many older workers. In Greece, digital tools are less frequently used for communication, and the impact on social ties is more limited. Portugal and Latvia similarly show minimal improvements in social ties through digital tools, with many workers reporting a lack of interaction with coworkers.

The use of digital tools to maintain social ties at work varied significantly. In Portugal, 82% of older workers felt that digital tools fostered a sense of closeness with colleagues, but these tools also blurred the boundaries between work and personal life, causing significant disruptions for over 84% of employees. Romania presented a different picture: older workers generally struggled to use digital tools for social interaction, which weakened their professional and social ties, particularly as the lack of face-to-face interactions became more pronounced. In Italy, most respondents did not have frequent remote interactions with their supervisors or colleagues, and digital communication remained limited, with many workers reporting that they communicated with their line managers via screen less than once a month. Similarly, Serbia faced

challenges in maintaining social connections through digital tools, with workers noting that while digital communication facilitated work coordination, it often hindered social bonding, with many workers feeling isolated from their teams.

### **General conclusions:**

Across the board, older workers in the countries covered by this research were affected by the pandemic and digitalization in distinct ways. Their characteristics, subjective health, and the impact of digitalization on their work and social ties varied based on local economic, social, and technological contexts. Italy, Portugal, and Serbia, for example, demonstrated relatively higher engagement in sectors that required on-site presence, limiting the adoption of remote work, while countries like Romania and Czechia, with lower digital literacy levels, faced difficulties in transitioning to new digital tools. However, digitalization also presented opportunities, particularly in enhancing flexibility and work-life balance for some, even as it exacerbated inequalities for others. The social impacts of digitalization were more ambivalent, as the loss of personal interaction was felt strongly, even where digital communication tools allowed for functional work coordination. These differences highlight the complexity of the aging workforce and the varying needs for policy interventions to support older workers in adapting to a rapidly digitalizing world.