Differential Older Workers' Experience with Technology-related Changes during the COVID-19 Pandemic[1]

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ABSTRACT

Many workers, including older ones, experienced changes at work during the COVID-19 pandemic, among which was a sudden increase in the use of digital technologies. This paper aims at understanding older workers' satisfaction with digital technology-related changes at work during the COVID-19 pandemic in the Nordics. Based on novel survey data collected in Sweden in 2020–2021, we analyzed the experience with digital technology-related changes at work and modeled the (dis)satisfaction with such changes among older workers (aged 50+). Our findings show that groups of older, less educated, reporting concurrent workload changes and digital technology-related difficulties had an increased likelihood of being dissatisfied with digital technology-related changes at work during the COVID-19 pandemic. The results have implications for the theoretical understanding of late working life and for the redefinition of working life policies and age management strategies in times of work digitalization of work.

KEYWORDS

COVID-19 / digitalization / inequalities / older workers / satisfaction at work

Introduction

Many workers, including older ones, experienced changes at work during the COVID-19 pandemic period (Shambi 2021). These changes involved, for example, increased workloads, rearranged work schedules, taking on new tasks or moving to new workplaces. Workers also experienced changes in their use of digital technologies at work (Mark et al. 2022; Shambi 2021). Research shows that the increased use of digital technologies at work has the potential to improve some individuals' work-related outcomes (e.g., Bolli & Pusterla 2022; Kortmann et al. 2021; Oksa et al. 2021)). However, since individuals show different levels of digital use, availability,

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and competence (Hargittai et al. 2019; Komp-Leukkunen et al. 2022; Poli, Kelfve, et al. 2021; Poli, Kostakis, et al. 2021; Ragnedda 2018; Ragnedda et al. 2020), the benefits of an increased use of digital technologies at work during the COVID-19 pandemic may have related to some groups of workers and not others (Eccles 2020; Ragnedda 2018), with specific groups experiencing a greater satisfaction with the changes than other groups of older workers.

Digital transformation is a major trend in the workplace. Technology-related changes at work during the COVID-19 pandemic period not only involved, for example, an increased use of digital devices and software for administration, communication, collaboration, and management, but also introduced new work arrangements (e.g., remote or hybrid working), new work routines and practices (e.g., online meetings, events, team gatherings, activity monitoring), new modes of training (e.g., e-learning, hybrid learning) (Mark et al. 2022; Shambi 2021; Shamsi et al. 2021; Shirmohammadi et al. 2022). We define digitalization here as the increase in digital technology use by industry and companies—and, thus, by workers (van Laar et al. 2020)—for digital-based administration, service delivery, and production (OECD 2021; Ogg & Rašticová 2020; Warhurst 2019). During the COVID-19 pandemic, some of these changes happened over a short period of time (Shambi 2021; Wang et al. 2021), which meant that workers were exposed to changes with a minimum of preparation or none at all (ILO 2020; Wang et al. 2021).

Although digital transformation was already happening in many workplaces, many of its practices were far from being widely implemented (Shambi 2021; Wang et al. 2021). For example, only 2% of employees in Europe were engaging in remote modes of working prior the pandemic (Eurofound 2017). Once restriction measures were introduced by governments, that increased greatly to an average of 40% of the workers in Europe working remotely (Eurofound 2020). During the COVID-19 pandemic period, organizations were forced by circumstances to accelerate the use of digital technologies in the workplace (Nagel 2020; OECD 2021; Sostero et al. 2020). Accelerating a digital transformation at work was one of the dominant strategies of organizations to support ongoing activities and sustain productivity (Shambi 2021) in response to the limited possibilities for working on-site or interacting face-to-face.

Previous studies have indicated that workers' use of digital technologies for work-related practices is associated with positive outcomes. Workers who use digital technologies at work have higher job satisfaction (Bolli & Pusterla 2022; Kortmann et al. 2021), a higher sense of competence and autonomy (Oksa et al. 2021), and higher perceived social support from employer and colleagues (Wrede et al. 2021). Remote forms of working were found to be associated with a reduced experience of work-related demands such as fatigue, less exposure to travel, and fewer physical barriers (Dropkin et al. 2016), and at the same time, with increased extrinsic rewards (e.g., income promotion, exclusive benefits) (Lissitsa et al. 2017) and an enhanced work-family balance (Shirmohammadi et al. 2022).

However, digital transformation in the workplace can disadvantage some groups of workers relative to others. Digital use, availability, and competence are unequally distributed among workers (Falck et al. 2022; Komp-Leukkunen et al. 2022; Martin 2018; Vasilescu et al. 2020; Xie et al. 2023), and the relevant gains from using digital technologies at work are available to some groups of workers more than to others (Ragnedda 2018; Ragnedda et al. 2020). Such discrepancies are particularly pronounced in late working life when the accumulation of advantages and disadvantages over an individual

career leads to an increased diversity between social groups in the individual experience of late working life (Phillipson 2019). As a result, some groups of older workers can find themselves in a more disadvantaged position and experience more dissatisfaction with digital-related changes at work than other groups of older workers.

The theoretical framework of digital capital provides a robust framework for understanding the patterns of satisfaction among older workers with the digital transformation at work (Ragnedda 2018; Ragnedda et al. 2020). Like other forms of capital (Bourdieu & Passeron 1990), it posits that digital use, availability and competence (which together constitute the individual digital capital) are not evenly distributed among individuals, or therefore among older people, but follow a social gradient. This leads to disparities in digital engagement, its benefits and, most likely, in individual evaluations thereof. For instance, Francis and colleagues found that older adults with lower levels of digital literacy were less likely to use digital technology and reported lower levels of satisfaction with its use (Francis et al. 2019). Similarly, Neves and Mead (2020) found that older adults with poor health status were less likely to engage with digital technologies, which could affect their satisfaction with digital transformations at work. Furthermore, groups of older workers seem to have a more pessimistic view of the impact of digital technologies on their careers and jobs compared with their younger counterparts (Dodel & Mesch 2020; Ghimire et al. 2020). It is also notable that older workers in occupations such as manufacturing and construction have typically been more exposed to the use of digital technologies than workers in other occupations, such as healthcare and social services, which could determine different levels of satisfaction with digital transformations at work (Vasilescu et al. 2020).

Overall, only a limited number of studies have focused on investigating individual evaluations (i.e., satisfaction vs. dissatisfaction) of digital technology-related changes at work. Previous studies have typically targeted workers in general and looked at specific types of technology-related changes at work, for example, remote work, and specific industrial sectors, see, for example (Abelsen et al. 2021; Mark et al. 2022; Shirmohammadi et al. 2022; Vasilescu et al. 2020; Wood et al. 2022).

A better understanding of the individual evaluation of technology-related changes at work is needed to inform and guide working-life policies and age management strategies in Sweden and the Nordics, as well as advance theoretical understanding of mechanisms shaping individuals' experience of late working life and changing inequalities in times of digital transformation. To the best of our knowledge, no studies have looked into satisfaction and dissatisfaction with technology-related changes at work and its distribution, focusing on older workers in the context of a sudden acceleration of digital transformation that is under the COVID-19 pandemic.

With this paper, we aim at understanding older workers' experience with technology-related changes at work during the COVID-19 pandemic and its association with socioeconomic and contextual factors in the Nordics. We focus on older workers for four main reasons. First, late working life participation is increasing, and most developed countries face an ageing workforce (OECD 2015; EUROSTAT 2022). This means that older workers represent a growing share of the workforce, with specific needs and preferences to be understood and addressed. Second, compared with workers in other age groups, older workers are more likely to have a more limited timeframe of experience in the use of digital technologies during their working life (Schuster & Cotten 2022). And third, older workers are less likely to be involved in training at work,

including technology-related training (Karpinska et al. 2015; Lazazzara et al. 2013; Lössbroek & Radl 2019). As a result, older workers are likely to be less equipped to deal with the changes brought by a rapid and evolving digital transformation at work than other groups of workers. Fourth, it is important to study older workers as more diversity can be observed and described among them with other age groups. The accumulation of advantages and disadvantages over an individual career leads to an increased diversity between social groups in the individual experience of late working life (Phillipson 2019).

We address the Nordic context, which is well-known as a frontrunner in the digital transformation and use the Swedish context as an example. Sweden is one of the most digitally advanced countries in Europe. The level of internet use in Sweden has been steadily increasing in recent years (European Commission 2022). In 2022, 95% of the population aged 16–85 years in Sweden indicated using the internet; 7% of Swedes between 65 and 74 and 21% of individuals in the 75–85 group reported never having used the internet (Statistics Sweden 2023). Use of digital technologies in the workplace is higher in Sweden than most OECD countries (OECD 2018). Sweden therefore represents a highly digitalized context, and conclusions about it can be generalized to existing and future contexts which are and will be similar in terms of diffusion of digital transformation in the workplace.

We address the following research questions: what changes in the use of digital technology at work did older workers experience during the COVID-19 pandemic period in the Nordics? How does satisfaction with changes experienced in the use of digital technologies at work in the COVID-19 pandemic vary across different groups of older workers in the Nordics? It is likely that different groups of workers experienced and evaluated the sudden increase in digital technology use at work differently from one another during the COVID-19 pandemic. We hypothesize that satisfaction with technology-related changes at work follows a social gradient, specifically that older workers in older age groups, with lower educational attainments and lower job levels who went through concurrent workload changes and had less experience in using digital technologies at work would show a decreased likelihood of being satisfied with changes experienced in technology use at work during the pandemic.

Methods and Material

Data

The ASC COVID-19 Survey Study

To analyze the older workers' experience of changes in technology use at work during the COVID-19 pandemic and their satisfaction with these changes, we used data from the COVID-19 survey study conducted by the Division of Ageing and Social Change (ASC) at Linköping University, Sweden, to which we will refer as the ASC COVID-19 survey. An ad-hoc instrument administered as an online survey, the survey addresses the social consequences in working life during the COVID-19 pandemic and targeted the adult population of the Östergötland region in Sweden. It was disseminated via the main

regional newspaper, the Norrköpings Tidningar (NT), in the form of an online advertisement in a dedicated banner bearing the Linköping University logo and calling for participants in an investigation of how COVID-19 was affecting their employment situation. The banner appeared on the main page of the newspaper for 10 days. Data was collected in four waves in June 2020, December 2020, June 2021, and December 2021, respectively. Sampling was unstratified and resulted in a net sample of $N = 2901$ for the four waves. The average age of the sample is 53, of whom 65% are women and 35% men. Sixty-nine percent reported having a level of education higher than upper secondary education. Overall, the sample is not representative of the Östergötland population. It includes more female and highly educated respondents than the overall population in Sweden.

The ASC COVID-19 survey included questions about changes in working life experienced during the COVID-19 pandemic and satisfaction with these changes. In addition to this, information on socioeconomic status, working conditions, and living situation was collected.

Study sample

For this paper, we relied on data from waves 2, 3, and 4 of the ASC COVID-19 survey, as they show a perfectly matching structure of the items of interest for this paper and therefore allow for a more accurate analysis of the data and interpretation of the results. We pooled the samples from the three waves and used a cross-sectional design as our focus was to investigate the distribution of the outcomes (i.e., satisfaction with technology-related changes at work) across groups within the sample and not to study if/how the outcomes changed over the pandemic period. Overall, the pooled sample of unique respondents across the three waves of data collected consists of $N = 2276$ respondents. In this study, we have used a sub-sample of this.

The sample for this study consists of all respondents aged 50 years or older, indicated as either employed or self-employed at the time they answered the survey and reported as having experienced technology-related changes at work during the COVID-19 pandemic. The relevant item for the experience of technology-related changes at work was: 'My use of technology at work has changed'—'Yes' or 'No'. Respondents who had just started a new job or returned to work after leave were not included in the analyses.

This resulted in a total sample of 291 individuals, with an average age of 56. Sixty-two percent were women and 38% men. Forty-four percent indicated to have a low or medium level of education and 56% had a high level of education.

Outcome variable

One main outcome variable was used, namely, *satisfaction with changes experienced in technology use at work,* detailing whether the individual was satisfied with the changes in technology use at work during the COVID-19 pandemic. While the satisfaction was investigated using a five-point Likert scale, it was reduced to a binary

variable prior to data analysis to increase the number of cases per item, allow a clear contrast between being satisfied and not, and improve the interpretability and understanding of the results.

The variable was thus constructed as a binary which took as categories 'Yes' (previously 'completely satisfied' and 'satisfied' on the five-point Likert scale) or 'No' (previously 'neither satisfied nor unsatisfied', 'dissatisfied', 'completely dissatisfied' on the Likert scale). The relevant survey item is: 'How satisfied are you with changes in the technology use at work under the COVID-19 pandemic?'.

Predictors

This study applied as predictors age, level of education, gender, management responsibilities, workload changes, and extent of technology-related difficulties experienced at work during the pandemic.

Age was used as a categorical variable with two categories: 50–59 years old and 60 years plus.

The *level of education* was measured by the International Standard Classification of Education (ISCED) and used in the analyses as a binary variable: 'lower' (up to post-secondary education, shorter than three years) and 'higher' (from bachelor's degree level upwards).

Gender was used as a binary variable: 'men' and 'women'.

Job level was measured as *management responsibilities*. It was utilized as a categorical variable with two categories distinguishing between respondents 'with management responsibilities' and respondents 'without management responsibilities'. In the context of this paper, having management responsibilities means being responsible for other employees.

The experience of *workload changes* during the COVID-19 pandemic, in parallel with the technology-related ones, was constructed as a binary variable taking 'Yes' or 'No' as values and based on the survey statement 'My workload has changed'.

Finally, the *extent of technology-related difficulties experienced at work* during the pandemic was applied as a binary variable with the options 'None or minor difficulties' or 'Major difficulties' and based on the survey question 'To what extent do you experience difficulties at work under the COVID-19 crisis with the following—technology-related problems?'. We considered this indicator as proxy information on the level of competence in the use of digital technologies.

Overall, all predictors were used as binary variables to increase the number of cases per levels of the variables, show a clear contrast between levels, and optimize interpretability and understanding of the results.

Missing data

Missing data was reported in the descriptive analysis results as *missing* (see Tables 1 and 3) but not included in the calculations. In the regression model, cases with missing data in the predictor or outcome variables were excluded from the model, leading to eight excluded cases (see Table 4).

Data analysis

First, we characterized the experience of digital technology-related changes at work during the COVID-19 pandemic. The types of technology-related change most often indicated were detailed.

Second, satisfaction with technology-related changes at work was investigated among those individuals who reported having experienced technology-related changes. Predictors were selected according to the hypothesis that satisfaction with technology-related changes follows a socioeconomic and contextual gradient. Descriptive statistics were produced to illustrate how the identified predictors characterize the individuals who were not satisfied and those who were satisfied with technology-related changes at work during the pandemic. We then performed logistic regression analyses to study the association of each identified predictor with the outcome, while controlling for the influence of the other predictors on the association. In particular, satisfaction with the technology-related changes experienced at work during the pandemic was modeled in its association with age, level of education, gender, management responsibilities, the experience of workload changes parallel to technology-related changes, and the extent of technology-related difficulties experienced at work during the pandemic.

Results

The following section presents the results of the study. First, a descriptive part specifies what types of technology-related changes were experienced by respondents. In the second part, satisfaction with the changes in the use of digital technologies at work during the COVID-19 pandemic is examined among those respondents who reported having experienced technology-related changes. We describe those who reported being satisfied and those who indicated dissatisfaction with the technology-related changes experienced at work, by age, education, gender, management responsibility, changes in workload, and technological-related difficulties experienced. Finally, we present a model of the association between satisfaction with technology-related changes at work and the above-mentioned indicators.

Descriptive results

Forty percent (n = 291) of the sample reported having experienced technology-related changes at work during the pandemic period, while 60% (N = 439) indicated not having experienced such changes.

The mean age of the individuals who experienced technology-related changes was 56 (Table 1). Eighty percent of the individuals (N = 226) were 50–59 years old, and 20% were 60 years old or older (N = 57). Fifty-six percent of the individuals (N = 164) who experienced changes reported a high level and 44% (N = 127) a low/medium level of education. Sixty-two percent (N = 179) were women, and 38% (N = 111) men. Seventy percent of the individuals (N = 203) did not have management responsibilities, with the other 30% indicating management responsibilities (N = 88).

Table 1 Experience of Change in the Use of Digital Technologies at Work during the COVID-19 Pandemic by Age, Educational level, Gender, and Management Responsibilities.

Experience of change in the use of digital technologies at work during the COVID-19 pandemic	
Group size	291
Group characteristics	
Age (mean, SD)	56 (4.59)
Age groups	
50–59	226 (80)
60+	57 (20)
missing	*8*
Educational level	
Low/medium	127 (44)
High	164 (56)
missing	*0*
Gender	
Woman	179 (62)
Man	111 (38)
missing	*1*
Management responsibilities	
W/o management resp.	203 (70)
W/ management resp.	88 (30)
missing	*0*

Table 2 Types of Experienced Changes in Digital Technology Use at Work

Types of technology-related change*	**Frequencies (%)**
Having more online meetings	272 (96)
Writing more emails	150 (53)
Using new programs on the computer or phone	133 (47)
Using technology to perform more tasks	125 (44)
Using more programs on the computer or phone	117 (41)
Participating in online training	49 (17)
Using social media for work purposes more often	37 (13)
Using new devices (except for programs on the computer or phone)	32 (11)
Moving or extending business online	6 (2)

*N = 282. Respondents could select more than one answer.

Table 2 details the types of change reported by 282 out of 291 respondents who experienced changes in digital technology use at work during the COVID-19 pandemic. Information on the types of change was missing for nine individuals.

The most reported type of change was having more online meetings to attend than before the pandemic. This change was reported by 272 individuals (96%). The next three most reported changes in digital technology use at work during the COVID-19 pandemic were writing more emails (N = 150, 53%), using new programs on the computer or phone (N = 133, 47%) and using digital technologies to perform more tasks at work (N = 125, 44%) than before. The least reported changes in digital technology use at work were using social media for work purposes more often (N = 37, 13%), using new types of devices (N = 32, 11%) and moving or extending business online (N = 6, 2%).

Satisfaction with the changes in the use of digital technologies at work

Satisfaction with the changes in the use of digital technologies at work during the COVID-19 pandemic period was investigated for those respondents who reported having experienced such changes and provided a valid answer to the item on satisfaction. This sample consisted of 282 individuals. Satisfaction with changes in technology use at work was investigated in its association with age, educational level, gender, management responsibilities, concurrent changes in workload as well as the extent of technology-related difficulties experienced at work during the pandemic.

Individuals who indicated satisfaction with the changes in digital technology use at work were significantly younger than those who indicated dissatisfaction with the changes experienced in technology use at work (mean: 55 years old, SD = 4.33 versus mean: 57 years old, SD = 4.64) ($p < 0.05$) (Table 3). It was more common for individuals aged 50–59 years to be satisfied with technology-related changes at work than for individuals aged 60 years or older (67%, N = 146 versus 49%, N = 27, respectively). Individuals 60 years old and older more often reported dissatisfaction with technology-related changes at work than individuals aged 50–59 (51%, N = 28 versus 33%, N = 73, respectively). These comparisons were statistically significant ($p < 0.05$).

Table 3 Satisfaction with Changes in Digital Technologies' Use at Work during COVID-19 Pandemic by Age, Education, Gender, Management Responsibility, Changes in Workload, and Experienced Technology-Related Difficulties.

	Satisfaction with changes in digital technology use experienced at work during the COVID-19 pandemic				
	Total	**No (row %)**	**Yes (row %)**	***F / X2***	***p***
Group size	282 (100)	105 (37)	176 (63)		
Group characteristics					
Age (mean, SD)	56 (4.48)	57 (4.64)	55 (4.33)	2.46	0.014*
Age groups					
50–59	219 (100)	73 (33)	146 (67)	5.83	0.016*
60+	55 (100)	28 (51)	27 (49)		
missing	*7*	*4*	*3*		

(*Continued*)

Table 3 (*Continued*)

Educational level					
Low/medium	121 (100)	51 (42)	70 (58)	2.08	0.150
High	161 (100)	54 (34)	106 (66)		
missing	*0*	*0*	*0*		
Gender					
Woman	172 (100)	62 (36)	110 (64)	0.23	0.632
Man	108 (100)	42 (39)	66 (61)		
missing	*1*	*1*	*0*		
Management responsibilities					
W/t management resp.	196 (100)	79 (40)	117 (60)	2.39	0.122
W/ management resp.	85 (100)	26 (31)	59 (69)		
missing	*0*	*0*	*0*		
Concurrent workload changes experienced during the COVID-19 pandemic					
Yes	135 (100)	57 (42)	78 (58)	2.62	0.106
No	146 (100)	48 (33)	98 (67)		
missing	*0*	*0*	*0*		
Extent of technology-related difficulties experienced					
None or minor difficulties	176 (100)	57 (32)	118 (67)	5.17	0.075
Major difficulties	106 (100)	48 (45)	58 (55)		
missing	*0*	*0*	*0*		

* $p \leq 0.05$.

Modeling (dis)satisfaction with the changes in digital technology use at work during COVID-19 pandemic

The regression model shows that age, education, changes in workload, and the extent of technology-related difficulties experienced at work during the pandemic significantly predict the level of satisfaction with the changes in technology use at work (Table 4).

Age is significantly associated with the likelihood of being satisfied with the changes in technology use at work during the pandemic (OR = 2.65, $p < 0.05$). Individuals aged 50–59 years were more likely to be satisfied with the technology-related changes experienced during the pandemic period than individuals aged 60 years and older.

Educational level significantly predicts the likelihood of being satisfied with the technology-related changes experienced at work during the pandemic. Individuals with a higher level of education are significantly more likely to report being satisfied than individuals with a lower level of education (OR = 1.87, $p < 0.05$).

Individuals who did not experience changes in their workload were significantly more likely to be satisfied with the changes related to technology use during the COVID-19 pandemic (OR = 2.01, $p < 0.05$). Finally, those people who reported having

experienced technology-related difficulties at work during the pandemic were significantly less likely to be satisfied with the technology-related changes at work (OR = 0.52, $p < 0.05$).

Table 4 Logistic Regression Model on the Association between the Individual Evaluation of Changes in Digital Technology Use at Work and Age, Gender, Education, Management Responsibility, Changes in Workload, and Technology-related Difficulties Experienced.

Satisfaction with changes in technology use at work during COVID-19 pandemic (YES/NO)*	**OR**	**SE**	***p***	**[95% CI]**
Intercept	0.50	0.21	0.094	0.22, 1.12
Age				
60+ (ref.)	1	–	–	–
50–59	2.65	0.86	0.003**	1.41, 5.00
Education				
Low/Medium (ref.)	1	–	–	–
High	1.87	0.53	0.026*	1.08, 3.24
Gender				
Women	1	–	–	–
Men	0.72	0.20	0.239	0.41, 1.25
Management responsibilities				
Without management resp. (ref.)	1	–	–	–
With management resp.	1.67	0.50	0.088	0.93, 2.99
Concurrent changes in workload experienced during the COVID-19 period				
Yes (ref.)	1	–	–	–
No	2.01	0.56	0.012*	1.16, 3.48
Extent of technology-related difficulties experienced				
None or minor difficulties (ref.)	1	–	–	–
Major difficulties	0.52	0.14	0.017*	0.30, 0.89
*N = 274, Pseudo R^2 = 0.0650				

* $p \leq 0.05$, ** $p \leq 0.01$.

Summary of the results

In sum, 40% of the sample experienced technology-related changes at work during the COVID-19 pandemic period. The changes most often experienced by workers were having to attend more online meetings, writing more emails, using new programs on their own computer or phone and using digital technologies to perform more job tasks than before the pandemic period.

Modeling the satisfaction with changes experienced in the use of digital technologies at work during the COVID-19 pandemic showed that age, education level, the

experience of changes in workload, and the extent of technology-related difficulties experienced at work are significantly associated with the likelihood of being satisfied with technology-related changes at work during the pandemic period.

Discussion

In this paper, we aimed at understanding older workers' experience of and satisfaction with digital technology-related changes at work during the COVID-19 pandemic in the Nordics, and their association with socioeconomic and contextual factors. We focused on older workers as they represent a fast-growing group in the workforce and more often share some specificities such as more limited experience with the use of digital technologies during working life and lower involvement in training initiatives than other age groups, that make some of them more vulnerable to suffering from a negative impact from technology-related changes at work. Our study is based on individual survey information collected through a three-wave survey on the social consequences of the COVID-19 pandemic in working life, conducted in the Östergotland region in Sweden in 2020 and 2021.

Our results show that the likelihood of being satisfied with technology-related changes at work during the COVID-19 pandemic was distributed unequally among older workers. Groups of older workers at the younger end of the range, with higher levels of education and who did not experience workload changes in addition to technology-related ones, and nor technology-related difficulties (which can be presumably interpreted as having greater digital competence), showed an increased likelihood of satisfaction with digital technology-related changes at work during the pandemic than their older, less educated, less digitally competent, and experiencing workload changes counterparts.

This was consistent with our hypothesis and theoretical framework, and finds possible explanatory mechanisms in the literature. In line with a social gerontological understanding of later life, diversity in individual experiences at work—and thus in the evaluation of technology-related changes experienced at work—exists among older workers and follows a social gradient (Phillipson 2019). Similarly, the unequal distribution of satisfaction with the technology-related changes experienced at work during the pandemic finds support in the concept of digital capital (Ragnedda 2018; Ragnedda et al. 2020). As with digital use, availability, and competence, so the individual assessment of the uses of digital technologies varies between social groups. Compared with other studies (Dodel & Mesch 2020; Ghimire et al. 2020; Vasilescu et al. 2020), our results stress that older workers are not a homogeneous group in terms of evaluating the experience with technology-related changes at work. Later life diversity exists and must be taken into account in working life research in order to inform adequate and inclusive strategies, as pointed out for other research fields (Allemann & Poli 2020; Poli et al. 2021).

Such diversity in satisfaction with technology-related changes at work can be explained by the fact that different groups of older workers may have been differently prepared to face technology-related changes at work during the COVID-19 pandemic, for example, due to differential access and availability of resources and opportunities at work. In this respect, previous studies have highlighted the unequal distribution of training opportunities among older workers. In particular, they tend to decline with age

and with lower job qualifications (Fleischmann & Koster 2018; Karpinska et al. 2015; Lazazzara et al. 2013; Lössbroek & Radl 2019). As the participation of older workers in training at work is associated with satisfaction at work (Visser et al. 2020), the dissatisfaction with technology-related changes reported by workers in older age groups, with lower educational attainment and digital competence may be explained by the fact that before the pandemic period these groups of older workers had poorer (or no) access to training opportunities, including the use of digital technologies at work for work purposes, than their counterparts. A further explanation relates to the fact that these groups of older workers may be less exposed to digital technologies beyond the work sphere as well (Hargittai et al. 2019; Poli, Kelfve, et al., 2021; Poli, Kostakis, et al. 2021; Tirado-Morueta et al. 2021), which may have made them less resilient in adjusting to the sudden increase in use of digital technologies at work during the pandemic period.

Finally, our results indicate that although digital technologies and internet use are widespread in Sweden and a large majority of the population have access to them (European Commission 2022; Statistics Sweden 2023), individuals' evaluation of digital technologies and the internet (i.e., satisfaction vs. dissatisfaction) can vary greatly between social groups. This may suggest that, once saturation in digital technology use is reached, another level of digital inequality occurs, and that is at the level of evaluating the experience of the increased use of digital technologies in daily life.

Moreover, it is worth mentioning that 60% of the sample did not experience technology-related changes. This can have different explanations. One is that because Sweden has been a forerunner in digital transformation at work, many workers are already accustomed to a broad use of digital technologies at work and did not therefore experience a change during the COVID-19 pandemic period. A second explanation finds its basis in the nature of our sample, which includes more highly educated respondents than the overall population in Sweden. Individuals with higher levels of education are more likely to occupy job positions which involved the use of digital technologies before the pandemic period. This means that the actual share of individuals who experienced technology-related changes at work during the pandemic period may have been larger than what we observed in our sample.

This study has some limitations. First, we compared our survey sample with the overall population in Sweden and found that it included more female and highly educated respondents than the overall population. This bias could have reduced or increased some of the reported associations. It also limits the generalizability of our findings to the overall Swedish population. Second, the survey was conducted as an online survey and thus older workers with low (or very low) digital skills or limited access to the internet and digital devices might have been underrepresented in our sample. Third, we only had limited information on individual digital competence and therefore used a proxy measure, that is, having reported difficulties in using digital technologies. Fourth, we decided to dichotomize all predictors in the analyses. While this enables clear contrasts between the levels of the variables and increases the interpretability and understanding of the findings, it may have hidden specific nuances in the indicators and reduced variability. Fifth, we investigated satisfaction with overall technology-related changes experienced during the pandemic period, which limited our ability to interpret the individual experience and impact of single technology-related changes. For instance, individuals might have qualified differently their experience with remote working and having more online meetings. Sixth, we do not know if the change involved an increased, decreased,

or different type of technology use at work, even though the first option is more likely considering the context and period of the study. Also, our study context—Sweden—has some specificities that limit our ability of generalize the results to other European contexts. Sweden is among the most digitally advanced countries in Europe and shows among the highest levels of internet use by individuals. Therefore, while our results might apply to the other Nordic countries which share similar figures with Sweden, they should be treated as an example of a likely future scenario for other European countries where digital transformation is less progressed to date.

Nevertheless, our study provides important insights and evidence of a differential impact of technology-related changes at work among older workers during the COVID-19 pandemic. Some groups of older workers were more likely to experience technology-related changes at work in a negative manner than others and may thus have been more exposed to their negative consequences on other relevant dimensions related to work and the private sphere. With digitalization increasingly dominant in workplaces and working life being prolonged, strategies to increase the resilience of older workers to the ongoing digital transformation at work and to unforeseen accelerations of such transformation (as with the COVID-19 pandemic) should be urgently identified and applied.

From a theoretical point of view, our study improves the understanding of late working life in times of digital transformation. The satisfaction with technology-related changes at work is distributed unequally following a social gradient. The ongoing digital transformation and the increased use of digital technologies at work has the potential to reinforce and widen existing inequalities in late working life. Moreover, our study enriches the existing body of literature on digital inequalities, which exist not only at the level of digital capital and related gains but also at the level of subjective experience and evaluation of their use. Satisfaction with the changes in the use of digital technologies at work is an overlooked factor which can influence other outcomes in late working life, such as willingness to prolong working life or job satisfaction, as well as in other spheres.

Our results have some key practical implications. They are of interest to policymakers and HR managers for redefining policies and practices which target the diversity of older workers and aim at being inclusive; to trade unionists for ensuring that all older workers are given the opportunity to be reskilled or upskilled to navigate the ongoing digital transformation in workplaces; and to older workers for increasing awareness around issues related to the impact of digital transformation on late working life.

Future research should investigate what it means for older workers not to be satisfied with changes in the use of digital technologies at work in times of rapid and massive digital transformation of workplaces, what the consequences are of such an experience in the later stages of one's career and, most importantly, what can be done about it both at policy and company level.

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