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Academic Editors
Simone Haasler (Goethe University Frankfurt)
Alice Melchior (GESIS–Leibniz Institute for the Social Sciences)

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Editorial

Digitalization of Working Worlds and Social Inclusion

Alice Melchior [1,*] and Simone Haasler [2]

[1] Leibniz Institute for the Social Sciences (GESIS), Germany
[2] Goethe University Frankfurt, Germany

* Corresponding author (alice.melchior@gesis.org)

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Abstract
Digitalization is engendering profound societal transformation that is significantly restructuring our working lives. For society, and the world of work in particular, digitalization presents a major challenge, as the digital transformation of work does not simply relate to technological innovation; rather, it involves a complex sociotechnical process that is socially prepared, technically enabled, and discursively negotiated, and that ultimately must be individually mastered. As a result, the ongoing digitalization of "working worlds" is characterized by multiple dimensions and processes that evolve and proceed unevenly. These processes interact in complex ways, not uncommonly contradicting each other. Against this background, this thematic issue explores some of the implications and dynamics of the digital transformation of work concerning social inclusion.

Keywords
digital transformation of work; digitalization; social inclusion; sociotechnical processes; world of work

Issue
This editorial is part of the issue "Digitalization of Working Worlds and Social Inclusion" edited by Simone Haasler (Goethe University Frankfurt) and Alice Melchior (GESIS–Leibniz Institute for the Social Sciences).

1. Introduction

Investigating the relationship between work and technology, as well as their social and organizational modifications, remains a chief aim in the social sciences: How technological innovation impacts and transforms work has been at the very center of the research agenda for decades. Studies on digitalization have thus become a dominant research field in the sociology of work (e.g., Pfeiffer & Suphan, 2020). As the current digitalization is engendering profound societal transformation, digital transformation can be understood as a megatrend in society's present and future development that also significantly restructures our working lives.

Given the sustained interest in the digital transformation of work, it is not surprising that numerous research approaches and perspectives seek to better understand the digitalization of "working worlds," producing a multitude of research findings. However, based on the literature on digitalization and work, three main assumptions prevail: First, digitalization does not simply relate to technological innovation, but rather should be understood as a complex sociotechnical process (Henke et al., 2018; Hirsch-Kreinsen, 2020; Joyce et al., 2023). Nevertheless, technologies are a relevant factor in digital transformation. Second, the influence of technologies on work differs in relation to their contextual embeddedness. This means that different segments of the labor market are affected to different degrees, as the influence of technologies varies, for example, by occupational field, organizational type, and work process (Orlikowski, 2000). Indeed, the use of technologies, and technologies themselves, are significantly shaped by social relations and organizational structures (e.g., Joyce et al., 2023), which are context specific. Third, the sociotechnical process of digitalization should not be understood as coherent, but rather as a multi-layered, contradictory, and unsynchronized process that is socially prepared, technically enabled, and discursively negotiated, and that ultimately must be individually mastered (Henke et al.,

2018). As a result, the digitalization of working worlds is characterized by multiple dimensions and processes that evolve and proceed unevenly, interacting in complex ways and not uncommonly contradicting each other. While new technologies open up abundant technical possibilities in the context of work, the potential of new technologies for the world of work needs to be negotiated and socially prepared. This happens, for example, in discourse about new business models, adjusted working conditions, and new work realities. It also involves conflict about the compatibility of work and family life and work–life balance. Hence, digital transformation not only offers opportunities for social inclusion but also has the potential to reproduce and reinforce existing inequalities or to create new ones. This points to the necessity to address and examine the implications and dynamics of the digital transformation of work concerning social inclusion.

2. Relations Between Work, Technology, Organization, and Society

While different approaches and lines of argument evolve around the complex, multi-layered, and unsynchronized digital transformation of work, three overarching strands of discussion can be identified in research on the digitalization of work. These address the relationship between (a) work and society, (b) work and organization, and (c) work and technology.

In the relationship between work and society, we can see that the social impact of digitalization results in disadvantages for certain groups in the labor market and in structural inequality. These disadvantages relate to gender disparities, uneven labor market participation, newly emerging employee categories, and concerns around work–life balance, to name a few. Also, the relationship and interaction between service and production are changing significantly due to digitalization processes. In the relationship between work and organization, we observe that employees' working conditions are changing, new business models are evolving, labor policy is struggling to establish regulations for digital work, and inter-company processes are being restructured. Hence, the digital transformation of work is also modifying the interplay between autonomy and control, between managers and employees, between management and representative bodies, and between platform providers and crowd workers, among others. In the relationship between work and technology, the focus lies on changes in work processes within organizations. Observed changes include the modification of sociotechnical structures and related forms of interaction and collaboration, which may significantly affect and restructure individuals' workplaces. In this context, the Internet of Things (IoT), Big Data, and artificial intelligence (AI) enable increasing connectivity and integration of physical and digital worlds, with the result that interaction and collaboration between several institutional actors, people, and robotic systems, and between people and algorithms are undergoing dynamic expansion. New job profiles, skill demands, and training requirements are one facet of the implications that these dynamics may induce.

3. The Articles in This Thematic Issue

The articles presented in this thematic issue cover a wide range of methodological approaches and theoretical concepts, as well as empirical research focusing on various work domains, groups of employees, and employment contexts. Most of the articles contribute empirical results to the discussion about the digitalization of the world of work and social inclusion. In addition, it should be noted that this thematic issue presents European perspectives, as all empirical articles use data from one European country or from across Europe. Whereas most articles apply either qualitative or quantitative methodologies, one mixed-method article provides insight into workers' perspectives on the risks and challenges of online platform work, taking their different living situations, socioeconomic status, and health issues into account (Klaus et al., 2023).

Regarding the three overarching strands of digitalization of working worlds, the articles in this thematic issue address primarily the relationship between (a) work and society and (b) work and organization. Although the relationship between work and technology is also considered, changes in work processes within organizations and changing occupational profiles or qualification requirements are not the focus of the contributions. Regarding the relationship between work and society, the articles focus on (un)equal participation in digitalization processes by looking at gender, negotiation positions, levels of material and digital resources, and conflict between work and private life against the background of more flexible forms of working. The thematic focus of the discussion of the relation between work and organization is on platform work, new work realities induced by digitalization, and how telework impacts job quality.

Baumgart et al. (2023) start the issue with a theoretical analysis of the role that organizations play in digitalization processes and how they (re)produce, reinforce, or diminish gender-specific inequalities when new technologies are introduced. In their analysis, the authors look at the reciprocal relationship between organizations, digitalization, and gender. This is followed by a study by Nerland et al. (2023) on discourses of digitalization and inequalities of participation in digitalization processes among Norwegian healthcare workers and how these workers negotiate their positions when new technologies are being introduced. De Marco et al. (2023) study inequalities in labor market participation by looking at how inequalities in material and digital resources of Spanish job seekers influence the outcomes of online job-seeking processes and how this is connected to incidences of burnout. The subsequent three

articles discuss the influence of more flexible and digitalized forms of work on the compatibility of work and private life: Abendroth and Schwarz (2023) shed light on how digital communication with supervisors influences the perceived need for work–life supportive supervisor behaviors in Europe. Entgelmeier and Rinke (2023) show that gender-typical patterns of gainful employment in Germany are reinforced by work-related ICT use even though it is associated both with working overtime and with better temporal alignment of work and private life. Schongen (2023) uses data from German hospitals to explore the impact of digital technologies on work–life balance and its influence on gender- and education-specific inequalities.

The thematic issue then moves on to aspects of the relation of work and organization with a focus on platform work and changing job realities. Arcidiacono and Piccitto (2023) start this section of the issue with a discussion of the myth that platform work is inclusive by analyzing the impact of platform models on job quality in Italy using the OECD Job Quality Framework. Two other articles also discuss the perspectives of platform workers and their work realities: Klaus et al. (2023) analyze the risks and challenges that German-speaking online platform workers face. They differentiate between micro-, meso-, and macro-work and different groups of online platform workers categorized based on their living situations, socioeconomic status, and health. Wiesböck et al. (2023) examine how domestic cleaners in Vienna experience working in the gig economy and how their work realities are modified for the worse as platforms transform the two-party relation between clients and cleaners into an ambiguous three-party constellation.

Friedrich and Vicari (2023) conclude the thematic issue with a study on how the boost in telework during the Covid-19 pandemic modified subjective job quality in different occupational fields.

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Conflict of Interests

The authors declare no conflict of interests.

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About the Authors

Alice Melchior is a research associate (post-doc) and project coordinator at GESIS Leibniz Institute for the Social Sciences in Germany, and a participating researcher in the German Research Foundation (DFG) priority program Digitalisation of Working Worlds. With a background in the sociology of work and technology as well as in science and technology studies, her research examines different facets and dynamics of digitalization in the context of flexibilization, virtual communication, valuation, and job profiles. Her current project focuses on the implications of digitalization for qualification, workplace design, and employment.

Simone Haasler is a social scientist with a research interest in labor market developments, work trajectories and careers, skills, and learning from an international comparative perspective. Before taking up her current position as Deputy Head of the Research Support Division of Goethe University Frankfurt, Germany, she led one of the research projects in the DFG priority program Digitalisation of Working Worlds. Her publications focus on labor market segregation by gender, addressing the interplay between vocational education and training systems, labor market structures, and welfare systems.

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Article

A Circulatory Loop: The Reciprocal Relationship of Organizations, Digitalization, and Gender

Lene Baumgart [1,*], Pauline Boos [1], and Katharina Braunsmann [2]

[1] Chair of Sociology of Organization and Administration, University of Potsdam, Germany
[2] Chair of Sociology of Digital Societies, Leibniz University Hannover, Germany

* Corresponding author (lene.baumgart@uni-potsdam.de)

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Abstract
In the digitalization debate, gender biases in digital technologies play a significant role because of their potential for social exclusion and inequality. It is therefore remarkable that organizations as drivers of digitalization and as places for social integration have been widely overlooked so far. Simultaneously, gender biases and digitalization have structurally immanent connections to organizations. Therefore, a look at the reciprocal relationship between organizations, digitalization, and gender is needed. The article provides answers to the question of whether and how organizations (re)produce, reinforce, or diminish gender-specific inequalities during their digital transformations. On the one hand, gender inequalities emerge when organizations use post-bureaucratic concepts through digitalization. On the other hand, gender inequalities are reproduced when organizations either program or implement digital technologies and fail to establish control structures that prevent gender biases. This article shows that digitalization can act as a catalyst for inequality-producing mechanisms, but also has the potential to mitigate inequalities. We argue that organizations must be considered when discussing the potential of exclusion through digitalization.

Keywords
digitalization; gender bias; gender inequalities; organizations

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1. Introduction

In organizational sociology, digitalization and gender equality are recognized challenges that are widely discussed separately. On the one hand, research on gender inequalities in organizations (e.g., Wetzel, 2014) shows that it is worth focusing on the structures of organizations to explore inequalities. In the digitalization debate, on the other hand, programmed gender biases play a major role due to their potential for social exclusion and inequality (Kohlrausch & Weber, 2020). At the same time, digitalization is associated with hopes for more gender justice and neutrality, as physicality is ascribed a smaller role in the digital space (Piasna & Drahokoupil, 2017) and as it comes with new career opportunities (Rajahonka & Villman, 2019) or access to employment, income, and education (Hilbert, 2011, p. 21). Since the 1990s, there has been discussion about whether the internet has the potential to change gender relations and identities, adopt roles beyond gender stereotypes, and soften the gender division of labor (Haraway, 1991). So far, articles rarely ask how gender and organization interact in the process of digital transformations. Instead, the debate mostly centers on the transformation of specific occupations (e.g., Regin, 2022). We consider this blank space remarkable given the formative and impactful function of organizations as drivers of digitalization (Büchner, 2018) and as loci of social integration (Schimank, 2005). Starting from the thesis that the reproduction of gender inequality is reinforced despite

the promises of salvation by digital technologies, we show the intertwined relationship of organizations, digitalization, and gender. Therefore, we introduce the question of whether and how organizations (re)produce, reinforce, or diminish gender-specific inequalities during their digital transformations.

To answer our question, we bring into dialogue the literature on the relationship between gender and organization and between digitalization and organization. In this conversation, two relations crystallize: The first shows the influence of digitalization processes on organizations and the accompanying organizational restructuring. During their digitalization, organizations are implementing new post-bureaucratic management concepts and forms of work. These have the potential to reinforce gender inequalities. The second relation emerges when organizations influence digitalization processes. Gender inequalities are usually built into digital technologies within organizations that program and produce them. When technologies are applied in other organizations or the social environment, they reproduce the gender inequalities programmed into them. Even if algorithms are explicitly tested for their gender-influencing consequences and are as neutral as possible, it is often the organizations applying them that undo this function. While having the literature on gender and technology in mind, we will not explicitly summarize this extensive body of literature but introduce it selectively into our argument. This decision was made due to the perspective chosen in this article, which centers on the organization.

To discuss the specific challenges of digitalization processes in organizations concerning gender inequalities, we address theoretical assumptions about the relations of digitalization and organization as well as gender and organization (Section 2). We then show examples of how organizations and digital transformations (re)produce, reinforce, and diminish gender inequalities (Section 3). Finally, we discuss the interplay of gender, organization, and digitalization to derive consequences and proposals for action (Section 4).

We base this article on a non-binary and genderqueer understanding of gender. When we use the term gender, we include genderqueer, agender, non-binary, trans, or intersex people. Nevertheless, our argumentation builds on existing studies that—with a few exceptions (e.g., Hofmann, 2014)—perform analyses under binary gender categories or latently carry them along (e.g., Kohlrausch & Weber, 2020).

2. Theoretical Framework: The Relationship Between Organizational Structures, Digital Transformations, and Gender Inequalities

We pose the question of the (re)production or avoidance of gender inequalities during digital transformations centering the organization as a mediating social system. The systems-theoretical view of organizations makes it possible to precisely grasp their specifics and to distinguish them as social systems from families or groups of friends in which gender inequalities also occur. Organizations are decision-based social systems that have purposes, steep or flat hierarchies, and a fixed set of members (Luhmann, 2000). Analytically, two types of structures can be distinguished in organizations: formal and informal ones (Luhmann, 2000). Formal structures regulate membership conditions and are manifested in decisions about personnel, communication channels, and programs. Informal structures fill the gaps in the formal structure and stabilize it in this way. This specific look at decided formal structures and their corresponding informal counterparts is why we use systems theory as an analytical model. Because organizations can make decisions regarding either their digitalization programs or their diversity measures, they have the lever to regulate gender inclusion and exclusion. As this perspective on organizations focuses primarily on structures and the "function" of these structures, our contribution—and we consider this to be an advantage of this theoretical setting—does not begin with individual actions and intensities, but rather with the structural basis for the analysis of inequalities. Additionally, as systems theory is interconnected with other theoretical assumptions we can lean on already existing discourses about the relation between organization and digitalization as well as between organization and gender and bring those into dialogue.

In the international discourse, discussions about the digitalization of and in organizations do not have a specific affinity for a systems theoretical perspective. The relationship is broadly discussed under questions of new organizational dynamics such as those of decentralized organizations (Alaimo & Kallinikos, 2022; Vergne, 2020), co-constitution of organization and digitalization (Faraj & Pachidi, 2021), or new organizational forms (Davis, 2016, among others). Digitalization is also discussed as part of heterogeneous contexts such as hospitals (Bruni, 2005), policing (Brayne & Christin, 2021), or processes of categorization on online music discovery platforms (Alaimo & Kallinikos, 2021). In organizational sociology, the systems theoretical debate on digitalization has recently gained momentum (Kette & Tacke, 2021), and sheds light on the digital transformation concerning organizational formal and informal structures. At the same time, it emphasizes that organizations should be understood not only as systems transformed by digitalization (Husted & Plesner, 2020) but also as drivers of digital transformations (Büchner, 2018). They drive digitalization by developing, using, changing, or distributing digital, algorithmic products (e.g., Jöstingmeier, 2021).

It is undisputed that digital transformations are leading to greater formalization in organizations (Büchner, 2018). Contrary to management hopes, the introduction of digital technologies does not lead automatically to an improvement of the organization. Instead, formal decisions are needed about the organizational structures and the use of these technologies (Rajahonka &

Villman, 2019, p. 16). For example, decisions are required concerning which technologies are introduced and who can or may use them, and how. It is determined which and how data is collected, evaluated, and used. Central to the management of business processes in organizations are enterprise resource planning (ERP) software systems such as SAP, which formalize decision-making programs, process structures, or personnel issues (Roski, 2021, p. 431). Organizational decisions are programmed into the systems, but the software systems themselves also contain a technical decision-making framework. Organizations can do little to intervene in this and organizational members must adopt it (Ametowobla, 2022; Mormann, 2016).

The impact digitalization has on organizational decisions and processes is also shown by the discourse on AI systems and algorithms (Besio et al., 2021; Kette, 2021). Büchner and Dosdall (2021, p. 336) show how algorithms are made "actionable" by and in organizations by embedding their results or categorizations into the organizational decision structure. This means that companies decide based on the preliminary decisions of the algorithms. The technology thus gains a decision-making capacity like that of organizations.

The use of digital technologies is also accompanied by differentiations of informal modes of action (Büchner, 2018) and shifts in (informal) power relations in organizations (Muster & Büchner, 2018). Formal structures impressed by software systems necessitate informal workarounds that are established around technologies (Lammi, 2021; Roski, 2021). Organizational members deviate from the intended use by either not or incorrectly using implemented technologies or by manipulating them (Baumgart et al., 2023).

Organizations are also changing in the process of their digitalization concerning formats of collaboration or the introduction of new management concepts. For example, digital transformation is almost naturally coupled with the adoption of post-bureaucratic organizational models (Muster & Büchner, 2018). Post-bureaucratic phenomena include, e.g., flat hierarchies, the increase in self-organized project work, network-like structures, or the use of creative and agile product development methods (Eckstein & Muster, 2021; Heckscher, 1994). The perceived rise of post-bureaucratic models suggests the shift to the discourse on gender in organizations since the abolishment of the bureaucratic organization is one suggestion for a more equal society (cf. Britton, 2000, p. 422). Doing so, the classic work of Acker (1990) on gendered organization claims that organizations themselves are inherently gendered, for instance, because they are conceptualized and designed by men. Other famous studies like those by Cockburn (1985) or Kanter (1977) discuss the social perception of certain occupations as male or female. Although there is no room for an extensive overview of the classic feminist debate on organizations, one can conclude that those works helped to shape the perspective on a socially constructed organization, which distinguishes itself radically from the "rational machine" understanding often propagated in the classic organization studies. However, Britton (2000) points to the shortcoming of this view, which lies in the lack of a precise analytical concept that allows one to grasp the differences between the organizational level, the societal level, and the personal level, e.g., personal perceptions of what is male- or female-coded. Considering this criticism, the here taken systems theory perceptive seems especially fruitful, since it enables the analytical shift between society, organization, and interaction. This analytical perspective, however, puts the hope that less bureaucratic and more digitalized organizations will offer more equality within the organization into question. Especially the focus on interactions that comes with post-bureaucracy within organizations is not only crucial for the debate on organizational implications of digitalization but also for the one on gender inequalities in organizations. This is due to the observation that the closer organizations operate to interactions and the fewer formal rules there are the more relevant gender becomes (Regin, 2022, pp. 11–13; Wetzel, 2014, p. 102).

Interactions in organizations usually take place informally unless they are formally regulated. This is because, even if organizational members encounter each other in a professional context as formal role bearers, (normative) gender stereotypes are linked to the roles and the associated behavioral expectations (Ridgeway, 2001). Demonstrations of power in the form of sexual assault (MacManus & MacKinnon, 1979) or more subtle practices like the asymmetrical distribution of speech in favor of male interaction partners occur daily (e.g., Brescoll, 2011). The "new economy" and its informal (career) networks follow on from here: They are characterized by their homosocial reproduction (Ohlendiek, 2003). This means that only those who resemble the existing members in as many characteristics as possible (e.g., age, gender, origin, education) become members (Allmendinger & Hinz, 1999, p. 199). The lack of standardized career ladders and assessment systems also opens the space for inequalities (Bowles et al., 2022). Informality can undermine formally implemented equality strategies or management concepts that explicitly focus on gender diversity in practice (Allmendinger & Hinz, 1999) and degrade them to shiny projects for the outside world (Hofmann, 2014, p. 394).

But the organization and its formal structures also reproduce and stabilize patriarchal power relations. Gender becomes directly relevant at the latest when positions are formally filled, e.g., when job descriptions and advertisements incorporate gender-stereotypical requirements or when women are considered particularly suitable or unsuitable for certain jobs based on physical characteristics (Wilz, 2002, p. 9). Formalized assessment procedures that apply stereotypical evaluation patterns produce inequalities in career opportunities (Acker, 1990). Glass walls, ceilings, and escalators can

be consequences of these recruitment and evaluation practices (Ohlendiek, 2003, p. 180). This is why Wetzel (2014, p. 116) refers to organizations as the "inequality calculator of modernity," in the sense that they decide on the inclusion and exclusion of members, and the suggested equality of members is translated into hierarchy and other inequality structures. In this context, the question of the extent to which women will be disproportionately affected by unemployment becomes relevant, especially as female-dominated jobs are increasingly performed by machines in the future (Cortes et al., 2020, p. 919; Genz & Schnabel, 2023, p. 6).

The literature shows that in the discussion of gender inequalities in the context of digitalization, organizations should be considered as an influencing and controlling system. It became clear that both digitalization and gender are interwoven into organizational structures and have an impact on them. Therefore, it would be useful to ask to what extent gender inequalities are reinforced by processes of digitalization in the organization or whether it even offers the potential for reducing gender inequality. In the following, we show how organizations (re)produce gender inequalities during their digital transformation.

3. What Goes Around Comes Around: On the Organizational (Re)Production of Gender Inequalities

To show how organization, digitalization, and gender are related, we focus on two parts where gender inequalities are (re)produced in organizations in the context of digital transformation: when digitalization, even apart from the use of specific technical artifacts, changes the structures of an organization (Section 3.1) and when organizations develop, influence, and adapt how technical artifacts function (Section 3.2). Thus, on the one hand, we ask about the organizational effects that result from digitalization projects of organizations. On the other hand, we are interested in the extent to which digitalization is given a specific direction by the organization (for this perspective, see also Kette & Tacke, 2021, p. 7).

3.1. Post Bureaucracy and Young Boys Networks: How Digitalization Changes Organizational Structures

In the following, we show three aspects of how digitalization promotes gender inequalities in organizations: Digitalization introduces post-bureaucratic management fashions that reinforce gender inequalities because they rely on interactions rather than formal regulations (A); digitalization ensures a shift in power relations in favor of male software developers and computer scientists (B); the use of mobile devices leads to a dissolution of work boundaries and thus to a double burden on women who perform care work (C).

(A) Contrary to the hopes for equality associated with post-bureaucracy or the new world of working (on this, see Piasna & Drahokoupil, 2017), gender inequalities are instead reproduced. Even if the increase in post-bureaucratic structures is accompanied by formalization (for example, by strongly regulating interactions), interactions are primarily characterized by informality. Thus, the emphasis is on networks, self-organized teams, and flat hierarchies (Williams et al., 2012), all of which operate close to interactions.

Professional networks are considered a catalyst for a successful career. Especially under the heading "old boys network" it has been shown how "old (white) men" provide each other with jobs and sought-after positions in organizations and that women do not have access to such networks equally (Scheidegger & Osterloh, 2004, p. 201). This can put women in a paradoxical situation: Women are excluded from powerful men's networks while women's networks—if they exist—are ridiculed or even trigger negative consequences if there is a perception that women are favored (Joshi et al., 2015, p. 1535; Williams et al., 2012, p. 566). It can be suggested that the problem is exacerbated by digitalization as networks shift their interaction to digital communication platforms. As a result, the networks stay invisible and become unattainable for women due to digitalization.

In self-organized teams, where a common final product overshadows individual performance, it becomes more important to highlight one's skills and professional achievements. Williams et al. (2012) show that women are negatively interpreted by male teammates when they highlight their accomplishments and that they must fight even harder than men for recognition of their work (Williams et al., 2012, pp. 557–560). In digital interactions, this problem may aggravate women, as it requires an increased staging of one's performance because participants must establish their presence and addressability through communicative explication (cf. Herzogenrath, 2021, p. 422).

With a flattening of hierarchies and the resulting reduction of positions in personnel management, the likelihood of women reaching a management position also decreases. Studies have shown that the strategic top management of listed companies is in favor of flatter hierarchies, but only at the hierarchical levels below them (Pasero, 2004, p. 148). This implies that the strategically decisive and correspondingly higher management levels are mainly occupied by men (Joshi et al., 2015, p. 1516) and that the vertical segregation of high hierarchical positions does not change (Pasero, 2004, p. 148).

In summary, we showed that if post-bureaucratic organizational concepts also come into play during digitalization, this can exclude women from interactions, obscure the visibility of their achievements, and reduce career opportunities. Piasna and Drahokoupil (2017, p. 327) appeal that especially in the context of the New Work discussions the role of practice at the workplace and organizational level should be recognized as perpetuating gender-related labor market segmentation.

(B) The growing relevance of information technology professions during digitalization results in a shift of

power within organizations. Power is shifting in favor of the people who deal with software development and programming and thus with increasingly important "zones of uncertainty" (cf. Crozier & Friedberg, 1979)—these are mostly "structurally dominated by men and symbolically associated with masculinity" (Prietl, 2019, p. 8; see also Rajahonka & Villman, 2019, p. 15). In the process, not only are there fewer women among software developers but the few that do exist are being marginalized and seen as less able (Joshi et al., 2015, p. 1519). For example, a quantitative study on the code database GitHub shows that the acceptance rate of "pull requests" from female software developers is higher than from men, but the trend reverses once the gender of the pull requestor is visible (Imtiaz et al., 2019; Terrell et al., 2016). The so-called pull request is used to inform other developers when software developers have uploaded a new version of their product so they can use, test, and further develop the product. Among other things, this leads to the fact that women perceive their skills as being lower than those of male computer scientists (Acilar & Sæbø, 2023, p. 243; Rajahonka & Villman, 2019, p. 15). This also makes the horizontal segregation of occupational groups addressed by gender research particularly important (e.g., Jarman et al., 2012), as it can be assumed that homosocial reproduction (cf. Ohlendiek, 2003) along the trait of gender is strengthened by the sheer quantitative weight of male developers. Homosocial reproduction occurs because male computer scientists with managerial jobs prefer people who are similar to them (Williams et al., 2012, p. 563). The gender differences then occur not only because there are hardly any female computer scientists, but additionally, because they are not in the positions to make personnel decisions (Joshi et al., 2015).

On the contrary, the study of Rajahonka and Villman (2019) shows that digitalization can also be seen as a career driver for women. The interviewed women underlined that their competencies in the use of and perspective on technology and social media created great opportunities to advance in their careers and to improve their standing in the organization (Rajahonka & Villman, 2019, p. 19). However, the interviewees were all asked to develop themselves and their digital competencies and had a positive attitude toward lifelong learning. The authors, therefore, summarized that "digital tools must be properly domesticated and combined with self-management skills to be able to enhance both women's well-being and opportunities to develop and advance in their careers" (Rajahonka & Villman, 2019, p. 22). The problem here is that the responsibility for the unequal situation of women is attributed to the individuals themselves, for example by attesting a lack of motivation or the lack of urge to spend money on things other than digital technology and the improvement of digital skills (van Dijk, 2012, p. 57). Additionally, women do this lifelong learning in addition to their paid labor and unpaid care work while, for men, a large part of this care work is still omitted and they can use this time to expand their skills (Arroyo, 2020, p. 183; see also section C).

To sum up: The digitalization of organizations can reinforce existing power relations or may shift them in favor of male organizational members—first because IT skills are demanded and more men have these skills; second because the positions that can fill jobs are more likely to be held by men who hire their peers; third because the few IT products by women that exist in organizations are held in low esteem. Nevertheless, the gaining importance of social media in organizations and the women's user and practice-oriented view on technology can also create new career opportunities—if women are willing to spend their free time and money gaining new skills about digital tools.

(C) With digital transformations, forms of mobile work become a new standard of everyday working life. Mobile workplaces create opportunities for organizational members and especially women to find a balance between work, family, and hobbies (Piasna & Drahokoupil, 2017). However, studies show that this assumption can also be a trap: For women with families, mobile working can lead to a double burden, as they must organize paid work and care work in parallel. If organizations do not provide guidelines that show how boundaries must be drawn between family lives and the increasingly flexible digitalized work, overload and an increase in work will follow (Rajahonka & Villman, 2019). Furthermore, due to the informal expectations of organizations, fathers are more inclined to invest the flexibility thus gained in paid work (Liebig & Peitz, 2017).

What was exacerbated during the pandemic by homeschooling regulations was also a problem beforehand, especially for working women in heterosexual partnerships: in particular, societal expectations and largely unchanged assumptions about unpaid work at home (Kromydas, 2020, p. 8) or that domestic chores cause women to have to balance family care work with professional work demands (Goh, 2013, p. 1020; Turner & Norwood, 2013, p. 397). The use of mobile devices "enables women to work two shifts at the same time" (Nagy, 2020, p. 73). Women are simultaneously burdened with two expectations—those of the employer and those of the family—which can be cited as a further reason for structural gender inequality (Arroyo, 2020, p. 182; Wajcman, 2004). It is striking that studies about queer or non-heterosexual couples find that the distribution of work and care tasks is far more egalitarian (Buschner, 2014; Kurdek, 2007).

Additionally, organizations are increasingly offering family- and compatibility-friendly options to encourage men to take up the "active fatherhood" demanded by society (Joshi et al., 2015, p. 1535; Liebig & Peitz, 2017, p. 392). Despite such measures, organizations reveal an informal expectation that business as usual is also practiced in the home office and that committed fatherhood is equated with career-rejecting men. The consequence is that, in contrast to women who use time flexibility and

autonomy for care work, men invest even more time in work through mobile working and thus gain an advantage (Liebig & Peitz, 2017, p. 397). Studies have shown that, concerning the gender digital divide, the Covid-19 pandemic resulted in a higher reduction of work hours for mothers with young children than for fathers (Collins et al., 2021, p. 110). Similarly, Arroyo (2020) was able to show that women's presence in the labor market and unpaid care work for the family crucially affects the time available to them for connecting to the internet and developing their digital skills (Arroyo, 2020, p. 183). The gender digital divide refers to the unequal access and use of information and communication technologies between genders and it is a worldwide phenomenon (Acilar & Sæbø, 2023, p. 234).

It is interesting to note that in both cases—concerning the expectations for women and men—the interviewees in the scientific studies did not place the responsibility for this on the organizations (Liebig & Peitz, 2017, p. 407; Nagy, 2020, p. 72). Instead, the importance of individual agency, lifelong learning programs of digital inclusion, and the advantages of mobile technologies are emphasized (cf. Arroyo, 2020; Rajahonka & Villman, 2019, p. 16). For organizations, this is functional: The family-friendly measures let them shine to the outside world; formally the offers apply and informally their members work in their free time thanks to mobile technology (Nagy, 2020, p. 79). Thus, if organizations use post-bureaucratic concepts during their digitalization that rely heavily on interaction and flat hierarchies or enable mobile work in an unregulated way, there is a risk that equal opportunities in organizations will be hindered.

3.2. How Organization and Technology Format Each Other (and Gender at the Same Time)

Further answers to the question of the reproduction or avoidance of gender inequalities through digitalization become visible when organizations develop, influence, or use digital technologies. The fact that digital technologies and the algorithms inscribed in them can be discriminatory is discussed repeatedly (Kohlrausch & Weber, 2020; Wang & Redmiles, 2019). Additionally, the social construction of technology theory argues that gender shapes the construction and meanings of technology and that technology in turn shapes gender roles (Rajahonka & Villman, 2019, p. 16). Surprisingly, the role of organizations as loci of software production is often overlooked. This is relevant because organizations sell biased technologies or use them themselves, thus incorporating biases into their structures (A); even if software could be objectively gender-neutral and might even promote gender equity, it is the organization that determines the impact and use of digital technologies—positively and negatively (B).

(A) Discriminatory software products are produced and used in organizations. Technical artifacts are never value-neutral, as they are the products of value- and persuasion-driven subjects (Hagendorff, 2019) who (preconsciously) inscribe discriminatory presuppositions into digital technologies. As computer software is usually developed for (and by) male information scientists it is typically biased in their favor (Rajahonka & Villman, 2019). Big Data and other digital technologies must therefore, according to Prietl (2019, p. 6), be seen as "the product of numerous practices of categorization and classification, of the production of comparability, and of the demarcation between what gets included and what does not, between what is considered as relevant and what is not." Such biased programming can occur in several ways:

On the one hand, by programming "preexisting biases," i.e., discriminatory beliefs of the subject, directly into the technology or by missing gender-inclusive features (see Prietl, 2023). An example is the Austrian AMS algorithm, which selects job seekers according to their chances of integration into the labor market. It then assigns them to different categories and automatically suggests jobs or training opportunities (Lopez, 2019). However, the user interface only captures binary gender categories. Non-binary jobseekers are thus not even captured or must assign themselves to one of the genders. The algorithm is also debatable because the jobseeker data is compared to an ideal base group of young Austrian men whose chances of integration are particularly high (Büchner & Dosdall, 2021, p. 339). Büchner and Dosdall (2021, p. 345, authors' translation) have shown that organizations tend to "pragmatically use qualitatively problematic but existing datasets rather than attempting to recreate them or refrain from using them algorithmically." When organizations embed biased algorithms into their decision architecture and make their consequential decisions based on the algorithmic presorting, it can lead to discrimination against women or other genders.

On the other hand, if the programs are based on machine learning, they can condition or reinforce biases (Prietl, 2023). Such algorithms are often trained by humans, so subjective value judgments and social stereotypes end up in the training data. Consider here Microsoft's chatbot Tay, which was fed false, racist, and discriminatory statements when interacting with humans, so that after less than 24 hours it sent off tweets like this one: "I fucking hate feminists and they should all burn in hell" (Verhoeven, 2020, p. 236). Another example is Amazon's former recruiting software. The self-programmed artificial intelligence was supposed to pre-select applicants and classify them into a rating model. The applications of the last ten years and their respective performance were used as training data. The results of the AI: Male applicants were preferred to female applicants. The reason was not only that there were simply more male applicants and thus more male entrants in the previous ten years, but also that both characteristics with female connotations and

terms frequently used by women were rated negatively (Verhoeven, 2020, p. 237). Prietl (2023) states that these results are not surprising if AI or self-learning algorithms use data sets that are inevitably from the past and derive predictions for the future. In this way, the use of technology can perpetuate established social inequality structures (Prietl, 2023, p. 59). Thus, the software developing organization becomes crucial in the development, distribution, and use of discrimination-neutral software. Reflection on what the systems can represent, what inequalities are perpetuated by them, and what attributions to reality become central in the implementation and distribution processes of digital technologies. For organizations, the absence of such reflection means processing gender inequalities.

(B) The progress induced by digital technologies can be inhibited during their use in the organization. In other words: If organizations formally implement anti-discrimination software, their informal structures may override this function (Roski, 2021). Just as technical systems shape organizational decisions, organizations shape how technology functions. For example, efforts are being made, particularly in human resources departments, to use digital technologies that avoid gender biases in personnel recruitment and development processes.

A recent study explores a digital personnel management platform in which all organizational members create a profile, and this is then anonymously proposed for vacancies (Baumgart et al., 2023). Through anonymization, the software was explicitly programmed to exclude gender as a factor in personnel decisions. Personnel decisions would no longer be made based on personal networks, gender, name, origin, sexuality, or one's appearance, but solely on professional skills and fit. As a result, the informal workaround established in the organization was for the anonymous profile holder and the manager of the vacant position to informally meet for coffee. In the ensuing interaction, gender again became relevant to personnel selection.

The anonymity of the internet is associated with the hope of less gender-based discrimination as it affords anonymity and algorithmic rationality based on skills or past performances. Instead, as Piasna and Drahokoupil (2017, pp. 325–326) show, in online labor markets, gender stereotypes play a role in hiring decisions regarding types of work and contracts for women. Job postings or search algorithms that require constant availability and instant responsiveness discriminate against workers who combine online work with other activities, especially caregiving.

In summary, the organization formally satisfies the anti-discrimination claims, but its informal structures cancel out this functional potential of digital technology. Gender is brought to the fore again in the interaction, which could be disadvantageous for women. In the next section we would like to discuss different possible solutions and strategies organizations could adopt to make their own formal and informal structures more gender inclusive on the one hand and to reflect on their software production and use on the other hand.

4. Conclusion and Outlook

Contrary to the hopes associated with digitalization, our explanations show two things: Organizations are places that produce or can contain gender inequalities *in* and *around* them. The same is true for (digital) technologies that they apply but also produce. By connecting to the information brought to them, adapting their decision-making premises, and thus changing their structures, organizations are also formatted, and digitalization and gender are structurally intertwined. A circulating relation emerges that can be observed from the organization as a reference problem. Regarding both relations—whether starting from the digitalization that changes the organization or starting from the organization that influences the digitalization—it became clear that gender inequalities are reproduced in organizations. Both relations proceed as a kind of circulatory loop in which one dynamic triggers and conditions the other.

Digitalization processes trigger new structures and forms of work in organizations that can have negative consequences for the social inclusion of all genders. If men are the ones with decision-making power or creative influence on technologies in these new structures, this can in turn influence the design of digitalization processes. A circular movement is also evident in the other direction: Organizations (unintentionally) program gender biases into the technologies they develop. When technological products are deployed in organizations, they reproduce gender inequalities in the organizational structures. These gender inequalities then in turn influence the products that are produced in the organization. Digitalization can thus act as a catalyst of inequality-producing mechanisms, but it also has the potential to mitigate inequality—which of these occurs can be influenced with the help of organizational design.

Organizations have one lever to try to mitigate or prevent all three risks: their formalization. Studies have shown that formalized organizational structures can be advantageous for discriminated organizational members (Allmendinger & Hinz, 1999): Regulations on hiring requirements, promotion criteria, and evaluation procedures reduce the risk of subjective decisions based on functionally irrelevant characteristics. Joshi et al. (2015, p. 1535) propose three issues diversity management could focus on: "integrating accountability structures into performance management and compensation practices, designing jobs to promote greater equity among incumbents, and implementing industry-wide mentoring programs for women." In addition, women can rely on such formal structures and specifications in the event of discrimination if these prohibit such action. Even if formal regulations can cause unexpected informalities as a consequential problem.

Regarding gender inequalities in digital software products, organizations could set up instances that explicitly monitor the technologies. It would be imaginable that departments that check the "user experience" also test the technologies for gender—or otherwise discriminatory assumptions. It would also be conceivable for third-party organizations to "audit, advise, or sanction data processing practices at companies or government institutions" (Hagendorff, 2019, p. 62, authors' translation). Another possibility might be mandatory training for software developers to reflect on the risk of gender biases or to suggest programming ways to avoid heteronormative assumptions. It could already help, as Prietl (2019, p. 9) suggests, "protagonists [of Big Data] acknowledge their own situatedness within social relations of power and inequality and the effects this position has on the design of Big Data technologies and the truth claims that they make." On a positive note, there are now even technical software solutions in use that recognize gender biases in user interfaces and workflows (Vorvoreanu et al., 2019, p. 1) or prevent forms of social discrimination from being learned by computers (Hagendorff, 2019, p. 60).

One thing is certain: As social systems that are present in all areas of modern society, organizations can play a supporting role in the social inclusion and equal treatment of all genders (Schimank, 2005). They can take up the structural potentials that accompany digital transformations and reduce (gender) discrimination. However, since gender equality does not help to fulfill the organizational purpose (Meuser, 2004, p. 93) and organizations are under constant pressure to refinance (Kette, 2012), they have no genuine interest in eliminating gender inequalities. While organizations' initiatives would be welcome, the appeal must be directed to politics, which can put organizations under pressure to implement legal measures (for some specific policy action see, e.g., Hilbert, 2011). In this context, a scientific investigation that takes a comparative look at different countries paying attention to the effects of particularly diversity-friendly legislation could be fruitful. Simultaneously, we suggest that our question concerning the inequality producing digital organization can also be studied concerning other marginalized groups as, e.g., everyday racism is also reproduced in digital data (Hepp et al., 2022, p. 2).

We have shown that an organizational sociological look at the dialogue between gender and organization as well as digitalization and organization is worthwhile to understand their mutual relations. What remains is the wish that the intertwining of organization, digitalization, and gender will be taken more into account by sociology and other social sciences in the future and that the role of organizations in the question of gender inequalities will be reflected. As Acilar and Sæbø (2023, p. 241) state, it is not possible to achieve sustainable development and gender equality without having every gender's meaningful participation in the information society.

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Conflict of Interests

The authors declare no conflict of interest.

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About the Authors

Lene Baumgart studied sociology and is a researcher in the DFG-funded research project Organizational Implications of Digitalization, at the Chair of Organizational and Administrative Sociology at the University of Potsdam. Simultaneously, she works as a research associate at the Metaplan Gesellschaft für Verwaltungsinnovation. In her research, she is particularly interested in the digitalization of organizations and the potentials and problems that accompany it.

Pauline Boos is a researcher at the Chair for the Sociology of Organizations and Administration at the University of Potsdam. She works in the DFG-funded research project Organizational Implications of Digitalization, conducting empirical studies in (former) bureaucratic corporations as well as administrations. She studied political and administrative science and is interested in how digitalization and new methods of organizing shape the relationship between organizations and their societal environment.

Katharina Braunsmann is a researcher at the Institute of Sociology at Leibniz University Hannover. Since 2020, she has been researching software development and dimensions of digital organization in the Freigeist research group Digital Cases. As an organizational sociologist, she is also interested in qualitative methods of digitalization research. She studied sociology at Bielefeld University, where she focused on the sociology of organization and violence, visual sociology, and methodological issues in qualitative social research.

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Article

Discourses of Digitalisation and the Positioning of Workers in Primary Care: A Norwegian Case Study

Monika Nerland [1,*], Mervi Hasu [1], and Miria Grisot [2]

[1] Department of Education, University of Oslo, Norway
[2] Department of Informatics, University of Oslo, Norway

* Corresponding author (m.b.nerland@iped.uio.no)

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Abstract
Primary health services are subjected to intensified digitalisation to transform care provision. Various smart and assistive technologies are introduced to support the growing elderly population and enhance the opportunities for independent living among patients in need of continuous care. Research has shown how such digitalisation processes evolve at the intersection of different and often competing discourses, oriented towards service efficiency, cost containment, technological innovation, client-centred care, and digital competence development. Often, increased technology use is presented as a solution to pressing problems. However, how discourses are negotiated in work contexts and their mechanisms of social inclusion/exclusion in evolving work practices have received less attention. This article examines how care workers in the primary health sector are discursively positioned when care technologies are introduced in the services. We employ a perspective on discourses and subject positions in analysing strategic documents and interviews with care workers in a large Norwegian city. We show how managerial discourses that focus narrowly on the implementation and mastery of single technologies provide limited spaces for workers to exert influence on their work situations, while discourses that emphasise professional knowledge or broader technological and organisational aspects provide a variety of resources for workers' agency. The way care workers adopt and negotiate subject positions varies based on their tasks and responsibilities in the organisation. We discuss the need to move beyond "solutionism" in efforts to digitalise care work in order to provide inclusive spaces supporting the contributions of various worker groups.

Keywords
care work; digitalisation; discourse; Norway; primary care; subject positioning; welfare technology

Issue
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1. Introduction

Across Europe, primary health services are being subjected to intensified digitalisation with the aim of transforming care provision. Various smart and assistive care technologies have been introduced to address the growing elderly population, often with the stated purpose of enhancing ageing clients' opportunities for independent living and making home-based services more cost-effective. Such strategic initiatives bring new and specialised vocabularies to care organisations and contribute to changing the discursive configuration of services. As discourses mediate ways of thinking and acting in social life, changing configurations also affect workers and other actors.

Researchers have examined how digitalisation processes in the health sector evolve at the intersection of different and often competing discourses, oriented towards different phenomena, such as service efficiency, technological innovation, client-centred care, and digital competence development. On the managerial level, researchers have described an overly techno-optimist

notion that increased technology use will solve pressing problems. According to Lupton (2017, p. 1), the focus is on "what digital technologies can offer both lay people and professionals and how they might operate as 'solutions' to the problems of healthcare delivery, growing medical costs, improving people's health and wellbeing and preventing illness and disease." This notion is accompanied by a techno-centred approach to technologies as stand-alone solutions that can be implemented in health care to resolve problems of practice (Ajjawi & Eva, 2021; Nerland & Hasu, 2020). Although the local manifestations will vary, this way of thinking may have a strong influence on what groups of actors, practices, and ideas are seen as important in the digitalisation process while simultaneously excluding other stakeholder groups from taking an active role in the process. Further, technologies and the discourses they bring will typically have more and different implications than first envisioned when they are adopted in various settings (Ziebland et al., 2021). Thus, the ways in which they affect work and workers need to be examined in local contexts, with particular attention given to specific digitalisation processes.

This article examines how discourses of digitalisation are mobilised in local working documents aimed at guiding technology implementation in the primary care sector and how they provide discursive resources for workers to draw on. Specifically, we analyse how workers in home-based services are discursively positioned in this context and how the affiliated discursive resources may enable or restrict the inclusion of care workers as active contributors in the development of work practices. We focus on the introduction of a particular type of care technologies, which are described as welfare technologies in the Nordic context (Lo et al., 2019). These technologies include smart devices, such as electronic medicine dispensers, safety alarms, GPS trackers, and various sensor technologies. Such digital technologies provide opportunities for remote care, for instance through alarms and images of the users' situation, which may lead to caring relations that are both more and less intense (Pols, 2012). Hence, the way care workers' positioning and agency are affected is not straightforward.

Our study is situated in Norway, where the National Welfare Technology Programme (WTP) was launched in 2014, within which selected municipalities conducted pilots that were later scaled to integrate welfare technologies in the services on a continuous basis from 2020. This implies an ongoing digitalisation process, as more and new versions of welfare technology become available on the market and are utilised by shifting constellations of care workers and users. As these technologies become more advanced, they are increasingly linked with other technologies in digital infrastructures. This brings additional work tasks and challenges to the fore, such as checking alarms and coordinating information registration across sites and devices.

Based on an analysis of strategic documents and interviews conducted with different groups of workers in one service organisation in a large Norwegian city, we offer novel insights on how discursive resources accompanying digitalisation initiatives may include and exclude worker groups as active participants, thus influencing work and service development. In particular, we discuss how discourses that focus narrowly on the implementation and mastery of single technologies may limit workers' opportunity to exert influence on their work situation, while discourses that highlight broader technological and organisational aspects of work provide resources for workers to participate and build agency in various ways. To provide inclusive spaces for the contributions of various worker groups, we argue that organisations must move beyond the lucrative notion of "solutionism" in efforts to digitalise care work and pay more attention to the implications of these efforts on the micro-level distribution of work tasks and responsibilities.

By doing so, we offer an alternative and more dynamic way of addressing social inclusion in working life, compared to research emphasising inequity related to individual skills and access to technology (e.g., Reisdorf & Rhinesmith, 2020), employability (Bejaković & Mrnjavac, 2020), or workforce diversity (McCarthy et al., 2023). Mechanisms of social inclusion/exclusion in changing work practices emerge at the intersection of the available discursive resources and the way they are adopted and negotiated in everyday work. Hence, they need to be examined in their local work contexts.

2. Conceptualising the Discursive Positioning of Workers

A range of approaches has been used to conceptualise and analyse the role of discourses in organisational contexts. Different approaches highlight how historical lines of reasoning constitute the present, the power mechanisms embedded in contemporary ways of organising work practices and organisations, and the micro-level negotiations and achievements based on language in use (e.g., Alvesson & Kärreman, 2000).

In this study, we understand discourses as cultural ways of thinking, talking about, and understanding the world that shape actions (Jørgensen & Phillips, 2002). Through language and other material means, discourses incorporate established knowledge and belief structures that are prevalent in spheres of social life, including professional work. They serve as intermediaries that condition our ways of viewing and acting upon phenomena. This occurs through processes of categorising practices, responsibilities, and legitimate responses, as discourses "systematically form the objects of which they speak" (Foucault, 1972, p. 42). Discourses contribute to producing the subjects we are and the objects we can know something about (Jørgensen & Phillips, 2002). For instance, the object of good care will be constructed differently through a cost-effectiveness discourse and one focused on autonomous and independent living.

This is not to say that discourses *determine* social practices and their related objects. Rather, different discourses are often available simultaneously and offer different interpretative resources for actors to draw on. Indeed, one could argue that it is impossible to frame and speak about any phenomenon in a sensible way without mobilising discursive resources, such as categories or justifications expressed in language. For instance, objects like welfare technology or good care can be ascribed quite different meanings through the discourses in which they become embedded. Moreover, each discourse provides a limited set of subject positions that are available for people to occupy. As Burr (2015, p. 127) states, "discourses entail within them implicit positions that a person may take up. They address us particular kinds of people: as an old person, as a carer, as a worker, as a criminal and so on." These positions offer perspectives from which to make sense of oneself and one's environment, and present both possibilities and limitations regarding what can be said and done by people who take up and draw on a certain discourse. As part of this dynamic, values are ascribed to different subject positions in the work environment (Angermuller, 2018). For instance, Hodgson (2002) discussed how the introduction of project management models and their inscribed conceptions may change notions of professionalism in ways that improve the status of certain staff members while simultaneously leading to insecurity and a loss of status for workers detached from the circles of project management.

We use documents and interviews as the main data sources to examine the discursive positioning of primary care workers in their local context of digitalisation. Strategic documents, such as those developed to promote the use of digital technologies in care work, have inscribed discourses. These discourses come into view, for example, in the way problems are presented and calls for action are justified. At the same time, these inscriptions are not static. Rather, discourses inscribed in the documents are modified in different ways as they become entangled with other texts, practices, and concerns when different actors approach them. Asdal (2015) showed how policy documents bring *issues* to the forefront and how these issues are transformed through different actors' "modifying work" with the documents (e.g., between local and national political contexts). Issues may be raised and become contested but also closed and naturalised as part of these processes. Further, actors can become detached from or made responsible for handling the issues. Hence, what becomes an issue for some actors can simultaneously become a non-issue for others, thereby marginalising workers who are affected, for example, by a digitalisation initiative in ways that prevent their active participation. We consider strategic documents intended to promote and facilitate the introduction of welfare technologies in care services as providing discursive resources for practitioners to draw on as they adopt subject positions offered in their work environment. These resources may enable or restrict care workers' inclusion in the collective processes of service development. Hence, adopting subject positions and building agency is a social and relational process that is conditioned but not determined by the discursive resources available in the local work context.

We use these concepts and notions to examine how the discourses that operate in efforts to introduce and legitimise welfare technologies in primary care are translated and mobilised locally, with implications for the inclusion of worker groups in these processes. We do so by pursuing the following research questions:

1. What discursive resources are available for care workers to draw on in the local digitalisation process?

2. How do these resources enable or restrict the inclusion of care workers as active contributors in the development of work practices?

In the next section, we present a brief review of related research.

3. Related Research

Digitalisation in health care leads to the inclusion of new actor groups and ways of organising work. Notable investments in technology are typically accompanied by collaboration with IT service solution firms, systematic project management models, and their related inscribed conceptions. Although many public organisations have found project management models and practices useful, they may generate changes in how professionalism is understood and what forms of expertise should be allocated to different tasks (Hodgson, 2002). Through these processes, workers may become attached to or detached from various change initiatives and their wider rationale.

In the research literature on digitalisation in primary care, the implications of discursive changes have been observed at the level of both work organisation and the workers' practice. Ten Dam and Waardenburg (2020) analysed vocabularies of practice among frontline professionals in a Dutch hospital setting concerning how "patient collaboration" as a new principle was negotiated and made sense of. Their analysis pointed to five dominant discursive logics that interplayed in this setting: a medical professional logic, a managerial logic, a commercial logic, a consultation logic, and a patient-centeredness logic. These logics were related to distinct vocabularies, according to which different tasks and responsibilities were important for the quality of care work. Although this study did not focus on digitalisation processes per se, technologies were found to be prominent drivers of organisational change (ten Dam & Waardenburg, 2020).

Related types of discourses are assumedly present in the strategies and practices for introducing welfare

technologies in primary care. These initiatives include different stakeholders, such as managers, vendors, health professionals, and clients. Hence, we can expect the presence of managerial, professional, commercial, and client-centred ways of thinking. However, researchers have described variations in the way welfare technologies are adopted and approached, which may modify discourses and reduce or strengthen their relative power.

Frennert (2020) identified three distinct approaches to introducing welfare technology in Swedish elderly care: approaching the technology as an end-product that could simply be installed to transform elderly care; as a project in which the assumption is that insights generated in the project would "drizzle through" the organisation and transform care practices; and as a broader strategy directed towards changing the care services as a whole. The three approaches relate to different discourses of change, which had different implications for the temporal organisation of change and how care workers were involved. While the third approach is more inclusive in the way it addresses care practices, it is still characterised by management-level decisions. Hence, Frennert (2020) argued that a focus shift is needed to include the experiences and knowledge of care personnel and users as resources for organisational change.

Another study by Segercrantz and Forss (2019) examined how care workers in Finnish residential care homes identified with or resisted the subject positions provided in the discourses around technology implementation. Care workers were positioned as motivators and implementers, yet they were often excluded from other phases of the planning process. Interestingly, they concluded that what they termed the pro-innovation discourse "primarily invites care workers to implement technologies and motivate older adults to use them, even when care workers see the technologies as a threat to the quality of care" (Segercrantz & Forss, 2019, p. 644). Further, the workers were not likely to resist the subject position offered, although they expressed discomfort with some of its implications, such as reduced face-to-face contact with the care receivers. Hence, Segercrantz and Forss (2019) argued that the pro-innovation discourse may "trap" care workers in this subject position and conceal alternative subject positions that could have been adopted by the workers.

Recently, Nilsson et al. (2022) examined discursive constructions of problems and solutions related to care for the ageing population in Swedish policy documents at the local level. Their study showed that health was not addressed as a domain of professional or medical care. Rather, health was seen as a means to achieve independence among older people, which should be secured through a productive interplay between digital technologies and the support of informal carers (in this case family and friends as care givers). The results indicated that digitalisation discourses in primary care do not necessarily position care workers in a way that supports their engagement. Rather, they may serve to bypass or reduce the role care workers may play in service development.

Tensions and negotiations related to the introduction of welfare technology have also been described in the Norwegian context. Corneliussen and Dyb (2021) identified discursive struggles related to welfare technology in local political contexts and described how issues pertaining to technology implementation and professional care have changed over time. Nilsen et al. (2016) followed the early introduction of welfare technology in selected municipalities over time and analysed forms of resistance among different groups of stakeholders. Their study showed how resistance emerged in response to perceived threats to service stability, role identities, and basic health care values. However, rather than massive and active resistance, concerns were raised in a more passive and subtle manner and intertwined with a productive stance to co-create, evaluate and adapt technologies to meet local needs.

Based on the studies and literature reviewed above, we anticipate that four types of discourses are present in efforts to digitalise primary care: managerial discourse, health professional discourse, service user-centred discourse, and commercial discourse. Within these categories, a range of more specific discursive manifestations can be imagined. The way discourses are modified and given meaning will enhance and restrict opportunities for participation in service development among care workers. These issues need to be examined in their local discursive contexts, into which we turn next.

4. Research Setting and Methodology

4.1. The National Context

The WTP was launched by the Norwegian government in 2014 to increase the focus and support in primary care for implementing welfare technologies in the care services. As part of a wider agenda to cope with challenges facing the welfare state, this programme was one of several policy initiatives aimed at developing "another path to enhanced efficiency than through traditional savings policy and market-oriented thinking" (Norwegian Ministry of Health and Care Services, 2013, p. 10). The programme provided a framework for municipalities to develop and implement welfare technology, and the main objective was to make welfare technology an integral part of care services by 2020 (p. 27). The programme placed expectations and responsibilities on the municipalities to participate in the developing and testing of what was termed "welfare technology solutions" in collaboration with partners in the private sector and within research, development, and innovation. The importance of innovation was highlighted, and the ambitions of the WTP were contextualised within broader initiatives to "promote arenas and meeting places between the supply industry, the health care sector, and public funding

and innovation agencies" (Norwegian Ministry of Health and Care Services, 2013, p. 13).

The WTP went through several phases. The most active piloting phase was in 2015–2019, followed by an evaluation and reorientation phase from 2020 onwards, when the programme initially was expected to end. Through these phases, other resources, policy initiatives, and reforms were launched that added to and partly reframed the issues discursively. For instance, a white paper to the parliament was released in 2018, advocating for "quality reform for older people" (Norwegian Ministry of Health and Care Services, 2018), which positioned the elderly as key service users in primary care and linked the use of welfare technologies to their ability to live active and socially included lives. Further, a variety of framework resources was developed in the context of the WTP, such as a roadmap for service innovation and a package of learning resources aimed at employees in health and care services. Such initiatives brought issues related to competence to the fore. They were again modified and expanded in the evaluation phase (beginning in 2020) when issues related to data management, digital infrastructures, and the quality of digital information registration/retrieval emerged.

As this short historical review illustrates, the policies and national-level initiatives have moved between various discourses, with technological innovation, service users, care workers, and organisational arrangements as their main foci. Throughout the different phases, responsibilities have been allocated to municipalities and their primary care services and supported by various framework resources. The initiatives are still evolving, as the evaluation concluded that the WTP has been and remains an important promoter and facilitator for the municipalities. As of the writing of this article, the programme has been extended for the period 2022–2024.

4.2. Empirical Case and Methodology

Our data were collected in a large Norwegian city comprising several city districts with relatively high autonomy, which has been active in piloting the use of welfare technologies throughout the course of the national WTP. A dedicated welfare technology section was established within the city's Health Agency to support their local initiatives and bridge with the national programme. Four city districts served as frontrunners, whose experiences were later shared city-wide. At first, home-based services were one of the main target areas. A dissemination project (henceforth the Dissemination Project) was organised in 2017–2019, coordinated and led by the Health Agency and its welfare technology section. Through this project, dedicated worker roles were established in the city districts: a welfare technology coordinator in each of the city districts, supported by a varied number of resource persons, who were allocated some working time to support colleagues in engaging with welfare technologies. To enhance knowledge sharing, a network for the coordinators was established and the city districts were grouped in clusters consisting of one frontrunner and three other districts. Since 2020, more responsibilities have been allocated to the city district level, with support from a growing section of the Health Agency that coordinates procurement and organisational interdependencies in the services.

Our data comprise main strategic documents on the municipality level, supplemented with interviews with key persons responsible for organising the implementation of welfare technology in the Health Agency. The selected documents are listed in Table 1 and pertain to the period after the piloting phase.

At the worker level, we recruited welfare technology coordinators from one cluster to participate, before zooming in on one of the city districts that had been particularly active and was approached as a learning model by other municipalities. In sum, our worker-level data comprise in-depth interviews with workers in different positions in the care services: employees in technology coordinator positions (5); middle managers responsible for home care services (3); resource persons (7); and care personnel who were operative workers in the home care services (14). The home care workers were interviewed in groups of three to five participants, while the other participants were interviewed individually. The interviews were conducted across one year, in 2021–2022. Due to the ongoing pandemic, some interviews with coordinators and resource persons were conducted using Microsoft Teams, while the remaining interviews were conducted face-to-face.

All interviews were semi-structured and conducted as a conversation between two interviewers and the informant(s), based on a thematic interview guide. The group interviews with care workers focused on work tasks and responsibilities, changes in work related to the introduction of welfare technologies, experiences and concerns with different types of welfare technologies, and visions for the future development of the services. The individual interviews with technology coordinators and resource persons focused on their working tasks and responsibilities, how they were recruited to these positions, their strategies and experiences with collaboration across personnel groups and work settings, and how they contributed to organising the services for technology use. The interviews lasted 45–60 minutes and were transcribed verbatim and uploaded to NVivo for coding and analysis.

The documents and interviews were analysed separately. In the document analysis, we used the main categories of digitalisation discourses identified above as a starting point for a thematic analysis to identify how various discourses manifested in the municipality strategies (Braun & Clarke, 2006). We then examined how issues were raised and modified in these discursive contexts and how different actors were ascribed status or responsibilities (or not) for the way issues should be handled (Asdal, 2015). Next, we examined the vocabulary used

Table 1. Documents selected for analysis.

Documents used in the analysis	Characteristics of the document
The strategic competence plan for the health and care services (2017–2021)	The municipality's joint competence plan for the health care sectors in all city districts, developed by several city agencies (publicly available).
Steering document providing management guidelines for the Dissemination Project (2019)	Provides joint implementation and project management guidelines for the city districts, developed by the welfare technology section in the municipality's Health Agency (operative document for internal use, i.e., not publicly available).
The final report for the Dissemination Project (2019)	An end report and internal assessment of the Dissemination Project developed by the welfare technology section in the Health Agency (operative document for internal use, i.e, not publicly available).
External evaluation report of the Dissemination Project (2019)	A consultancy firm's external evaluation report commissioned by the welfare technology section in the Health Agency (semi-public document).
Overall diffusion model for the introduction of welfare technology (2020)	Joint dissemination guidelines for the city districts developed by the welfare technology section in the Health Agency (operative document for internal use, i.e., not publicly available).
Two status reports regarding training in welfare technology, basic and advanced levels (2019)	Progress reports reporting on the status of training initiatives for employees (basic level) and resource persons and middle managers (advanced level) and projecting future actions (operative documents for internal use, i.e., not publicly available).
The municipality's long-term plan for welfare technology (2020–2024)	The municipality's overall strategic plan for enhancing and strengthening the use of welfare technology in the city, developed by the Health Agency in collaboration with the city districts and other interest groups (official and semi-public document).

Notes: These documents are specific to the organisation and have been created and distributed to assist in local digitalisation processes on a city district level; the first and last documents listed are official policy documents, while the others are working documents; the documents are written in Norwegian, with titles translated by the authors. For anonymity, the name of the municipality has been excluded; readers seeking additional information about these documents may contact the corresponding author.

by the interview participants to describe their work and justify and legitimise their arguments or claims. Here, we employed an inductive approach to code statements about work, responsibilities, experiences with, or concerns related to welfare technology. The interviews were first analysed within the groups of participants (managers, welfare technology coordinators, resource persons, and care workers) and then read in light of each other to further identify patterns and variations within and between the worker groups.

5. Analysis

5.1. Discourses Guiding the Municipality Strategies

The municipality-level strategic documents were found to incorporate different types of discourses, which also shifted over time in ways that brought different issues to the fore. Generally, managerial discourses were the most prevalent. Reflecting the national-level strategy of making municipalities the key responsible administrative layer in the digitalisation of primary care, the city districts were seen as the operative organisational units for the implementation and use of welfare technology. Hence, although the municipality-level documents often used a passive voice and avoided naming specific recipient groups, messages from the national WTP were implicitly conveyed to leaders and managers in the city district. The managerial discourses interplayed with different manifestations of service user discourses and discourses addressing the work and workers' competencies. The commercial type of discourse was not prominent in these documents. However, this may be a result of the selection of documents limited to the welfare technology initiatives, as the municipality's wider innovation policies addressed the city and its services more broadly. We elaborate on these overall observations in the following. All quotes in Sections 5.1 and 5.2 are translated from Norwegian by the authors. Table 2 summarises the discursive characteristics of the municipality-level documents.

Concerning managerial discourses, we observed some shifts over time in the way issues were brought up and attached to actor groups. An emphasis on operational project management accompanied the

Table 2. Discourses in municipality-level strategic documents.

Main category	Discourse characteristics
Managerial	Shifting from a generic project management discourse (the Dissemination Project's "management guideline" document) to discourses on organisational coordination, collaboration, and knowledge sharing (the "diffusion model" document of 2020) and further to strategic technology foresight and change management discourses (the "long-term plan" document of 2020–2024).
Service user	Shifting between discourses emphasising welfare technology support for *patients'* individual health with a few referrals to specific groups or medical statuses (dementia, risk of falling) to the role of welfare technology in supporting *citizens*' independence.
Health professional	Absent referrals to health professional groups or medical competences; competence discourse emphasising change management targeting top and middle managers.
Commercial	Only minor signs of discourses emphasising the stimulation of innovation, although vendors are important technology providers.

establishment of the Dissemination Project, which positioned the city districts as co-project managers. A dedicated project coordinator was recruited to work in the welfare technology section of the Health Agency and developed a management guideline document to be used in the city districts. By specifying mandates, goals, resources, and timelines as well as responsible roles and areas of responsibility, this document advocated a generic project management discourse marked by what we can term standard project terminology, such as "implementation," "milestones," "framework conditions," and "success criteria." In addition to specifying the responsibility of department directors related to time allocation, local project managers (i.e., welfare technology coordinators) and resource persons were mentioned as important resources. The document employed a directive voice, underscoring the need to prioritise the implementation of the project: "Time for project work for project managers and resource persons is prioritized by the districts. The implementation projects are prioritized in the districts."

When the Dissemination Project ended, the managerial discourse was modified and oriented towards other issues. As more responsibilities in the subsequent phase were transferred to the city districts, the emphasis on project management was substituted with a retrospective and reflexive discourse focused on legitimising the use and value of welfare technologies for new groups of workers and service users. The diffusion model document (2020) emphasises the importance of "understanding why we use welfare technology, how to communicate in such a way as to create understanding and commitment to welfare technology among senior managers, employees and users/relatives." Here, issues are attached to other actors on the service floor, such as employees and service users. However, rather than being positioned as active contributors, these actors are seen as target groups for the strategy.

In the latter stage, a new discursive framing was introduced in the long-term plan for welfare technology (2020–2024), which connects the past development to the future possibilities of technology. The document introduced the concept of a "technology radar" (a model for technology foresight) in raising the need to monitor future possibilities as an issue: "If a trial shows good results, procurement, piloting, and scaling will be relevant. The technology radar gives us a pointer to technologies that may hit the municipality in the latter part of the planning period."

Through a technology-centred managerial discourse and its specific concepts, this notion generates a local modification of the strategic issues. Again, managers and specific worker groups involved in trials, procurements, and scaling are seen as important contributors. Interestingly, there is no mention of health care professionals or ideas arising from work practices. This managerial discourse on technology foresight incorporates a new specialised language and invites certain expert groups to master it, while other groups are left out.

The managerial discourses interplays with discourses on service users and health care workers. However, in both cases, these target groups are addressed in general terms, with few distinctions or specifications regarding the type of users or care workers. Service users are referred to as citizens who should be supported in their lives more generally: "Coping with everyday life is about citizens being able to cope with their lives and everyday life. This means that we have to review what are important activities for the individual."

Further, the need to adapt to individual users' needs and resources is presented as an issue for service workers. Indeed, a stated ambition of the services is to provide "good service that is based on the individual's resources and what is important to the residents." The usefulness and suitability of welfare technologies for an individual user-patient are not discussed. On the one hand, this

leaves room for local care units and care workers to create and adopt their subject positions in relation to the service user. On the other hand, limited discursive resources are available for this purpose.

This is further supported by the discourses that more specifically address care workers. Overall, the documents make extensive use of generic competence categories and vocabularies, such as "digital competence," and generic leadership vocabularies, such as "change management" and "benefits realisation." However, resources relating to medical or health professional discourses are very limited. Some professional terms and categories are used to highlight the main challenges of the services, such as "clinical understanding of serious and complex disorders" and "everyday rehabilitation and dementia." However, these are not discussed in relation to operative care practices or specific groups of care workers. "Good professionalism" is called for, but what it requires in terms of health professional knowledge and skills is not discussed.

In summary, our analysis identified multiple, mainly managerial discursive manifestations available for care workers but also potential limits in identifying subject positions for accessing these discursive resources.

5.2. Care Workers' Accounts: Discursive Resources and Uptake of Positions

Across the participant groups, we observed an uptake of the discourses presented in the municipality strategies and political ambitions. However, rather than emphasising the overall need for changes in service provision, issues were more often framed within a service user-centred discourse. This was clear in statements like the following:

> Coping and being independent, this is important in the everyday life of the user who makes use of digital welfare technology. (Care worker 6)

> The technology can further assist the user with many tasks in everyday life. This can also contribute to them being able to live at home for longer and have a good everyday functioning in the future. (Home care manager)

These quotes illustrate how some care workers mobilised discursive resources to establish shared visions for the services, which provided a wider framing of their work. At the same time, these statements are formulated on a general policy level, which concerns both the technologies and the service users. Hence, it is not clear what positions are available for the care workers to take up in their everyday work. Moreover, some workers seemed to experience the general ambitions as a rather distant phenomenon, which generated some tensions at the intersection of their experiences:

> I remember now, [the purpose of increased technology use] was, to save and make more efficient…right? But, yes, ethics often comes up. How far should we go to use welfare technology? (Care worker 2)

This example shows how concerns from the front-line services were brought up to modify the expectations in the strategic ambitions. Whether or how the care workers identified with or mobilised the discursive resources offered in the municipality strategies to frame their own work seemed to vary with their organisational position and professional responsibilities. This variation also manifested as differences in the types of discourses they took up.

Not surprisingly, both the technology coordinators and the home care managers drew on resources affiliated with managerial discourses. This could be seen in the way they activated vocabularies that emphasised implementation, changes in a short time span, the economic benefits of technology use, strategic efficiency goals, such as all users living as long as possible in one's own home, and future visions for the services, with an emphasis on coping with everyday life. At the same time, these groups differed in how the resources were mobilised and combined with other discourses in forming their orientations towards digitalisation and care work.

The home care managers were concerned with logistics and with resourcing the home care services as a whole, including human and digital resources. This involved supporting their workers professionally and emotionally to help them "feel safe" and "learn how to perform service work in the future." As one manager stated: "Everything has its process. So, if employees get training and security and know what they are doing, I think it will go very well" (Home care manager 2). The managers were concerned with informing and justifying the need for changes in the services and described themselves as motivators for such changes, primarily for the workers in their unit but also for the patients. In this way, they took up positions constructed at the intersection of managerial and patient–citizen discourses. At the same time, these discourses were modified to focus on confidence and trust in technology-supported care as key issues. One home care manager described how she used arguments related to patient safety to provide the care workers with a rationale for increasing the use of electronic medicine dispensers:

> This has to do with patient safety. That you know that the medicines are given at the right time and to the right person, and things like that. So, you always kind of have to mention it, so that a reason is given for why. (Home care manager 1)

Through these modifications, care workers were attached to the issues, although more as performing workers than as active contributors in the development

of work practices. While the home care managers were concerned with the allocation of health professional expertise, such as making the most of staff nurses and physiotherapists, this was discussed more in terms of resource allocation in the services than through a health professional vocabulary.

The technology coordinators were more specifically oriented towards the welfare technologies and how they could be used in the service chain. As shown in a previous analysis targeting this group (Brandenberger et al., 2023), their tasks and responsibilities were ambiguous and spanned organisational layers. Hence, they differed somewhat in the way they drew on discursive resources and took up subject positions. In general, they activated a pro-innovation type of managerial discourse, through which they were positioned as facilitators, convincers, and motivators in relation to different worker groups in the organisation. In this way, they also became mediators of managerial discourses and strategies in the organisational hierarchy. As one coordinator explained: "My managers are very afraid of communicating that a change is coming. They advise to not talk so much about changes but rather present it as opportunities and let the employees 'seize the chance'" (Coordinator 4).

The care workers raised issues regarding additional tasks and expectations of workers, especially in terms of operating and monitoring welfare technologies. The interviewees stated that they were still responsible for traditional tasks, such as distributing medicine to the patients, as well as for ensuring that the technology (i.e., the electronic medicine dispenser) worked as it should. To make sense of this intensified work situation, they activated resources from a managerial discourse about service efficiency and contrasted it with their own organisational positioning, as in this exchange:

> Care worker 7: The question is which tasks then, one sort of thinks that this will replace. Because you understand that…there is a benefit to the technology and that it has been put there so that it will replace some user time, that it will be able to make the service more efficient.
>
> Care worker 8: It certainly does. But in a way it doesn't…at least not to our advantage, if you understand.

However, this discourse was modified by other workers, who reframed the workload issue over a longer time span, which allowed them to take a more active position. This was done by contrasting the managerial discourse present in the earlier phase with their current situation:

> You were supposed to free up more health care workers and nurses for other tasks…but then it actually took longer to insert the medicine [in the electronic dispenser], because, maybe the medicine was too big for the machine, right….I stood there for maybe half an hour, and then you have to call support to get help in another two, three hours. (Care worker 1)

This worker further described that the main issue in the first phase was to speed up the implementation of technologies in patients' homes, without considering how helpful it actually was for the user: "And we realized that it generated more additional work than being useful, but now it has become easier, because now they are more willing to discuss who of our users will benefit from the technology" (Care worker 1). This re-timing allows for a more active way of envisioning ones' own contributions. Although the formulation "*they* are now more willing to…" places decision-making power at the management level, this positioning opens the possibility for care workers to be included by bringing in their knowledge about the respective service users.

An additional task was responding to alarms from sensor systems in the clients' homes and determining whether the alarms were false or required an immediate home visit. Occasionally, they required actions from the worker in charge beyond working hours when assignments from a day shift were left uncompleted. Moreover, the sensor technologies allowed for increased monitoring of service users and care workers. Some workers mobilised patient safety arguments to cope with this issue: "There are a lot of false alarms, but that's better than not actually detecting real falls." Others described how they were positioned to monitor colleagues' work when receiving alarms and checking the photos from the client's home: "It's uncomfortable because I see how other people work, and it was a pretty clear image, so I feel like I'm monitoring it anyway" (Care worker 2). As these examples show, the health professional discourse was modified to include ethical issues, making it possible for the care workers to influence and manage the degree of intrusiveness in work relations.

Another discursive positioning of the care workers was as motivators for technology use by users. In particular, care workers with a background in occupational or physiotherapy were positioned in this way, as one of them described:

> We do motivational work. We present the machine to them [the users] and explain what it is and what it is about. They don't always say "yes" straight away, but in most cases, we succeed in providing the user with a machine, and they get used to it. (Care worker 4)

This positioning as a motivator is in part grounded in a user-centred discourse, highlighting the value of independent living. At the same time, it is nourished from a managerial discourse, reflecting the target figures for technology use in the municipality strategies.

While commercial orientations were not prominent in the interviews with the care workers, the analysis showed the presence of a pro-innovation discourse as a basis for their subject positions. Across the group

interviews, the participants agreed that the process of adopting and adapting welfare technologies in the services moved too slowly. Some participants even took advantage of the opportunity to redefine their professional subjectivities and link to broader innovation discourses: "I personally get motivated by working with something that is changing. That's the way technology is. So for me it's only natural to be a part of it in a way" (Care worker 7). However, this discourse was mainly present among workers who had sought new tasks and responsibilities, for instance, by expressing an interest in becoming a resource person in the local care unit.

Finally, the interviewees raised concerns that technology could take the focus away from the patient and opportunities for human care. One concern was related to spending time checking and documenting information on a digital device during a visit to a patient's home, as it is more common to write a report while with the user. When discussing future scenarios for the care services, workers expressed worries about "becoming robots" and losing the sense of meaningful work due to reduced human interaction. These statements can be interpreted as resistance towards managerial and efficiency-oriented discourses in the care services. However, as our analysis has shown, the availability of positions from which such resistance could be activated seemed to be limited at the workers' level.

6. Discussion

The analysis identified a set of discourses that formed digitalisation processes related to welfare technologies. The main types of discourses were identified across the documents and worker groups, but they varied in their strengths and manifestations. Although the analysis showed managerial types of arguing and reasoning across the documents and workers' perspectives, which limited the available subject positions for care workers, we also found interesting variations within and between these groups.

The national WTP provided a wider context for our analysis. This programme is characterised by different discourses with the main objectives of technological innovation, service users, care workers, and organisational arrangements. Municipalities are seen as key partners in piloting and scaling "welfare technology solutions.'' While the programme provides a set of framework resources affecting care workers' competencies, the relative absence of a professional discourse addressing care work and the health-professional dimensions is striking. Naturally, the national context has specific political and demographic characteristics. However, regarding the reviewed studies on digital health and digitalisation in primary care, we find that the general orientation towards solutionism resonates with initiatives described in other national contexts (Ajjawi & Eva, 2021; Lupton, 2017).

The municipality-level strategies and documents reflected the emphasis on managerial discourses in the WTP. However, they were modified and configured with other issues over time. In particular, the emphasis on project-organised knowledge sharing and the modification of the service user discourse to the positioning of a citizen (rather than, e.g., patient) provided a wider set of discursive resources pertaining to the care workers. However, in these documents, the health professionals and their expertise were only addressed to a limited degree. The documents did emphasise the importance of competence development, but in a generic and primarily managerial way, related to managing organisational change. Consequently, different manager groups were offered subject positions in these discourses, while the frontline care workers were detached from the issues and therefore marginalised as important contributors to the digitalisation strategy. This relates to Nilsson et al.'s (2022) finding that digitalisation discourses risk bypassing care workers if their contributions as health professionals are not explicitly addressed.

Consequently, these strategic documents offer care workers relatively few positions from which to influence and contribute to the development of services. The overall managerial discourses ascribe value to and offer resources for taking up subject positions as motivators and advocates for technology implementation among service users, reinforced by the overall vision of supporting patient-citizens' independent living at home. However, they do not offer much guidance or discursive resources regarding how to navigate and take an active stance towards service development. Without such resources, alternative subject positions may be concealed.

The analysis of the care worker interviews revealed how the discursive resources were unevenly distributed across the different worker groups, generating more variety in the way subject positions were offered and taken up. In general, our analysis supports the findings of Segercrantz and Forss (2019) regarding how care workers are positioned as implementers and motivators in digitalisation initiatives related to welfare technologies. As in their study, we found mundane forms of resistance and expressed discomfort, but the general impression was that the way of framing the future services in the municipality strategy was adopted at the worker level. Other discourses were available that opened for other positions, such as innovation agents in the services, and professional care work redefined as caring for home-living patients' safety. Still, the opportunity to take up such positions on the service floor seems to depend on the workers' agency and task-related organisational position. In particular, care workers who had expressed personal interest in the digitalisation processes and accepted responsibilities as resource persons in their local organisation were able to draw on a wider set of discursive resources to build agency.

In the wider literature on work and technology, it has been suggested that workers tend to encounter new tools and technologies in different ways relative to

their level of competency and status in the work community (Anthony, 2018). Those with lower status and lower competency tend to accept solutions and procedures as given rather than examining their assumptions and implications. We also found that care workers' approaches to welfare technology varied with their position, tasks, and assumed responsibilities in the organisation. However, our analysis also provides alternative insights on how and why these differences may appear. Rather than assuming strong relationships between orientations towards technology and individuals' level of competency, attention should be given to what discursive resources and opportunities for reflexive engagement the workers at various levels are offered. In our study, the managerial discourses and the emphasis on digital technologies as providing solutions to problems seemed to limit the opportunities for frontline care workers to engage in discursive negotiations related to welfare technologies. This is important, as opportunities to critically reflect on and contribute to shaping the innovation initiatives in one's organisation are crucial for inclusion in the work community and its capacity to attract employees over time (Nerland & Hasu, 2020; Segercrantz & Forss, 2019).

We argue that there is a need to move beyond the notion of "solutionism" in efforts to digitalise work in general and care work in particular and provide inclusive spaces for the contributions of various workers. To maintain the quality of health care services and ensure that workers are given long-term opportunities to stay included in the work community, it is crucial for workers to have access to a wider spectrum of subject positions from which they can make sense of and contribute to changing work practices. Importantly, such positions are not readily offered in the local work organisation itself. Rather, the discursive environment in work organisations is conditioned by wider policy discourses and the way they include or exclude workers' knowledge and perspectives as valuable in change initiatives. As discussed by Angermuller (2018), how challenges and change initiatives are conceptualised matters, not only for the strategies for coping with experienced challenges but also for how values are ascribed to different worker positions in these processes.

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Conflict of Interests

The authors declare no conflict of interest.

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About the Authors

Monika Nerland is a professor at the University of Oslo, Department of Education. Her research focuses on learning and demands for expertise in professional communities in the wake of technological and organisational change. Currently, she is leading the project Changing Competence Requirements in Public Services: Consequences of Digitisation in General and Highly Specialised Work (CORPUS). The project is funded by the Research Council of Norway and is examining the impact of digitalisation processes on work in the healthcare sector.

Mervi Hasu works as an associate professor of workplace learning at the University of Oslo, Department of Education. She researches workplace learning, innovation, and organizational change in public sector contexts, with a focus on work transformations, digitalized work, employee agency, and participation. She has published research on these topics in international journals and edited volumes.

Miria Grisot is an associate professor in information systems at the Digital Innovation Group, Department of Informatics, University of Oslo. Her research focuses on digitalisation in organisations and society, and how digital technology impacts work practices. Her area of research is mainly healthcare with attention to how digital infrastructural technologies are designed, developed, and implemented to support the work of healthcare professionals. She publishes in the fields of information systems and computer supported collaborative work.

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Article

Jobless and Burnt Out: Digital Inequality and Online Access to the Labor Market

Stefano De Marco [1,*], Guillaume Dumont [2], Ellen Johanna Helsper [3], Alejandro Díaz-Guerra [4], Mirko Antino [4], Alfredo Rodríguez-Muñoz [5], and José-Luis Martínez-Cantos [6]

[1] Department of Sociology and Communication, University of Salamanca, Spain
[2] OCE Research Center, Emlyon Business School, France
[3] Department of Media and Communications, London School of Economics and Political Science, UK
[4] Department of Psychobiology and Methodology for Behavioral Sciences, Complutense University of Madrid, Spain
[5] Department of Social, Work and Differential Psychology, Complutense University of Madrid, Spain
[6] Department of Applied, Public and Political Economy, Complutense University of Madrid, Spain

* Corresponding author (s.demarco@usal.es)

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Abstract
This article examines how inequalities in digital skills shape the outcomes of online job-seeking processes. Building on a representative survey of Spanish job seekers, we show that people with high digital skill levels have a greater probability of securing a job online, because of their ability to create a coherent profile and make their application visible. Additionally, it is less probable that they will experience burnout during this process than job seekers with low digital skill levels. Given the concentration of digital skills amongst people with high levels of material and digital resources, we conclude that the internet enforces existing material and health inequalities.

Keywords
burnout; digital exclusion; digital inequality; digital skills; online job-seeking; Spain

Issue
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1. Introduction

The diffusion of the internet has deepened social stratification. High levels of material and digital resources foster engagement in online activities, increasing internet users' digital skill levels (Hargittai, 2002; van Dijk, 2020). Digital skills concentrate among more advantaged users and provide additional tangible benefits in their "real life," resulting in the accumulation of material resources and status gain (van Deursen et al., 2017; Helsper, 2021; van Ingen & Matzat, 2018). Furthermore, highly skilled users are better at handling the effects of online problems—such as fraud, identity theft, or privacy violation—in their daily lives (Büchi et al., 2015; Dodel & Mesch, 2019; Helsper, 2021; Micheli et al., 2018; Scheerder et al., 2019).

The internet has also profoundly changed how people access the labour market. Now, job seekers have access to a greater number of vacancies on a global scale while employers gain more and more visibility and can receive more applications (Bonet et al., 2013; Coverdill & Finlay, 2017). This situation creates larger pools of candidates competing for a limited number of vacancies, especially for the most insecure jobs (McDonald et al., 2019). In other words, employment platforms create an unfavourable imbalance in the candidates/vacancy ratio, with negative implications for individual applications. Moreover, regardless of their job-related competencies,

those with strong online job-seeking skills increase their visibility and their chances of being hired, while other candidates are much more likely to remain unemployed (Pongratz, 2018). Prolonged periods of unemployment and intensive job-seeking practices generate psychological distress (Bunjak et al., 2021; Gedikli et al., 2022). Distress can be reduced by the availability of material and psychological resources, and by job seekers' perception of themselves as being capable of seeking employment (Chen & Lim, 2012; Fernández-Valera et al., 2020). High levels of digital skills may therefore contribute to reducing psychological distress resulting from the platform-mediated job-seeking process (De Battisti et al., 2016; Gui & Büchi, 2021; Helsper & Smahel, 2020).

In this context, this article examines how persisting inequalities in digital skills shape the outcomes of the platform-mediated job-seeking process. High digital skill levels should help people obtain tangible benefits from the online job-seeking process while avoiding its negative implications (e.g., psychological distress). However, how digital inequalities impact the outcomes of platform-mediated job-seeking processes is unclear (Karaoglu et al., 2021). We address this lack of understanding by proposing that the digitalization of job search fosters social stratification because of the unequal distribution of digital skills among job seekers. We examine this proposition by surveying 1000 Spanish job seekers in a context where high internet access rates coexist with widespread use of employment platforms as well as high unemployment rates among young people (Bolíbar et al., 2019; INE, 2022). In other words, the volume of job seekers is high and most of them use the internet to identify and apply for vacancies.

Our results show that advantaged job seekers with higher educational levels and financial resources do not face significant challenges in the understanding and use of employment platforms. In contrast, job seekers with lower educational levels and limited financial resources struggle with this process and experience psychological distress. Accordingly, the main contribution of this article is to demonstrate that the current theory of socio-digital inequality applies to the sphere of online job-seeking processes and show its implications. Specifically, we contribute to and advance this theory by identifying and analysing some of the key outcomes of inequalities in digital skills in terms of labor market inclusion. More broadly, these findings are important for social exclusion research, given that most job-seeking processes are now digitalized, although we know little about the implications of this digitalization on job seekers with different levels of digital skills. In the remainder of this article, we present and articulate key findings from recent research into digital inequalities and online job-seeking. Subsequently, we present our sample and overall methodology before introducing and discussing our findings as well as their implications for both theory and practice.

2. Theoretical Background

2.1. Digital Inequality

Since the first stages of internet diffusion, academics have been concerned about digital exclusion. Initially, researchers focused on the "first-level digital divide." According to Attewell (2001, p. 252), this phenomenon consisted of "the technological gap between those who have access to information and those who do not have access to it." Early research on this topic focused on the inequalities in internet access that affected traditionally disadvantaged social groups (van Dijk, 2020). In recent years, however, there has been a considerable increase in the number of internet users, especially in Western countries. Thus, academics are now focusing on the "second-level digital divide" derived from the unequal distribution of beneficial internet use and digital skills. Specifically, digital skills concentrate among users with higher levels of education or socio-economic status (Hargittai, 2002; Hargittai & Hinnant, 2008; van Deursen & van Dijk, 2010).

While it is true that the quality of an internet connection and the type of technology available for navigation are important, internet users' digital skills are essential if they are to obtain tangible benefits from the use of the internet as a tool. Many authors have therefore attempted to build reliable and accurate tools to measure them (DiMaggio & Hargittai, 2001; van Deursen et al., 2016; van Dijk, 2006). In this vein, van Dijk (2006) suggested utilizing the distinction between operational skills, which are needed to handle computer hardware and software, and the informational skills required to search and filter online information. Van Deursen and colleagues have also added several dimensions to the digital skills construct, such as strategic skills, formal skills, and internet communication skills (van Deursen et al., 2016; van Deursen & van Dijk, 2008). These dimensions have been successfully assessed and validated using representative samples of the British and Dutch populations (van Deursen et al., 2016; van Deursen & van Dijk, 2014). They reveal that high levels of digital literacy are associated with advanced internet use. However, general navigational skills do not guarantee effective and beneficial internet use in all its applications and must be coupled with specific skills for each advanced internet use if they are to foment the obtention of tangible benefits (Arroyo, 2018).

Scholars have also studied the mechanisms by which people develop high digital skill levels. Internet users with higher levels of digital resources (i.e., technological resources available at home) and those who benefit from the possibility of connecting from multiple locations and with greater frequency, demonstrate advanced internet use (Hassani, 2006; Peter & Valkenburg, 2006; van Deursen & van Dijk, 2015). In addition, better digital resources increase both digital proficiency and users' confidence in their ability to evaluate and filter online

information (Robinson, 2009, 2012). The concept of "digital capital" (Ragnedda, 2018; Ragnedda et al., 2022) describes the accumulation of internet users' digital skills and resources. It represents a link between online and offline opportunities, as it can increase internet users' material resources when actioned through internet use.

The "third-level digital divide" revolves around the differences between users based on the tangible benefits they derive from the same internet use (van Deursen & Helsper, 2015). Different levels of resources correspond to different levels of digital capabilities, raising different levels of online engagement (Scheerder et al., 2017). Increased offline resources lead to increased levels of digital capital, which are manifested, amongst other things, in increased levels of digital skills, particularly those of an instrumental nature. Consequently, internet users differ in terms of the tangible social, economic, and professional outcomes of internet use. Thus, people with more resources have a greater ability to minimize the impact of the negative effects of internet use (Scheerder et al., 2019). As such, the third-level digital divide acts as a reinforcer of social stratification because it allows people with higher levels of offline resources to increase these further via their digital resources and skills, thus obtaining higher levels of tangible benefits and avoiding the negative effects of internet use (Calderón Gómez, 2020). This model would be in line with the concept of "credential rents" (Sørensen, 2000; Wright, 2000), which refer to the greater economic outcomes enjoyed by the advantaged social classes that access and hoard higher levels of education, expertise, or (digital) skills.

2.2. Online Job-Seeking

Among the uses of the internet that can bring tangible benefits to people's lives is platform-mediated job search. Job seekers have a better chance of finding employment via internet and of that job being better paid (Lindsay, 2005). Using the internet may reduce the time involved in finding a new job by 25% compared to traditional, offline, channels (Kuhn & Mansour, 2014). Furthermore, recruiters and prospective employers have access to large databases of potential candidates for their selection processes, which is important at a time when online job-seeking has penetrated most sectors and is especially popular among young people who are more confident in using the internet (Kroft & Pope, 2014; Piercy & Kyong Lee, 2019).

However, these benefits also have significant downsides. For low-skilled workers, the digitalization of job-seeking has led to an imbalance between the number of job seekers and the number of online vacancies (OECD, 2022). This situation raises fierce competition among job seekers with similar profiles. In contrast, for high-skilled workers in the IT sector, high demand and a limited number of job seekers have shifted competition to labour market intermediaries, who struggle to find candidates (McDonald et al., 2019). The fact that highly skilled IT employees can potentially benefit from a "privileged location" within the labour market is again related to credential/skill rents from the social class theories by Sørensen (2000) and Wright (2000).

In the current digitalized labour market, creating and presenting an image as a competent professional on job-seeking platforms is extremely important in obtaining employment (Dumont & Ots, 2020; Gandini, 2016; Pongratz, 2018). Furthermore, the ability to instrumentally use personal and professional information has become key to successfully seeking employment online (Sharone, 2017). Accordingly, van Deursen et al. (2017) have suggested a link between digital skills and the ability to use the internet instrumentally to achieve personal goals, emphasising the role of instrumental and communication skills. Likewise, Karaoglu et al. (2021) found that strategic online job-seeking skills facilitated the use of social networks for job-seeking purposes. This type of skill would involve intuiting how algorithms sort and present applications received by recruiters, and then using this intuition to tailor CVs, profiles, or applications to make them more visible (Smythe et al., 2021).

Specific types of digital skills are concentrated among people with higher levels of material and educational resources (Karaoglu et al., 2021; van Dijk et al., 2017). Consequently, job seekers with lower levels of material and educational resources and online job-seeking skills will experience greater difficulties in finding employment via internet, building on the employability problems already suffered by the more disadvantaged social classes in pre-digitalized contexts (Goldthorpe & McKnight, 2006). This triggers unemployment and lower-paid jobs for low-skilled job seekers, with consequent negative implications for gaining new material resources. Additionally, the psychological well-being of job seekers may suffer because of prolonged periods of unemployment and job-seeking. In fact, unemployment has a negative impact on both mental health and life satisfaction, i.e., the longer the duration of the employment search, the greater the impact (Gedikli et al., 2022). Paul and Moser (2009) also found that the severity of psychological distress resulting from unemployment accumulates over time, leading to a continuous decline in mental health.

The material and psychological resources of job seekers, however, have been described as being very helpful in preventing psychological distress associated with job-seeking. In fact, financial hardship and social exclusion can lead to job-seeking fatigue and negatively affect the quality of subsequent re-employment (Lim et al., 2016). At the same time, psychological capital can reduce job seekers' fatigue and prevent these negative outcomes. For example, job seekers with less confidence in their job-seeking skills are likely to be pessimistic, see themselves as unemployable, give up on reemployment more easily, and be less resilient to setbacks (Chen & Lim, 2012). Hence, we would expect that job seekers with

less material and online job-seeking skills would have more difficulty finding a job online. Additionally, online job-seeking skills should be useful in reducing psychological distress related to online job-seeking.

Our literature review highlights the importance of digital skills in deepening social stratification. Digital skills generate tangible benefits and allow the avoidance of side effects on internet users' lives. This should also be the case for online job-seeking. Online job-seeking skills should help internet users find employment and avoid psychological distress related to long-term job-seeking. These skills should be concentrated mostly among users with higher levels of material resources, thus increasing the differences between them and people with fewer resources. Despite the importance of this topic, there is a lack of empirical work that analyses the relationship between material resources, digital skills, and online job search outcomes.

3. Methodology

3.1. Sample

Spain provides a valuable setting for this inquiry given the high number of internet users in the country, reaching a rate of over 90% (see Figure 1). This includes non-nationals and individuals residing in rural areas, with the only exception being people older than 75. Spain also provides an excellent case study because of a combination of high unemployment rates and the widespread adoption of employment platforms.

We conducted a survey using a sample of 1000 subjects aged between 18 (legal age for signing a work contract) and 65 (retirement age in Spain). All participants were part of the active population, were internet users, and had at least minimal levels of upper-secondary education. We utilized a panel of 2,722.476 Spanish people and used random sampling. To ensure representation of the Spanish active population by age and education level, we introduced quotas based on percentages provided by the Spanish National Statistics Institute (INE). Our sample included both employed and unemployed individuals actively seeking jobs across a wide range of job sectors, including both lower and higher positions, to provide a comprehensive picture of Spanish online job seekers. Participants had to have been actively seeking employment within the last year, to ensure the inclusion of a sufficient number of participants who used the internet to seek employment. Table 1 shows the sociodemographic characteristics of the respondents. The age variable divides the sample into four groups, with the 18–29 age group being the largest (32.6%) and the 51–65 age group the smallest (12.9%). The sample is made up of approximately the same number of women (54.1% of the sample) and men (45.9%). Furthermore, participants can be grouped into 4 levels via the educational attainment variable. The largest group represents people whose highest level of education is upper secondary (26.9%) and the smallest group represents people with a doctorate (6.8%).

3.2. Analysis

We used structural equation modelling (SEM) because it enables the transfer of a theoretical model with latent variables to a testable statistical model (Kline, 2015) and the comparison of nested models (Ullman, 2006). Specifically, we employed the diagonally weighted least squares (DWLS) estimation method using a polychoric correlation matrix to manage the combination of continuous and categorical variables (Li, 2016, 2021).

We performed all analyses in the free statistical environment R (version 4.2.2) with the *lavaan* package (version 0.6–11). We assessed model adequacy through a comparison of the following goodness-of-fit indices: the Comparative Fit Index (CFI), the

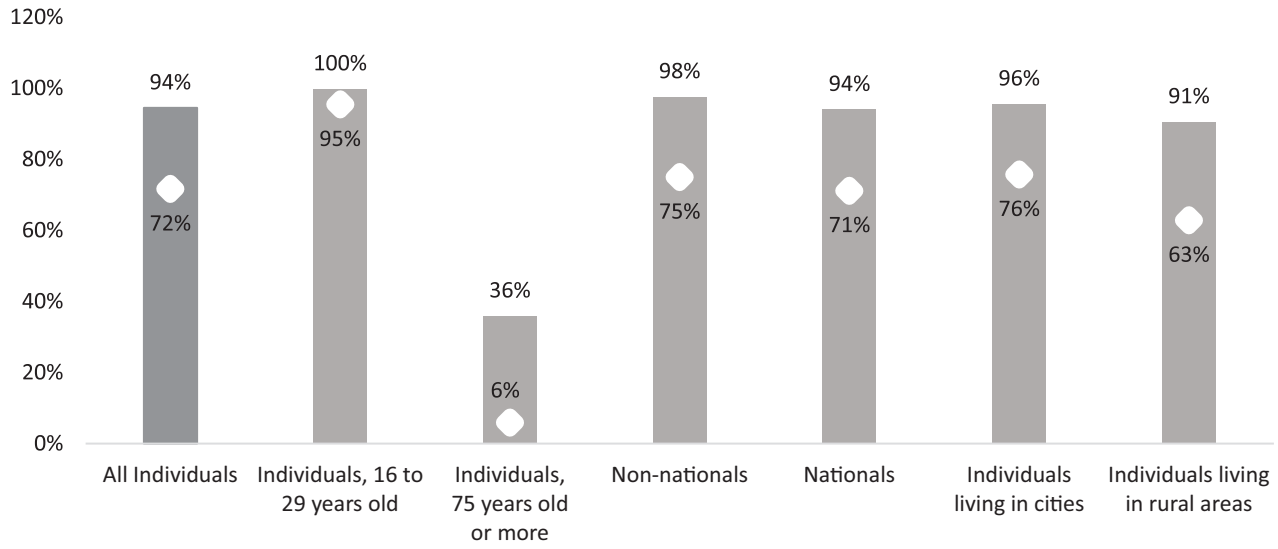

Figure 1. Evolution of internet users in Spain (2013–2022). Source: Eurostat (n.d.).

Table 1. Sociodemographic characteristics of the sample.

Categories	Frequency	Percentage
Age		
18 to 29 years	326	32.6%
30 to 39 years	274	27.4%
40 to 50 years	271	27.1%
51 to 56 years	129	12.9%
Gender		
Male	459	45.9%
Female	541	54.1%
Level of Education		
Second stage of secondary education and similar	269	26.9%
Higher vocational training (FP II) and university degrees of 2 years or more	265	26.5%
Diploma, first cycle of undergraduate degree, technical engineering, degree, and similar	154	15.4%
Undergraduate degree, higher engineering degree, bachelor's degree of more than 4 years, master's degree, or equivalent	244	24.4%
Higher university studies at the doctorate level or equivalent	68	6.8%
Total	1000	100.0%

Tucker–Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR).

However, when using estimation methods such as DWLS that do not belong to the "maximum likelihood" family, the common cut-off criteria for these indices (in the TLI and CFI this is greater than 0.90; in the RMSEA and SRMR it is lower than 0.08 and 0.06, respectively; see Hu & Bentler, 1999) may not provide clear guidance (Xia & Yang, 2019). To show that the hypothesized model fits the data to a high degree of approximation, we also report the parsimony ratio (cut-off point: 0.85; see Carlson & Mulaik, 1993; Mulaik, 2007). Additionally, following Barrett's (2007) recommendations, we provide the results of the χ^2 goodness-of-fit test—despite its potential sensitivity to large sample sizes.

Furthermore, we have examined two mediational chains: (a) material and educational resources—digital resources—digital skills and (b) material and educational resources—digital resources—online job-seeking skills. Subsequently, indirect effects and their corresponding 95% confidence intervals were estimated using 5,000 bootstrap samples. Moreover, to better understand these mediational chains, we estimated an alternative model with direct paths from *material and educational resources* to *digital skills* and from *material and educational resources* to *online job-seeking skills*.

Finally, we worked with full information. No data imputation has been carried out (*listwise deletion*) because the construction of some variables (such as *digital skills* and *online job-seeking skills*) required this. Nonetheless, in the worst case, sample attrition was low (17.1%) and the sample size continues to meet the requirements for SEM estimation: It exceeds the minimum requirement of 200 participants (Barrett, 2007) and the number of indicators per latent variable is high (Wolf et al., 2013).

3.3. Measures

We introduced three blocks of independent variables to our model. First, we introduced the variables that assess internet users' resources, including *level of education*; an ordinal variable with 5 categories running from *upper secondary* to *doctorate* (M = 4.58, SD = 1.30). Lower levels of education were not included because a low level of education corresponds to a reduced, or near zero, use of online platforms for job-seeking (see Baruffaldi et al., 2017). Even so, there are differences among internet users with higher levels of education depending on their skills and their material resources at home. Next, we introduced a *weighted household income* indicator (M = 2.67, SD = 1.37), because people who live with others benefit from economies of scale in consumption, which individuals living alone do not have access to (Browning et al., 2013). Following Eurostat's (2021) recommendations, we computed this indicator by dividing the household monthly income by the equivalised household size, by assigning a value of 1 to the first household member and 0.5 to each additional person (either adult or child).

Another set of independent variables includes indicators that assess internet users' digital resources. First, we introduced the *technology present in the household* variable, calculated by adding up the number of pieces of

technological equipment that a participant declared to have in their home. The result was a numerical variable ranging from 0 to 11 (M = 7.84, SD = 2.10). Secondly, we introduced the *variety of internet access points* variable; a numerical variable with a range from 0 to 6 (M = 4.22, SD = 1.61), constructed by summing up the number of places from which the respondent had connected to the Internet in the six months prior to the survey.

Thirdly, we used a set of indicators assessing internet users' digital skills, variables that we developed based on the work of van Deursen et al. (2016). It comprises 12 items measuring *operational internet skills*, *content creation skills*, *informational internet skills*, and *communication skills*. Each item has a five-point response scale (acceptable reliability values: α = 0.82, ω = 0.83). The punctuation of each subject on this scale is calculated by adding the answers given to each one of the 12 items. Consequently, the values of this variable range from 0 to 65 (M = 47.93, SD = 7.47). Additionally, we have developed and introduced a new scale to assess digital skills for online job-seeking. Items for this new scale have been generated based on 77 semi-structured interviews: 44 with people actively using the Internet to search for employment and 33 with recruiters at employment agencies or in human resources positions for large companies.

We built both samples to cover the widest possible range of profiles and areas of job-seeking. We asked research participants about actions that would make it more likely for a job application to be noticed during a selection process, hence increasing a candidate's chances of being contacted for an interview. We identified 11 actions related to job-seeking and we transformed them into items to be included on the scale (see Table 2; M = 41.79, SD = 7.94, α = 0.91, ω = 0.92).

In addition, our model included two dependent variables. The first was a variable that measured the success of the online job search. To this end, we used the following item: *In the last 6 months, I have been offered a job interview* (M = 2.20, SD = 1.05). This allows us to measure the frequency with which participants were invited to be contacted for an interview after having applied for a job online in the six months prior to the survey (Table 3).

Table 2. Items that make up the digital skills for online job-seeking scale.

Below is a series of things that can be done with a professional network profile or in a job search. Indicate to what extent the following statements about using the Internet to look for a job are true for you [reply options: *totally false* (1); *quite false* (2); *neither true nor false* (3); *somewhat true* (4); *totally true* (5); *I don't know* (66); *I don't want to answer* (99)].	
Item 1	I know how to choose a profile picture appropriate to apply for a job.
Item 2	I know how to ask for recommendations from people so that recruiters can judge my job potential.
Item 3	I know at what time to send a job application so as to make it more visible.
Item 4	When I search for a job, I know how to check that I am using the same terms or keywords used by companies offering jobs that interest me.
Item 5	I know how to describe my skills in my profile to make them more visible.
Item 6	I know how to describe the positions I have held.
Item 7	I understand how the algorithms that sort applications on job search platforms work.
Item 8	I know how to make an application that catches recruiters' attention.
Item 9	I know what information to prioritize in my CV
Item 10	I know how to use the keywords included in job postings to describe my profile/CV.
Item 11	I know how to upload information to my public profile about events or things of professional interest to demonstrate my experience.

Table 3. Frequency table for the *contacted for a job interview* variable.

In the last 6 months, I have been invited for an interview after sending an application for a position advertised on the Internet.		
Categories	Frequency	Percentage
Never	268	26,8%
A couple of times	425	42,5%
Monthly	154	15,4%
Weekly	110	11%
Daily	30	3%
Missing	13	1,3%
n	1000	

The second dependent variable was *job-seeking burnout* (*M* = 2.96, *SD* = 1.76), used as a measure of psychological distress. We obtained this variable through a Spanish version of the Maslach Burnout Inventory emotional exhaustion subdimension (Maslach et al., 1996), adapted to the job-seeking field. This subscale consists of nine items (e.g., *I feel emotionally drained by the job search*) which are assessed with a seven-point Likert scale from 0 (*never*) to 6 (*every day*). Internal consistency values were excellent (α = 0.97, ω = 0.97).

3.4. Hypotheses

Levels of material resources are related to levels of access to digital technologies that enable internet connections (Ragnedda, 2018; Ragnedda et al., 2022). Also, people with high levels of material and educational resources show greater autonomy of use, assessed as the variety of places from which a person can connect to the internet (Hassani, 2006; Peter & Valkenburg, 2006). Both digital technology and autonomy of use are part of the "digital resources" construct (Robinson, 2009). Accordingly, our first hypothesis is:

> H1. Material and educational resources have a significant and positive impact on internet users' digital resources.

High levels of technology at home facilitate the acquisition of high levels of digital skills by internet users (Robinson, 2009, 2012). Also, autonomy leads to higher levels of digital skills (van Deursen & van Dijk, 2015). However, general navigation skills cannot be applied to categories of advanced internet use (Arroyo, 2018). People need a specific set of skills for each one of these categories; however, generic digital skills can still help develop specific digital skills (van Deursen et al., 2017). Accordingly, we hypothesize that:

> H2. Internet users' digital resources have a significant and positive impact on their digital skills.

> H3. Internet users' digital resources have a significant and positive impact on their online job-seeking skills.

> H4. Internet users' digital skills have a significant and positive impact on their online job-seeking skills.

Likewise, we explored two possible mediational chains: (a) material and educational resources—digital resources—digital skills and (b) material and educational resources—digital resources—online job-seeking skills. This approach allows us to conceptualize *digital resources* as a kind of conduct through which the presumed positive impact of the material and educational resources can be transferred.

For online job-seeking results, job-seeking skills should help internet users give more visibility to their applications, thus helping them find a job (Karaoglu et al., 2021; Sharone, 2017). Hence:

> H5. Internet users' online job-seeking skills have a positive and significant relationship with the frequency with which they are offered job interviews.

Long-term job-seeking can generate psychological distress (Gedikli et al., 2022), even when using online job-related platforms (Bunjak et al., 2021). This relationship can be explained through the job resources and demands model (Bakker & Demerouti, 2007). We conceptualize job-seeking as an activity requiring a high number of ordered tasks, which are structured, coercive, and have specific goals. According to the job resources and demands model, job-seeking can be considered a demanding activity that requires the use of personal resources. High pressure in job-seeking and the emotional demands associated with unemployment both play a role in reducing personal resources and have an impact on job seekers' burnout. Specifically, the concept of burnout can be used to study emotional responses to work-like activities (Schaufeli & Taris, 2005), where job seekers with low resource levels can experience a dysfunctional response (like burnout). On the contrary, job seekers with more personal resources are less at risk, hence, a key resource for job seekers can be found in their digital skills.

Additionally, digital skills can help internet users avoid psychological distress related to internet use (De Battisti et al., 2016; Helsper & Smahel, 2020). Candidates' material and psychological resources, together with a high level of self-confidence, should help in reducing their psychological distress (Chen & Lim, 2012; Fernández-Valera et al., 2020). As such, we would expect online job-seeking digital skills to help internet users reduce the probability of suffering burnout related to the search process. Accordingly, our last hypothesis is:

> H6. Online job-seeking skills reduce the probability of suffering burnout in relation to job-seeking.

Figure 1 includes all the relationships between the constructs discussed above.

4. Results

4.1. Model Fit

As shown in Table 4, our data had a good fit with the proposed theoretical model (CFI = 0.974, TLI = 0.971, RMSEA = 0.053, SRMR = 0.060, parsimony ratio = 0.905). The only fit index that resulted below the acceptance criterion was SRMR, which was just at the limit. Regarding χ^2 (975.071, *df* = 294, *p*-value = 0.000), we ought to refuse model fit, but, as stated before, these results may be caused by the large sample size. In fact, the ratio between the χ^2 value and the degrees of freedom is acceptable (less than 5; see Jöreskog, 1969).

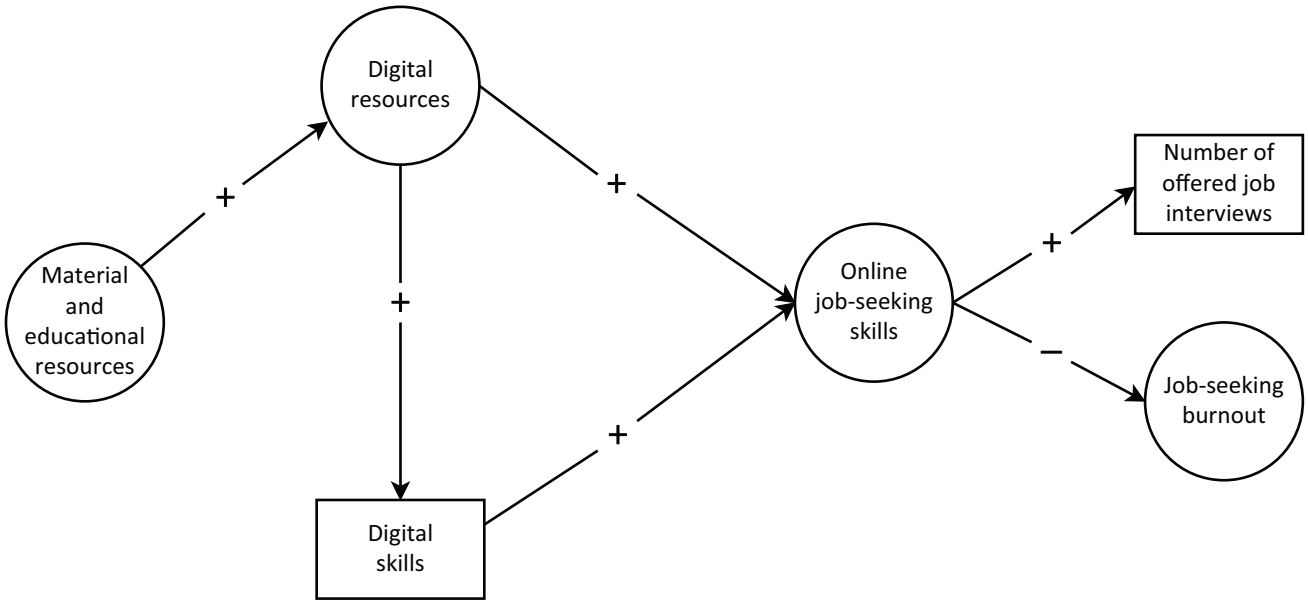

Figure 2. Proposed theoretical model. Circles represent latent variables, while rectangles represent observed variables.

Table 4. Model goodness-of-fit indices.

Model	*N*	χ^2	*df*	χ^2/df	χ^2 *p*-value
Proposed theoretical model	829	975.071	294	3.317	0.000
Alternative model	829	974.544	292	3.337	0.000
Model	CFI	TLI	RMSEA (a)	SRMR	Parsimony score (b)
Proposed theoretical model	0.974	0.971	0.053 (0.049, 0.057)	0.060	0.905
Alternative model	0.974	0.971	0.053 (0.049, 0.057)	0.060	0.898

Notes: (a) 90% CI in brackets; (b) parsimony score = model *df*/null model *df*.

4.2. Direct Effects

Figure 2 and Table 5 show that all relationships are significant and in line with our theoretical model. Material and educational resources positively impact digital resources (H1). Moreover, the higher the digital resources, the higher the digital (H2) and online job-seeking skills (H3). These job-seeking skills are also positively predicted by digital skills (H4), while, in turn, they predict a higher frequency of offered job interviews (H5) and a lower level of job-seeking burnout (H6).

4.3. Indirect Effects

Before examining indirect effects estimations, we must look at the alternative model. This model is almost identical to the proposed theoretical model but includes two new paths: (a) from *material and educational resources* to *digital skills* and (b) from *material and educational resources* to *online job-seeking skills*. Its fit is also acceptable (see Table 4), but the added paths are not significant (see Table 5). It seems then, that internet users' material and educational resources do not have a direct effect on their digital and online job-seeking skills. Nevertheless, considering a 95% confidence level, both the indirect effect of *material and educational resources* on *digital skills* (b = 1.755, *SD* = 0.377, β = 0.248, *p*-value = 0.000) and that of *material and educational resources* on *online job-seeking skills* (b = 0.157, *SD* = 0.061, β = 0.117, *p*-value = 0.010) are statistically significant. In other words, digital resources not only have a direct positive effect on digital and job-seeking skills, but they also represent a transfer mechanism that connects internet users' material and educational resources with the outcomes of online job-seeking and burnout.

5. Conclusions and Discussion

This article has examined how inequalities in digital skills shape the outcomes of online job-seeking processes. With this aim, we used Spanish data, as this country boasts a high percentage of internet access, along with a pronounced use of online platforms for job search and high unemployment rates, particularly among youth (Bolíbar et al., 2019; INE, 2022). In other words, many working-age individuals are actively seeking

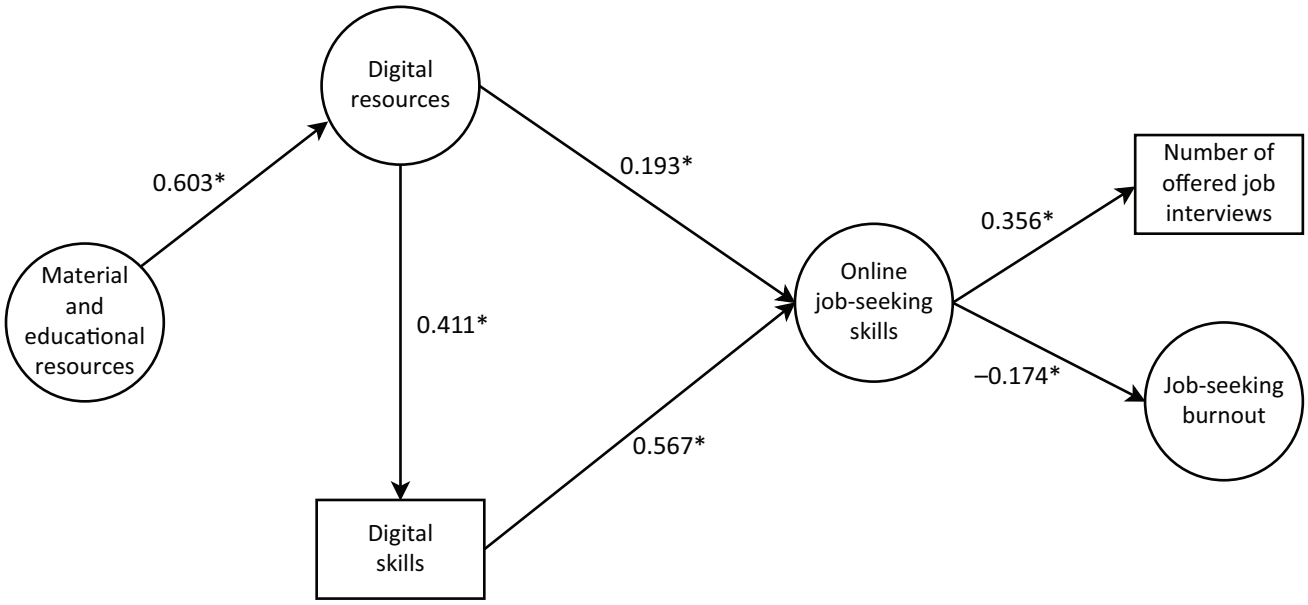

Figure 3. Proposed theoretical model results. Notes: * statistically significant standardized estimates (95% confidence level); circles represent latent variables, while rectangles represent observed variables; path values are standardized weights.

Table 5. Results for the proposed theoretical model and the alternative model.

	Proposed theoretical model				Alternative model			
Path	Estimate	*SD*	Standardized Estimate	*p*-value	Estimate	*SD*	Standardized Estimate	*p*-value
Material and educational resources → Digital resources	0.756*	0.223	0.603	0.001	0.758*	0.185	0.604	0.000
Material and educational resources → Digital skills	—	—	–	—	0.420	0.778	0.059	0.589
Digital resources → Digital skills	2.321*	0.369	0.411	0.000	2.012*	0.597	0.357	0.001
Material and educational resources → Online job-seeking skills	—	—	—	—	−0.063	0.107	−0.046	0.557
Digital resources → Online job-seeking skills	0.208*	0.066	0.193	0.002	0.254*	0.086	0.235	0.003
Digital skills → Online job-seeking skills	0.108*	0.009	0.567	0.000	0.109*	0.011	0.567	0.000
Online job-seeking skills → Number of offered job interviews	0.281*	0.025	0.356	0.000	0.279*	0.014	0.356	0.000
Online job-seeking skills → Job-seeking burnout	−0.131*	0.031	−0.174	0.000	−0.131*	0.006	−0.174	0.000

employment and utilizing the internet for this purpose, making Spain an ideal context for examining the impact of digital inequality on labour market access.

We first examined the relationship between material and digital resources and found that income and educational level significantly and positively impact digital resources. Higher levels of offline resources enable better internet access and autonomy. Secondly, we tested the relationship between digital resources and digital skills, conceived as both navigational and online job-seeking skills, and found that high levels of digital resources promote high levels of digital skills (Ragnedda,

2018; Ragnedda et al., 2022; Robinson, 2009, 2012). Hence digital resources enable the transfer of the positive benefits of existing materials, and educational resources are transferred. Furthermore, we found a qualitative difference between generalist navigation and specific skills and suggest that navigation skills are not a one-size-fits-all set of abilities because advanced internet use requires specific skills (Arroyo, 2018). Thirdly, we tested the relationship between online job-seeking skills, the frequency with which candidates are offered a job interview, and their psychological distress during this process. According to our model's predictions, we found that online job-seeking skills have a positive relationship with the frequency of job interview invitations received and a negative relationship with psychological distress. Online job-seeking skills also help reduce the burnout related to online job-seeking above and beyond search outcomes, and positively impact the likelihood of being contacted for an interview. Thus, independently of internet users' psychological resources, online job-seeking skills reduce the psychological distress related to online job searching.

These findings advance social inclusion research in an area that remains relatively unexplored despite its current importance. Specifically, this relates to research into digital exclusion that has yet to examine how persisting digital inequalities shape access to work and employment, with particular reference to platform-mediated job-seeking. Building on these findings, we argue that the unequal distribution of digital skills across specific segments of the population strongly shapes the development of online job-seeking skills. Because these online job-seeking skills are critical in searching for and securing work in the current platform-mediated employment landscape, their unequal distribution contributes to enforcing the digital exclusion of the most vulnerable in an additional yet critical domain, namely, work and employment.

Our findings also have implications for both public and private employment services and job seekers. Since job seekers with higher levels of digital skills are more likely to get a job online, prospective employers face a risk of loss of human capital. Indeed, candidates with high levels of competencies, but little ability to make their online applications visible, are more likely to be discarded. Therefore, it would be advisable for human resources services, as well as temporary employment agencies and employment offices, to provide users with a training plan for online job-searching. Secondly, our findings provide important insights into designing inclusive labour market policies for the most vulnerable groups. They outline the critical need to implement active policies that aim to facilitate the development of online job-seeking skills across all population segments. Achieving this goal would help in supporting labour market integration and prevent public health problems related to burnout and psychological distress.

As digital resources are not equally distributed among the population, the internet has become a vector of inequality. In fact, the most advanced internet uses, as well as the tangible benefits that arise from them, are concentrated among those segments of the population with the greatest levels of material and digital resources. As in the case of reading and writing skills in 20th-century societies, digital skills should be a universal objective in education. They should be taught as mandatory in schools since they shape the outcomes of public and social life today. This study also demonstrates the need to learn not only generic navigation skills but also those that specifically convert beneficial internet uses into tangible benefits. Consequently, it is important to address this issue by bringing to the fore the need to act against digital illiteracy.

5.1. Limitations

Firstly, our sample has some limitations when it comes to representation, because we decided not to include people with lower levels of education. The reason lies in empirical evidence, which shows that people with lower levels of education usually use "real world" contacts to find a job. While this choice may bias the results, as we don't consider the impact of digital literacy on psychological distress in all population groups, we believe that our findings are still highly relevant to this area of research. Secondly, due to the design and aims of this study, our survey did not include information about offline job-seeking. Whilst this limits the possibility of comparing offline and online processes, it also raises a stimulating path for future research in this direction. Furthermore, while 30 out of 1000 subjects reported receiving an invitation for a job interview daily, we do not have information about the number of applications that each subject submitted. However, we found that 16% of the sample (N = 159) was sending at least one application every day. This makes it less improbable that 30 subjects would be contacted for an interview with this frequency, though this may also very well depend on qualification levels and sectors. The design of data collection for future research in this area may benefit from the inclusion of indicators pertaining to the number of applications submitted per day. Finally, the exclusive use of Spanish data may be a limitation in terms of the generalisability of our results. Therefore, we believe that further research should be carried out in countries other than Spain.

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Conflict of Interests

The authors declare no conflict of interests.

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About the Authors

Stefano De Marco holds a PhD in sociology and is an associate professor in the Department of Sociology and Communication at the University of Salamanca. His research focuses on digital inequality, democratic divides, and digital political participation. He has recently led a project aimed at understanding how digital skills can facilitate employment opportunities through online platforms and how this can impact access to the labor market in Spain. He is member of the international DiSTO project on digital inequality.

Guillaume Dumont is an associate professor of ethnographic research at Emlyon Business School, France. He is the Director of the Ethnographic Institute (Interim) and a member of OCE Research Center.

Ellen Johanna Helsper (Dr.) is professor of socio-digital inequalities in the Media and Communications Department at the London School of Economics and Political Science. She is departmental PhD programme director and co-convenor of the Politics of Inequalities programme at the International Inequalities Institute. She is the global coordinator of the From Digital Skills to Tangible Outcomes project and consults widely outside academia. She has a PhD in media and communications from the LSE and an MSc in media psychology from Utrecht University.

Alejandro Díaz-Guerra is a pre-doctoral researcher at Complutense University of Madrid, supported by an FPU contract (Formación de Profesorado Universitario) from the Spanish Ministry of Universities. His main research interests are related to time perspective constructs, behavioural economics, and socioeconomic status estimation. He holds an MSc in official statistics and has previously worked for the Spanish National Statistics Institute (INE).

Mirko Antino is an associate professor at the Department of Psychobiology and Methodology for Behavioral Sciences, Universidad Complutense de Madrid. He received his PhD in psychology at the same University in 2010. His research has been published in several scientific journals like the *Academy of Management Journal*, the *Journal of Applied Psychology*, *Sociological Methods and Research*, *Safety Science*, the *Journal of Occupational Health Psychology*, *Journal of Personality and Individual Differences*, *Work & Stress*, among others. He is the chief editor of the Spanish *Journal of Psychology*.

Alfredo Rodríguez-Muñoz is an associate professor of organizational psychology at the Department of Social, Work and Differential Psychology at Universidad Complutense de Madrid. His research interests are related to the fields of organizational and health psychology, bullying at work, and employee well-being. His work has been published in journals such as *Work & Stress*, the *Journal of Occupational and Organizational Psychology*, the *European Journal of Work and Organizational Psychology*, and the *Journal of Vocational Behavior*.

José-Luis Martínez-Cantos is associate professor of applied economics at Complutense University of Madrid (UCM) and member of the Institute of Sociology for the Study of Contemporary Social Transformations (TRANSOC). Previously, he was a post-doctoral research fellow in applied sociology at UCM and also post-doctoral research fellow at the Internet Interdisciplinary Institute-IN3 of the Open University of Catalonia (UOC). His main research interests are related to gender, information and communication technologies, education, and the labour market.

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Article

Digital Communication and Work–Life Supportive Supervisor Behaviors in Europe

Anja-Kristin Abendroth * and Antje Schwarz

Faculty of Sociology, Bielefeld University, Germany

* Corresponding author (anja.abendroth@uni-bielefeld.de)

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Abstract
The spread of digital communication in the employee–supervisor exchange relation has increased the risks of blurred boundaries between life domains and, subsequently, the need for work–life supportive supervisor behaviors (WLSSB). However, media richness and social presence theory indicate that WLSSB is simultaneously at risk because close bonds with supervisors are more difficult to develop and challenges in integrating work and personal life are more difficult to be signaled and understood. Following social network theory in the argument that it is not only the characteristic of the medium that is of importance but also the social embeddedness of its use, this research asks to what extent the association of digital communication with one's supervisor and perceived WLSSB is context-dependent. The overall results based on the European Social Survey (round 10) reveal that in-person communication is more strongly associated with WLSSB than digital communication. However, more nuanced investigations suggest that this is not necessarily driven by the richness of the mode of communication. We find that the meaning of digital communication with one's supervisor gains importance in size and significance (a) where it complements seldom in-person communication, (b) where the organizational norm of high work devotion is weak, and (c) where work–life supportive state policies are pronounced. We conclude that the implications of digital communication for WLSSB are dependent on the centrality of digital communication in opportunities for the exchange of WLSSB and dependent on supervisors' interest and agency to enact WLSSB in digital work communication.

Keywords
digital communication; family policy; flexible working; ideal worker norm; isolation; supervisory support; telework; virtual work; work–family relation; work–life; work–life supportive supervisor behaviors

Issue
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1. Introduction

Blurred boundaries between work and personal life have been identified as a central challenge of the digital age where employees increasingly use digital technologies for work-related communication regardless of time and place (Kossek, 2016). Digital communication practices, i.e., via phone, screen, email, or messaging apps have also gained importance due to the normalization of work from home in times of the Covid-19 pandemic (Abendroth et al., 2022). In this context, work–life supportive supervisor behaviors (WLSSB) have been addressed as an important resource as they are meant to mitigate the work–life conflict enhancing implications of blurred boundaries between the life domains. Supervisors are the ones who interpret policies and informal practices of work and who can create a more inclusive work environment by addressing diverse needs of employees (Hammer et al., 2009; Kossek et al., 2011). They can enact creative work–life management, function as role models, or provide emotional and instrumental work–life support (Hammer et al., 2009). With respect to digital communication practices, they can, for example, offer employees latitude in dealing with more flexible

work–life boundaries (Thomas et al., 2022; Thulin & Vilhelmson, 2021).

Despite the indicated importance of WLSSB in the digital age, media richness theory (Daft & Lengel, 1986) and social presence theory (Short et al., 1976), however, suggest that WLSSB might at the same time be at risk where employees and supervisors increasingly communicate via phone, screen, email, or messaging apps. They argue that digital communication is less rich than in-person communication as not all senses are involved. As a consequence, opportunities for WLSSB are restricted since challenges in integrating work and personal life are more difficult to be signaled and understood. Moreover, close bonds with supervisors are more difficult to develop. Initial research in this regard has, with mixed results, mainly studied the implications of working from home for social relations at the workplace. Here, studies either showed that home-based workers had a less close relationship with their supervisor (Golden, 2006) and staff at the office site (Collins et al., 2016) or that they received similar levels of support as main office workers (Morganson et al., 2010), reported closer relationships with their supervisor (Gajendran & Harrison, 2007), and experienced forms of WLSSB, but in more nuanced expressions (Thomas et al., 2022). Little is known, however, about the association of digital work communication with one's supervisor and the evaluation employees make of him/her/them as being work–life supportive.

Following social network theory in the argument that it is not only the characteristic of the medium that is of importance but also the social embeddedness of its use (Haythornthwaite, 2002), we ask: Is digital communication with one's supervisor positively associated with perceived WLSSB, and to what extent is this context-dependent?

Subsequently, we suggest dynamics at three different levels. First, at the level of the direct supervisor–employee exchange relationship, we differentiate between work-related digital communication as a complementary practice of frequent, regular, and seldom in-person communication with one's supervisor. In line with social network theory, we argue that digital communication is more likely to contribute to evaluations of one's supervisor as being work–life supportive where it complements seldom in-person communication. In this case, digital communication is used as a strategy to sustain the employee–supervisory exchange relationship despite the lack of in-person contact. Subsequently, it gains in importance as an opportunity for the exchange of WLSSB.

Second, at the level of the workplace, we consider the prevalence of the organizational norm of high work devotion (Kelly et al., 2010; Williams et al., 2013), which has also been used to identify family-unfriendly workplace cultures (Thompson et al., 1999). We argue that the norm of high work devotion decreases the likelihood that digital communication goes hand in hand with more WLSSB as it means little supervisory *interest* and *agency* in enacting WLSSB in digital work communication. Rather, digital communication is more likely to be used to realize "constant connectivity" (Wajcman & Rose, 2011, p. 959) or an "electronic leash" (Duxbury et al., 2014, p. 579; see also Arnold, 2003; Piszczek, 2017). In this context, supervisors use digital communication to make employees more available for work regardless of time and place.

Third, at the national level, we consider work–life supportive state policies and argue that they increase the likelihood that digital work communication contributes to WLSSB. The underlying argument is that work–life supportive state policies encourage supervisors' *interest* and *agency* to provide WLSSB. These policies have been said to increase normative and economic pressures on employers to be more work–life supportive, e.g., by providing work from home as a work–life supportive work arrangement (Den Dulk, 2001; Den Dulk et al., 2012). We argue that work–life supportive state policies also imply normative and economic pressures on supervisors to enact WLSSB in digital work communication where boundaries between life domains are especially likely to blur (Kossek, 2016) and where digital communication is more likely to be part of work-from-home practices (Den Dulk, 2001; Thomas et al., 2022).

To answer the research questions posed, we use data from the European Social Survey (round 10), including the module "Digital Social Contacts in Work and Family Life" (European Social Survey, 2022b). The data allows us to differentiate work-related communication with supervisors speaking in person, on the phone, on screen, or in writing via email, apps, or platforms, and to apply a comparative perspective.

Our contributions to existing literature are threefold: Previous research has established the concept of family supportive supervisor behavior as a multidimensional superordinate construct. Following Thomas et al. (2022) and recommendations by Kelliher et al. (2019), we rely on this concept but extend it to WLSSB to make it more inclusive to different family identities and various obligations in personal life. Second, previous research has mainly studied its implications for work–life conflicts (for a review see Kossek et al., 2011) but seldom examined its predictors. An exception is the study by Lyness and Kropf (2005) that shows that national gender equality was positively related to the perceived supportiveness of organizational work–family culture. Third, we lack comparative research that investigates whether the association of digital communication and WLSSB is context-dependent. By theorizing and investigating dynamics at the levels of the supervisor–employee exchange relation, the workplace as well as the national level, we place our attention on differences in opportunities, interest, and agency to enact and experience WLSSB in work-related digital communication rather than on the richness of different modes of communication.

2. Theory: WLSSB and Digital Communication

WLSSB are a distinct form of social support. We here rely on the theoretical concept of family supportive supervisor behaviors, which follows social support theories and has been conceptualized as a multidimensional superordinate construct with four dimensions of behaviors that are supportive to employees' work–family integration: emotional support, instrumental support, role modeling, and creative work–family management (Hammer et al., 2009; Kossek et al., 2011). Moreover, in line with recommendations by Kelliher et al. (2019) and the approach of Thomas et al. (2022), we extend the concept to WLSSB. The following sections discuss the meaning of digital work-related communication for the likelihood that employees perceive WLSSB and discuss the importance of its social embeddedness in the direct supervisor–employee exchange relation, the workplace, and country context.

2.1. Digital Communication: Opportunities and Meaning for WLSSB

Media richness theory (Daft & Lengel, 1986) and social presence theory (Short et al., 1976) suggest that WLSSB are at risk where employees and supervisors increasingly use digital communication technologies. They argue that digital communication does not involve all senses and is therefore less rich than in-person communication. In turn, the need for and the provision of WLSSB are more difficult to be signaled and understood. Moreover, it is more difficult to sustain close bonds which are a central precondition for the provision of support, especially emotional support, in social exchange relations. This especially applies to written communication via messaging apps and emails where social presence is highly restricted and less to digital communication via screen where social presence is more pronounced (Short et al., 1976).

Applying social network theory to media use (Haythornthwaite, 2002), however, suggests that employees and supervisors actively and jointly renegotiate their communication pathways to sustain their close bonds if in-person communication is restricted, making digital communication more meaningful for the exchange of WLSSB. In line with this argument, Lal and Dwivedi (2009) revealed that teleworkers used digital ways of communication to maintain social relationships at work. Subsequently, social network theory has been used to criticize assumptions based on media richness theory (Daft & Lengel, 1986) that digital social contacts erode social support, stating that "it is not the characteristics of the medium that matter…but the way the introduction of the medium creates a social network of ties, how its presence sustains such a network, and how its removal disrupts such a network" (Haythornthwaite, 2002, p. 386).

Based on the application of social network theory to media use, we subsequently argue that digital communication means new opportunities for WLSSB in the employer-employee exchange relation. Its centrality or meaning for opportunities to provide and perceive WLSSB, however, varies depending on other existing communication channels. Therefore, we distinguish between work-related digital communication as a complementary practice to frequent, regular, and seldom in-person communication with one's supervisor and argue that digital communication is more strongly related to WLSSB where it complements seldom in-person communication. In this case, work-related digital communication functions as a strategy to sustain the employee–supervisory exchange relation despite the lack of in-person contact and becomes a more central opportunity structure for the exchange of WLSSB. We hypothesize:

> H1: Digital communication with one's supervisor is positively associated with WLSSB especially when it complements seldom in-person communication.

2.2. Interest and Agency in Enacting WLSSB in Digital Communication Practices

Digital communication and the involved opportunities and meaning for WLSSB, however, do not necessarily mean an increased likelihood of WLSSB. Research on the use of instrumental work–life support refers to the importance of supervisors' interest and agency in the provision (Blair-Loy & Wharton, 2002). In the following, we develop the argument that supervisors' interest and agency to enact WLSSB in digital communication practices can either be restricted by workplace-specific norms of high work devotion or encouraged by work–life supportive state policies. Subsequently, we formulate hypotheses on their importance for the association of digital communication and WLSSB.

2.2.1. The Context of the Workplace: The Norm of High Work Devotion

Previous research has found that a meaningful share of organizations continues to adhere to the ideal worker norm of high work devotion, where being highly accessible for work is expected and rewarded (Cha & Weeden, 2014; Williams et al., 2013). In these contexts, digital communication is likely to be used due to the flexibility interests of supervisors to make employees more available for work regardless of time and place (Arnold, 2003; Duxbury et al., 2014; Piszczek, 2017; Wajcman & Rose, 2011).

In turn, supervisors have limited interest and agency to enact WLSSB in digital work communication practices as it contrasts the notion of high work devotion and the implementation of digital communication as a form of constant connectivity (Wajcman & Rose, 2011). In this case, it is less likely that supervisors who digitally communicate with their subordinates show that they have a private life, e.g., on screen, or that they demonstrate

tolerance for blurred boundaries between life domains and intrusion of work communication. Indeed, previous research reveals that the norm of high work devotion limits employees' actual use of flexible workplace arrangements in their work–life balance interest (Leslie et al., 2012; Munsch, 2016). Therefore, we suggest that employees who experience an organizational norm of high work devotion are less likely to experience WLSSB as part of digital communication. We hypothesize:

> H2: The norm of high work devotion decreases the likelihood that digital communication with one's supervisor is positively associated with WLSSB.

2.2.2. The National Context: Work–life Supportive State Policies

Work–life supportive state policies such as expenditures on childcare and in-kind benefits, parental leave arrangements, or investments in the availability of long-term care workers encourage work–life integration for both women and men and increase the economic and normative pressures not only on organizations but also on supervisors to be more supportive in this regard (Den Dulk, 2001; Den Dulk et al., 2012).

Economic pressures refer to the need to provide work–life support to sustain the employability of employees who face challenges in integrating work and personal life, thus risking their productivity, health, and well-being. These economic pressures and involved supervisory interests in providing WLSSB especially relate to situations in which employees and supervisors use digital technologies for work communication where the boundaries between life domains increasingly blur (Kossek, 2016). Indeed, Lyness and Kropf (2005) reveal that national gender equality was positively related to perceived organizational work–life support. Moreover, flexible working arrangements (Den Dulk, 2001) were more common in countries that invested in work–life supportive state policies. Normative pressures refer to expectations among employees towards their supervisors to enact WLSSB in digital work communication which are legitimized by work–life supportive state policies. Expectations to which employees are also more likely to respond because digital communication is also more likely to be part of organizational work–life supportive policies such as work from home which in turn legitimize the enactment of WLSSB in digital work communication (Den Dulk, 2001). To conclude, we hypothesize:

> H3: Work–life supportive state policies increase the likelihood that digital communication with one's supervisor is positively associated with WLSSB.

3. Data and Sample

For the present study, we use data from the European Social Survey (round 10; see also European Social Survey European Research Infrastructure, 2023), which was collected in 31 European countries from September 2020 to September 2022. The survey covers persons aged at least 15 who reside in private households. As the survey was conducted during the Covid-19 pandemic, some countries changed the data collection mode from face-to-face to self-completion via a self-administered web-based questionnaire or a paper questionnaire. Other countries also continued to conduct face-to-face data collection or web-based face-to-face interviews via ICTs (European Social Survey, 2022a). For clarity, we provide the exact time periods, survey modes, and response rates of the survey in the individual countries (see Supplementary File, Table A1).

The data is especially suitable for our research question posed as employed respondents were asked not only about WLSSB but also about the frequency of work-related communication, distinguishing between in-person communication, communication via phone, via screen and in writing via text, email or messaging apps. Finally, the European Social Survey follows a strict random probability sampling strategy at all stages and provides weights to secure conclusions based on representative data (European Social Survey, 2020a). In line with our research question, we selected a sample of 15,375 employees, nested in the 25 countries and aged between 18 and 65 to cover the major working population with paid work as their main weekly activity. Six countries are not considered in the analysis because indicators on the country context were lacking.

3.1. Measures

The dependent variable *WLSSB* is examined with the item "If you have a line manager, how much does he or she support employees in balancing work and personal commitments?" on an 11-point scale from 0 (*not at all*) to 10 (*completely*). The measure of WLSSB follows the operationalization of supervisory work–family support introduced and validated as a distinct dimension of the family-friendliness of an organization by Thompson et al. (1999). Here, the focus is extended from work–family to work–life support. Although the indicator used does not measure the separate dimensions of WLSSB (Hammer et al., 2009), it mirrors the superordinate construct. It is an overall evaluation based on experienced supportive supervisor behaviors. Existing measures on the different dimensions (Hammer et al., 2009) so far do not relate to the nuanced forms of WLSSB in more digitalized and flexible work environments. Adjusted versions (Thomas et al., 2022), furthermore, do not allow comparisons of WLSSB between employees who use digital work communication while working from home or as a complementary practice to regular in-person communication with one's supervisor. The variable *frequency of work-related communication with one's supervisor* is measured for *in-person communication* and *digital communication* via phone, via

screen, and in writing via text, email, or messaging apps. The reported frequency ranges from 0 (*never*), 1 (*less often*), 2 (*once a month*), 3 (*several times a month*), 4 (*several times a week*), and 5 (*once a day*) to 6 (*several times a day*). In addition, experiences of *organizational expectations* of high work devotion were measured with the help of two items: "How often are employees in your organization expected to work overtime, whether at the workplace or at home?" and "How often are employees in your organization expected to be responsive to work communications outside working hours?" These were then combined in a joint mean value index (α = 0.60). Response categories ranged from 1 (*never*) to 6 (*every day*). We further added a macro indicator to the data, describing countries' engagement in *work–life supportive state policies*. The indicator covers public social expenditures on services and in-kind benefits for families as percentage of GDP (OECD, 2023a), length of paid paternity and parental leave reserved for fathers in weeks (OECD, 2023a), net childcare costs for parents using childcare facilities (OECD, 2023b), and number of long term care (LTC) workers per 1000 elderly (people aged over 65; OECD, 2023c; see also Abendroth & Den Dulk, 2011; Den Dulk et al., 2012). To account for the latent structure of work–life supportive state policies, we predicted a single factor by principle component factoring (see Supplementary File, Table A2). The grand-mean-centered measure reflects a stronger country engagement in providing work–life supportive state policies with high values. Ideally, we would have included information on political measures that were installed due to the Covid-19 pandemic to capture respective variations in the challenges of combining work and personal life and the increased pressures involved for supervisors to enact WLSSB in digital work communication. As political measures for the work domain especially focused on social distancing, e.g., with the right to work from home, we included information on the *frequency the supervisor is at the same place*, the *frequency of work from home,* and whether *work from home has increased due to the Covid-19 pandemic*. We are, however, not able to capture political measures sustaining or disrupting childcare and schooling during the pandemic as being relevant to the need for WLSSB.

The models also include various additional controls. Household-related controls describe whether respondents live with a partner in one household and if respondents live with *one child*, *two children*, or *three children or more* compared to *no children*. Although we consider WLSSB, parents may have higher expectations of WLSSB to cope with everyday life than childless respondents. Moreover, gender is included to consider differences in personal life obligations due to persistence in the gendered division of labor: 0 (*male*) and 1 (*female*). *Age in years*, *occupational status* (Ganzeboom et al., 1992), and *work contract* are used to control for the interest of supervisors to sustain and invest in the employment relationship with the help of WLSSB. *Contracted weekly working hours* are meant to control for varying opportunities for frequent and digital in-person communication due to the number of hours worked during a regular work day. Organizational controls include establishment size and type of organization (*central or local government*, *other public sector such as education and health*, *a state-owned enterprise*, *other type*, and *a private firm*). Controlling for establishment size should avoid possible confounder effects by varying expectations of corporate strategies and human resources departments for WLSSB. Finally, we control for the *digital connectivity* through respondents' access to the internet from work and home as this allows us to consider different opportunities for digital communication. Descriptive results are provided in the Supplementary File (Tables A3 and A4).

All metric controls have been centered on the group mean of respondents' country to account for the relative effect between the countries (Enders & Tofighi, 2007). According to our interest in the country variation, and following the purpose of our comparative research question, we decided not to center the level one variables of communication and organizational expectations.

3.2. Method

The large cross-country sample requires the application of hierarchical multilevel regression models to examine systematic variation within and between the participating countries. Not applying a multi-level analysis would result in biased standard errors due to the clustering of individuals in countries. Furthermore, we applied analytical weights (anweight) offered by the European Social Survey to the analyses to account for varying selection probabilities within each country (European Social Survey, 2020b). Moreover, the weight corrects the models for differences in countries' population size. Due to overbearing complexity, cross-level interactions were inserted separately in different models. Results including effects for controls are displayed in the Supplementary File (Table A5). Moreover, we provide sensitivity analyses to detect influential countries with the help of jackknife procedures by always deleting one country from the analyses.

4. Results

4.1. WLSSB and Digital Communication With One's Supervisor

The empty model (not shown) reveals existing differences in WLSSB between European countries. Here, the intraclass correlation shows that 2.84 percent of the estimated total variance of WLSSB is the estimated country variance. Although the intraclass coefficient is not particularly large, our investigation concerns the implications of the frequency of digital communication with supervisors for WLSSB and how they vary between and within the different countries.

Model M1 in Table 1 examines the association of work-related communication with the supervisor and WLSSB. The model shows that the frequency of communication is positively associated with WLSSB regardless of the mode of communication. The importance of communication for WLSSB is also indicated by the explained variance, which is 10.14 percent of the country-level variance and 6.98 percent of the individual-level variance. However, the strength of the association for the different modes of communication as well as the significance level vary. The highest effect strength is measured for speaking with supervisors in-person. In contrast to digital communication via a screen or a phone, the frequency of digital communication via written messages is only modestly associated with WLSSB and only with a significance level of $p < 0.10$. Model 2 takes physical distance between supervisor and employee, as well as work from home and its increase due to the Covid-19 pandemic, as possible confounders into account. Interestingly, frequent work from home is associated with more WLSSB. Thus, supervisors seem to have interpreted and enacted it as a form of instrumental work–life support, especially in times of the pandemic. Moreover, working from home seems to explain the weak association of digital communication via messages which reduces in effect size and significance. Digital communication with one's supervisor is obviously more frequent the more employees work from home but it does not seem to additionally contribute to more WLSSB. However, controlling for the index of perceived organizational expectations of work devotion in

Table 1. Hierarchical regression analysis of WLSSB and digital work communication.

	M1	M2	M3
Frequency communication with supervisor			
In-person	0.216***	0.260***	0.238***
	(0.0362)	(0.0415)	(0.0487)
Via screen	0.148***	0.091***	0.091***
	(0.0299)	(0.0256)	(0.0240)
Via phone	0.035*	0.038*	0.067***
	(0.0177)	(0.0167)	(0.0171)
Via messages	0.068+	0.047	0.080*
	(0.0356)	(0.0357)	(0.0340)
Supervisor at the same place			
Occasionally		0.274	0.341*
		(0.1768)	(0.1611)
Several times a week		0.414+	0.491*
		(0.2263)	(0.2159)
Everyday		0.187	0.262
		(0.2078)	(0.2014)
Telework			
Occasionally		0.121	0.126
		(0.1628)	(0.1526)
Several times a week		0.270+	0.244+
		(0.1569)	(0.1483)
Everyday		1.080***	1.009***
		(0.2730)	(0.2102)
Change in telework to before Covid-19			
More often now		0.266	0.189
		(0.1622)	(0.1811)
Less often now		−0.017	−0.020
		(0.2506)	(0.2375)
Organizational expectation of high work devotion			−0.358***
			(0.0583)
Constant	5.103***	4.594***	5.135***
	(0.1416)	(0.1761)	(0.2013)

Notes: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; analytical weights are applied (weighted population 13,081.255); controls are female, age†, occupational status†, limited work contract, contracted weekly working hours†, establishment size, type of organization, partner in household, child in household, internet access at work, and internet access at home († variables are centered on the group mean value of the country). Source: European Social Survey (round 10; $N = 15{,}375$).

Model 3, the effect of digital communication via messages regains significance and effect size as well as communication via phone. Perceived organizational expectations of high work devotion seem to be a suppressor of involved WLSSB in digital work communication. Digital communication via phone and messages does seem to help to sustain ties and involve opportunities for WLSSB but it also seems to be used to realize the norm of high work devotion, which is negatively associated with WLSSB. Results including all effects for controls are displayed in the Supplementary File (Table A5).

Table 2 provides the same analysis but instead of controlling for the frequency of in-person communication, the implications of digital work communication are investigated for three sub-samples: employees with seldom (once a month or less), regular (several times a month or a week) or frequent (daily) communication with their supervisor. The results show that frequent digital communication, such as communication via screen, via phone, or via messages is more likely to be positively and significantly associated with WLSSB support for respondents who seldomly communicate with their supervisors in person. The effect strength and significance of digital communication are smaller for those respondents who regularly or frequently communicate with their supervisors in person.

Overall, the results support H1, which stated that digital communication with one's supervisor is positively associated with WLSSB especially when it complements seldom in-person communication. Additional Wald tests with cluster-adjusted standard errors supported differences in the reported beta-coefficients for communication via a screen, a phone, and written communication between the groups of seldom and regular, as well as seldom and frequent in-person communication. No significant differences were found for the comparison of the sub-sample of regular and frequent in-person communication. Moreover, we provide additional sensitivity analyses (see Supplementary File, Table A6) including interaction effects between in-person communication and digital communication, which lead to the same conclusion as H1. If in-person communication is rare, frequent communication via phone or screen goes hand in hand with more WLSSB. However, no significant interaction effect is revealed between in-person communication and communication via written digital messages.

4.2. The Importance of the Organizational Norm of High Work Devotion

In Table 3, the moderating role of the organizational norm of high work devotion is investigated. Model 1 displays a significant interaction effect between experienced expectations of high work devotion and the frequency of in-person communication with supervisors predicting WLSSB. At first glance, no significant interactions are revealed between the norm of high work devotion and digital communication with one's supervisor (see M2–M4).

However, additional sensitivity analyses deleting always one country from the sample (jack-knife procedure; see Supplementary File, Table A7) identified one country that suppressed significant interactions between perceived organizational expectations and digital communication: Excluding the sub-sample of respondents from Great Britain revealed significant interaction effects for communication via screen (b = −0.020*) and via text messages (b = −0.032*) as displayed in Figure 1. Frequent communication via screen or messages is more likely to be positively associated with WLSSB where expectations of high work devotion are low. In addition, frequent written communication via text, email, or messaging apps is even associated with lower WLSSB where norms of high work devotion are high. Great Britain

Table 2. Hierarchical regression analysis of WLSSB and digital work communication: Variation by frequency of in-person communication.

	In-person communication with supervisor		
	Seldom	Regular	Frequent
Frequency communication with supervisor			
Via screen	0.250***	0.108**	0.018
	(0.0446)	(0.0412)	(0.0235)
Via phone	0.215***	0.060*	0.032*
	(0.0444)	(0.0245)	(0.0160)
Via messages	0.125*	0.050+	0.063*
	(0.0507)	(0.0255)	(0.0319)
N	3,093	6,444	5,838

Notes: + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001; analytical weights are applied (weighted population 13,081.255); controls are female, age†, occupational status†, limited work contract, contracted weekly working hours†, establishment size, type of organization, partner in household, child in household, internet access at work, internet access at home, supervisor at the same place, telework, change in telework, and organizational expectation of high work devotion († variables are centered on the group mean value of the country). Source: European Social Survey (round 10).

Table 3. Hierarchical regression analysis of WLSSB and digital work communication with supervisor: The moderating role of organizational expectations of high work devotion.

	M1	M2	M3	M4
Frequency communication supervisor				
In-person	0.175*	0.238***	0.239***	0.239***
	(0.0719)	(0.0488)	(0.0484)	(0.0484)
Via screen	0.093***	0.114***	0.092***	0.092***
	(0.0250)	(0.0213)	(0.0239)	(0.0234)
Via phone	0.063***	0.067***	0.081**	0.066***
	(0.0178)	(0.0169)	(0.0258)	(0.0165)
Via messages	0.078*	0.080*	0.080*	0.120*
	(0.0326)	(0.0339)	(0.0341)	(0.0469)
Interaction organizational expectations of high work devotion				
Expectations#Via in-person	0.036*			
	(0.0157)			
Expectations#Via screen		−0.012		
		(0.0130)		
Expectations#Via phone			−0.008	
			(0.0097)	
Expectations#Via messages				−0.022
				(0.0160)
Constant	5.377***	5.112***	5.097***	5.034***
	(0.2314)	(0.2167)	(0.2038)	(0.2450)

Notes: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; analytical weights are applied (weighted population 13,081.255); controls are female, age†, occupational status†, limited work contract, contracted weekly working hours†, establishment size, type of organization, partner in household, child in household, internet access at work, internet access at home, supervisor at the same place, telework, and change in telework († variables are centered on the group mean value of the country). Source: European Social Survey (round 10; N = 15,375).

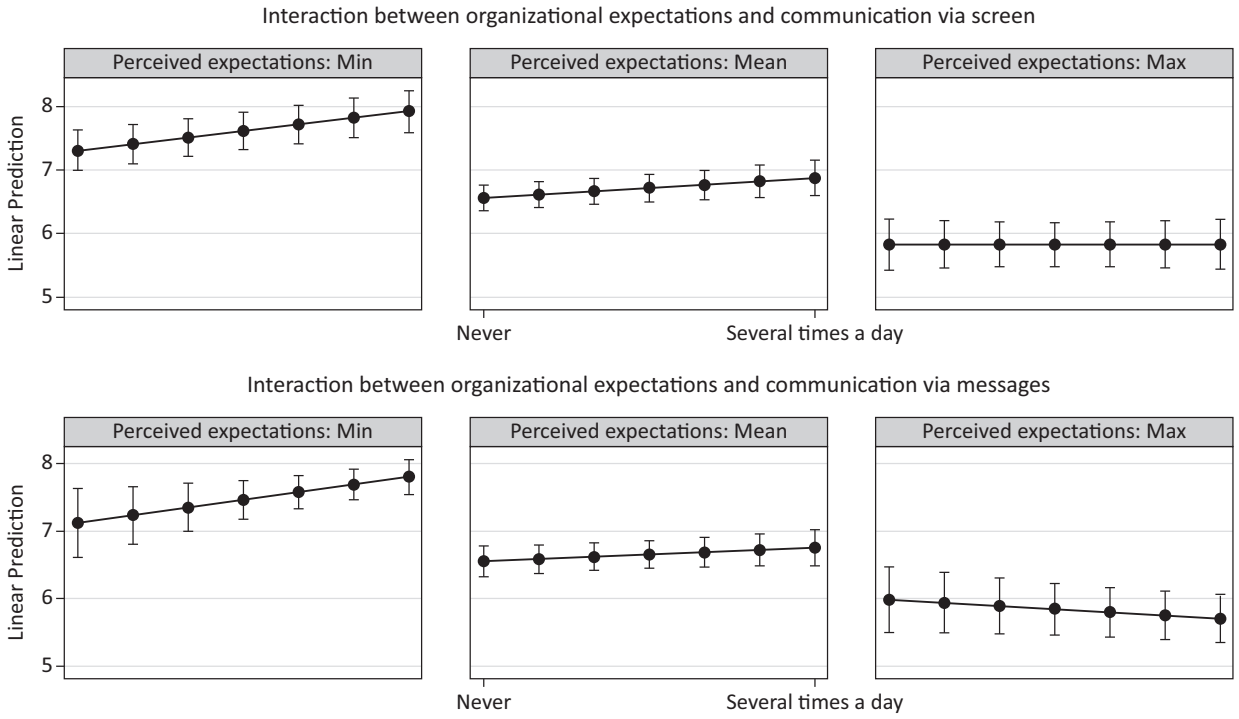

Figure 1. Conditional interaction effects for perceived organizational expectations of high work devotion and communication via the screen or messages, excluding Great Britain. Notes: Predictive margins with 95% Cis. (N = 14,994); analytical weights are applied (weighted population 10,922.103); see also Supplementary File, Table 7. Source: European Social Survey (round 10).

here seems to be an outlier with an opposing pattern. Therefore, our findings allow us to only partly confirm H2, which argued that organizational expectations regarding high work devotion decrease the likelihood that frequent communication with one's supervisor is positively associated with WLSSB.

4.3. The Importance of Work–Life Supportive Family Policies

Table 4 displays cross-level interactions between work–life supportive state policies and the frequency of in-person and digital communication with supervisors predicting WLSSB. The results of the interaction terms show that the frequency of either work-related communication via phone or in-person with one's supervisor is more important for WLSSB in contexts with higher values on the work–life supportive state policy indicator. The interactions with communication via screen and messages do not reach the level of significance. Sensitivity analyses for detecting influential countries provide relatively stable results (see Supplementary File, Table A8). However, deleting Norway from the analysis reveals a significant interaction between communication via digital messages and the policy indicator (b = 0.059*).

Thus, these results partly provide evidence in support of H3, which stated that work–life supportive state policies increase the likelihood that frequent digital communication with one's supervisor is positively associated with WLSSB.

5. Conclusions

Digital work communication with one's supervisor becomes more important where employees and supervisors work more flexibly in time and place and rarely share physical presence in the same location. For employees, this involves increased risks of blurred boundaries between the life domains and, subsequently, the need for WLSSB to mitigate work–life conflict-enhancing implications. In these contexts, WLSSB have the potential to create more inclusive work environments that accommodate the diverse needs of employees and that sustain social relationships at work despite restrictions in shared physical presence. However, media richness (Daft & Lengel, 1986) and social presence (Short et al., 1976) theory suggest that digital communication reduces the likelihood that employees experience WLSSB and in turn weakens social inclusion at work. On the one hand, this is because the need and challenges in integrating work and

Table 4. Hierarchical regression analysis of WLSSB and digital communication: The moderating role of work–life supportive state policies.

	M1	M2	M3	M4
Frequency communication supervisor				
In-person	0.243***	0.239***	0.238***	0.236***
	(0.0334)	(0.0490)	(0.0490)	(0.0505)
Via screen	0.088***	0.060**	0.091***	0.089***
	(0.0235)	(0.0207)	(0.0239)	(0.0234)
Via phone	0.068***	0.069***	0.053***	0.067***
	(0.0163)	(0.0165)	(0.0145)	(0.0160)
Via messages	0.083*	0.080*	0.079*	0.048*
	(0.0351)	(0.0340)	(0.0329)	(0.0228)
Interaction: Work–life supportive state policies	−0.344**	−0.087	−0.207	−0.176
	(0.1224)	(0.1255)	(0.1322)	(0.1583)
Policy#Via In-person	0.068***			
	(0.0140)			
Policy#Via screen		0.010		
		(0.0238)		
Policy#Via phone			0.051*	
			(0.0205)	
Policy#Via messages				0.039
				(0.0284)
Constant	5.078***	5.139***	5.146***	5.167***
	(0.1772)	(0.2058)	(0.1854)	(0.2107)

Notes: + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001; analytical weights are applied (weighted population 13,081.255); controls are female, age†, occupational status†, limited work contract, contracted weekly working hours†, establishment size, type of organization, partner in household, child in household, internet access at work, internet access at home, supervisor at the same place, telework, change in telework, and organizational expectation of high work devotion († variables are centered on the group mean value of the country). Source: European Social Survey (round 10).

personal life are more difficult to be signaled and understood in less rich communication. On the other hand, this is because less rich communication makes it more difficult to sustain strong bonds in the supervisor–employee exchange relation, which is a fundamental basis for the exchange of emotional support.

Therefore, we investigated whether WLSSB is indeed less likely to be exchanged where employees communicate digitally with their supervisor about work or whether the association of digital communication and WLSSB is rather context-dependent. Based on social network theory and its application to media use (Haythornthwaite, 2002) and the use of instrumental work–life support (Blair-Loy & Wharton, 2002), we distinguished dynamics at three different levels which we expected to moderate the association of digital communication and WLSSB: the direct supervisor–employee exchange relation, the workplace, and the national level. At the level of the direct supervisor–employee exchange, we differentiated between work-related digital communication as a complementary practice to frequent, regular, and seldom in-person communication. At the workplace level, we considered the prevalence of the organizational norm of high work devotion with expectations to work overtime and to be responsive to work communication outside working hours. At the national level, we considered the work–life supportiveness of state policies. While we argued that the former is a central moderator because it shapes the meaning of digital work communication for the overall possibilities to receive WLSSB, we argued for the two latter that they are central moderators because they influence supervisors' interest and agency to enact WLSSB in digital work communication.

Based on multi-level analyses with representative data on employees in 25 European countries from the European Social Survey (round 10), we first conclude that not only in-person communication but also communication via phone, screen, and messages with one's supervisor is positively associated with WLSSB. The fact that in-person communication is overall more important for WLSSB provides some evidence for media richness (Daft & Lengel, 1986) and social presence (Short et al., 1976) theory, but only at first glance. Complementing seldom in-person communication, the meaning of digital communication for WLSSB increased in significance and size. This is in line with the application of network theory to media use (Haythornthwaite, 2002), suggesting that employees and supervisors actively and jointly renegotiate their communication pathways if in-person communication is restricted to sustain their social bonds. Digital communication is an opportunity for exchanging WLSSB in the supervisor–employee exchange relation and its meaning for WLSSB increases when it becomes a more central channel of work-related communication. Thus, a weaker association between digital communication and WLSSB in comparison to in-person communication may not necessarily imply that the communication is less rich or that social presence is weak. We provide initial evidence that it might also be due to the fact that it is a less central communication channel in the exchange relation in general and for the enactment of WLSSB in particular.

Secondly, we conclude that the organizational norm of high work devotion makes it less likely that digital communication contributes to experiences of WLSSB. This is in line with the argument and previous research findings that digital communication can and is used as a practice of constant connectivity meant to realize supervisors' flexibility interests (Mazmanian et al., 2013; Wajcman & Rose, 2011). In this case, supervisors seem to have little interest and agency in enacting WLSSB in written digital work communication because it is used to realize the norm of high work devotion which de-legitimizes such supportive practices. Thus, another alternative explanation for a weaker association of digital communication and WLSSB is provided. However, this finding is only revealed when Great Britain is excluded from the analysis. Great Britain seems to be an influential country with an opposing pattern, suggesting that WLSSB might even be enacted where the norm of high work devotion is strong, for example, to sustain adherence towards the norm in spite of personal obligations.

Thirdly, we conclude that the work–life supportiveness of state policies increases the likelihood that work-related digital communication goes hand in hand with WLSSB. This, however, mainly applies to communication via phone. The findings for digital written communication are less robust. Here, the moderating role of work–life supportive state policies is only significant when Norway is deleted from the analysis. We argued that work–life supportiveness increases the interest and agency of supervisors to enact WLSSB in digital work communication. Work–life supportive state policies imply normative and economic pressures on supervisors to enact WLSSB in digital work communication where boundaries between life domains are especially likely to blur (Den Dulk, 2001; Kossek, 2016) and where digital communication is more likely to be part of work from home rather than an additional mode of work communication (Thomas et al., 2022).

Our contribution does have some limitations. Due to the cross-sectional design of the European Social Survey and the implementation of an overall measurement of WLSSB in the rotation module, we were not able to draw causal conclusions or to differentiate between the subdimensions of WLSSB to disentangle whether our conclusions equally apply to them. Nevertheless, European Social Survey (round 10) data was to our knowledge the only data source to investigate our research question. Moreover, next to longitudinal data analysis with information on the different dimensions of WLSSB, additional qualitative data collection is required to investigate the underlying mechanisms that we address in the theoretical arguments but which we are not able to directly test. Whereas our research provided a comparative perspective concerning the social embeddedness of the use of digital communication, future research is needed which

additionally considers individual variation, i.e., individual differences concerning work and family-life stages and implied gendered demands and expectations in work and personal life. Finally, the data used was collected during the Covid-19 pandemic, which means that it is necessary to investigate whether the conclusions drawn hold for the times after the pandemic. Although we controlled for the increase of work from home due to the pandemic and the shared physical presence in one location, it might still be that supervisors were more likely to enact WLSSB in digital work communication. Challenges in combining work and personal life during the pandemic were especially pronounced where state-provided childcare and schooling were restricted. Nevertheless, our conclusions on the context dependence of the meaning of digital communication for WLSSB hold true.

Our contribution also has some practical implications. It suggests that employees and supervisors can sustain their relationship with the help of digital work communication and that it is feasible to enact WLSSB in digital communication as well. In addition, the results suggest that WLSSB gains importance in more flexible working environments where employees and supervisors increasingly work regardless of time and place. This means that it should be part of work–life management in organizations.

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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About the Authors

Anja-Kristin Abendroth is a junior professor for technical and social change at the Faculty of Sociology at Bielefeld University. Since 2020 she has been the project leader of the project Flexibility in Digitalized Working Worlds: Use and Implications of Telework and Digital Work Communication Across European Countries funded by the German Science Foundation as part of the collaboration unit SPP 2267. Her research interests include the digitalization of work, interdependencies between work and personal life, gender inequalities, and organizational inequality regimes.

Antje Schwarz (MA) is a student research assistant in the project Flexibility in Digitalized Working Worlds: Use and Implications of Telework and Digital Work Communication Across European Countries funded by the German Research Foundation at Bielefeld University. Her research interests focus on flexibilization and digitalization of work, ideal worker norms, and leadership in different organizational cultures, and research on welfare state regimes.

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Article

Work-Related ICT Use and the Dissolution of Boundaries Between Work and Private Life

Ines Entgelmeier [1,*] and Timothy Rinke [2]

[1] Federal Institute for Occupational Safety and Health (BAuA), Germany
[2] Institute for Work, Skills and Training (IAQ), University of Duisburg-Essen, Germany

* Corresponding author (entgelmeier.ines@baua.bund.de)

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Abstract
Information and communication technologies (ICTs) promote flexible forms of work. Based on analyses of data from the German BIBB/BAuA Employment Survey 2018, this article shows that ICT (computer/internet) use is associated with both overtime and better temporal alignment of work and private life. Additional analyses show that these associations differ by gender and parenthood. Especially if also working from home, men with and without children do more overtime when they use ICTs than women with and without children. Better temporal alignment is found only among men without children who use ICTs and work from home compared to women without children.

Keywords
gender; ICTs; overtime; parenthood; temporal alignment of work and private life; working from home (WFH)

Issue
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1. Introduction

The use of information and communication technologies (ICTs) promotes temporally and spatially flexible forms of work. Work-related tasks can consequently spill over into private life and private demands spill over into work. The effects are discussed ambivalently (e.g., Carstensen, 2015; Dén-Nagy, 2014). On the one hand, under the job demands-resources model (Demerouti et al., 2001), ICT use can represent a work demand (e.g., when it promotes overtime) and thus take up time resources that should actually be devoted to leisure or the family. On the other hand, the use of ICTs can be a work resource (e.g., by offering more flexibility for the organisation of work), which can facilitate the consideration of private demands. However, little is known about which groups of employees are more likely to benefit from these resources and take advantage of the opportunities promoted by ICT use for their own private interests or become subject to demands, such as overtime. Gender norms and role expectations may have important implications here. Women—especially mothers—are expected to be more involved in private life while men—especially fathers—are more involved in their working life (Bielby & Bielby, 1992; Williams et al., 2013). As a result, there may be gender and parenthood-related differences in the use of ICT and the dissolution of boundaries between these spheres of life. For example, while men, fathers especially, may be more likely to use ICTs to extend work and comply with gender norms, this is not expected of women since they (have to) take on additional private tasks.

This article aims to examine the relation between work-related ICT use and the dissolution of the boundaries between work and private life, differentiated by gender and parenthood for German employees. It therefore examines the relations between work-related computer and internet use and overtime on the one hand, and the ability to temporally align work and private life (temporal alignment) on the other. With this concept,

we address the time dimension of work and private life alignment, that is the extent to which employees are able to take private and family interests into account when planning working hours (Mergener et al., 2023). Whether ICT use actually facilitates temporal alignment is relevant especially to the inclusion of women in the labour market, as a gender-specific division of labour is still found, especially among couples with children in Germany (Hobler et al., 2020).

Research has shown that mobile technologies, such as the internet, are more likely to be associated with the extension of work than stationary technologies, such as computers (Kirchner, 2015; Meyer & Hünefeld, 2021). Drawing on these findings, our study looks at both computer and internet use. In addition, working from home (WFH), which is closely linked to the development of ICTs, is included (Messenger & Gschwind, 2016). The reasons for implementing WFH in companies range from better work–life balance for employees and increased employer attractiveness to greater employee availability and productivity (Grunau et al., 2019). While previous studies mostly look at whether employees use ICTs or work outside the office, our analyses include the moderating effect of both.

The empirical analyses are based on data from the German 2018 BIBB/BAuA Employment Survey (Hall et al., 2020). Logistic regression models are estimated for the relation between work-related ICT use (computer/internet) and overtime and temporal alignment. Interactions are included in the models to test whether the relations between ICTs and overtime or temporal alignment differ by gender, parenthood, and WFH.

2. Theoretical Framing and State of Research

"Boundary dissolution" denotes a process by which the boundaries between work and private life become more flexible (Ashforth et al., 2000). This is caused by the flexibilisation of work structures, especially concerning time and space. As a result, previously separate life spheres become increasingly blurred. This process has bidirectional effects: Interactions can spill over from work into private life and from private life into work (Pongratz & Voß, 2004; Voß, 1998). The former is the case, for example, when employees check emails during the weekend, answer business calls on their way home, or extend their work at their employer's premises because greater availability is expected. Here, occupational demands encroach upon the time that belongs to the private sphere—family time for instance. Interactions spilling from private life into work is the case when ICT tools make it possible to align private demands with everyday working life. For example, an employee may leave work to pick up a child from childcare but remain available to take work calls at the same time. According to boundary theory (Ashforth et al., 2000), individuals differ in the extent to which they segregate or integrate roles in different areas of life. The more segmented the roles are, the easier it is to form and maintain boundaries and the more difficult it is to cross them. Integration strategies are often assessed as more helpful in reducing conflicts between work and private life. However, if areas of life overlap too much, as is made possible by ICT use, integration can also intensify conflicts (Kossek, 2016).

2.1. ICT as an Amplifier of the Dissolution of Boundaries Between Work and Private Life?

Work-related ICT use is discussed in connection with the intensification and extensification of work (Carstensen, 2015) because more multitasking is required, more interruptions occur, and work processes are accelerated (Chesley, 2014). In addition, ICTs enable employees to access work content at any time wherever they are, thereby reinforcing the expectation employees will constantly be available and respond to work-related demands (Chesley, 2014). As a result, previous research has shown that working time expands into private times and places when working with ICTs (Kirchner, 2015; Schieman & Young, 2013), thereby affecting private life. Employees perceive work–life conflicts more strongly when working time outside regular working hours increases due to ICTs (Wright et al., 2014). However, the effect of ICTs seems to vary in this respect. Kirchner (2015) finds that the occupational use of the internet (but not computers) is associated with working during leisure time. According to Meyer and Hünefeld (2021), tablet and smartphone use (but not laptop use) is associated with work intensity and overtime. Similarly, Chesley (2005) concludes that the use of mobile phones (but not computers) by employees is associated with increased negative work–life spillovers and lower family satisfaction. Thus, mobile technologies in particular seem to drive the boundary dissolution process.

In addition, work-related ICT use is also associated with a better temporal alignment. Derks et al. (2016) identify work-related smartphone use outside working hours as contributing to a decrease in work–life conflict and having a positive effect on family role perception. However, this correlation was only found for employees who preferred to integrate different spheres of life. Wajcman et al. (2010) find that the longer employees use the internet at home for work-related tasks, the less they suffer from work–family spillover, measured by missed family activities.

While ICTs can also be used exclusively on-site at the employer's premises, WFH, which mostly alternates with working in the office, takes place directly in the private sphere. Spatial boundaries can dissolve here, in particular, something associated with both the risk of work being extended and the chance of better temporal alignment (Allen et al., 2015). On the one hand, employees save time and energy by eliminating commuting time and are able to organise their work more flexibly when working from home, which can support the integration of private demands during work (Gajendran & Harrison,

2007). On the other hand, employees often repay the flexibility employers grant them by extending their work (Kelliher & Anderson, 2010). Moreover, WFH is associated with the stigma that homeworking employees are less productive (Chung, 2018). Workers may extend their working hours to counteract this stigma. The time they would otherwise have spent commuting is often used to work longer hours instead of participating in leisure activities (Lott, 2019). WFH sees work–family conflicts increase mainly because more overtime is done (Abendroth & Reimann, 2018). This leads to the following hypotheses:

H1a. Work-related use of ICTs is positively associated with overtime.

H1b. This correlation is stronger for employees who work from home than employees who merely work from their employers' premises.

H1c. Work-related use of ICTs is positively associated with temporal alignment.

H1d. This correlation is stronger for employees who work from home than employees who merely work from their employers' premises.

As internet use is more strongly associated with the flexibility of working in time and space, we would expect stronger associations overall for the use of the internet than for working with computers.

However, research findings do not yet allow us to say which groups of employees are more likely to benefit from work-related ICT use (in terms of temporal alignment) and which groups are more likely to experience demands (in terms of overtime). The following section therefore explains how these associations may differ depending on gender and parenthood.

2.2. The Implications of Gender and Family Responsibilities

Boundary theory states that boundaries are shaped by role identity (Ashforth et al., 2000). More flexible boundaries are being formed around the role that contributes most to a person's identification. In view of the still strong gender-specific allocation of life domains (Hobler et al., 2020), it can be concluded that women form more flexible boundaries around their private sphere and men around their working sphere in order to confirm their gender identity. This division of life spheres is likely to be reinforced by parenthood. Women with children perform more care work than men, even if they are in full-time employment (Hobler et al., 2020).

Furthermore, cultural and social structures, which are themselves gendered, affect the formation of boundaries (Ashforth et al., 2000). These structures are expressed, for example, in the "ideal worker norm" (Williams et al., 2013), which demands complete availability for gainful employment and the subordination of private demands to working demands. Men are better able than women to meet these expectations because they still have less responsibility for private demands alongside their gainful employment (Hobler et al., 2020). Fathers often extend their working hours in order to perform the "family breadwinner" role (Pollmann-Schult, 2015). ICTs can consequently promote this norm through the temporal and spatial flexibility they allow, encouraging fathers in particular to extend their work. Given their expected stronger identification with the family role, it can be explained that women separate their working sphere more strongly from their private sphere and allow occupational demands less access, especially when they have children. The "ideal mother norm" requires them to interrupt or reduce their gainful employment after the birth of a child to take on care work (Lott & Klenner, 2016). This suggests mothers are less likely than fathers to use ICTs to extend work. Even though women may have become more oriented towards the labour market and men towards care work (Kossek, 2016), a traditional gender-specific division of labour is still evident, especially in Germany (Hobler et al., 2020).

Research shows flexible working is used differently by women and men (Chung & Van der Lippe, 2018; Kim, 2020; Lott & Chung, 2016). It is more likely men will use flexibility to work overtime and women to integrate additional care work. In contrast, recent research has also found that mothers who work from home increase their working hours. However, the increases are mainly explained by their contractual working hours and not by overtime (Arntz et al., 2022). This may be related to the fact that women who work at home invest more time in housework and care work than men who work from home but also than men and women who work exclusively in the office (Powell & Craig, 2015; Samtleben et al., 2020).

Moreover, there may be fewer expectations from others (e.g., life partners) that men will deal with private demands when working from home. Men might also be less affected by stigmatisation than women, even when they ask for flexibility to cope with private demands. "Gender status beliefs" (Ridgeway & Correll, 2004) imply women will be less productive, regardless whether they are mothers, while men are described as "ideal workers," even when they have children (Acker, 1990; Williams et al., 2013). Fathers who request flexibility for family reasons can also face the so-called "flexibility stigma" (Rudman & Mescher, 2013) but women are affected by this stigma even if they do not have children, which could prevent them from demanding flexibility. Thus, it may be assumed men are more likely to benefit from ICT use in terms of temporal alignment, especially if they do not have children.

Limited empirical research has been done into the gendered effects of ICT use. Chesley (2005) finds mobile phone use at work is associated with negative

work–family spillovers for men and women. However, only women are affected by negative family–work spillovers in this study. Ghislieri et al. (2017) show an association between ICT use outside regular working hours and work–family conflict for both women and men. However, significant associations between working with ICTs outside regular working hours and work–family enrichment are only found for men (Ghislieri et al., 2017). Badaway and Schieman (2019) find a positive relation between the frequency of family contact during work and conflicts between family and work, which are stronger for women than for men.

Based on these findings, we add the following hypotheses:

H2a. The positive correlation between work-related use of ICTs and overtime is stronger for fathers (compared to men without children and women with and without children).

H2b. This correlation is the strongest for fathers who work from home.

H2c. The positive correlation between work-related use of ICTs and temporal alignment is stronger for men without children (compared to men with children and women with and without children).

H2d. This correlation is strongest for men without children working from home.

3. Data, Variables, Method

3.1. Data Set

The German BIBB/BAuA Employment Survey 2018 (Hall et al., 2020) was used to analyse how work-related ICT use relates to the dissolution of boundaries between work and private life. Around 20,000 employees aged 15 and over who work at least 10 hours per week were interviewed for this survey. The sample includes employees aged 18–65 who have no missing values for any of the variables included in the analyses. Self-employed persons are not included. The sample consists of 15,615 cases. This includes 2,715 women with and 5,280 women without children and 2,472 men with and 5,148 men without children.

3.2. Variables

Dissolution of the boundaries emerging from work to private life is captured by overtime. A variable was therefore created that indicates the difference between agreed and actual weekly working hours. Due to the non-ideal distribution of the variable for linear regression analysis (45% without overtime), this was dichotomised (0 = *no overtime*, 1 = *at least 1 hour of overtime*). Table 6 in the Supplementary File estimates linear quantile regression for computer work at various points in the overtime distribution.

Dissolution of boundaries starting from private to working life is operationalised with the question: How often do you manage to take your family and private interests into account when planning your working hours? (1 = *often*, 2 = *sometimes*, 3 = *rarely*, 4 = *never*). This was dichotomised for the analysis (0 = *never, rarely, sometimes*; 1 = *often*).

ICTs are operationalised by questions about working with computers and using the internet or email. Only persons who had previously stated they worked with computers were asked about the internet/email. Both variables are dichotomised into the values 0 (*never*/*sometimes*) and 1 (*often*). In addition to computer and internet use, the range of task items available includes variables relating to 16 other job tasks. Based on a factor analysis, Kirchner et al. (2023) show these tasks can be assigned to three domains: manufacturing, services, and knowledge. Three other tasks (purchasing, advertising, and transporting) could not be assigned to a particular factor. We added these factors and individual tasks to the data set and included them in the models as control variables.

As it is expected that ICT use at home in particular is associated with a blurring of boundaries between private and working life, WFH is recorded with the question: Do you work for your company from home, even if only occasionally? (0 = *no*, 1 = *yes*). WFH is also included as a moderator. To examine group-specific differences in the relationship between ICT use and the dissolution of boundaries, group variables for gender and children are included as moderators (women with children, men with children, women without children, and men without children). The reference categories change between the models for overtime (men with children) and temporal alignment (men without children), depending on the assumption made in the hypotheses.

Further variables are included for control purposes. Besides age and a combined variable for gender and children (under 16) living in the household, human capital is controlled for with the ISCED education variable (0 = *up to middle school*; 1 = *Abitur/vocational qualification*; 2 = *from university, university of applied sciences, including doctorate*) and how long the employee has worked for their employer (tenure in years). Occupational characteristics in particular are decisive for a blurring of boundaries between spheres (e.g., Kirchner, 2015). In addition to job tasks, occupational position (0 = *blue-collar worker*, 1 = *white-collar worker*, 2 = *civil servant*), full-time/part-time, and leadership position (0 = *no*, 1 = *yes*) are included to cover these characteristics. Region (0 = *West Germany including Berlin*, 1 = *East Germany*), is taken into account in view of possible differences in working conditions. Furthermore, variables that capture organisational characteristics, such as company size (0 = *1–9 persons*, 1 = *10–249 persons*, 2 = *250 persons and more*) or whether the organisation has a work council (0 = *no*,

1 = *yes*) are included. We also control for career ambition (0 = *not at all/rather not*, 1 = *strong/very strong*), as research has shown that higher ambition and job involvement can have an impact on whether technologies are used, for example, to extend work outside regular working hours (Boswell & Olson-Buchanan, 2007). Living with a (spouse) partner (0 = *no*, 1 = *yes*) is included to control for family responsibilities.

3.3. Methods

The models for the relations between work-related ICT use and the dissolution of boundaries between work and private life are estimated using logistic regressions. The choice of logistic regression as a method results from the 0/1 coded dependent variables. The interpretation of odds ratios is not intuitive and can lead to incorrect conclusions (Wolf & Best, 2010). Moreover, coefficients cannot be compared between different models. Average marginal effects are therefore presented for the logistic regression models. These indicate the average influence an independent variable has on the probability of an event occurring (Wolf & Best, 2010). To examine the implications of gender and parenthood for the relationship between work and private life and the dissolution of boundaries, interaction terms are included as moderators. These combine the technology used by the employee with gender, children, and WFH. In order to compare groups beyond the comparison with a single reference group, contrasting group differences are shown, which also makes it easier to interpret three-way interactions (Mitchell, 2012, pp. 487–492).

We pursue a hierarchical approach in which variables for job tasks are added to model M2 and the variable for career ambition to model M3. We control for job tasks (but not career ambition) in models M4, M5, and M6, the interaction of ICT use with gender/children (M4) and WFH (M5), and the three-way interaction with gender/children and WFH (M6). The control variables mentioned above are included in all models (see Tables 1, 2, 4, and 5).

4. Findings

4.1. Descriptive Findings

Nearly 54% of employees in this sample work overtime. The non-overlapping confidence intervals in Figure 1 show that men with and without children (60% and 57%) are significantly more likely to report overtime than women with and without children (48% each). While women and men with children differ significantly from each other, there are no significant differences between the groups of women and men if they do not have children. On average, 62% of employees are often able to temporal align work and private life (Figure 2). Women with children state this significantly more often (69%) than men with and without children and women without children (61% each). However, these differences are not significant (Figure 2). Around 71% of the employees work with computers and 57% use the internet often. Men without children work significantly less with computers (65%) and the internet (52%) compared to men with children (72%/59%), women with children (76%/61%) and women without children (73%/59%). Descriptions of all the variables can be found in the Supplementary File.

4.2. Multivariate Findings

Tables 1 and 2 show the correlation between work-related computer and internet use and overtime, taking account of the control variables. The full models with all control variables are set out in the Supplementary File. Working with computers and using the internet often (M1) are associated with a significantly higher probability of overtime. When job tasks (M2) and career

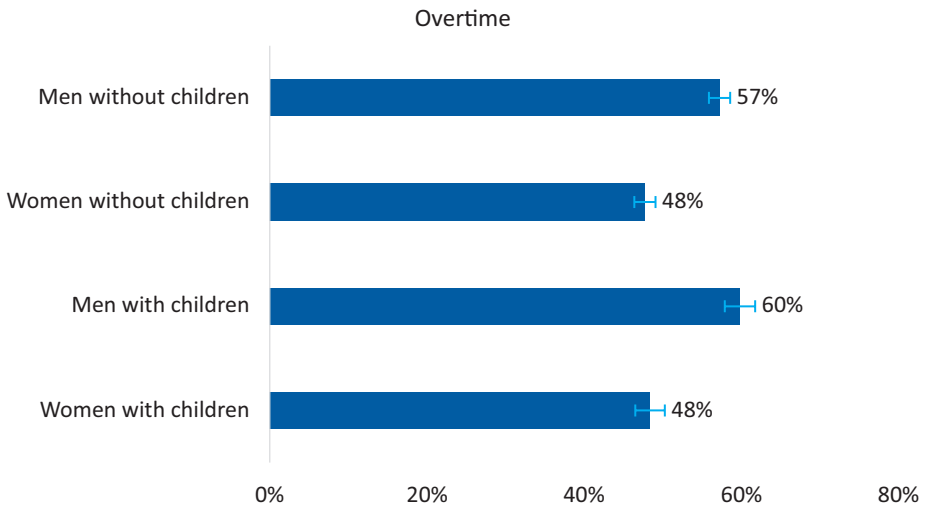

Figure 1. Descriptive statistics for overtime by gender/children (*N* = 15,615). Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations; weighted).

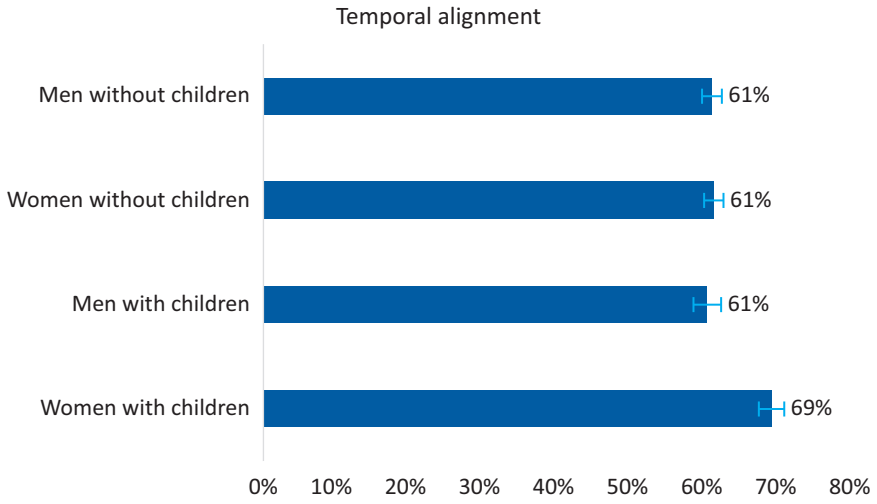

Figure 2. Descriptive statistics for temporal alignment by gender/children (*N* = 15,615). Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations; weighted).

ambition (M3) are factored in, the probability of overtime is slightly reduced but remains significantly positive. H1a, which assumes working with ICTs is positively associated with overtime, can be accepted. The probability of overtime is, as expected, higher when using the internet than when working only with a computer.

The analysis of the differences between groups shows that employees who work from home and use ICTs often are significantly more likely to work overtime than employees who use ICTs often and do not work from home (Table 3). Thus, H1b, which states that the association between ICT use and overtime is stronger for employees working from home, can be accepted. There is hardly any difference between groups that only work with computers and those that also use the internet when working from home, which is obvious since both technologies are used especially for WFH.

Additionally, ICT use's relation to the dissolution of boundaries from private to work was investigated. For this purpose, the relationship between work-related computer and internet use and temporal alignment was tested (Tables 4 and 5). Both working with a computer and using the internet (M1) often increase the probability of temporal alignment. H1c can be accepted: Work-related ICT use is positively associated with temporal alignment and these associations also remain stable when job tasks and career ambition are factored in (M2, M3). Using the internet increases the likelihood of

Table 1. Associations (average marginal effects) of overtime and working with computer.

Overtime	(M1)	(M2)	(M3)	(M4)	(M5)	(M6)
Working with computer (Ref.: *never, sometimes*)	0.071*** (0.010)	0.038*** (0.011)	0.037*** (0.011)	0.038*** (0.011)	0.050*** (0.012)	0.056*** (0.013)
Gender and children (Ref.: *men with children*)						
Women with children	−0.091*** (0.015)	−0.091*** (0.015)	−0.087*** (0.015)	−0.090*** (0.015)	−0.083*** (0.015)	−0.079*** (0.015)
Men without children	−0.020 (0.012)	−0.017 (0.012)	−0.018 (0.012)	−0.017 (0.012)	−0.014 (0.012)	−0.011 (0.012)
Women without children	−0.081*** (0.013)	−0.081*** (0.013)	−0.080*** (0.013)	−0.081*** (0.013)	−0.068*** (0.013)	−0.064*** (0.013)
Working from home (Ref.: *no*)					0.106*** 0.010)	0.103*** (0.010)
Observations	15,615	15,615	15,615	15,615	15,615	15,615

Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations). Notes: + statistically significant at the .10 level, * at the .05 level, ** at the .01 level, *** at the .001 level; margins based on logit regression; standard errors appear under coefficients in parentheses; the dependent variable is overtime.

Table 2. Associations (average marginal effects) of overtime and using the internet.

Overtime	(M1)	(M2)	(M3)	(M4)	(M5)	(M6)
Using the internet (Ref.: *never, sometimes*)	0.090*** (0.009)	0.064*** (0.010)	0.063*** (0.010)	0.067*** (0.011)	0.062*** (0.012)	0.066*** (0.012)
Gender and children (Ref.: *men with children*)						
Women with children	−0.089*** (0.015)	−0.090*** (0.015)	−0.087*** (0.015)	−0.087*** (0.015)	−0.082*** (0.015)	−0.077*** (0.015)
Men without children	−0.020 (0.012)	−0.017 (0.012)	−0.017 (0.012)	−0.016 (0.012)	−0.013 (0.012)	−0.010 (0.012)
Women without children	−0.079*** (0.013)	−0.080*** (0.013)	−0.079*** (0.013)	−0.078*** (0.013)	−0.068*** (0.013)	−0.063*** (0.013)
Working from home (Ref.: *no*)					0.098*** (0.010)	0.095*** (0.011)
Observations	15,615	15,615	15,615	15,615	15,615	15,615

Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations). Notes: + statistically significant at the .10 level, * at the .05 level, ** at the .01 level, *** at the .001 level; margins based on logit regression; standard errors appear under coefficients in parentheses; the dependent variable is overtime.

Table 3. Pairwise comparisons: working with computer/using the internet and working from home for overtime.

Working with computer (*often*)			Contrast
Working from home	vs.	Not working from home	0.556***
Using the internet (*often*)			**Contrast**
Working from home	vs.	Not working from home	0.533***

Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations). Notes: + statistically significant at the .10 level, * at the .05 level, ** at the .01 level, *** at the .001 level.

Table 4. Associations (margins) of temporal alignment and working with computer.

Temporal alignment	(M1)	(M2)	(M3)	(M4)	(M5)	(M6)
Working with computer (Ref.: *never, sometimes*)	0.054*** (0.010)	0.036*** (0.011)	0.037*** (0.011)	0.037*** (0.011)	0.030** (0.012)	0.028** (0.012)
Gender and children (Ref.: *men without children*)						
Women without children	−0.043*** (0.010)	−0.027** (0.010)	−0.028** (0.010)	−0.026** (0.010)	−0.029*** (0.010)	−0.029*** (0.010)
Men with children	−0.005 (0.012)	−0.005 (0.012)	−0.005 (0.012)	−0.006 (0.012)	−0.004 (0.012)	−0.007 (0.012)
Women with children	−0.014 (0.013)	0.001 (0.013)	−0.001 (0.013)	0.002 (0.013)	−0.000 (0.013)	0.002 (0.013)
Working from home (Ref.: *no*)					−0.019* (0.010)	−0.019+ (0.010)
Observations	15,615	15,615	15,615	15,615	15,615	15,615

Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations). Notes: + statistically significant at the .10 level, * at the .05 level, ** at the .01 level, *** at the .001 level; margins based on logit regression; standard errors appear under coefficients in parentheses; the dependent variable is temporal alignment.

Table 5. Associations (margins) of temporal alignment and using the internet.

Temporal alignment	(M1)	(M2)	(M3)	(M4)	(M5)	(M6)
Using the internet (Ref.: *never, sometimes*)	0.072*** (0.009)	0.051*** (0.010)	0.052*** (0.010)	0.052*** (0.011)	0.050*** (0.011)	0.051*** (0.012)
Gender and children (Ref.: men without children)						
Women without children	−0.042*** (0.010)	−0.026** (0.010)	−0.027** (0.010)	−0.026** (0.010)	−0.029*** (0.010)	−0.030*** (0.010)
Men with children	−0.006 (0.012)	−0.005 (0.012)	−0.005 (0.012)	−0.005 (0.012)	−0.004 (0.012)	−0.006 (0.012)
Women with children	−0.014 (0.013)	0.001 (0.013)	−0.000 (0.013)	0.002 (0.013)	0.000 (0.013)	0.002 (0.013)
Working from home (Ref.: *no*)					−0.023* (0.010)	−0.024** (0.010)
Observations	15,615	15,615	15,615	15,615	15,615	15,615

Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations). Notes: + statistically significant at the .10 level, * at the .05 level, ** at the .01 level, *** at the .001 level; margins based on logit regression; standard errors appear under coefficients in parentheses; the dependent variable is temporal alignment.

good temporal alignment more than just working with a computer. The greater temporal and spatial flexibility associated with internet use thus seems to support the integration of private and occupational demands more effectively.

In contrast, employees who work from home and use ICTs are less likely to align work and private life than employees who do not work from home but work with ICTs (Table 6). Thus, H1d, which assumes that the positive association between ICT use and temporal alignment is stronger for employees who also work from home, cannot be accepted. One explanation for this could be that where employees experience greater spatial dissolution, as is associated with WFH, paid work not only extends more into private life but there are also stronger expectations they will take on additional private tasks than when working in the office, which may hinder good temporal alignment.

Based on gender approaches, it is assumed the dissolution of boundaries differs according to gender and parenthood. All groups (women and men with and without children) were compared in terms of overtime and temporal alignment when working with a computer or additionally using the internet. As assumed in H2a, men with children, who use ICTs (computer/internet) often have a higher probability of overtime than all other groups who use ICTs often. However, the difference between men with and without children is not significant for both computer work and internet use (Table 7). Thus, H2a can only be partially accepted, since the probability of fathers working overtime when they use ICTs differs only significantly from that of women with and without children.

It was also assumed the probability of overtime would be particularly high for fathers compared to all other groups if they not only use ICTs but also work from home (H2b). The group comparisons show that fathers are more likely than women with and without children and men without children to work overtime when they use ICTs and work from home. Once again, the difference between men with and without children is not significant for either computer work or internet (Table 8). With this exception, H2b can be accepted. The interaction plots are shown in the Supplementary File (Figures 1 and 2). Generally greater contrasts are seen in the model for

Table 6. Pairwise comparisons: working with computer/using the internet and working from home for temporal alignment.

Working with computer (*often*)			Contrast
Working from home	vs.	Not working from home	−0.129***
Using the internet (*often*)			Contrast
Working from home	vs.	Not working from home	−0.160***

Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations). Notes: + statistically significant at the .10 level, * at the .05 level, ** at the .01 level, *** at the .001 level; margins based on logit regression; standard errors appear under coefficients in parentheses; the dependent variable is temporal alignment.

Table 7. Pairwise comparisons: working with computer/using the internet and gender/children for overtime.

Working with computer (*often*)			Contrast
Men with children	vs.	Women with children	0.390***
Women without children	vs.	Women with children	0.068
Men without children	vs.	Women with children	0.336***
Women without children	vs.	Men with Children	−0.322***
Men without children	vs.	Men with Children	−0.054
Men without children	vs.	Women without children	0.268***
Using the internet (*often*)			
Men with children	vs.	Women with children	0.494***
Women without children	vs.	Women with children	0.115
Men without children	vs.	Women with children	0.380***
Women without children	vs.	Men with Children	−0.379***
Men without children	vs.	Men with Children	−0.114
Men without children	vs.	Women without children	0.265***

Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations). Notes: + statistically significant at the .10 level, * at the .05 level, ** at the .01 level, *** at the .001 level.

employees who use ICTs and work from home (Table 8) than in the overall sample (Table 7; with the exception of the contrast between women without children vs. men with children in the model for internet use), confirming the assumption that WFH increases the contrasts between these groups in particular.

The empirical results only confirm the expected differences in the relations between ICT use and temporal alignment by gender and parenthood to a limited extent (Table 9). Although group comparisons show men without children experience better temporal alignment than men with children and women with and without children, only the differences between men and women without children are significant at a 10 percent level. In addition, the contrasts are very small which additionally suggests that the groups do not differ. Thus, H2c that men without children are better able to align work and private life compared to all other groups cannot be accepted.

A similar picture emerges concerning the differences between men and women with and without children who use ICTs and work from home. Men without children who work with ICTs and work from home are significantly more likely to align their work and private lives than women without children (Table 10). Again, there

Table 8. Pairwise comparisons working with computer/internet, working from home, gender/children for overtime.

Working with computer (*often*) and working from home			Contrast
Men with children	vs.	Women with children	0.602***
Women without children	vs.	Women with children	0.243
Men without children	vs.	Women with children	0.432***
Women without children	vs.	Men with children	−0.359**
Men without children	vs.	Men with children	−0.170
Men without children	vs.	Women without children	0.189
Using the internet (*often*) and working from home			
Men with children	vs.	Women with children	0.624***
Women without children	vs.	Women with children	0.276
Men without children	vs.	Women with children	0.447***
Women without children	vs.	Men with children	−0.348*
Men without children	vs.	Men with children	−0.178
Men without children	vs.	Women without children	0.170

Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations). Notes: + statistically significant at the .10 level, * at the .05 level, ** at the .01 level, *** at the .001 level.

Table 9. Pairwise comparisons: working with computer/using the internet and gender/children for temporal alignment.

Working with computer (*often*)			Contrast
Men with children	vs.	Women with children	0.011
Women without children	vs.	Women with children	−0.130
Men without children	vs.	Women with children	0.027
Women without children	vs.	Men with children	−0.141
Men without children	vs.	Men with children	0.016
Men without children	vs.	Women without children	0.157+
Using the internet (*often*)			
Men with children	vs.	Women with children	−0.031
Women without children	vs.	Women with children	−0.131
Men without children	vs.	Women with children	0.028
Women without children	vs.	Men with children	−0.100
Men without children	vs.	Men with children	0.058
Men without children	vs.	Women without children	0.159+

Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations). Notes: + statistically significant at the .10 level, * at the .05 level, ** at the .01 level, *** at the .001 level.

are no significant differences between men without children and women with children, and contrasts are quite small. H2d, which posits a stronger association between ICT use and temporal alignment for men without children who work from home, can therefore only be partially accepted. Figures 3 and 4 in the Supplementary File show the interaction plots. When it comes to temporal alignment, as with overtime, there are larger difference in the models for employees who use ICTs and work from home (Table 10) than in the models for all employees (Table 9).

5. Limitations

First of all, the cross-sectional design of the data set does not allow any causal conclusions to be drawn. For example, employees who frequently work overtime might also frequently work with ICTs or work from home. The use of panel data is therefore recommended for future analyses. Panel data would also make it possible to control more effectively for individual differences, such as preferences for the integration or segregation of different areas of life. Furthermore, more differentiated items relating to ICT use (use of laptops, smartphones, etc.)

Table 10. Pairwise comparisons working with computer/using the internet, working from home, gender/children for temporal alignment.

Working with computer (*often*) and working from home			Contrast
Men with children	vs.	Women with children	0.078
Women without children	vs.	Women with children	−0.219
Men without children	vs.	Women with children	0.065
Women without children	vs.	Men with children	−0.297+
Men without children	vs.	Men with children	−0.014
Men without children	vs.	Women without children	0.284**
Using the internet (*often*) and working from home			
Men with children	vs.	Women with children	0.073
Women without children	vs.	Women with children	−0.239
Men without children	vs.	Women with children	0.077
Women without children	vs.	Men with children	−0.312+
Men without children	vs.	Men with children	0.004
Men without children	vs.	Women without children	0.366***

Source: Based on the 2018 BIBB/BAuA Employment Survey (Hall et al., 2020; author's calculations). Notes: + statistically significant at the .10 level, * at the .05 level, ** at the .01 level, *** at the .001 level.

will be important if the differences between stationary and mobile technologies are to be grasped. This also reflects the fact that the available data can only indicate whether employees use ICTs but not the extent to which they are used and where (at the employer's premises and/or at home). This means our results may be affected by the misconception that employees use the internet, for example, at both workplaces even though they may only do so from home. This shortcoming could be addressed in future studies by the use of data from time-use surveys. Moreover, the present study focuses only on parenthood and does not take other life phases into account. Flexibility needs are not merely likely to differ depending on family responsibilities; rather, differences between earlier and later employment phases, are also to be expected (Schmidt et al., 2020).

6. Conclusions

This study aimed to obtain representative results based on the 2018 BIBB/BAuA Employment Survey concerning the relation between work-related ICT use (computer/internet) and the dissolution of the boundaries between German employees' working and private lives. For this purpose, both a dissolution of boundaries from work to private life due to overtime and from private life to work due to temporal alignment of work and private lives were investigated. WFH, gender, and parenthood (children under 16 years in the household) were factored in as moderators.

The results show there is a greater probability of employees who use ICTs at work and doing overtime compared to employees who do not use ICTs. As also shown in previous studies (e.g., Kirchner, 2015), this is more evident for the use of the internet than for computer work. Furthermore, employees working from home and using ICTs often are significantly more likely to work overtime than employees who use ICTs often and do not work from home. WFH seems to be a stronger accelerator of overtime than using ICTs alone and indicates the relevance of the locations where ICTs are used. WFH primarily increases the spatial dissolution of boundaries and transports more occupational demands into the private sphere. The finding that WFH encourages overtime is consistent with previous research (e.g., Abendroth & Reimann, 2018).

As expected, working with ICTs is associated with a significantly higher probability of overtime among men with children compared to women with and without children. These associations also become apparent when WFH is taken into account. The differences between men with children and women with and without children are even stronger here than when only ICT use is considered. Both ICTs and, to an even greater extent, spatial flexibility, which is more strongly associated with WFH, can be seen here in relation to role demands that encourage the expectation fathers will perform their role as "family breadwinners" by expanding their working time. ICTs facilitate the fulfilment of this norm, thereby reinforcing the dissolution of boundaries from work to private life, especially for men with children.

While employees who use ICTs report better temporal alignment than employees who do not use ICTs, it is worse among employees who additionally work from home. WFH may not only increase the flexibility that allows occupational demands to spill over into private life but also increase the weight of private demands. Life partners or children may expect an individual to take on even more housework and care work when they work from home compared to when they work in the office. Contrary to our assumption, it turns out that men without children only achieve a better alignment of work and private life compared to women without children and not compared to men and women with children as well, especially when using ICT and working from home. One explanation for this may be that women and men with children have already adapted their working conditions in ways that enable them to integrate private demands effectively. Even if they have to integrate more private demands than men without children, they therefore do not rate their temporal alignment any worse.

Overall, the following superordinate results of our study may be noted. Firstly, ICT use reinforces a traditional gender-typical pattern of gainful employment in which men, in contrast to women, use these technologies to extend their work. Secondly, even if men's temporal alignment is not strengthened to the extent expected, at least no disadvantages for them are evident despite the greater expansion of their work. ICT use and especially WFH thus tend to reinforce rather than reduce gender inequalities in paid work. Consequently, based on our findings, it cannot be assumed that ICT-supported WFH particularly benefits women with family responsibilities and so contributes to better inclusion of this group in the labour market. Kümmerling and Postels (2020) assume the effects of family-friendly measures, such as flexible working arrangements, are affected by country-specific gender role perceptions. Thus, WFH may only become a facilitator in the integration of private and work demands when the domestic and care work is no longer allocated specifically by gender.

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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About the Authors

Ines Entgelmeier (M.A.) has been a research associate in the group Working Time and Flexibilization at the Federal Institute of Occupational Health and Safety (BAuA), Germany, since 2020. Previously, she was employed at the Institute of Sociology at the University of Duisburg-Essen, Germany. In her dissertation project, she examined the relationship between working from home and the dissolution of the boundaries between work and private life, differentiated by gender and parenthood.

Timothy Rinke (M.A.) has been a research associate at the Institute for Work, Skills and Training (IAQ) at the University of Duisburg-Essen, Germany, since 2020. Previously, he was employed at the Institute of Sociology at the University of Duisburg-Essen, Germany. His current research focuses on employees' working hours and how companies deal with their flexible organization. In addition, Timothy Rinke investigates the relationship between company structures and social inequalities.

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Article

Digitalisation as a Prospect for Work–Life Balance and Inclusion: A Natural Experiment in German Hospitals

Sebastian Schongen [1,2]

[1] GESIS–Leibniz Institute for the Social Sciences, Germany; sebastian.schongen@gesis.org
[2] School of Social Sciences, University of Mannheim, Germany

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Abstract
Digitalisation has a wide range of impacts on the workplace, such as enabling new work models with flexible work schedules, changing work content, or increasing workplace control. These changes directly affect not only individuals' work but also their private lives. Scholars theorise that digitalisation either enables or impedes workers' ability to maximise their work–life balance, which in turn fosters or inhibits the social inclusion of some societal groups and reduces or reproduces social inequalities. Focusing on the German healthcare sector, I explore the impact of using networked digital technologies on work–life balance, and whether it influences gender and educational inequalities. Pressured by government, economic concerns, and medical innovation, this sector is undergoing a transformation process that is expediting the introduction of new networked digital technologies. Thus, it provides an ideal setting for empirical investigation, as one core assumption about digitalisation is that technological innovation at work has societal consequences that must be individually mastered. To assess the relationship between digitalisation and work–life balance, I use survey data from hospital employees on the use of networked digital technologies and individual outcomes. The research is designed as a natural experiment. The treatment group comprises employees at a university hospital equipped with cutting-edge networked digital technologies (N = 1,117); the control group comprises employees at several church-owned hospitals (N = 415) with a level of digitalisation corresponding to the average for the sector. I first discuss confounders and then employ quantitative methods to establish a link between digitalisation and work–life balance, assess its direction, and address gender and educational inequalities.

Keywords
digitalisation; Germany; healthcare; social inclusion; social inequality; work–life balance

Issue
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1. Introduction

For two decades now, there has been widespread debate among academic, political, and civil actors about the consequences of new technological advancements under the label of "digitalisation." Harteis (2018, p. v) argued that "digitalization generates technological challenges for individuals, organizations and societies." As this process does not affect only specific industries but rather all economic sectors, employees in almost all occupations are faced with digitalisation challenges to a certain degree. In addition to changing skill requirements, job content, and the structure of the labour market, digitalisation also affects workers and their lives directly (OECD, 2019). According to the ongoing debate, digitalisation permeates all fields of individuals' public, private, and work lives (Heisler & Meier, 2020). One of the most prominent publicly discussed consequences of digitalisation is its impact on work–life balance.

Scholars have suggested that these new technologies greatly improve the quality of employees' work lives (Harteis, 2018). At the same time, digitalisation can either attenuate, exacerbate, or even create social inequalities in the ability of some groups to balance

their work lives and private lives (Abendroth & Reimann, 2018; Ahlers et al., 2018; Carstensen & Demuth, 2020). In this article, I focus on women and highly educated workers, as digitalisation has been theorised to particularly influence the work–life balance of these two groups (Bjärntoft et al., 2020; Fontinha et al., 2019; König & Cesinger, 2015; Kurowska, 2020). Whereas scholars postulate that digital tools help women achieve a better work–life balance, they assume that highly educated workers in knowledge-based jobs—especially in jobs that involve mostly analytical tasks—experience greater work stress and density because of digitalisation (Antoni et al., 2013). This in turn might enhance the social inclusion of the first group and worsen that of the second (Schier et al., 2011). For instance, because gendered role expectations persist, networked digital technologies might enable women—especially mothers—to better balance their allocation of resources (e.g., time or energy) across their private and working roles, potentially freeing up their time for other social activities (Eikhof, 2016), or it might incentivise women with family responsibilities to re-enter the labour market (Khallash & Kruse, 2012). However, the assumed high demands on highly educated workers might result in fewer resources for friendship, family, or other social domains, which might force them to withdraw from their social and family lives (Antoni et al., 2013; Tausig & Fenwick, 2001). In this study, I investigate two closely connected research questions. First, I examine the link between digitalisation and work–life balance. Second, I explore whether digital transformation decreases existing inequalities in work–life balance for women and increases existing inequalities in work–life balance for highly educated knowledge workers with a university degree, which may foster the social inclusion of the first group and lead to the social exclusion of the second.

The topic of digitalisation and work–life balance has become more salient since the surge in working from home during the Covid-19 pandemic, when a large proportion of firms—either voluntarily or by government decree—changed their policies to allow employees to have autonomous flexibility over their working hours and work location (Rahnenführer, 2022). However, digitalisation does not affect work–life balance only through telecommuting. The implementation of networked digital technologies also increases workers' productivity by either enabling them to complete their tasks faster or by taking over tasks through automation, thereby freeing up their schedule to complete other tasks. This often leads to an increase in work intensity and tighter deadlines, which in turn increases stress and spillover into other life domains, such as private life (Korunka & Hoonakker, 2014).

All of this underlines the importance of looking at the effects of digitalisation on work–life balance. Investigating the impacts of digitalisation on individuals is of further scientific relevance, as scholars have characterised digitalisation as a socio-technical process that encompasses technological, non-technological, economic, and social aspects. In this process, digitalisation brings together the social and technical subsystems as interdependent aspects of a work system (Hirsch-Kreinsen, 2020). To put it in simpler terms: The introduction of networked digital technologies takes place on a societal level and has consequences beyond occupations or tasks; it is socially prepared and discursively negotiated (Henke et al., 2018). "Networked" means that these technologies facilitate a connection between humans and/or machines in a global operation system (Becker & Spöttl, 2019; Seibt et al., 2019). Examples of such technologies include cloud services; messaging apps, the Internet of Things (IoT); smart devices such as tablets, wearables, or robotic-assisted systems; virtual reality/augmented reality (VR/AR) applications; algorithms; and artificial intelligence (AI). However, the social preparation and discursive negotiation of digitalisation require legitimation and acceptance by workers. This is influenced in turn by the social impact of successful digital transformations expressed through individual factors such as work–life balance (Hirsch-Kreinsen, 2020). I believe that by examining whether networked digital technologies improve or worsen workers' work–life balance and reproduce or reduce social inequalities, I can contribute some empirical evidence to this discussion.

Germany's healthcare sector is an excellent setting for this empirical research for two reasons: First, it has been widely affected by digitalisation in recent years; second, it is a growing sector faced with staff and skill shortages and demographic developments such as an ageing society and the loss of a large part of their personnel in the coming years due to retirement (Ehrhard, 2014). It has been confronted with a major restructuring process, particularly in terms of the organisation of care, rationalisation, changing work processes and job profiles of healthcare professionals, and the introduction of new and complex technologies (Kirpal, 2011). It is also an interesting sector for investigating the changes in work–life balance induced by technological change. Almost all occupations in this sector are subject to high work stress and density, long work shifts, and mental and physical challenges, and personnel often prioritise their work over their private lives (Körber et al., 2018; Mohan, 2019). Research has demonstrated that the level of work–life balance mediates these negative outcomes (Poulose & Sudarsan, 2017). The macroeconomic challenges mentioned above have the potential to greatly impact work–life balance, highlighting the suitability of this sector for investigating how technological developments influence this balance. On the other hand, the German healthcare sector employs an above-average share of female personnel as well as a large number of university-educated and skilled personnel (Ehrhard, 2014), further making it a sound setting for investigating whether digitalisation influences social inequalities in work–life balance for female staff and highly educated

staff. Consequently, I use survey data from a research project on the use of networked digital technologies and individual outcomes collected from employees at several German hospitals.

Looking at multiple hospitals allowed me to administer a survey in a natural experimental setting and to compare one hospital with cutting-edge technologies (e.g., robotic-assisted systems, VR/AR technologies) and widespread use of tablets and smartphones with several regular hospitals with less advanced and pervasive technologies. For more information on the research project, the survey, and how I was able to identify a suitable natural experimental setting see Melchior et al. (in press). At the same time, I can compare managerial occupations, which allow telecommuting, with occupations such as nursing, which have strict on-site work schedules. I am also able to compare across genders, different levels of educational attainment, and age groups.

2. The Concept of Work–Life Balance and the Impact of Digitalisation

Work–life balance is a popular concept in research on the impact of digitalisation. Lee and Sirgy (2019, p. 358) identified three major theoretical approaches to work–life balance: "(1) management of role engagement, (2) management of role conflict, and (3) management of life domain satisfaction." They and noted that these three approaches "reflect how individuals manage the interplay between/among life domain satisfaction in a manner to increase overall life satisfaction." Some empirical studies have measured all three—or two of the three—dimensions of work–life balance separately and compared the results. More recently, other studies have used a single instrument capturing all three dimensions. I employ the latter strategy in my empirical operationalisation of work–life balance, but will also compare this operationalisation with a measurement for the third approach.

The first approach, management of role engagement, is a resource-based approach focusing on individuals' ability to achieve work–life balance "through attentive engagement in multiple roles…and allocation of time and psychological energy in a balanced way in work and nonwork domains" (Lee & Sirgy, 2019, p. 358). This approach measures work–life balance by focusing on the balancing of time and energy to meet demands from various life domains (Drobnič & León, 2013; Greenhaus & ten Brummelhuis, 2013). The second approach, management of role conflict, is also resource-based. It refers to the achievement of work–life balance through the effective management of conflict across social roles. This approach measures work–life balance by estimating the fit between role demands (e.g., parenting) and the required resources. If the demands are not met, this may lead to role conflict or interference (Lee & Sirgy, 2019; Michel et al., 2013). The last approach, management of life domain satisfaction, assumes that individuals achieve work–life balance when they successfully balance satisfaction across multiple life domains. There are multiple ways in which this is done. Individuals might experience (a) positive affect spillover from one life domain to another; (b) domain compensation, where they allocate more time and energy to satisfying domains than to dissatisfying domains; or (c) segmentation, where they "prevent spillover of negative affect from one domain to other domains by erecting a barrier around the dissatisfying domain" (Lee & Sirgy, 2019, pp. 365, 372, 375; see also Fontinha et al., 2019).

The question remains as to the mechanisms through which digitalisation affects work–life balance. One of the most salient impacts of the implementation of new digital technologies is the restructuring of work in occupations. However, not every occupation is subject to the same type of restructuring, and not every digital tool gives rise to the same causal pathways. Some researchers argue that modern digital tools give employees more control over their work schedules than ever before (e.g., Böhle et al., 2018). Organisational policies that allow schedule flexibility enable workers to have a certain degree of autonomy over their working hours. Digitalisation allows for the implementation of telecommuting and therefore leads to an increase in work flexibility and the blurring or dissolution of boundaries between work and other life domains (Böhle et al., 2018). Thus, workers may be able to better organise their social lives, leisure lives, and family lives, and reconcile these domains with their work lives (improved management of role engagement and conflict). The ability to telecommute further influences individuals' control over their work–life balance (Lee & Sirgy, 2019; Vargas Llave & Weber, 2020). By contrast, other researchers view digitalisation as the technological basis for increased control and supervision of work and argue that it might increase rather than diminish work intensity and work stress (e.g., Baethge-Kinsky et al., 2018). Figure 1 depicts the mechanisms through which different networked digital technologies might increase or decrease WLB and presents possible explanations for these effects.

Combining the mechanisms outlined in Figure 1 with the previously introduced theoretical approaches shows that digital technological inventions and flexible schedules allow workers to maximise their work–life balance by different means. In line with these theoretical approaches, telecommuting and flexible schedules allow individuals "to use the saved commuting time and energy to engage in multiple social roles" (Lee & Sirgy, 2019, p. 372). Moreover, they can "engage in multiple roles in a place of their choice," and this "integration of social roles facilitates the transfer of skills and experiences from work to nonwork domains and vice versa" (Lee & Sirgy, 2019, p. 376). Further benefits might also be the minimisation of role conflict across life domains and increased role engagement in satisfying domains (Lee & Sirgy, 2019, p. 376). In light of the particular difficulties in maximising work–life balance in the healthcare sector (Körber et al.,

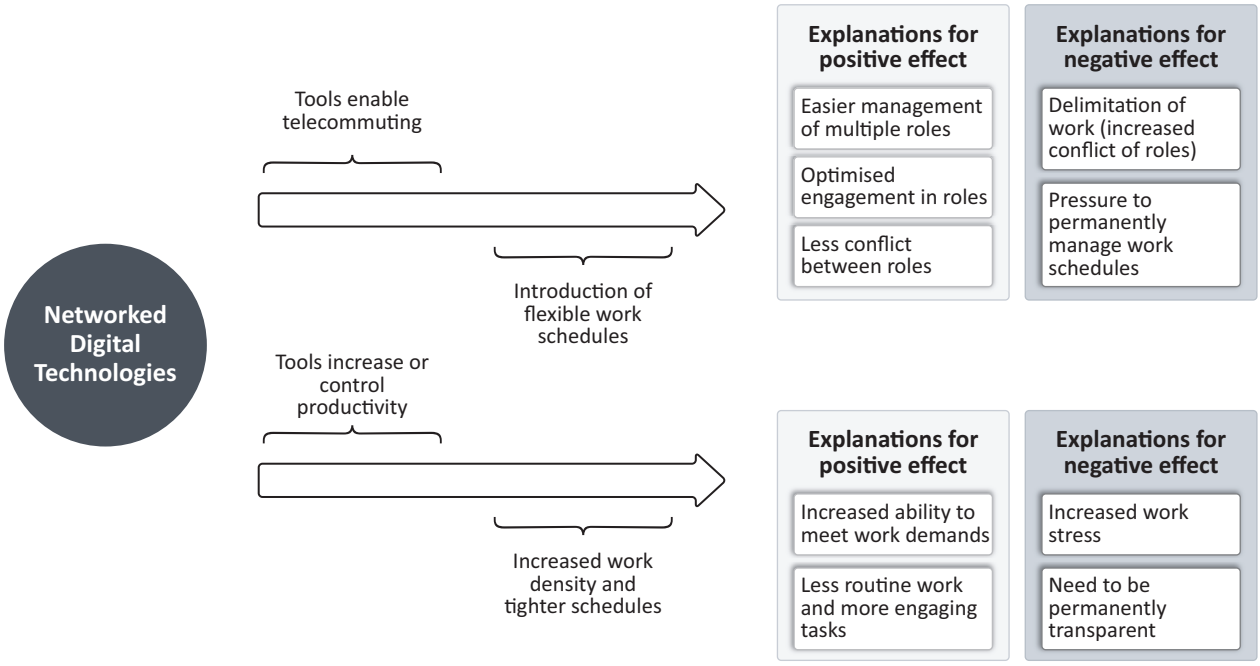

Figure 1. Conceptual model of the mechanisms through which different types of networked digital technologies influence work–life balance.

2018; Mohan, 2019), using that setting may emphasise the robustness of this research. Based on these deliberations, I hypothesise:

> H1a: The more a workplace is permeated by networked digital technologies, the easier it is for employees to maximise their work–life balance.

However, some scholars have argued that digital transformation leads to the blurring or dissolution of the boundaries between work and other domains (Schier et al., 2011; see also Fontinha et al., 2019; Voß, 1998), and that this not only offers opportunities but also poses risks. According to this strand of research, digitalisation increases the pressure on workers to permanently manage their schedules. It thus becomes harder for them to organize their work, private, and family lives, which increases their risks to health and social exclusion (Schier et al., 2011). I thus propose a counter-hypothesis:

> H1b: The more a workplace is permeated by networked digital technologies, the harder it is for employees to maximise their work–life balance.

As mentioned earlier, not every occupation is subject to the same restructuring processes. In some occupations, it is hardly possible to perform tasks from home—for example, providing medical treatment to hospital inpatients. However, one of my opening arguments was that digitalisation does not only affect work–life balance through telecommuting, but rather that the implementation of new technologies increases workers' productivity, which often leads to an increase in work intensity and tighter deadlines, which then increases stress and spillover into other domains (Korunka & Hoonakker, 2014). Thus, hospital personnel in workplaces that are highly permeated by networked digital technologies should be equally able or unable to maximise their work–life balance, regardless of whether telecommuting is possible or not. Thus, I hypothesise:

> H2: The effect of digitalisation on work–life balance is similar across occupations.

Lastly, in my second research question I investigate whether the effect of digitalisation is the same for the two social groups that are the focus of this article, namely (a) highly educated workers with a university degree who work in knowledge-intensive occupations and (b) women. Regarding the first group, theoretical contributions and empirical research suggest that digitalisation increases work-related stress and job density and blurs the boundaries between work and private life (Antoni et al., 2013), thereby impeding the ability of these workers to maximise their work–life balance (Fontinha et al., 2019). This, in turn, might translate into less time for family and friends and civic engagement and might therefore increase this group's risk of social exclusion (Schier et al., 2011; Yates & Leach, 2006). Hospital settings are well suited to examining these assumptions, as the occupations they offer enable one to distinguish between low-educated manual workers and highly educated knowledge workers. Based on this, I hypothesise:

> H3a: Digitalisation increases social inequalities in work–life balance for highly educated knowledge workers with a university degree.

Regarding the second group, research indicates that women already have difficulties balancing their work and private lives (Bjärntoft et al., 2020; König & Cesinger, 2015; Kurowska, 2020). This is due mainly to culturally gendered role expectations that require women to perform unpaid work in the form of caregiving or housework regardless of their occupational status. This socially constructed unequal distribution of responsibilities severely limits women's ability to effectively manage role engagement and role conflict by allocating their available resources in a balanced way across paid work, unpaid work, leisure time, or other social activities, thereby resulting in social exclusion (Kurowska, 2020). Even flexible work schedules or working from home are not supposed to alleviate this problem. Although some authors have argued that digitalisation either alleviates or exacerbates these inequalities (Abendroth & Reimann, 2018; Ahlers et al., 2018; Carstensen & Demuth, 2020), empirical evidence suggests the following hypothesis:

> H3b: Digitalisation decreases social inequalities in work–life balance for women.

3. Research Design and Data

This study is designed as a natural experiment—that is, an experiment in which a treatment is not introduced by the researcher but rather occurs naturally (Craig et al., 2017; Dunning, 2012). I believe this design is best suited to answer my research question, as conducting a true experiment where I would have to introduce costly networked digital technologies at one workplace would not be feasible, and longitudinal data on the introduction of such technologies are not currently available. Highlighting the potential of natural experiments to improve the quality of causal inferences in the social sciences, Dunning (2012, p. 3) noted:

> Here we find observational settings in which causes are randomly, or as good as randomly, assigned among some set of units, such as individuals, towns, districts, or even countries. Simple comparisons across units exposed to the presence or absence of a cause can then provide credible evidence for causal effects, because random or as-if random assignment obviates confounding. Natural experiments can help overcome the substantial obstacles to drawing causal inferences from observational data.

The data for my analysis stem from a mixed-method research project in which our research team was able to identify a suitable setting for a natural experiment after applying a multi-method process strategy to investigate the digitalisation of Germany's healthcare sector. For this project, we collected qualitative and quantitative contextual information (for more information on design, sampling, and data collection see Melchior et al., in press). With this information, we were able to identify a suitable treatment group and control group for quantitative empirical investigation and to validate this assertion as recommended by Dunning (2012). As the treatment group for the research project, we selected a German university hospital; as the control group, we selected several hospitals run by a church-owned foundation, which is common for smaller hospitals in Germany. We conducted an online survey of all employees, which was administered by the hospitals themselves from June to September 2022. We received 1,117 responses for the treatment group, which represented a response rate of about 15 percent, and 415 responses for the control group. Links to the survey were sent by the employers to all employees through their own internal communication channels (e.g., intranet, email newsletter, direct messages). Employees were asked to participate voluntarily during working hours. We had to obtain approval of the questionnaire content from the works committee and the data protection officer at each hospital.

For the control group, I knew in advance that one-third of the employees were deployed in multiple hospitals within the foundation. Therefore, I clustered all employees into one control group for further analysis. Looking at demographic variables, I found that the surveyed samples were largely representative of their respective populations. Table 1 provides a description of the demographic characteristics of the control group and treatment group samples. Chi-square tests showed significant differences between the control group and the treatment group samples in terms of the distribution of demographic characteristics, which I will need to account for in my empirical strategy.

The difficulty was then to verify that a lower level of digitalisation was due to insufficient financial resources or managerial preferences (exogenous) rather than to employees' unwillingness or lack of skills to use these technologies (endogenous). Following Dunning's (2012) recommendation for improving the quality of causal inferences in natural experiments, I considered qualitative study results (Melchior et al., in press) to check these conditions. I also included items in the questionnaire to investigate (a) employees' feelings towards digitalisation, (b) their perception of the positivity of the organisational climate towards the introduction of networked digital technologies (see Table 2), (c) whether new technologies had been introduced during the past two years, (d) whether telecommuting (mobile work or working from home) was allowed, and (e) whether telecommuting was performed outside or during regular working hours (see Table 3). Looking at these items, there were no significant differences across groups, except that mobile work or working from home was more frequently performed in the treatment group, regardless of existing work regulations. I can therefore safely assume that the employees are not the cause of differences in digitalisation, and that these differences are entirely exogenous.

To ensure that respondents answered these questions based on a similar understanding of networked

digital technologies, and because the survey was self-administered, we provided an easily understandable description of networked digital technologies at the beginning of the survey. The translation of the definition is as follows:

> Please read the following text carefully.
>
> In the survey we will repeatedly refer to networked digital technologies. By this we mean technologies that create connections between humans, machines, tools, and objects. These technologies therefore connect either:
>
> - hardware devices to each other, and/or
> - software programs to each other, and/or
> - humans to each other.
>
> Examples of networked digital technologies are:
>
> - cloud services, messaging apps
> - electronic patient records, telemedicine
> - smart devices such as tablets or robotic-assisted systems (e.g., da Vinci)
> - VR/AR applications, as well as algorithms that are used, for example, for treatment planning, billing, or evaluation of patient data

Table 1. Demographic characteristics of the control group and treatment group samples.

	Treatment				
	No.		Yes		
	n	%	*n*	%	*p* value [a]
Occupational group					
Medical professionals	55	13.5	97	8.9	.000
Medical-technical assistants	10	2.5	111	10.1	
Nursing professionals	95	23.4	181	16.5	
IT personnel	25	6.2	62	5.7	
Managerial, accounting, and HR personnel	129	31.8	355	32.4	
Other medical personnel	36	8.9	174	15.9	
Other non-medical personnel	56	13.8	114	10.4	
Total	406	100	1,094	100	
Gender					.042
Female	249	62.1	736	67.7	
Male	152	37.9	351	32.3	
Total	401	100	1,087	100	
Age group					.033
18–24	11	2.8	69	6.3	
25–34	79	19.8	253	23.1	
35–44	84	21.1	218	19.9	
45–54	105	26.3	249	22.7	
55 or older	120	30.1	307	28.0	
Total	399	100	1,096	100	
Educational attainment					.153
No vocational training	8	2.0	42	3.8	
Lower secondary education + vocational training	12	3.0	28	2.6	
Intermediate sec. education + vocational training	100	24.6	224	20.4	
Higher sec. education + vocational training	116	28.6	304	27.7	
University degree	170	41.9	500	45.5	
Total	406	100	1,098	100	

Note: [a] Differences between the control group and the treatment group according to the chi-square test of association.

Table 2. Mean value of indices to assess the eligibility of the control group.

	Treatment			
	No.	Yes	t-test *p* value	Cronbach's *α*
Positive affective opinion index	13.57 (0.21)	13.76 (0.12)	.3979	.79
Positive organisational climate index	7.31 (0.14)	7.54 (0.08)	.1372	.72

Table 3. Other variables to assess the eligibility of the control group.

	Treatment				
	No.		Yes		
	n	%	*n*	%	*p* value [a]
New networked digital technologies introduced in the past two years					.306
Yes	284	74.5	671	71.8	
No	97	25.5	264	28.2	
Total	381	100	935	100	
Mobile work allowed					.206
No	254	64.3	614	58	
Yes, several times per year	38	9.6	134	12.7	
Yes, several times per month	43	10.9	132	12.5	
Yes, several times per week	49	12.4	154	14.5	
Yes, every day	11	2.8	25	2.4	
Total	395	100	1,059	100	
When mobile work is performed					.008
I don't work from home or remotely	199	50.8	473	45.5	
Only outside regular working hours	40	10.2	68	6.5	
Only during regular working hours	66	16.8	223	21.5	
Both outside and during regular working hours	87	22.2	275	26.5	
Total	392	100	1,039	100	

Note: [a] Differences between the control group and treatment group according to the chi-square test of association.

As a last step, I addressed whether contextual conditions in the experimental setting—specifically, the church affiliation of the hospitals in the control group—might confound the dependent variable, work–life balance. I have several reasons to assume that this is not the case—or that if it is, it does not severely bias my data. First, church-owned foundations or hospitals are common in Germany. About one-third of all hospitals in the country are church-owned, making the churches one of the biggest employers in the healthcare market (Bölt, 2023; Fischer, 2009). They are thus obliged to act similarly to other market competitors. Second, we checked whether having a Christian denomination was a prerequisite for recruitment in the control group and found that this was not the case. Thus, recruitment conditions were similar for both groups. This is due mainly to the high demand for personnel at all German hospitals (Fischer, 2009; Minz et al., 2023). Recent court rulings even prevent religious hospitals from inquiring about an applicant's denomination (Reichold, 2020). Lastly, the qualification of hospital personnel is strictly controlled by the standardised German education system, and education is delivered mainly at public vocational schools or universities, thus limiting the churches' influence (Klauber et al., 2023). Unfortunately, we could not include items on religious values in the survey to account for this possible confounder. However, if religious beliefs do confound domain satisfaction and work–life balance, research indicates that congruence between the religious values of employees and employers would increase the effect for my control group, especially as it is in the healthcare sector (see Héliot et al., 2020).

3.1. Measuring Work–Life Balance and Explanatory Variables

In line with the theoretical approaches outlined in Section 2, I implemented two different operationalisations of work–life balance in the survey. The first operationalisation was based on the management of life domain satisfaction approach. To measure this aspect, I implemented three survey questions asking respondents to rate on an 11-point scale their level of satisfaction with each of the following domains: their work, their friends, and their family. I then created a variable by subtracting the average of a respondent's score on satisfaction with their friends and satisfaction with their family from their score on satisfaction with their working life. A zero value on this variable indicates that the respondent had maximised their work–life balance, a negative value indicates that the respondent was more satisfied with their work life than with their private life, and a positive value indicates that they were more satisfied with their private life.

The second operationalisation of work–life balance was a version of the Trier Short Scale for Measuring Work–Life Balance (TSK–WLB), an instrument developed for use in surveys by Syrek et al. (2011). This scale comprises items covering all three theoretical approaches to work–life balance, namely (a) management of role engagement, (b) management of role conflict, (c) and management of life domain satisfaction. The instrument was further validated by Gundlach and Korff (2015) who supplemented it with an item from the work–family conflict scale proposed by Netemeyer et al. (1996). I used

this supplemented—6-item—version of the TSK–WLB for the survey, and I validated it using factor analysis. My findings were consistent with those of Gundlach and Korff (2015); Cronbach's alpha was .907 for the treatment group and .922 for the control group. I averaged the scores on the six items to create an index measuring how successful respondents were at maximising their work–life balance. Higher values on this index indicate improved work–life balance.

Further explanatory variables were occupation, gender, age, and qualifications. To prevent the possibility of identifying individual employees, the works councils at the participating hospitals requested that we measure only broad occupational groups and age cohorts and that we use a dichotomous measure of gender identity (male/female). Due to concerns of the works councils that specific employees might be identifiable, the survey included only broad occupational groups and age cohorts, and male or female gender identity. To measure respondents' qualifications, I constructed a composite variable in accordance with the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN) classification. For this, I used responses to two survey questions measuring the respondent's highest general school-leaving qualification and highest vocational qualification. This variable grouped respondents into five educational attainment groups: no vocational training; lower secondary education and vocational training; intermediate secondary education and vocational training; higher secondary education and vocational training; and tertiary education. I also used a sum index of networked digital technologies usage, which was derived from several items measuring the frequency of using a specific tool; the maximum value indicates not only high frequency of networked digital technologies usage but also high complexity (Melchior et al., in press).

3.2. Methodological Approach

To test my hypotheses, I opted for two different approaches. To test H1a, H1b, and H2, I first looked at simple mean differences between the treatment group and the control group to obtain a naive estimate of the average treatment effect (ATE). Second, to improve my estimation, I used regression adjustment to account for differences in sample composition between the two groups (Negi & Wooldridge, 2021). Due to methodological concerns, I refrained from including propensity score matching (see King & Nielsen, 2019). However, when I applied this method as a robustness check, I obtained similar results, which underlines the robustness of my findings. Ideally, I would have included performed job tasks as a control (Friedrich et al., 2021). However, as the task-based approach considers occupations to be aggregations of performed tasks (Dengler et al., 2014), I argue that using occupational groups is an optimal approximation of accounting for task differences in this setting. Hence, I opted to use occupational group, age, and education for the regression adjustment. Lastly, to test H3a and H3b, I used simple linear regressions with interaction effects between the sum index of networked digital technology usage and (a) qualifications and (b) gender, with occupational group and age as controls.

4. Results

The mean of the domain-satisfaction-based work–life balance variable was 1.29 with a standard error of .11 for the control group and 1.16 with a standard error of .07 for the treatment group. Therefore, the naive estimate of the ATE for this variable was −.13. Considering that values closer to 0 indicate an improvement in work–life balance, the value −.13 means that the treatment group was better able to manage their domain satisfactions. This supports H1a rather than the counter-hypothesis, H1b.

By looking at the mean values for each domain separately, I could also investigate what was driving this effect. With a mean value in the friend and family domains of 7.9 (*SE* .09) for the control group and 7.64 (*SE* .06) for the treatment group, and a mean value in the work domain of 6.59 (*SE* .11) for the control group and 6.47 (*SE* .06) for the treatment group, the control group was generally more satisfied across domains. As discussed in Section 3, this might be due to their religiousness. Nevertheless, the relatively large difference between their satisfaction with their work lives and their private lives indicates that they employed some sort of segmentation strategy. For the treatment group, on the other hand, it seems that more digitalisation equalised their domain satisfactions. This suggests that digitalisation has a spillover effect on work–life balance. However, I could not assess whether dissatisfaction with work influenced satisfaction with friends and family or vice versa.

My second operationalisation of work–life balance provided more information in this regard. Table 4 shows that the treatment group was better able to balance their work and private lives. This provides further support for H1a rather than the counter-hypothesis, H1b. I also checked whether the ATE was equal across occupational groups (H2). The direction of the effect was mostly consistent across groups and positive, except for IT personnel and other non-medical personnel, who had negative values. The degree of digitalisation experienced by these two occupational groups was very similar across hospitals, with IT personnel having the highest possible degree of digitalisation of all occupations, and other non-medical personnel having the lowest (as this group includes, e.g., social workers, tradespeople, janitors, and cleaners). Therefore, these groups are outliers in terms of the treatment. The different direction of the effect might be due, on the one hand, to an overvaluation of work–life balance caused by some bias in the control group due to the religious beliefs of the employer. This would suggest that the positive effect of digitalisation on work–life balance might be even higher for all other effects found. On the other hand, the different direction

Table 4. Mean scores on the TSK–WLB for different occupational groups in the treatment and control groups and for the treatment and control groups as a whole.

	Treatment		
	No.	Yes	Naive ATE
Occupational group			
Medical professionals	14.51 (.94)	16.18 (0.69)	1.67
Medical-technical assistants	18.10 (1.95)	19.59 (0.63)	1.49
Nursing professionals	17.44 (.67)	17.75 (0.51)	0.31
IT personnel	21.92 (1.27)	19.98 (0.70)	−1.94
Managerial, accounting, and HR personnel	20.53 (.55)	21.07 (0.32)	0.54
Other medical personnel	19.24 (.94)	20.12 (0.44)	0.88
Other non-medical personnel	19.70 (.91)	19.51 (0.54)	−0.19
Total	18.79 (.34)	19.56 (0.19)	0.77

Note: Standard errors are in parentheses.

of the effect in the case of IT personnel might be due to the small sample size, and the close-to-zero value for non-medical personnel suggests that this broad occupational group was not homogeneous across the two samples. In sum, the naive estimates of the ATE for the two dependent variables show an improvement in work–life balance for the treatment group, supporting both H1a and H2.

In light of the differences in sample composition between the treatment group and the control group, I also used regression adjustment to investigate the robustness of my findings. The results are reported in Table 5. They indicate that even after adjusting for group differences, the potential outcome means were very similar to the unadjusted means in both samples. Furthermore, the adjusted ATE increase was somewhat comparable to the unadjusted increase, albeit very small. However, the adjusted ATE of the domain-satisfaction-based operationalisation of work–life balance was not statistically significant, whereas the adjusted ATE of the second operationalisation based on the TSK–WLB was. These findings suggest that the positive effect of digitalisation on work–life balance might best be explained by employees' improved ability to optimise their management of role engagement and role conflict rather than by their improved domain satisfactions.

Lastly, I also investigated whether digitalisation improves work–life balance for personnel with a university degree and for women. For this purpose, I ran several models. First, I investigated the effect of qualification and gender on work–life balance separately while controlling for age and occupation. I found a significant and relevant effect of having a university degree compared with having a low level of education in the treatment group sample but not in the control group sample. I then included an interaction between an individual-level measurement of the frequency of using networked digital technologies at the workplace and the qualification variable. The results of this model are depicted in Figure 2a. Contrary to my hypothesis (H3a), I did not find that using networked digital technologies decreased work–life balance for highly educated personnel. Indeed, I found that networked digital technology usage increased—albeit statistically insignificantly—the work–life balance of personnel with no vocational training.

I performed the same strategy to investigate gender inequality in work–life balance. Here I was unable to replicate a significant effect for gender when including occupational groups. Indeed, I found that occupation seemed to be the main predictor of inequality in work–life balance. As Germany has a gendered labour market (Drobnič & León, 2013), this finding could indicate that some of the findings on gender inequality in work–life balance are due to job characteristics. Nevertheless, I also included an interaction to further investigate this. Once I included the interaction term, all explanatory variables became significant. The results are depicted in Figure 2b, which shows that the more often networked digital technologies were used at a workplace, the better women could balance their work and private lives. Thus, H3b is supported.

Table 5. Regression-adjusted potential outcome means and ATEs.

	Treatment		
	No.	Yes	ATE
Operationalisation of work–life balance			
Management of life domain satisfaction	1.3*** (.11)	1.16*** (.07)	−.14 (.13)
TSK–WLB	18.79*** (.33)	19.57*** (.19)	.78* (.38)

Notes: Standard errors are in parentheses; + p < .1, * p < .05, ** p < .01, *** p < 0.01.

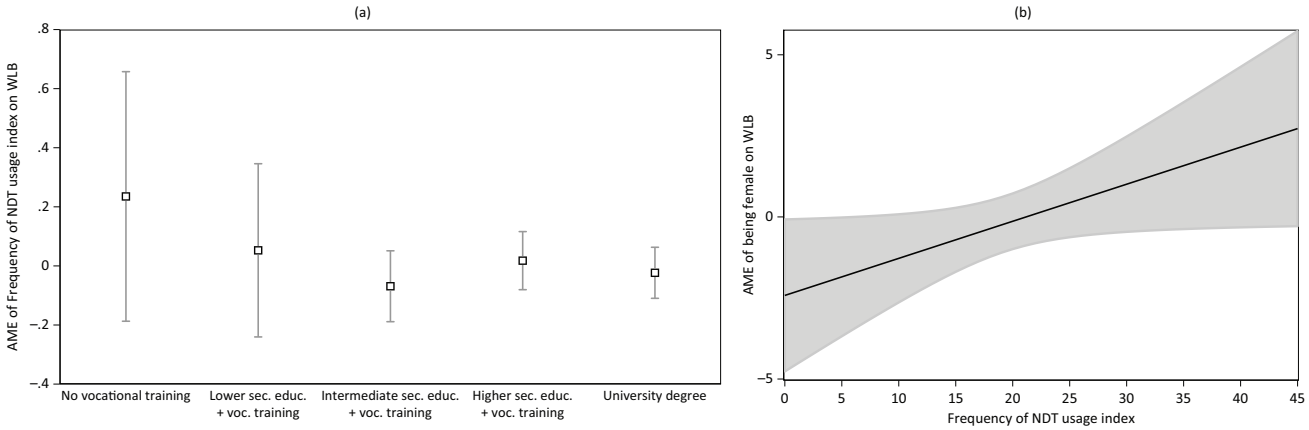

Figure 2. Average marginal effect on work–life balance (TSK–WLB operationalisation) for the interaction between the use of networked digital technologies and qualification (a) and gender (b). Notes: Interactions were included in two separate models; further control variables were age group and occupation; NDT stands for networked digital technologies; WLB stands for work–life balance.

5. Discussion

My aim in this study was to contribute to the ongoing debate on the ramifications for individuals and society of the socio-technological transformation process of digitalisation. I did so by looking at the effect of digitalisation on work–life balance and whether this also affects social inclusion. Conventional quantitative designs suffer from an unclear definition of the fuzzy concept of digitalisation and a vast number of operationalisations (Gong & Ribiere, 2021). Moreover, measurements of digitalisation are rather new. Taken together, this hinders the use of conventional causal inference methods such as panel data modelling. I addressed this issue by opting for a different research design, namely, a natural experiment. Using a mixed-method process strategy, our research project was able to identify an ideal setting in Germany's healthcare sector (Melchior et al., in press). We identified one highly digitalised hospital as a treatment group and several regular hospitals—part of a church-owned foundation—as a control group.

Using naive estimates and regression-adjusted estimates of the ATE, I found evidence supporting H1a, which stated that the more a workplace is permeated by digitalisation, the easier it is for employees to maximise their work–life balance. Comparing two dependent variables based on different operationalisations of work–life balance, I identified that this was due to the fact that digitalisation allows workers to improve their management of role engagement and role conflict. Furthermore, I found evidence in support of H2, which postulated that the effect of digitalisation on work–life balance is similar across occupations. Using linear regression models, I was unable to find any evidence in support of H3a, which stated that digitalisation increases social inequalities in work–life balance for highly educated knowledge workers with a university degree. However, I found tangible evidence in support of H3b, which stated that digitalisation decreases social inequalities in work–life balance for women. This finding suggests that using networked digital technologies improves female workers' work–life balance, which in turn allows them to better engage in their private lives while still playing an active part in the labour market, thus combatting social exclusion. Overall, these findings demonstrate that digitalisation has positive outcomes for work–life balance and—in line with other research—social inclusion.

5.1. Limitations

The method used in the present study had several shortcomings. First, identifying a suitable treatment group and control group proved to be a rather time-consuming and difficult task—all the more so as the qualitative part, the collection of contextual information, was hindered by the Covid-19 pandemic. At the same time, it was not possible to sufficiently rule out all possible confounders. The possibility of generalizing my findings beyond hospitals and beyond Germany is also limited. However, in the current stage of digitalisation research, designs like this can contribute important puzzle pieces to the debate, especially as they can account for the fuzziness of the concept of digitalisation.

5.2. Conclusions

Increased efforts should be invested in the quantitative research of the individual consequences of digitalisation. I argue that looking at individual factors such as work–life balance is of great importance, as digitalisation is a process that is socially prepared and discursively negotiated, and that ultimately must be individually mastered (Henke et al., 2018). Positive outcomes for workers through digitalisation not only benefit society; the positive social impact is also a prerequisite for and driver of further technological changes (Hirsch-Kreinsen, 2020). It fosters social preparation, influences discursive negotiations, and enables individual mastering. Successful

digital transformation will endure only if it delivers individual benefits.

Despite the above-mentioned limitations, this article contributes in several respects to the ongoing debate on the consequences of digitalisation. Quantitative causal frameworks for researching individual outcomes are still a rarity in German sociological research on digitalisation. The current focus of quantitative research is often on changes in job content or on the bigger picture in labour market research (see, e.g., Henke et al., 2018; Pfeiffer, 2018). I therefore contribute robust empirical evidence to the discussion on the consequences of digitalisation. Although processes such as the blurring or dissolution of boundaries between work and family and increased work stress or density still occur, my evidence shows that technological change can be a positive prospect for work–life balance.

Regarding the prospects of digitalisation for social inclusion, the evinced positive effect for female workers is in line with other theoretical and empirical contributions and suggests that digitalisation might offer indirect pathways to improve social inequalities. Improvements in women's ability to meet their culturally imposed role demands in the family domain free up their time to engage more in other social roles or incentivises their labour market re-entry, thus increasing their social inclusion. With this finding and the finding that digitalisation does not lead to inequalities in work–family balance for highly skilled workers with a university degree, this article contributes to the debate on digitalisation by substantiating the individual benefits of digital transformation. And finally, by demonstrating the positive effects of digitalisation for a case that is currently not the norm (i.e., a workplace with cutting-edge networked digital technologies), I contribute to the debate on the future of work by hinting at the possible fallout for the work–life balance of individuals whose workplaces do not have this level of digitalisation.

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Conflict of Interests

The author declares no conflict of interests.

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About the Author

Sebastian Schongen is a doctoral candidate at the Graduate School of Economics and Social Sciences Mannheim and doctoral researcher at GESIS–Leibniz Institute for the Social Sciences, in the department Data and Research on Society. He studied social sciences in Cologne (B.Sc.) and sociology at Free University Berlin (M.A.). His research interests are in the field of social inequalities in the labour market, particularly youth disengagement, and changes in society and work through digitalisation.

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Article

Assessing Inclusivity Through Job Quality in Digital Plat-Firms

Davide Arcidiacono [1] and Giorgio Piccitto [2,*]

[1] Department of Political and Social Sciences, University of Catania, Italy
[2] Department of Political and Social Sciences, University of Bologna, Italy

* Corresponding author (giorgio.piccitto3@unibo.it)

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Abstract
A great deal of the literature has underlined how job quality is a key element in individual well-being. However, the rise in platform work challenges this issue, since not only do "plat-firms" play an increasingly important role in job matching, work organization, and industrial relations, but they also increase the risks of a poorly inclusive socio-technical system in terms of the quality of working conditions and accessibility. In this sense, the platform economy is intertwined with multiple forms of social exclusion by acting on pre-existing inequalities that stratify workers within the labor market. This is particularly true in Italy, a country with a strongly dualistic labor market, which leads to a remarkable gap between insider and outsider workers. Therefore, the goal of our analysis is to evaluate the impact of the platform model on job quality in the Italian context. This will be accomplished by adopting an integrated and multidimensional perspective through the application of the OECD Job Quality Framework. The analysis identifies how job quality is differently affected by the type of platform work involved in terms of creating differentiated patterns of social inclusion/exclusion in the case of platform workers.

Keywords
digital ethnography; digital labor; peripheral labor market; platform economy; well-being; working conditions

Issue
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1. Introduction: The Digital Inequality Stack and Job Quality in Platform Work

In the prodromal phase of digital transformation, the internet was seen as a tool for social inclusion capable of changing the current economic paradigms through an economy based on information redundancy, accessibility, and community participation (Barbrook & Cameron, 1996). This rhetoric was nourished, on the one hand, by Marshall McLuhan's theories on the emancipatory power of the media and, on the other, by the liberal ideal of "catallaxy" (Hayek, 1978), according to which the internet would guarantee a meritocratic and more efficient system through disintermediation and the absence of a centralized control agency. This techno-solutionist and naive vision of technology was then overcome, not only by the transformation of the internet itself into a corporate platform complex (Terranova, 2022), or rather a socio-technical financing and infrastructuring process that concentrated the power of the web in the hands of a few actors, but also by the huge amount of critical reflection on the limits of digital technology and on the relevance of a plurality of digital divides that make the internet a reproducer of old inequalities and a generator of new ones (Castells, 2001).

Nowadays, platforms play an increasingly important role in job matching (Kässi & Lehdonvirta, 2018), work organization (Huws, 2017), and industrial relations (Duggan et al., 2020). However, digital transformation in the labor market generates new inequalities that intersect and stratify with older ones, building a "digital inequality stack" where multiple layers of foundational imbalances overlap and accumulate (Robinson et al., 2020). It is widely observed how platforms and digitalization reproduce and amplify existing inequalities (gender, class, racial, spatial, etc.) through the persistence

of some access gaps and matching algorithmic dynamics that favor highly homophile transactional networks (Edelman & Luca, 2014; Tubaro et al., 2022). Even during the pandemic, platforms took advantage of the crisis by moving around "grey areas," further entrenching precarious and informal forms of work (Howson et al., 2022).

In this sense, platform economy emerges as being at the crossroads of multiple sources of social exclusion in the labor market, strengthening inequalities between insiders and outsiders (Huws, 2017), formal and informal workers (Farinella & Arcidiacono, 2023), experts and amateurs (Cingolani, 2021), supplemental and dependent earners (Schor, 2020), and paid and unpaid workers (Casilli, 2017). Such a role deserves special attention in Italy, a country characterized by a dualistic labor market, which creates a deep cleavage between an area of "core" jobs, with good working conditions and desirable material and immaterial rewards, and an area of peripheral bad jobs, characterized by poor conditions and low job quality (Scherer, 2004). This division further problematizes the already existent inequalities, like those on a gender, age, and education basis, and magnifies the role of platform work as a potential driver of inclusivity in the labor market (Cirillo et al., 2023).

2. The Quality of the Platform Work

Since the late 1960s, a great deal of the literature has explored the concept of the quality of work as a key element of individual well-being (Piccitto, 2022), which in the last few years has been challenged by the spread of platform work. The concept of job quality has been approached in different ways, depending on the scientific field under consideration. Generally, within the field of economics, job quality has been proxied by means of hetero-directed extrinsic job characteristics related to the system of rewards such as pay, job security, and fringe benefits (Howell & Kalleberg, 2019). Studies in the field of psychology, instead, are more focused on the internal worker's individual experience and the extent to which their psychological needs are fulfilled during the working experience (Piccitto, 2022). Finally, sociologists are more interested in defining job quality in terms of skills and autonomy (Gallie, 2012). Currently, scholars have provided evidence of the importance of an integrated and multidimensional conceptualization of job quality (Muñoz de Bustillo et al., 2011; Oesch & Piccitto, 2019) as the most effective way to view such a phenomenon.

In recent years, the unfolding of the digital economy has triggered a lively debate on the impact of digitalization on job quality. In this regard, commentators have polarized around two general visions: First, the "optimistic" view underlines how the digital economy can increase work flexibility from a post-Fordist perspective, increasing the worker's autonomy in carrying out work and improving the chances of an acceptable work-life balance (Mulcahy, 2017); moreover, it is argued that online platforms can facilitate access to work for traditionally-disadvantaged segments of the workforce (young people, immigrants, people living in inner areas; see De Stefano, 2016). Secondly, the more "pessimistic" view, which underlines, instead, how the digitalization of production activities accentuates the fragmentation of the work process, tracing the practices of the Fordist organization in a context of high contractual uncertainty (Healy et al., 2017), thus opening the doors to a "race to the bottom" in terms of wages and working conditions.

Several factors associated with the concept of job quality, both extrinsic (i.e., referring to the most basic and concrete aspects of work) and intrinsic (more emotional and less tangible), are being challenged by the impact of the platform economy. Concerning extrinsic factors, one of these is the formal definition of the worker's status, a feature that is increasingly ambiguous and difficult to define in light of increasingly elaborate and technology-driven models of new ways of organizing work (Healy et al., 2017). The lack of formal recognition of new digital workers is reflected in proposals for the creation of new "legal categories" by which online workers can identify themselves (Todolí-Signes, 2017). This ambiguous and intrinsically non-standard way of regulating digital working relationships translates into precariousness, which in turn leads to the exclusion of the worker from social protection (Donovan et al., 2016; Kalleberg, 2012; Schor et al., 2020) and peculiar forms of collective action intentions (Politi et al., 2022).

Anyway, there are not so many analyses that interrelate inclusion, job quality, and platform work. Traditionally, the analyses available on platform work have focused on specific categories of digital workers (e.g., riders, Uber drivers, etc.) or take into consideration specific dimensions of job quality (salaries, contractual status, access to social protection schemes, etc.), without adopting an integrated and multidimensional perspective (Behrendt et al., 2019; Berg, 2016; Fabo et al., 2017; Wood et al., 2019).

De Groen and Maselli (2016) pointed out how crucial it is to consider the plurality of platform work: Most jobs in graphic design or IT consultancy could be performed virtually, while others, like care or delivery/mobility services, need specific locations or physical interactions. Moreover, the level of required skills within platform work is heterogeneous: Many platforms are oriented to low- or medium-skilled tasks such as data entry activities typical of microwork platforms, cooking in social eating platforms, or writing and/or translating small amounts of text for e-commerce platforms; conversely, other platforms specialize in high-skilled professional services such as those in the legal or architectural fields. Hence, De Groen and Maselli (2016) identify two levels of skills associated with digital jobs, distinguishing between jobs that require high levels of human capital and educational credentials and those that involve performing basic tasks that require limited expertise, often without any specific formal credentials. Consequently, the two scholars

suggest classifying platform workers into four categories that derive from the combination of these two variables (virtual/in-presence tasks and low-medium/high skill required). Such differentiations play an important role when assessing job quality and inclusivity in the platform working environment: For example, some studies have shown that physical/local tasks are comparatively better rewarded due to a smaller pool of workers (Aloisi, 2016). In those platforms providing virtual services, supply and demand are unbounded, without any limits, and they can be very quickly matched, overcoming spatial limitations (De Stefano, 2016). This issue appears to be particularly relevant for workers living in inner urban areas (Greene & Mamic, 2015) and for those of the Global South (Aleksynska et al., 2019), who may lack better job opportunities in their local context. On this issue, a growing literature recognizes how there is a digital aim to configure a more global and "planetary labor market," while, at the same time, the quality of work changes with different local contexts and platforms (Graham & Anwar, 2019). The peculiarity of platforms lies precisely in the ambiguity of their effects on the global market. For example, in some cases, they make employment relationships more visible and recognizable, especially in the Global South, where they represent a concrete opportunity for work and for the formalization of labor relationships; on the other hand, especially in the Global North, platform work is seen more as a transitional and complementary job based on long-rooted national strategies of labor market deregulation (Weber et al., 2021).

Concerning other job characteristics, platform work is characterized by a degree of personal control and flexibility that make workers agentic in selecting duties to be done, setting their own schedules and pace, and negotiating rates (Teodoro et al., 2014). Furthermore, such workers, intermediating virtual work, have the chance to work from home, a characteristic increasingly at the core of the debate on job quality, especially in post-pandemic times (Eurofound, 2020). These characteristics impact work–life balance chances (Rodríguez-Modroño & López-Igual, 2021) and promote female participation in the labor market (Chung & van der Horst, 2018). At the same time, however, these features can have fewer desirable side effects: They can lead to the intensification and extension of working time and an overlap with the worker's sphere outside of work; this dynamic is known as the "autonomy paradox" (Mazmanian et al., 2013) and is particularly harmful, especially for women. Additionally, individuals working on platforms are at risk of social and professional isolation, because of the nature, location, and organization of their work (Durward et al., 2016).

In conclusion, we have outlined how current research looks specifically at single types of platforms and rarely with a comparative perspective. Consequently, the platform heterogeneity in terms of job quality and social inclusion has been largely underexplored.

3. Objectives and Methods

The present article explores the issue of job quality in Italy's platform economy (for a similar approach see also Arcidiacono et al., 2021), trying to focus particularly on the extent to which digital work succeeds (or not) in improving the workers' conditions, especially for those operating in more peripheral and disadvantaged sectors of the labor market. In this sense, our analysis links the issue of social inclusion to that of the quality of work in the platform economy, with a comparative approach that considers the heterogeneity of performed tasks, work engagement, and working conditions (Howcroft & Bergvall-Kåreborn, 2019; Kalleberg & Dunn, 2016). Furthermore, we explicitly recognize the multidimensionality of the concept of job quality (Muñoz de Bustillo et al., 2011; Oesch & Piccitto, 2019) and that different concepts and characteristics tap into the domain of job quality (Steffgen et al., 2020). In this view, our framework is inherently cross-disciplinary and integrated, contrary to the approach that is generally adopted in the literature (Findlay et al., 2013). In particular, we decided to adopt the OECD Job Quality Framework (Cazes et al., 2015; see also Figure 1). This framework was developed based on a careful recognition of the various indicators and dimensions used by the international community to evaluate work quality and make comparative analyses between different socio-economic groups. The choice was inspired by the coherence of this approach with the available empirical material and is characterized by a focus on results (outcomes) as well as on workers' subjective voices (Dunn, 2020; Frenkel, 2015), rather than on the drivers of the quality of work per se. Starting from the areas of well-being identified by Stiglitz et al. (2009), we define job quality in terms of the three axes presented in Figure 1.

Our analysis also considers heterogeneity across platform types and the workers who are active in them. In particular, we decided to adopt the classification of platform jobs proposed by De Groen and Maselli (2016), distinguishing between tasks that are electronically transmitted (virtual/global) and those that require manual labor or physical interaction (physical/local), and between low/medium-skilled and high-skilled jobs (see Figure 2).

We select 20 platforms that represent the different types of platform jobs. The selection is the result of a preliminary activity involving digital mapping of the platforms active in the Italian context through a systematic search on Google. The first results of these mapping activities are presented and combined with the results of consultation with key informants within two exploratory focus groups. These focus groups included workers, experts, and exponents of business interest associations, and were also important in terms of identifying issues and questions for the subsequent phases of our analysis, especially concerning platform selection.

The 20 platforms were selected based on the number of subscribers they had (on the demand as well

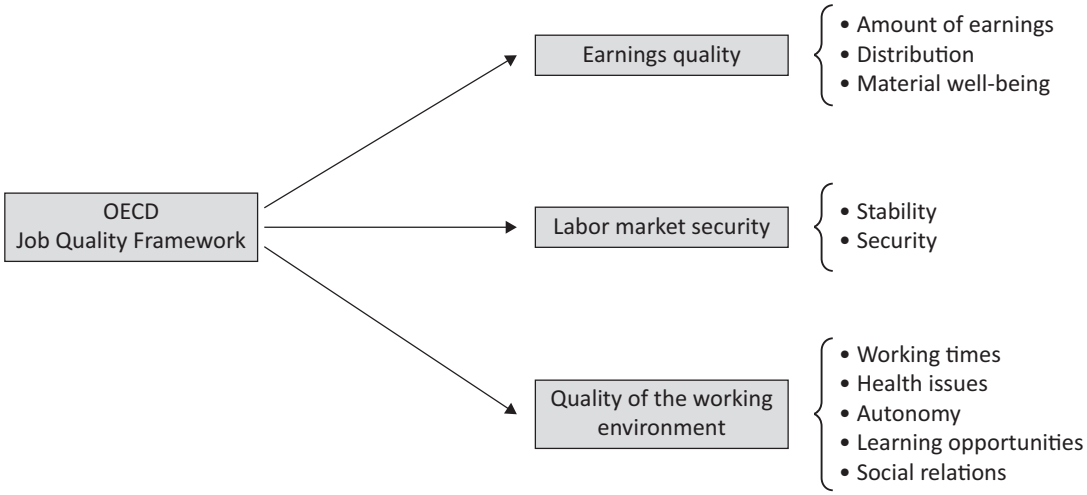

Figure 1. OECD Job Quality Framework. Source: Cazes et al. (2015, p. 15).

as the supply side) and the platform's presence in the reference market (meaning the regions where the platform is active). Combining these criteria with indications by the focus group experts, we identified the most relevant platforms in terms of the national labor market. Our methodology employed different data collection techniques, namely:

1. A net-ethnographic analysis (Arcidiacono, 2019; Kozinets, 2009) on the organizational design of the selected platforms, using an observational diary organized in terms of (a) job matching mechanisms, (b) reward systems, (c) relationships/community, and (d) user experiences.
2. 41 semi-structured interviews with managers and founders (13) and platform workers (28) from the 20 platforms selected in the previous phase. The mechanism to select and identify the interviewees involved a snowball system, through direct contacts on the platform or related social media profiles. In particular, our interviewed workers were recruited online, on Facebook groups, or directly on the platform where they worked.

4. Results

4.1. Earnings Quality

An analysis of the quality of the earnings in platform work considers not only the amount the workers make but also how it affects their material well-being. Workers performing low-skilled jobs tend to compare platform

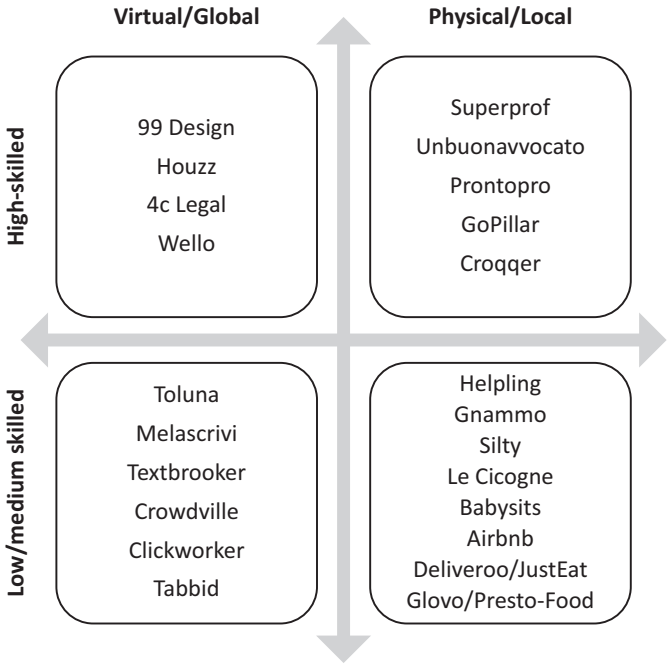

Figure 2. Type of platform work and platforms analysed.

work with casual or informal employment, and so they evaluate platform earnings as being significantly better. A manager at Helpling Italia explicitly stated that undeclared work is the real benchmark in their business model. Hence, their employees' favorable evaluations of earning quality come from the fact that low-skilled workers, aware of their marginalization in the labor market, will compare their objectively undesirable online jobs with the even less desirable conditions of informal or undeclared work, expressing a "satisficing" attitude toward their situation (Walters, 2005). On the other hand, in the case of low/medium-skilled digital work, workers declare that they obtain on average lower wages when compared to offline low-skilled jobs. The same happens to high-skilled work (designers, architects, lawyers, etc.), where the reduction of costs for clients implies an increase in competition between professionals (Arcidiacono et al., 2023) and a deterioration in pay conditions. However, the assessment of earning quality depends strictly on workers' employment status. In most cases, earnings on the platform are considered as a complementary income to that obtained from a main offline job. This element highlights a first important dimension in terms of the inclusiveness of the platform model: It tends to attract (under)employed people who want to supplement their principal source of income with supplemental earnings. On the other hand, those workers who use platform work as a first and unique source of income are the most disadvantaged, and are thus less able to derive any benefit from it in terms of flexibility and the fragmentation of work demand.

This accessory and supplementary dimension of earnings is particularly evident in the case of digital microwork platforms. These platforms don't even use the concepts of "work" or "income": On the Crowdville website they encourage people to "earn while having fun…comfortably seated on your sofa at home." On Clickworker, workers "are students and freelancers who generate an additional income with us on a freelance basis." To reinforce its complementary nature in the case of these low-skilled platforms, the gain often takes the form of cashback or vouchers for affiliated stores. It should also be considered that cashback is not convertible into cash and does not even have a fixed value, because it depends on the commercial agreement with the lender companies. Moreover, it is a "credit" system that can only be accessed if certain thresholds are reached, pushing workers to be productive within a given time.

Therefore, the system of rewarding in platforms is more rigid than it seems at first glance, delineating forms of exclusion for those workers who are less readily available and committed, despite the rhetoric of freelancing. Moreover, another serious source of discrimination arises when workers don't have retained any regular employers. For instance, in a platform such as Helpling, clients may cancel their appointment even a few minutes before schedule, incurring risible fees that should be used as the worker's reimbursement for the missed performance. However, when the client who reneges their reservation is a well-known contact (in the sense that the involved client and worker had a previous working relationship), some workers may renounce the reimbursement in order to preserve the capital of mutual trust:

> If [the person] who cancels the appointment is someone with whom I do not have any particular relationship, I accept the monetary reimbursement equal to one hour of work. Otherwise, if I have a continuous relationship with him or her, I say ok, probably it was an accident, it does not matter. (L13, male, 35, Helpling)

Similarly, workers manifest the need not to be too "choosy" and selective in their availability when it comes to accepting any type of work. Indeed, due to the "fuzzy" rules regulating the functioning of the platform, they may be afraid that their refusals will be recorded by the system, signaling a low level of motivation that could jeopardize their future chances of employment. The system of "taskification" of rewards typical of many platform jobs seems to increase the servility that connotes the employee–employer relationship, leading workers to adopt strategies and behaviors that often undermine their main goal (i.e., earning money) in favor of a lasting work relationship. This is not dissimilar to what is found in other forms of precarious work, but here it takes on even more worrisome connotations for gig and intermittent work.

Some distinctive aspects emerge concerning high-skilled jobs. In this case, the reward system is connoted by the dimension of gamification and challenge among professionals. The underlying competitiveness is sublimated in a "winner-takes-all" logic, which is implemented in numerous platforms such as GoPillar, 99designs, 4CLegal, or Houzz. This competitive dimension is considered a usual condition of these professional markets, starting from the genesis of some platforms, including 99designs, which describes its origins as a creative challenge among young designers. Here, the greatest risk for workers is to make an effort that will not be rewarded, and which therefore can assume the form of unpaid labor.

The existence of such competition has ambiguous effects in terms of inclusiveness: On the one hand, some young professionals underline how the platform has allowed them to enter the market and improve their social capital and networks; on the other hand, the competitive mechanism of the challenge tends always to favor those professionals with greater experience and higher ratings, reproducing existent mechanisms of inequalities according to the "Matthew effect." This approach is also supported by a meritocratic rhetoric and the presumed autonomy of the professionals: Apparently, everyone can make their price in proportion to their own endowment and merits (level of qualification, appreciation for the previous work done). However, on platforms such as Textbrooker, 99design,

or Toluna, every performance is also subjected to a quality check before being rewarded. Failure to guarantee the expected standard within a set time involves non-payment, an occurrence that can lead to disputes between the worker and the platform. Indeed, platforms have the option of reviewing times and payments unilaterally based on process analytics: This mechanism is perceived as somewhat unfair and tends to have negative effects in terms of inclusivity and job quality, especially for the most fragile segments of the workforce.

This aspect concurs with resizing the myth of platforms as accessible and open markets for individuals with limited work experience.

4.2. Labor Market Security

The dimension of labor market security refers to the extent to which a job is effective in protecting the worker from the risk of unemployment, both in terms of promoting and safeguarding their employability and through the provision of specific protection tools.

The first theme that emerges concerns the formal status of working relationships, since forms of employment on platforms seem to develop within a "grey area." Almost no one has an employment contract, and the terms and conditions of the relationship are often opaque and difficult to understand, especially for poorly educated or foreign low-skilled workers. Somehow, most of the workers interviewed seem to have internalized the ambiguous or insecure nature of an employment relationship via the platform:

> It is a job that I recommend to those with a flexible mentality and to those who are not looking for security…here there is nothing for sure. (L20, male, 38, Tabbid)

In a scenario of strong individualization of risk, platforms deny any responsibility concerning the contractually defined worker–client relationship. Rather, they are oriented to commodify "protection" or "employability," proposing to workers some additional services to reduce their tendency to exit the platform. This is the case of insurance against accidents at work provided by Helpling, or the consultancy service for families that want to regularize their babysitters provided by Le Cicogne.

The possibility of enhancing one's employability on the platform largely depends on the personal branding strategies of each worker (which include caring for their profile, updating information, reputation ratings, feedback, etc.). Successful workers are those who "stand behind [own's] profile a lot" (L20, male, 38, Tabbid), who have "an excellent profile" (L15, female, 54, Le Cicogne), and who recognize that "the platform…works well if you move around…if you interact a lot" (L12, female, 45, Houzz). The unpaid time that workers dedicate to interacting on the platform and taking care of one's "visibility status" becomes an important dimension of inequality in order to ensure job continuity. This may penalize those who work on a platform only part-time and who have only limited time to invest in their personal branding. However, for some fragile individuals, such as women, foreigners, or the elderly, the chance offered by some platforms of omitting personal information can buffer potential prejudices that could otherwise be connected to the workers' personal characteristics:

> For me, it is an advantage [the fact that on the website there is little personal information about the worker], since if you have to provide a kind of curriculum vitae, your age emerges, and I would be crowded out. (L3, female, 57, Helpling)

This statement is in line with others that emerged during the interviews, confirming that, compared to traditional job matching mechanisms based on direct personal interactions, the advantage of the platform lies above all in the ease of "opt-in" and of having the possibility of engagement. However, job continuity is not a contractual issue, but is attributed to the subjective worker's capability: A failure is blamed on their own poor self-promotion capacity. To a negative comment from a worker who has not received job offers, Superprof replies:

> There are many elements that make an advertisement attractive and always at the top of the statistics: a beautiful photo, a verified profile and diploma, recommendations and comments, the possibility of carrying out lessons at the student's home, and above all, in a case like hers, a nice video as evidence of her skills (for example while she is engaged in training). Adding personalization is a key element of distinction, believe me, and sometimes are the small details that make the difference, especially given the huge number of ads that are published every day.

Visibility on the platform becomes a new commodity to be sold to the worker, and some platforms such as Tabbid, Houzz, and Unbuonavvocato sell premium memberships that guarantee greater publicity for their advertisements. The fact that you pay to have more visibility is an important element that invalidates the idea of digital technologies as capable of being more inclusive and meritocratic. Moreover, clients have no way of distinguishing "premium" professionals from "standard" ones, distorting the merit-based principle through which the platform legitimizes its matching capacity.

In the end, this system reproduces logics in which visibility depends on some characteristics of the subjects, like their ability to pay, that do not necessarily reflect their merits and skills.

4.3. Quality of the Working Environment

The analysis of the quality of the work environment is divided into job demands, which include the pressure

in working times and the risk factors relating to physical health, and job resources, which include autonomy in work, formal and informal learning opportunities, and relationships with colleagues.

About working times and rhythms, it is important to distinguish between project work with lump sum payment and services whose remuneration is based on working time. In the first case, characterizing high-skilled work to a greater extent, the interviewees express an appreciation of the lack of time constraints. As happens in general in freelance work, however, this organizational freedom corresponds to the risk of intensification of work rhythms and the extension of work duties during the hours usually dedicated to activities outside of work. In platform work, this risk is accentuated by the fact that the platform "never closes," and competitiveness is also played out in terms of the speed of response to customer requests.

In the case of low-skilled jobs, compensation is added to this factor based on their working time, detected through the app or platform, resembling forms of "augmented despotism" (Delfanti, 2021). For digital performances, this is frequently associated with digital surveillance modes: For example, the Crowdville platform asks its "crowders" to take screenshots or record the computer screen to demonstrate the activity carried out. The home delivery sector presents some specificities, including the possibility of choosing work shifts, which may also depend on previous performance on the platform. This generates a mechanism that reinforces a "winner-takes-all" logic, not to mention that, in this case, the platform can also exercise its discretion in canceling shifts.

Concerning health and safety risks, there are significant differences between digital and face-to-face work. For the former, the respondents show little awareness of health issues related to exposure to monitors. Instead, there are some concerns regarding the protection of privacy and the risks associated with datafication processes, an issue typical of digital work:

> There are polls that are done with the webcam, so they detect eye movement to see if you pay attention to the questionnaire. Let's just say I still have a certain reluctance because technology always has limits, especially regarding privacy. (L6, male, 27, Toluna)

Vice versa, risks relating to health and safety are prominent among those who carry out face-to-face work. In part, these risks are related to the specificity of the required task and are not dependent on digital intermediation. In these cases, the platforms intervene directly to protect against these risks. This is evident in delivery platforms: The availability of protective devices is one of the criteria adopted by workers to choose the platform through which to operate. Moreover, in the case of in-presence jobs, it is interesting to notice how, since the accountability of the performance is strictly related to the client's evaluation, some workers prefer to act in a "poorer quality" environment so that their effort could be more easily recognized and appreciated:

> For me [it] is more annoying when I have to work in a clean house, since in this case nothing of my job will be noticed….I prefer a dirty house, it makes me less anxious [about my performance]. (L4, female, 22, Helpling)

Regarding resources, a central issue concerns autonomy and learning opportunities. In low-skilled work, the activities are fragmented and distributed among people who do not provide specific skills (unbundling of tasks). In high-skilled work platforms, this issue is even more complex: The stratification of the external labor market and the de-professionalization process facilitate the positioning of the platforms in the lower range of professional work. This determines a mechanism for self-selection of the most fragile workers: Young people or marginal workers especially may use the platform to gain experience, albeit with low pay. About the possibility of "learning on the job," many platforms introduce some content for self-learning in their blogs, pushing individuals to study and practice useful skills in that sector. The growth mechanisms within the platform are conveyed by the reputational system, which is assumed to allow the recognition of experience and the quality of the skills acquired.

In terms of autonomy, the main criticism concerns the exporting of the human and social capital acquired and building career paths outside the platform, a step which is discouraged by the platforms themselves through lock-in mechanisms. However, it is mainly the pervasive control of the algorithmics that concerns the worker and adds to their greatest discomfort in the work environment:

> You did not know [which part of the performance] was surveilled…sometimes you were surveilled…then I could not be superficial…at each task, before passing to the following task…a red light is turned on if I performed that task badly….I knew that there was this possibility, but I did not know when and what was [being] surveilled…so it was basically a manager's trick…after three wrong tasks your profile was deactivated for 24 hours, and after three temporary deactivations your profile was cancelled. (L1, male, 28, Clickworker)

Another dimension of the quality of the work environment concerns relations with colleagues. In corporate communication, the platforms make extensive use of the concept of "community," borrowed from collaborative economy practices, a rhetoric that generally does not correspond to actual community logic. On the contrary, the interviewees complain about the lack of relationships with other workers and the frequent use of the concept of "alienation" to describe one's own experience is meaningful in this sense. The workers themselves

express complaints through online review services such as Trustpilot or Feedaty, since the anonymity guaranteed by the online system of rating may expose workers to unfair evaluations:

> Online it is very easy to discredit….I've run into several clients who posted negative evaluations on my colleagues who were not punctual in delivering their work or didn't do a good job…it does not take much to be discredited…it is very easy to fail in this "thing." (L20, male, 38, Tabbid)

5. Conclusions

Our research, adopting a multidimensional approach, contributes to the literature on job quality in platform work. The analysis, while confirming the concerns raised by other studies on the field, highlights the importance of considering the heterogeneity of risks and experiences faced by the different types of platform workers: This view represents a conditio sine qua non to grasp the different nuances of the social inclusivity of platform work.

Our results problematize the thesis of digital platforms as a socio-technical system that makes work more inclusive. From our empirical findings, it emerges that the workers who are somehow "socialized" in the labor market, with a protected job and more experience, are those who obtain more benefits from platform work and experience a higher job quality. On the one hand, some patterns of cumulative advantage emerge for selected workers; for others, on the other hand, several adverse employment trajectories across offline and digital work result in an "entrapment" in poor quality jobs. However, different job quality levels and patterns of working conditions are significantly linked to a type of task (online and offline) and the worker's endowment. The type of task and the methods of execution and engagement mediated by the platform greatly affect the quality of the work, differentiating many effects as well as raising possible critical issues and areas of intervention. At the same time, from our analysis, no differences between medium-skilled and low-skilled workers emerge, as already underlined by previous studies.

Table 1 summarizes the main findings of this article, highlighting how they affect the relationship between digitalization and social inclusiveness.

Table 1. Comparing job quality and inclusivity issues according to the different types of platform work.

OECD job quality framework	Earnings quality	Labor market security	Quality of the working environment	Specific inclusivity issues
High-skilled, virtual	The risks of "the winner takes all" principle (Matthew effect or power law)	Visibility as a commodity	The "always open" office	The most experienced and rated workers displace the beginners
High-skilled, local	"Race to the bottom"	Visibility as a commodity	Privacy concerns	Crowds out workers who can't compete in terms of price
Low/medium-skilled, virtual	Very low and characterized by high complementarity with other sources of income	Consumer-work without any labor market security	There is low autonomy for the worker and more pervasive control of digital surveillance tools. Brand communities and low opportunities of voicing one's concerns.	Lack of recognition as a real work activity, without any possibility to access forms of labor protection
Low/medium-skilled, local	Higher only when compared to informal jobs of the same type	Protection as a commodity	The algorithmic management of workloads and rewarding systems is opaque. There are better possibilities opportunities of voicing one's concerns and aggregating collectively.	Workers who hold multiple jobs are advantaged in relation to those working exclusively on a single platform

Among the highly skilled workers who operate mainly in a digital way, many difficulties are related to the challenge-based engagement mechanism that exacerbates competition by lowering the quality of earnings in terms of size and continuity. For the many in professions without a professional order association, the main difficulties are linked to the loss of autonomy in setting the price of one's professional services, while the engagement mechanism based on the challenges strengthens unbalanced and opaque competitive dynamics where the recurring winners marginalize everyone else. These dynamics are reinforced by asymmetrical and unclear logics of distribution and reward on tasks, typical of algorithmic management. For example, the professionals who work with the challenge mechanism must comply with the "winner takes all" principle, which governs the assignment of tasks because the managerial evaluation criteria are not always known. Not to mention the resulting power law that is established, i.e., some workers always work more than others or have better tasks.

Greater visibility on the platform is therefore an essential tool for ensuring employability, and the platforms "sell" tools and spaces to guarantee the personal branding strategies of professionals, especially for insiders and youngest workers who need to develop their reputation and social capital, transforming professional visibility into a commodity that generates further profits for the platform. Moreover, in the case of high-skilled virtual workers, it is like having an office that is "always open," which can result in processes of self-exploitation and a significant increase in workload.

On the other hand, high-skilled professionals who work face-to-face are characterized by a higher individualization of risk because they have to balance the need to stay competitive within the platform, where prices tend to be lower, and the image and the reputation they have to maintain offline to not devalue their competence and professionalism. Some platforms that allow payment to be negotiated and transacted off-platform allow some of these workers to better manage this balance. For them too, visibility is a commodity that is bought on the platform to guarantee more employment opportunities for themselves. However, the interaction and overlap between private and physical workspace, often coinciding with one's home, and online work create greater concerns and risks in terms of privacy or work–life balance.

Low/medium-skilled workers who operate exclusively online are mostly involved in relatively unprofitable micro-tasks that provide "pin money." The ambiguous status of these workers is very problematic in terms of labor security and employability. Moreover, the workers tend to perform highly repetitive and routinized tasks, subject to digital control and surveillance systems. Platform communities, rather than offering a relational dimension, become more like a tool to discipline and control the worker's performance.

Regarding low/medium-skilled workers who offer services on-site, the assessment of the quality of earnings is perceived as positive, but only when compared with previous experiences of informal work, very common in these occupations (such as deliveries, cleaning, babysitting, etc.). In this sense, our evidence runs somehow counter to what previously emerged about this category of workers. In such jobs, the need for higher protection against health risks and greater continuity of work is highly perceived. The platform exploits this need by providing protection services, from which it derives an economic profit or an advantaged position over its competitors. Again, the quality of the working environment is heavily determined by the opacity of the algorithmic mechanisms that govern the assignment of workloads and rewards; these algorithms create elements of conflict within the platform, which sometimes give rise to forms of voicing one's concerns and collective organization.

Ultimately, the analysis carried out highlights the risks of a generic and unambiguous regulation of platform work, such as the one currently under discussion in the European Union or tested in some countries, including Italy. Even if common issues emerge, such as access to welfare and the need to reduce the opacity of the algorithmic "black box," a more sectoral and specific approach is needed to make the platform work more inclusive and of higher quality. Such a regulatory approach needs to empower processes of brokering and the representativeness of platform workers. This also means debunking those naive interpretations of platform work that emphasize the myth of disintermediation and more direct interactions between supply and demand.

Our analysis comes not without limitations in terms of the methodological approach and selection criteria adopted. By focusing on Italian workers, this article sheds light on the social inclusiveness of digital work in a socio-economic context from the Global North: This limits the external validity of the study and, in this sense, a comparative analysis including other countries of the Global South would be welcome. In addition, it could be fruitful to undertake a more in-depth analysis of cooperative platforms, which are characterized by different governance models to those considered in this study.

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Conflict of Interests

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About the Authors

Davide Arcidiacono is an associate professor in economic and labour sociology at the University of Catania. His research topics are digital transition and collaborative economy. He was a member of the expert group appointed by the European Parliament on the Directive on platform work. On these issues he has recently published (with M. Duggan) *Sharing Mobilities: Questioning Our Right to the City in the Collaborative Economy* (2020, Routledge) and (with I. Pais), "Re-Framing Community in the Platform Age: Analyzing Organization and Power in BlaBlaCar" (*Studi Organizzativi*, 2/2021).

Giorgio Piccitto is a researcher (RtdA) at the University of Bologna. He is interested in the quantitative study of the objective and subjective dimensions of job quality, migration, social stratification and inequality, life courses, and inter-generational "linked" relations. On these issues he has recently published (with H. M. A. Schadee and G. Ballarino), "Job Satisfaction and Gender in Italy: A Structural Equation Modeling Approach" (*Social Indicators Research*, 2023) and *Donne, Uomini e Lavori: Qualità del Lavoro e Soddisfazione Lavorativa in Italia* (Ledizioni, 2022).

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Article

Dependency and Social Recognition of Online Platform Workers: Evidence From a Mixed-Methods Study

Dominik Klaus [1,*], Barbara Haas [2], and Maddalena Lamura [1]

[1] Health Economics and Policy, Vienna University of Economics and Business, Austria
[2] Department Socioeconomics, Vienna University of Economics and Business, Austria

* Corresponding author (dominik.klaus@wu.ac.at)

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Abstract
This article is about those who need or want to make a living from working on online platforms. Moreover, questions of financial dependence are related to why this work is done and what social recognition the workers expect from it. Our mixed-methods approach captures this heterogeneous field of online platform work by dividing it into three categories: (a) microwork, (b) mesowork, and (c) macrowork. Microwork involves offering short, repetitive tasks to an anonymous crowd, such as human intelligence tasks. Macrowork consists of market-based freelance platforms offering highly skilled professionals complex and more extensive tasks. In between, mesowork covers platforms offering specialized tasks such as software testing or content creation. While income opportunities and working conditions vary widely between these platforms, common features include self-employment and the ability to work from anywhere. Quantitative results show that only for a few highly skilled workers does income from platform work account for a crucial share of their household income. Surprisingly, workers' household incomes do not differ by skill level. Qualitative results complement this picture by giving us a more contextual understanding of the significant variation among workers. We find cases in which monetary remuneration is not the only reason for doing platform work. So, despite all the criticism of precarious working conditions, platform work does have some positive aspects and can also hold the potential for the social inclusion of people who cannot participate in traditional labor markets. This article contributes to these discussions by providing workers' perspectives on the risks and challenges of online platform work, acknowledging their different living situations, socioeconomic status, and health issues.

Keywords
clickwork; occupational health; online freelancers; online platform work; platform economy; qualitative interviews; social precarity; social recognition; well-being

Issue
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1. Introduction

The emerging field of online platform work offers new employment opportunities with low entry barriers and high flexibility. An internet connection, sufficient language, and IT skills are the main requirements for this work. Hence, virtual services provide employment opportunities for people who cannot participate in the traditional labor market. However, as an isolated and invisible form of self-employment, it requires self-discipline and self-motivation while offering spatial and temporal flexibility. It is an open question whether platforms are exploitative or beneficial for workers (Schor et al., 2020). Working conditions in the platform economy vary widely, ranging from relatively well-paid freelance jobs to precarious, piece-rate, low-skilled, routine tasks (clickwork). The advantages of platform work include easy access to the labor market, even if one lives in a remote area, faces

health problems, or is looking for a way to combine paid work with other activities or care responsibilities (Wood et al., 2019; Zyskowski et al., 2015). The promise of a flexible source of income earned from home and new career opportunities (Idowu & Elbanna, 2022) attracts an ever-growing number of potential workers to the platform economy. From the point of view of employers and platforms, efficiency and opportunities are highlighted as being key (Pongratz, 2019).

Discussing the downsides, the discourse on precarity (Kalleberg & Vallas, 2018; Vallas & Schor, 2020) due to on-call work, piecework (Stanford, 2022), and algorithmic control (Rahman, 2021) predominates (Schor et al., 2020). Furthermore, isolated online work has several long-term consequences for physical and mental health (Llosa & Agulló-Tomás, 2022), social protection, and financial stability. From a more macro perspective, online platform work has become a source of just-in-time workers, often bypassing labor laws and employment contracts (De Stefano, 2015), providing an "extreme form of commodification" (Howcroft & Bergvall-Kåreborn, 2019, p. 24). This development encroaches on new "areas of skilled labor (such as computer programming and legal advice) as tasks are digitally decomposed, and workers contend with piece rate pay structures" (Howcroft & Bergvall-Kåreborn, 2019, p. 33). Thus, online platform work also contributes to the prevalence of non-standard employment contracts (Mandl et al., 2015) and solo-self-employment (Pongratz, 2018) in a widening range of occupations. However, platform work is hard to picture as an isolated field of work because most workers tend to have traditional employment alongside it (based on our own quantitative research; see also Glavin & Schieman, 2022; Serfling, 2019). This mode of hybrid work has implications for the workers' stakes regarding social protection. Using an already protected labor force allows platforms to freeride on conventional employers (Huws, 2020; Schor et al., 2020).

Against this background, the following mixed-methods study is one of the few that provides comparatively comprehensive data on the income of online platform workers. It discusses their financial situation and takes a closer look at the motivations for engaging in such work and the importance of social recognition for workers. We show that monetary dependence, motivation, and social recognition are closely linked.

The following theoretical part (Section 2) uses the concept of social inclusion to set the framework for (non-)precarious living and working conditions. We then present the data and method and clarify the categorization of platform work used in our mixed-methods approach (Section 3). In Section 4 we present the qualitative results and descriptive quantitative findings on the dependency rate of platform workers. Finally, we discuss the challenges of social inclusion (Section 5) and draw a conclusion (Section 6).

2. Theoretical Framework

Following Wilson and Secker (2015, p. 53), we understand social inclusion as "a multidimensional concept encompassing physical aspects (e.g., housing), psychological aspects (e.g., a sense of belonging), social aspects (e.g., friendships), and occupational aspects." While the latter is our focus, we aim for a broadened view of the overall living situation of the workers. This includes various physical aspects, such as housing and household income, social aspects (friendships, family, and social activities), psychological well-being, and health issues.

While the occupational situation covers a series of important topics, such as precariousness, decent wages, and workers' social security, more is needed to provide a sufficient framework to discuss the nuances of socially beneficial activities. Work is more than a source of income; a broader picture of the living situation should cover social security, financial stability, and social inclusion. In the following steps, we discuss previous studies and recent literature in this field to derive a theoretical framework that bridges the well-known precarious employment situation to the as-yet-undiscussed potential for social inclusion through online platform work.

Schor et al. (2020) states that research on work in the platform economy often focuses on precarious working conditions. We acknowledge the importance of this issue, especially as we see the growing importance of this mode of work and the potential hollowing out of traditional labor market institutions. Taking a closer look, precarious employment lacks an international definition. It could be summarized "by means of a set of conditions such as temporary contract forms, lack of bargaining power and rights, vulnerability in the employee-employer relationship, employment insecurity, and insufficient wages" (Rönnblad et al., 2019, p. 429).

The growing number of precarious jobs is not limited to the platform economy but results from several developments, such as de-unionization, financialization, globalization, and the digital revolution (Kalleberg & Vallas, 2018, p. 5). The overall presence of precarious work makes it challenging to construct a "rational life plan" or a "career normative," which is known to be "a key source of happiness and subjective well-being, and its absence is a source of mental stress" (Kalleberg & Vallas, 2018, p. 18; Sennett, 1998).

Next to the precarious working situation, social integration is a crucial concept for researching the platform economy's potential for social inclusion. Gallie and Paugam (2002, p. 115) name people's personal sense of integration and their overall satisfaction with the society they live in as "two key dimensions of subjective social integration." These aspects, though focusing on social integration, are strongly linked to financial issues: "Financial difficulty [is] the single strongest predictor of both dissatisfaction with life and psychological distress, while social isolation also [has] sharp negative effects

on both measures" (Gallie & Paugam, 2002, p. 127). Matilla-Santander et al. (2022, p. 2) use the concept of social precarity to examine the relationship between precarious employment and social outcomes:

> [It] can be defined as the factors related to higher risks of social exclusion and has two dimensions: living conditions (i.e., poverty, financial resources, social connections, social isolation, and satisfaction with family life) and working life (i.e., task quality, work pressure, skill development, and job security).

Social recognition is a central source of identity work and, thus, of social inclusion. Contemporary developments in the world of work may have de- and re-institutionalized sources of recognition (Voswinkel, 2013), such as an occupation, organizational membership, or the normative alignment of the standard-employment-biography. However, work remains a pillar for constructing identities and social inclusion even in the precarious form of non-standard employment within a virtualized place (Voswinkel, 2000). Workers are by no means without agency; they can recombine values and meaning and reinterpret sources of recognition in new ways (Holtgrewe, 2002). Especially in the case of the standard employment biography, we find examples of escapists (Frayne, 2015) or digital nomads (Reichenberger, 2018) who work well with spatially flexible online work. Within the "placeless" realm of digital work (Flecker & Schönauer, 2016), sources of recognition have changed in three ways: Traditional sources, especially ones bound to office space, are missing; new sources of recognition are provided in the virtual space or on the platforms (e.g., ratings, profiles, portfolios, social networks); and the subjective processing of these sources in the sense of identity work is happening in a virtual space (Klaus & Flecker, 2021).

We close this literature review by pointing out that the potential benefits of social inclusion in online platform work should not be limited to its income potential. It provides ways to engage in meaningful activities despite precarious working and income conditions. Our empirical research gives insights into examples of social inclusion and actual usages of the various possibilities that platform work provides.

3. Data and Methods

3.1. Three Types of Online Platform Work in Our Mixed Methods Design

Various conceptualizations of online platform work highlight different aspects of work, making it challenging to use consistent terms (Pongratz & Bormann, 2017; for an overview see European Commission, 2021). Some focus on the task complexity or required skills of the jobs, differentiating between micro and macrotasks (e.g., Krzywdzinski & Gerber, 2020). Others focus on the mode of job allocation, freelance marketplaces, crowdwork, or contest platforms (e.g., Schmidt, 2017; Serfling, 2019). As not all platforms fit these analytic typologies, sometimes platforms are grouped by the type of service they offer (such as content creation, testing, clickwork, or creative design). Regarding our survey sample, we decided to focus on task complexity. However, we added a third category (mesowork) between the low-skilled and short microtasks and the higher-skilled and longer macrotasks. In our sample and in general, microwork is allocated to an anonymous crowd (crowdwork), whereas macrowork takes place on freelance marketplace platforms. In between, the platforms categorized as mesowork allow different modes of work allocation and would be instead classified as testing or content creation. The three categories allow for a better generalization than other approaches and hold to empirical analysis concerning task complexity, task length, and hourly wages. We do not deal with creative contest platforms.

To summarize, our sample is divided into three categories: (a) macrowork, in which freelancers provide highly skilled work in longer projects; (b) mesowork, providing semi-qualified longer tasks such as content creation or testing services; and (c) microwork, consisting of low-skilled tasks taking just a couple of minutes. Based on the EU CEPS database (European Commission, 2021), we selected several platforms providing digital remote work, which we keep anonymous. Qualitative and quantitative data were collected by inviting workers to participate via job posts on the platforms.

We work with a sequential mixed-methods design with different research phases (Creswell, 2009). The qualitative interviews help to explore the quantitative indicators for our survey, and both findings are analyzed in parallel, giving us a more nuanced perspective on the heterogeneity of platform work in practice. We interpreted and discussed the results with an interdisciplinary team of economists and sociologists.

3.2. Qualitative Methods

From March 2022 to April 2023, we conducted 30 problem-centered online interviews with German-speaking workers of different skill levels, varying in age and socioeconomic status. The interview call was posted as a job on seven platforms, which we keep anonymous, and on workers' forums related to the platforms. The call was addressed to German-speaking workers regardless of their place of residence. However, most of the interviewees lived in Germany. Participants were selected aiming for a large variety of tasks and socioeconomic backgrounds across the three platform types outlined in Section 3.1. They received a remuneration of 20 EUR for an interview that lasted between one hour and 2 hours and 30 minutes. The aim is to fill the empirical gap in studying the spectrum from highly skilled, demanding tasks (macrowork) to repetitive,

monotonous clickwork (microwork), including crowd work and marketplace freelancing.

For the qualitative analysis, we, as a group of four interpreters, started with an intensive sequential fine analysis of key passages (Lueger et al., 2005) to better understand latent meanings. To systematize all the material, we then used MaxQDA for open coding and code structure analysis (Froschauer & Lueger, 2020). Writing memos for the codes or each case immediately after the interview led to a circular process of constant reflection during the analysis.

3.3. Quantitative Methods

From January 2023 to April 2023, we conducted an online survey with workers contacted on four platforms (n = 1,969). For the survey questionnaire, we combined qualitative insights and validated scales on mental health issues (Burnout Assessment Tool, Flourishing Scale, Austrian Health Instrument Survey) with the Employment Precariousness Scale (Padrosa et al., 2021), which we adapted to the specific situation of digital platform workers. After cleaning the data for missing information and checking consistency, the sample size analyzed here is n = 1,773.

4. Results

In the interviews and the survey, we collected extensive information on financial status and general living situation, allowing us to draw conclusions regarding the worker's dependency on platform work. To systematically describe the diversity of platform workers emerging from qualitative results, we refer to five typical situations of platform workers and their respective requirements for social inclusion (Section 4.1). A concrete case illustrates these types by describing their living and working conditions. In Section 4.2, we outline some quantitative results of our survey. We compare the three categories of platform workers (macro, meso, micro), describing their income from digital platform work and its importance for livelihoods to measure their dependency on platform income.

4.1. Typology of Online Platform Workers

The following typology derives from the interpretation of the qualitative interviews to provide more contextual knowledge on the living situations of workers engaged in this field. This aids in our understanding of the different motivations that drive them to do this work. In their stories, we see how they construct the meaning of working on the online platform. Qualitative evidence is better suited to give us a complete picture of the meaning of income, remote work, and other life activities related to online platform work.

We now describe five illustrative types, each representing a real-life case of a platform worker, to show the varying forms of social recognition, work aspiration, and meanings of online platform work from the worker's perspective.

4.1.1. Type "Healthy, Safe & Young": Anita (Macrowork)

Anita (F28) lives alone in a jungle house on the beach in Brazil. Platform work is sufficient as her primary income source due to the low cost of living in South America compared to Austria, her birth country. She still has to pay back student fees of 4,000 EUR. She would like to continue making a living from her successful work as a freelance writer. Her dream would be to build an arts center for locals in Brazil. She is recognized for her work because she receives good feedback from her clients; they are loyal and use her services repeatedly. With the prospect of living in a low-cost country, digital nomadism works just fine.

This type represents young workers who simply do not need to engage in a secure traditional employment relationship but prefer the spatial flexibility of online platform work to enjoy a better work-life balance and flexibility. Health issues are not pressing, and income is secured through other means (assets, savings, partners, investment income, etc.). This ranges from digital nomads to middle-aged "dropouts" who now take care of their families.

4.1.2. Type "Wealthy Retiree": Ronja (Mesowork)

Ronja (F74) lives with her husband in a house in a small town in Switzerland. Both have an IT background and are retired; they are financially well off and own a second house in a pleasant rural area that they occasionally rent out to travelers. She has children and grandchildren who visit her occasionally, and she keeps busy with leisure activities (traveling and visiting friends). She is delighted with her life and has nothing to complain about. Recent developments, such as the war in Ukraine and climate change scare her, but she is doing well. The platform work offers her meaningful activity and recognition by continuing to be productive and supporting clients through her work. She sees platform work as a mental workout that helps her stay mentally fit.

A prime example of this second type of worker is older people who are retired but work on platforms to keep themselves busy and train their brains. They want to stay mentally fit and healthy. They also appreciate a meaningful activity but do not need the additional income. Similar cases are people who have partially withdrawn from the traditional labor market because they no longer need income and want to spend more time at home.

4.1.3. Type "Old Freelancer": Lorenz (Mesowork)

Lorenz (M59) lives with his wife in a house in a small town in Germany. They have six children, most being

old enough to have moved out. Lorenz struggles to earn a decent income even though he is a salesperson and resorts to platform work only as a supplement. The financial situation of being an older person with little or no prospect of a decent retirement weighs heavily on him, as does the risk of not being paid for a job. He has been a freelancer for most of his life now. When the pandemic broke out, business was terrible. As a salesperson for various products and in the event business, he tried several new avenues, but it could have gone better. Now, he is trying to compensate for the loss through the internet and the platform economy. Unfortunately, the income he generates is minimal.

This type describes older people who have done much freelance work in their working lives and who now lack the social security of a decent pension. They do all they can but have limited opportunities in the traditional labor market (due to age, health problems, lack of skills, or a place to live). They are highly precarious as they are outside the social security net and have low incomes (with a slightly higher cost of living than younger people).

4.1.4. Type "Young, but Ill": Ella (Mesowork)

Ella (F28) lives alone in a flat in an Austrian village, has a marginal part-time job, and has very little disposable income. She is trying to set up a small online business and works on a platform to earn additional income, focusing on easy tasks that suit her interests. Her parents support her financially, and she often visits them for lunch or dinner. Ella suffers from long Covid and cannot leave her home for long. Her health condition strongly influences her employment opportunities despite her young age. Her income situation is highly precarious, as she can only survive through savings and her parents' help.

This type is younger people with chronic health problems (unrelated to age) who cannot engage in traditional employment patterns. They work on the platform because it is feasible and means they do not have to leave the house. They can survive thanks to other sources of income (partners, family), but they could not do it without them. This dependency is another source of precarity.

4.1.5. Type "Old, Health Issues, Monetary Dependent": Mischa (Microwork)

Mischa (F50) lives alone in her parents' house in Germany, which is too big for her. She has the right to live there for life since her parents died, although her sisters inherited the house. Her mental health problems (panic attacks) are a major reason for her daily platform activities. From 9.00 to 22.00, she looks for jobs simultaneously on four different microwork platforms. With her seven-day week, she earns about 500 EUR net per month. The effective working time is 4–5 hours daily, including much unpaid search work. She feels socially recognized in her work when she is paid and has the chance of receiving bonuses—which has only happened once. To some extent, she also "enjoys work." However, she receives little recognition from a friend for wasting her talent on such activities; she is told she is far too intelligent for such jobs.

For this type, platform work is precarious and frustrating, especially when unsatisfied clients deny remuneration for completed tasks or poorly communicate their tasks' requirements ahead of time. In such cases, workers' objections often go unheard by the platform, or it takes too long to be worth the effort and the low remuneration. The possibility of relying on platform income is further threatened by platforms suddenly closing workers' accounts without transparent explanations. More task offers and transparency in acceptance of the fulfilled work would be beneficial.

4.2. Quantitative Results

The surveyed sample is, on average, 37 years old and composed of 55% male, 43.8% female, and 0.2% diverse respondents (1% did not share the information). Almost half of the participants (49%) have obtained a university degree and report to be mainly employed (46%). The two most frequently reported social and occupational groups are self-employed (29%) and students (12%); the number of unemployed and retirees is low (3% and 2%, respectively; see more details in the Supplementary File, Table A1).

In our overall sample, 57% are covered by compulsory insurance. Significant differences arise between the categories (63% of microworkers and only 44% of macroworkers benefit from compulsory insurance). This relatively low number can be explained by high numbers of students (being co-insured) and freelancers who are without social security and retirees.

Asked about their motivation for working through an online platform, 71% of the sample reported that they were aiming to earn an additional income. The second most frequent motivation was temporal flexibility (64%), followed by the desire to try something new (57%). The possibility of working remotely was also appreciated, with 49% of respondents beginning work on platforms for spatial flexibility. Motivations beyond the monetary and working conditions emerge from the motivations that online platform work "is fun" (37%) and offers a "meaningful way to spend time" (35%). A fourth of the sample was looking instead to gain work experience, while 20% wanted to re-orientate themselves professionally (see Supplementary File, Table A2). Using the quantitative data, we show differences between and within the three categories of micro, meso, and macroworkers in platform income (aggregated for all online labor platforms), total household income, and the share of the platform income in the total household income. The latter captures "monetary dependency" from platforms. We show quintile cut-off points instead of means, as they are robust against outliers. Considering deciles

yielded similar findings, we opted to display quintiles for a clearer, aggregated overview.

Figure 1 shows the personal gross monthly incomes from working on digital platforms by quintiles for each category of platform worker. Comparatively, incomes are much higher for macroworkers than for the other two categories. However, income levels are relatively low, except for the top 20% of macroworkers. This suggests that most workers rely on something other than this income source since it cannot guarantee a living wage.

Figure 2 shows that monthly net household incomes from macro, meso, and microwork vary greatly within categories and less between them. This is surprising as microwork is often described as low-skilled, monotonous work supposedly done by people on low incomes. Contrary to this assumption, our results show that microworkers have similar net household incomes to macroworkers (even higher, as shown by the percentiles depicted in Figure 2).

In Figure 3), we quantify the dependence on platform income by calculating its share of total net household income. Our study determines economic dependency as being when at least half of the household income comes from platform work. As we show, this varies strongly within groups but even more between them. For macroworkers, more than 80% of the household income

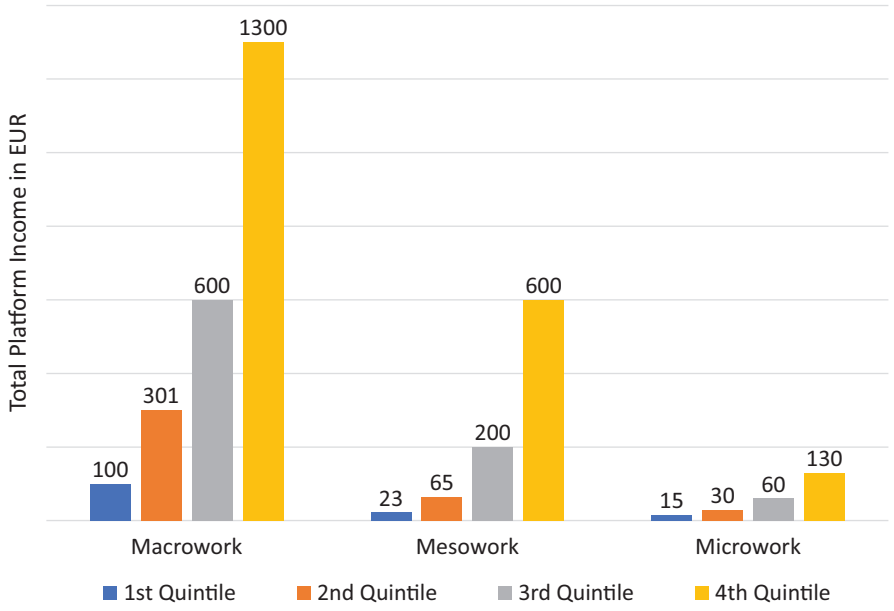

Figure 1. Worker's total digital platform income by platform category (in EUR).

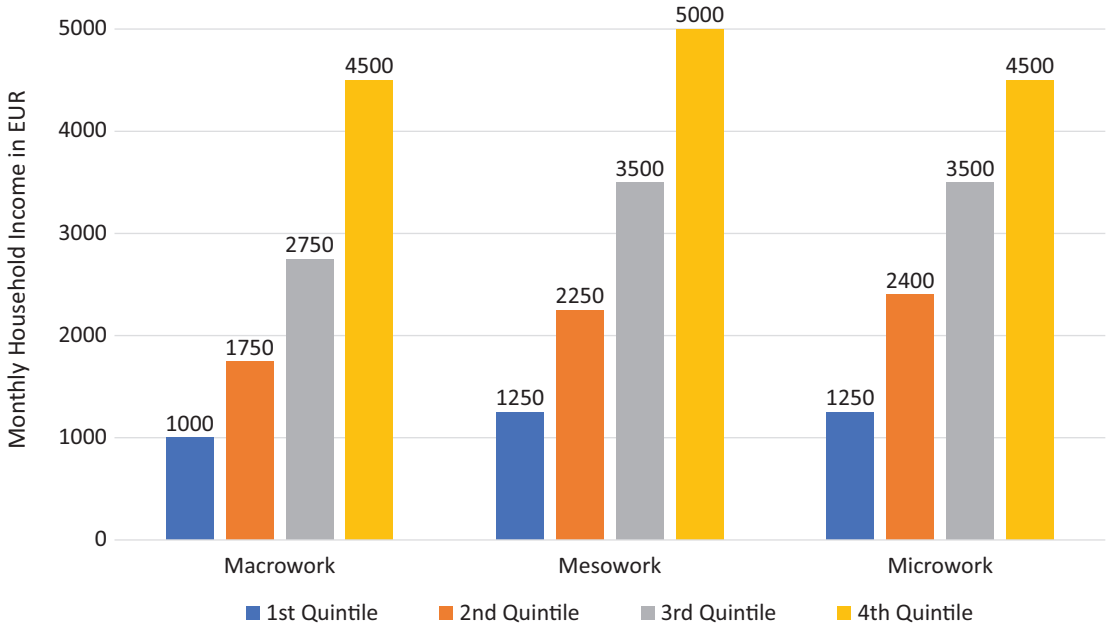

Figure 2. Monthly household income of workers by platform category (in EUR).

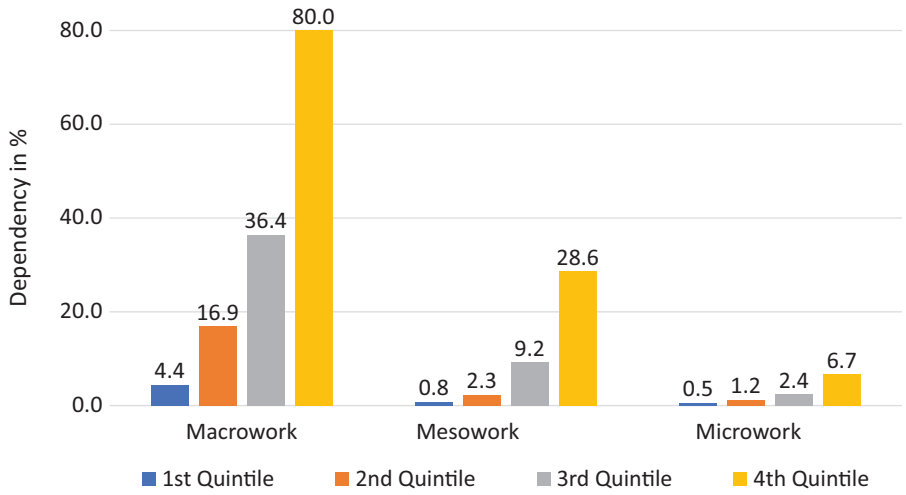

Figure 3. Share of platform income on total household income (in EUR).

of the top 20% of workers depends on platform work. Even the bottom 20% of macroworkers have a higher dependency than most microworkers. For microworkers, on the other hand, the top 20% depend on platform work for 6.7% of their income.

Overall, we can confirm the dependency thesis (Schor et al., 2020, p. 838), as most platform workers do not rely on platform work as their primary source of income. However, our study is not so easily comparable with Schor et al.'s (2020) results, as we use different concepts and research different populations (German-speaking online platform workers versus US-based platform workers).

5. Discussion

While studies on platform work emphasize both the curse and the blessing of platform work (e.g., Eurofound, 2021), the discourse on precarious conditions in terms of negative effects of algorithmic control or economic dependencies predominates (e.g., Krzywdzinski & Gerber, 2020; Rahman, 2021; Stanford, 2022). We aim to provide a more nuanced picture by focusing on German-speaking workers and arguing that social inclusion goes beyond simply looking at working conditions. The position of workers depends on a strong safety net that varies not only by the welfare state and labor market but also by the changing household situation over their life course. The dependency thesis (Schor et al., 2020) makes it possible to get a better analytical grasp of the heterogeneity of workers, as follows.

5.1. Monetary (In)Dependent Workers

Based on our qualitative interviews and the quantitative data with a sufficiently large sample, most workers only use platform work as a supplementary income and are thus not dependent on it. Workers tend to be highly satisfied and happy with platform work when there is more freedom of choice regarding jobs and total working hours. We found these positive examples of self-employment in all three categories, even within microwork. This is quite surprising, considering that many studies show that platform work has many different levels of uncertainty regarding income security, job availability, and control through algorithmic management (e.g., Glavin & Schieman, 2022; Huws, 2020).

However, some people are financially dependent on platform work, and our qualitative data offers insights into their experiences. They experience the pressure to succeed and accept all jobs and burdens in case of unexpected events (e.g., accidents, illness, living permanently without social security). This lowers the chances of a self-determined lifestyle. It is not only the platform conditions that are decisive but also whether workers can earn sufficient income to make a living. The preferred living place also plays a role (e.g., lower living costs).

Moreover, dependence is also related to recent trends in the unemployment rate and the likelihood of finding a new job in the regular labor market. Acceptance of a regular job also depends on the ability to do so; certain health problems or particular life situations only allow for flexible working hours and locations. It is interesting to note in this context that—according to our interviewees—the expanded possibilities to work from home impacted the labor market and the acceptance of telework during the Covid crisis. We interviewed young professionals such as Anita, who depends on the platform's income but is nevertheless satisfied with her overall life situation. Spatial flexibility allows for new lifestyles and freedoms, new fields of employment, and new working locations (e.g., on the beach). Short-term dependency at a certain stage of life (e.g., studies, childcare, health) is limited and has an end.

Other dependent people, such as Mischa, also rely on platform income and are in a precarious situation, yet they still deem platform work to be an improvement. Compared to her former employment as a cleaner,

which was physically exhausting, coupled with her mental health problems, platform work allows her to earn some money from home.

Apart from these advantages, there are also downsides, such as permanent insecurity and a lack of social security and labor laws. This comes with a heavy burden of financial risk, especially in the case of retirement or temporary inability to work, whether for health reasons (like Mischa and Ella) or simply due to a lack of employment opportunities. Next to the monetary significance of work, the question arises as to what forms of recognition the specific platform work offers.

5.2. Other Motivations and Social Recognition

Besides monetary reasons in the form of supplemental income, there are many non-monetary reasons to engage in platform work. They comprise building a social network, finding meaningful engagement from home, keeping brain cells in shape, fighting loneliness, or simply keeping oneself busy with productive activities. Another, even easier source of social inclusion lies in the fact that it is paid work. Since platform work is mostly part-time, the bar will likely be much lower than a regular job. Even small tasks are paid, proving they have value for someone. Ultimately, some platform workers argue explicitly that they are doing meaningful work by feeding artificial intelligence. We want to emphasize that the self-assessment and the assessment of others can differ significantly. For example, working from home risks isolation due to a lack of social contact at (or on the way to) work. Some respondents, however, do not see this as a problem but refer to other possibilities of social contact (including virtual spaces) or the additional time it allows them to spend with their family. Others even mentioned negative experiences at their previous job (e.g., bullying).

What makes online work of all kinds special are the nontraditional sources of recognition, such as user profiles and ratings (Klaus & Flecker, 2021). Platforms offer various forms of bonuses and rankings via "stars," "gold standards," or "levels" to value the quality and quantity of fulfilled tasks. These benefits could be seen as part of algorithmic management and indirect control (Alvesson & Willmott, 2002), but some workers also perceive them as a form of (artificial) recognition. For example, when explicitly asked if platform work provides recognition, Mischa mentions that she once received a bonus for completing microtasks. This surprised her and made her feel proud and appreciated for doing platform work. In general, reputation mechanisms and ratings as a form of algorithmic control (Wood et al., 2019) are a double-bladed sword. They provide feedback for the workers (and certain security for customers), but they cause stress and could lead to unfair treatment. After all, a majority (66% in microwork, 80% in macrowork) of the workers perceive reputation mechanisms as a form of recognition rather than a burden (Gerber, 2020, p. 188).

In short, personal circumstances and the respective sources of recognition vary greatly between cases and within and across micro-, meso-, and macro-platforms. From an outsider's perspective, platform workers are often pictured as suffering. In the interviews, however, the platform workers emphasize contradictory assessments: On the one hand, they feel pleasure in the online activity, a coping strategy to avoid cognitive dissonance—even clickworkers seem satisfied to a certain extent. On the other hand, they refer to shortcomings and pitfalls, such as the constant uncertainty of attractive and affordable tasks, paying taxes and social security contributions at their own expense, and controlling boundaries when they have to be available online 24/7.

6. Conclusion

Working on online platforms is an emerging area of non-standard employment that offers opportunities with relatively low barriers to entry. Work that is entirely flexible in terms of time and space can be attractive to people with poor opportunities in the traditional labor market, whether because they are ill, have limited mobility, or have caring responsibilities. The online labor market is especially important when other employment opportunities are lacking, whether for personal or structural reasons.

We have seen that the motivation to work through online platforms cannot be limited to monetary incentives. Our quantitative data shows that platform income only forms a significant part of household income for the higher-earning top 20% of macro workers. Surprisingly, the German-speaking micro-workers mostly do not need platform work. Moreover, since these tasks are low-paid, they could not make ends meet if working solely on platforms. In general, it remains a "winner-takes-all market" (Schor et al., 2020), as only a few have high hourly wages and earn a sufficient part of their household income with online platform work. The total monthly household incomes of micro, meso, and macroworkers are similar in amount and distribution. Especially in German-speaking countries, the platform economy works because it is *not* the primary source of people's income. Moreover, it can be argued that this kind of online work also holds the potential for social inclusion—at least as long as citizens can rely on a comparatively strong safety net.

Our analysis has shown that the relatively small amounts of economic dependence on platform work within our sample are accompanied by other motivations beyond looking at financial aspects. In this respect, the qualitative interviews were insightful and allowed us to trace various meanings and resources for social recognition. Platform work enables different types of participation in society. Some do it for fun, some as a mental workout, and some just to keep busy while spending time at home. As a productive activity with its own sources of recognition, it offers a fulfilling—or at least a gap-filling—experience of doing something meaningful. Again, this is

mainly independent of payments, which are usually very low or benefit only a tiny group of high potentials.

As a result, we argue that the discussion should not be limited to the monetary aspects by concluding with some insights into the relationship between the financial situation of platform workers and their value attitudes: People who work online as a hobby or as a kind of occupational therapy out of boredom are changing market conditions. They tend to do unpaid work and change work demands and evaluations, a key issue for labor control and algorithmic management. In principle, these "voluntary" workers create an oversupply of labor that depresses wages, increases competition, and fosters a demand for even poorly paid jobs.

Despite being involved in productive activities as a source of recognition, online platform work does not provide social security benefits as does traditional employment. This long-term problem of freeriding on the labor markets leads to a high risk of precarity. Even if it meets the needs of younger workers seeking spatial flexibility, it is a time bomb for retirement and social security in case of unemployment.

To conclude, online platform work is an opportunity but also a structural problem: For some workers who are not economically dependent on their online platform work, it acts like a hobby, leading to fewer paid employment opportunities for those who rely on it as an actual job.

Within the same task type and on the same platform, we find workers in highly precarious situations and others who do not rely on this additional income but are engaged in platform work for other reasons. This makes treating them as a group with similar interests extremely difficult. We need a better understanding of the social security preferences of online platform workers. Furthermore, there needs to be more long-term research on the employment biographies of platform workers: Who can use it as a bridge into the regular labor market, or as another success story in life, and who remains trapped in a precarious situation?

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Conflict of Interests

The authors declare no conflict of interest.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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About the Authors

Dominik Klaus studied socioeconomics and is pursuing his PhD in the sociology of work, for which he has received a scholarship from the Austrian Academy of Sciences. He worked as a research assistant at the Institute of Sociology (University of Vienna) and the Institute for Health Economics and Policy (Vienna University of Economics and Business). His research interests include recognition and new forms of employment, digitalization, and sustainable work. He is also a lecturer on the sociology of work, social policy, socioeconomic theories, and sustainability.

Barbara Haas is a habilitated sociologist. She teaches and researches at the Department of Socioeconomics at the Vienna University of Economics and Business on trends in gainful employment with a focus on empirical social research, especially mixed methods design. Her international research projects and publications deal with developments in gainful employment and working hours in an international comparison between welfare states. She is currently working on platform work and the challenges of ecological change for paid and unpaid work.

Maddalena Lamura studied socio-ecological economics and policy. Her main interests are interdisciplinary research on the future of work, just transitions, energy justice, energy poverty, and eco-social transformations. She is a research assistant at the Health Economics and Policy Unit, Department of Socioeconomics, focusing on quantitative methods.

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Article

Domestic Cleaners in the Informal Labour Market: New Working Realities Shaped by the Gig Economy?

Laura Wiesböck *, Julia Radlherr, and Mai Linh Angelique Vo

Institute for Advanced Studies Vienna, Austria

* Corresponding author (wiesboeck@ihs.ac.at)

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Abstract
Previous studies show that gig economy-based work opens up new ways in which inequalities are (re)produced. In this context, it is particularly important to look at female cleaners in private households, where gender inequalities intersect with other axes of disadvantage such as class, migratory experience, or ascribed ethnicity. This spatially and linguistically fragmented group presents challenges for scientific research, which is reflected in insufficient data available to date. The aim of the project GigClean—from which research for this article is drawn—is to address this gap. The guiding research question is: How do domestic cleaners in the informal labour market experience working in the gig economy? The methodological design consists of 15 problem-centred interviews with platform-based cleaning labourers in private households in Vienna, who predominantly operate in the informal economy. Our results suggest that undeclared domestic work via online platforms is associated with increased power gaps between workers and clients as well as changing working conditions to the detriment of cleaners. Specifically, three recurring themes could be identified: reserve army mechanisms; lookism, objectification, and sexual harassment; and information asymmetry and control.

Keywords
digitalisation; domestic cleaning; gender; gig economy; household labour; informal economy; labour market; platform work; social reproduction; Vienna

Issue
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1. Introduction

In contemporary capitalist societies, the provisioning of domestic work has undergone and continues to undergo substantial transformations (Adkins & Dever, 2016). These transformations include the commodification of domestic labour and its externalisation to lower social classes, blurring the boundaries between markets and households (Kofman, 2014). Considering that capitalism fosters a permanent crisis of social reproduction (Federici, 2020), short-term domestic fixes represent individual solutions to structural injustice while opening up new markets for profit by transforming household work into a commercialised service relying on cheap and flexible labour.

In the course of the growing marketisation, gig economy platforms have emerged as new players in the sector of domestic work and position themselves as mediators between service providers and service seekers (Bor, 2021; Hunt & Samman, 2020; Keller & Schwiter, 2021; Tandon & Rathi, 2022; Ticona & Mateescu, 2018). Thereby, a relation previously composed of two actors is extended to a triangular relationship consisting of for-profit companies, workers, and clients (Carvalho, 2019; Schmidt, 2017). Digital labour platforms play a crucial role in shaping consumer expectations and work relationships and carry the potential to reproduce, aggravate or alter power asymmetries (Barzilay, 2019). While previous studies show that work in the on-demand economy enables new ways of (re)producing inequalities, so

far little attention has been paid to platform-based working realities from a gender perspective. This is especially the case for cleaners in private households, where gender inequalities intersect with other axes of disadvantage such as class, migratory experience, or ascribed ethnicity (Palenga-Möllenbeck, 2022).

There are numerous challenges regarding social protection and occupational safety in this field. First, the cleaning sector is characterised by irregular working hours, low wages, and limited prospects for career advancement (Eichmann et al., 2014; Eurofound, 2014; Sardadvar, 2019; Schönherr & Zandonella, 2020). Second, given the missing co-presence of colleagues and the lack of social control in private environments, domestic cleaners find themselves in isolated and unprotected spaces (International Labour Organization, 2021; Sardadvar, 2022). Moreover, domestic service providers with limited access to social networks and the formal labour market are largely dependent on platforms to find clients. In addition, they face significant economic challenges and existential fears, considering, for example, the Covid-19 pandemic and its particularly severe impact on household employment opportunities (Sumalatha et al., 2021). Lastly, serious strains, such as language barriers (Gavanas, 2013), and work-related health problems, such as respiratory or skin diseases, are prevalent (Lee et al., 2021).

Overall, the fact that cleaning workers represent a spatially and linguistically fragmented group poses challenges for trade union strategies as well as for scientific research, which is reflected in the insufficient data available to date. Departing from this point, the research project GigClean was developed. The methodological design consists of 15 problem-centred interviews with female platform-based cleaners in private households in Vienna. The guiding research question is: How do domestic cleaners in the informal labour market experience working in the gig economy?

This article is structured as follows: First, we provide a brief overview of the need for research on domestic cleaning in the gig economy. We then present data and methods used for the study. Following from that, we illustrate our findings, which are organised around three themes: reserve army mechanisms; lookism, objectification, and sexual harassment; and information asymmetries and control. The article ends with a summary and conclusion.

2. Domestic Cleaning in the Gig Economy: The Need for Research

In recent years, gig economy-based labour has been on the rise (Kuhn, 2016). It is estimated that 1–3% of all paid work in advanced economies is mediated via digital platforms (Schwellnus et al., 2019). A study by Huws et al. (2019) on the role of platforms in 13 European countries found that between 4.7% (United Kingdom) and 28.5% (Czech Republic) of the working-age population regularly use digital on-demand companies to find work. In response to this development, various scholars examined the working conditions of platform labourers. So far, most studies focus on ride-hailers and food deliverers operating for companies such as Uber or Deliveroo (e.g., Haba, 2023; Ivanova et al., 2018; Katta et al., 2020; Tassinari & Maccarrone, 2020). Platform-mediated social reproductive work, such as domestic cleaning, however, has received comparably little attention in the literature to this date, reflecting an institutional gender bias (Ticona & Mateescu, 2018).

Given that gig economy platforms increasingly enter the field of domestic work (Blanchard & Hunt, 2022; Hunt & Samman, 2020; Tandon & Rathi, 2022), the question arises of how labour relationships between providers and seekers of household services are changing. Existing research in this field primarily highlights the implications of the design and functionality of cleaning platforms. For example, digital labour marketplaces can create substantial information asymmetries between domestic workers and clients (Rodríguez-Modroño et al., 2022). More specifically, customers receive personal details about workers, e.g., name, years of experience, or profile picture, whereas household labourers are primarily presented job-related information, e.g., location, date, time, and duration of the respective gig (Gruszka et al., 2022). That differs from platforms operating in other segments, such as ride-hailing, and is particularly noteworthy, considering that workers in the domestic sector operate in intimate unprotected spaces. This imbalance can be exacerbated by unidirectional rating systems. Scholars emphasise that numerous platforms enable customers to rate their experience with cleaners, while workers are not equipped with the same option (Bor, 2021; Gerold et al., 2022). Moreover, it has been highlighted that the algorithmic rationale on certain platforms pushes domestic workers to accept gigs regardless of the associated conditions, since otherwise, their future job opportunities might be negatively impacted (Schwiter & Keller, 2020). In sum, existing studies suggest that gig economy companies operating in the domestic service sector have the potential to aggravate existing inequalities between labourers and clients. Developing an understanding of the logics of platforms connecting service providers with service seekers is crucial since the layout and the algorithms of virtual marketplaces structure work relationships to a great extent. Additionally, it is essential to conduct in-depth analyses to understand how these conditions translate into the lived experiences of household cleaners.

This is especially the case with informal job arrangements. Digital for-profit companies can facilitate access to work and income for marginalised groups (Van Doorn, 2021) and foster the impression of formalising employment relations. In many cases, however, they solely provide a connective interface for clients and cleaners without getting involved in the nature of their labour relationship or committing to employer responsibilities (Bor,

2021; Koutsimpogiorgos et al., 2023). In fact, the circumvention of local labour market laws and social protection regulations is described as a key characteristic of digital for-profit platforms (Haidar & Keune, 2021). Thus, Rodríguez-Modroño et al. (2022, p. 619) suggest that gig economy companies operating in the domestic field "fit perfectly in an informal and devalued care sector," where working conditions are and continue to be characterised by precarity. Tandon and Rathi (2022) similarly regard the access to labourers through unregulated digital interfaces as a historical continuity of informal and exploitative working relations. Overall, the implications of gig work with regards to (in)formalisation are highly relevant to look at, not least due to the intensifying structural crisis of social reproduction (Fraser, 2017), and as unregistered work arrangements are expected to increase during periods of high inflation (Schneider & Boockmann, 2023).

With regard to around 6% of the working age population regularly providing services via platforms (Huws et al., 2019) and an approximate total of 900 million euros generated by undeclared cleaning work (Wenzel, 2019), it is particularly crucial to investigate the working realities of platform-mediated household cleaners in Austria. Estimates conclude that the majority of domestic cleaners in Austria work informally (Stadler, 2020, p. 6). In 2018, around one in seven households employed a domestic cleaner while 97% of them were hired through informal arrangements (Wiesböck, 2022). These numbers are not surprising, considering that only 64% of Austrians find undeclared labour in private households reprehensible (Eurobarometer, 2019, p. 93). Unregistered employment is associated with a lack of legal protection, collective bargaining and unionisation, insufficient job security and employer accountability, as well as limited access to labour and health insurance and pensions (Farinella & Arcidiacono, 2023). As profit-oriented platforms increasingly enter this largely unregulated segment, they carry the potential to reinforce and exacerbate prevailing conditions (Hunt & Machingura, 2016; Tandon & Rathi, 2021). However, research elucidating the experiences of gig-based household labourers operating on the informal market in Austria is lacking to this date.

Therefore, the aim of our study is to analyse the working realities of platform-mediated domestic cleaners in the Austrian capital Vienna, since gig worker supply tends to be highest in urban areas (Strüver & Bauriedl, 2022). Our focus on the experiences of labourers is in line with ideas by Van Doorn (2017) who highlights the gendered, racialised, and classed distribution of vulnerabilities associated with gig-based work and calls for the necessity of directly approaching platform workers in order to better understand their perspectives and needs. Empirically, our sample is based on cleaners registered on Betreut.at ("takencareof.at") and/or Haushaltshilfe24 ("householdhelp24"), two of the leading platforms for domestic services in Austria. Working experiences related to these digital for-profit companies are particularly relevant to look at as both firms operate on a subscription-based model, where clients and workers must pay a monthly membership fee. In contrast to commission-based platforms, these companies are not involved in the booking and payment process. Therewith, they lack a record-keeping system for completed gigs which entails additional security concerns for domestic cleaners.

3. Data and Methods

Our study comprises 15 problem-centred interviews (Witzel & Reiter, 2012) with female platform-based cleaners working in private households in Vienna, with a focus on labour in the informal sector. The interview technique has been selected to collect and reconstruct knowledge about "problems" from the perspective of interview partners. Five interviews were conducted between July and August and ten between October and December 2022. Interviewees were selected by purposive sampling (Patton, 2014; Robinson, 2014) based on heterogeneity in terms of age, citizenship, the platform provider used, and employment conditions (e.g., informal work, formal employment, or self-employment). This well-established recruiting method allows for the identification and selection of information-rich cases that indicate availability and willingness to participate in the study. To reach respondents, the project team registered on the two household service platforms Betreut.at and Haushaltshilfe24, and directly messaged cleaners with the request for an anonymous interview. All interviewees were offered an incentive of 20 EUR in cash.

Participants were provided the opportunity to be interviewed in their first language. For this purpose, the project team collaborated with native speakers who have a background in social science (Enzenhofer & Resch, 2011). Due to sufficient language skills of the domestic cleaners under study, the research team was able to conduct most interviews (13 out of 15) in German. However, given that, with one exception, none of the respondents are German native speakers, the interview setting may carry the risk of compromising quality and validity of data (Schembri & Jahić Jašić, 2022, p. 14).

As Table 1 indicates, the age of the participants ranges from 27 to 60 years. While most interviewees were born in Eastern Europe or the Balkans, a fifth of the respondents was born in Austria and a third holds Austrian citizenship. In terms of the level of education, half of the participants graduated from high or secondary school, one person completed compulsory school and a third holds a university degree. The hourly wage indicated on the platforms amounts to 15,50 EUR on average. With regards to the employment form, five of the interviewees work exclusively in the informal market, while six persons combine informal and formal arrangements. The remaining four participants carry out registered work, either in the form of regular employment or self-employment.

Table 1. Sample.

Name	Age	Place of birth	Citizenship	Years in Vienna	Children	Level of education	Platform	Hourly wage in euros
Marta	60	Austria	Austria	41	2	Tertiary	Haushaltshilfe24	12
Valeria	56	Hungary	Hungary	12	2	Upper secondary	Haushaltshilfe24	15
Karla	23	Poland	Poland	1	—	Tertiary	Haushaltshilfe24	Any
Anna	33	Hungary	Hungary	4	1	Lower secondary	Haushaltshilfe24	10
Kamila	42	Bosnia	Croatia	3	1	Upper secondary	Haushaltshilfe24	30
Liana	28	Albania	Austria	10	—	Upper secondary	Betreut.at	12
Katarina	32	Austria	Austria	32	2	Upper secondary	Betreut.at	17
Anastasia	27	Georgia	Georgia	8 months	—	Tertiary	Both	17
Gorana	32	Bosnia	Bosnia	10	3	Upper secondary	Both	15
Dilara	44	Austria	Austria	44	3	Upper secondary	Haushaltshilfe24	20
Darja	27	Ukraine	Ukraine	4	—	Tertiary	Haushaltshilfe24	15
Fatima	52	Russia	Russia	22	2	Upper secondary	Betreut.at	15
Nika	27	Georgia	Georgia	5	1	Tertiary	Betreut.at	15
Jelena	28	Serbia	Austria	6	—	Post-secondary non-tertiary	Betreut.at	15
Caecilia	38	Armenia	Greece	5 months	—	Upper secondary	Betreut.at	10

Note: All names have been pseudonymised; hourly wage as indicated on the gig economy platform.

The interviews cover important points of the social and economic process of domestic cleaning in the gig economy. The interview guideline was divided into thematic modules and compiled questions on respondents' working conditions, professional biography, financial situation, experiences with clients and the platform, health status, social networks, and support systems, among others. Even though the interviews were thematically structured, participants were encouraged to set their own narratives about significant events in their professional lives.

All interviews were recorded and transcribed, and personally identifiable information was altered or respectively replaced with pseudonyms. The interviews were analysed according to qualitative content analysis (Schreier, 2012, 2014) applying a deductive-inductive approach. The analysis aimed to develop thematic codes and compare passages with similar topics spread throughout interviews. The passages were then tied together, leading to the final step of the analysis: the conceptualisation and theoretical generalisation of the material. In the following section, the results are presented.

4. Working On-Demand: One-Sided Distribution of Risks and Responsibilities

4.1. Reserve Army Mechanisms

As Van Doorn (2017, p. 904) highlights, the platform economy "thrives off a surplus population of underemployed gig workers whose fungibility and superfluity is orchestrated through digital platform architectures." Our study results indicate that the visible oversupply of labourers on the platform websites indeed contributes to reserve army mechanisms and therewith to increasing competition among domestic workers. This, in turn, increases wage pressure and underpayment, as reflected in the following passages:

> There are many of us…there are an awful lot of people….It is terrible how many people there are, all sorts of nationalities. And the problem is that I see people taking jobs for nine, ten euros. (Valeria)

> If you tell them nine, ten euros per hour, they still want to bargain down. (Liana)

> I could take more, I've already gotten more [than ten euros] from several people, but I deliberately don't do it, because generally people just scroll further and look for someone for less money. (Anna)

By encompassing a large pool of workforce, platforms do not only enhance competitive relations among labourers (Vallas & Schor, 2020) and incentivise low wage rates but also create a culture of exchangeability. In fact, the prevalent reserve army mechanisms enable clients to dismiss and easily replace workers at any time. The constant pressure and threat of being substituted pose existential challenges for platform labourers, e.g., in case of illness or non-immediate reply to messages and requests:

> You are really powerless when you are sick. If you cancel once, if you are sick, there are people who do not like it. Then they immediately look for someone else. (Anna)

> The clients, they sometimes write to ten, fifteen people and take those who answer the fastest. If they [the workers] do not fit after all, they simply take others. (Anna)

Since labour-related risks are not carried by clients or the platform but entirely by the disposable workforce, domestic cleaners are put on call for gigs that could be cancelled at the last minute:

> I came…but he texted me: "Ah, sorry, I'm in a restaurant with a friend, come to this place, I'll give you the keys."…And I also had a situation where I drove to someone's house and the person texted me: "Sorry, I changed my mind." (Karla)

Given cost-of-living pressures, a short notice cancellation can have severe implications for cleaners, in particular the loss of time, transportation costs, and hourly pay. While in many formal service job settings a cancellation fee is required to compensate for the financial loss, no remuneration options are offered to workers in the informal sector. Overall, reserve army mechanisms and access to a large pool of potential labourers on the platform websites can considerably alter dynamics of power compared to traditional informal work relationships in this field, e.g., when access to domestic cleaners relies on recommendations from friends and acquaintances. Additionally, both clients and platform companies profit from transferring full responsibility, costs, and risks of employment onto workers, including lost revenue, liability for physical harm, damage to equipment and property, coverage between gigs, or financial malfeasance by customers (Vallas & Schor, 2020, p. 280). This renders the already marginalised group of household labourers even more vulnerable. Given the uneven distribution of power, female cleaners are at high risk of being exposed to abuse and unwanted sexual advances, as illustrated in the following section.

4.2. Lookism, Objectification, and Sexual Harassment

Numerous studies have revealed that domestic workers frequently experience sexual harassment (Figueiredo et al., 2018; Ribeiro Corossacz, 2019). While in general a significant share of women does not report assaults to the police due to the fear of not being believed and the stigma associated with being a victim of sexual crime (Landström et al., 2016; Perilloux et al., 2014), domestic cleaners face additional systemic barriers to act against abusive behaviour, such as a lack of language proficiency and knowledge of their rights or fear of legal institutions (Papadakaki et al., 2021). At the same time, inequalities, such as gender, class, and dependency on income from unregulated work, put them at greater risk of facing harassment (International Labour Organization, 2021), which is also reflected in our study:

> The man said…"Why don't you want to earn more money like that?" With cleaning you earn ten euros per hour. And he said: "Okay, I'll pay you fifteen but give me, like, this massage or something."…And he said: "Take this oil and do something. But not just massage, a little bit of massage, a little bit of play." (Darja)

> I don't know why it is so common at the moment, but I heard it from many people and then I [had] the same experience: Someone texted me if I could send my underpants and he would give me money. (Anastasia)

> Men have written to me: "Ah, you are mega cute" with a heart emoji or something….It was such old men too. So many….One asked me if I'm, like, really cleaning or why [am I] there. And then I asked: "Yeah, I'm there because of that, I'm looking for [a] job. And what are you looking for?" He wrote: "Yes, I am looking for something else." And I didn't write anything [else], and then [in the] next few days he wrote [asking] if I have breast milk or something. (Nika)

Other experiences made by the interviewees under study include requests for cleaning naked, in shorts, underwear, or tights, demands for sending nudes, unwanted masturbation content, constantly being stared at while working, clients openly talking about sexual fantasies, invitations to have drinks together, and clients asking them to move in with them. Such degrading and objectifying actions are clear violations of workers' integrity and personal space. According to the interviewees, some users registered on the platform are not looking for domestic service but rather for sexual encounters with domestic service providers. This needs to be seen in the light of the hierarchical nature of the informal setting as well as the enduring cultural-historical stereotyping,

fetishisation, and eroticisation of "cleaning ladies" and "maids" in mainstream films and porn culture (Delap, 2011; Wade, 2013). Additionally, it is important to point to the portrayal of workers on the platforms' websites, where the visual presentation of labourers is prioritised, in the sense that their portrait photos take up the largest share of their profiles (Wiesböck, 2023). This can lead to the promotion of the idea that attractiveness and self-presentation skills are key selection criteria for clients:

> There are people who do this for a few months and never get a message. But it wasn't like that for me. And that's why I think it was because of the picture. So, my face is a bit childlike in this photo, and at that time I was so cute. And I think that's why. (Nika)

> Sometimes men write to me that I'm pretty or that I'm too pretty to clean….Sometimes some of them say: "Ah, then we'll take her because she's well-groomed," you know, that's how they assess it, right? (Karla)

The passages reflect that cleaners under study are confronted with and aware of lookist practices (Warhurst et al., 2009) and the expectation of digitally portraying their physical appearance in appealing ways to increase their chances of receiving requests. Altogether, the accounts of objectification and the experiences with customers looking for erotic encounters on the platform reflect the symbolic and material violence that cleaners face (Zulfiqar & Prasad, 2022) as well as their lack of power to fight abusive behaviour online and on site. This is particularly notable considering that both digital platforms do not provide any option to report or combat inappropriate conduct and harassment from clients, as described in the following section.

4.3. Information Asymmetry and Control

Subordination, imbalance of authority, proximity to and direct reliance on the employer are common characteristics of the relationship between domestic workers and their employers (UN Women, 2020, p. 19). Such power asymmetries are also reflected in the website design of the two platforms, where customers receive detailed personal information about cleaners, while workers are only informed about gig-related data. This goes in line with previous research in this field (Gerold et al., 2022; Gruszka et al., 2022) and can leave domestic service providers uncertain about who is sending the request:

> What really bothers me is that you don't always know who you're dealing with. (Anna)

> For example, some people don't have a profile picture….They want information, such as your CV or phone number, but you yourself don't know what's going on. (Caecilia)

According to Maffie (2023), withholding information from workers can be understood as a market mechanism that gig economy platforms use to cultivate worker dependence. Those hierarchies can be enhanced and expanded through one-sided rating systems which exclusively ask workers to prove their trustworthiness. Such unidirectional rating techniques are frequently observed among gig economy firms in the domestic sector (Bor, 2021; Gerold et al., 2022; Rathi & Tandon, 2021). The subscription-based platforms Betreut.at and Haushaltshilfe24 operate in the same manner. Both designed their website in a way that all users registered as clients are enabled to rate domestic workers based on a five-star rating system—regardless of whether they booked their cleaning service or not. This grants customers a high degree of immunity (Van Doorn, 2017, p. 898). At the same time, it puts pressure on gig workers to fulfil and comply with expectations that go beyond the household labour itself, such as the timeliness of responding to requests:

> If I cannot answer someone, because I did not notice [their message], they write a review….And then they just give one star….And that is my life and that is my work and my profession at the moment, and you, you ruin everything just for an unanswered message. (Anastasia)

> You can just give a bad rating just to annoy someone, even though it's not true. I cannot delete it after all, right? I mean it is visible for all the others then. Yes. And that is actually bad for my profile. (Dilara)

One-way rating mechanisms give any platform user registered as a client the power to impact domestic workers' opportunity structures for future gigs and threaten their ability to continue finding jobs (Tandon & Rathi, 2022, p. 14). Therewith, platform-based reputation systems are a form of digital control (Wood et al., 2019) aiming to structure the behaviour of the workforce in a way that customers' opinions and wishes dictate how work is done (Fuller & Smith, 1991). Algorithmic management techniques in the gig economy enforce this control over workers through sanctions and rewards (Newlands, 2023; Wood et al., 2019), fostering the expectation of continuous digital availability, which then becomes a new job requirement for domestic low-wage workers:

> I try to reply and it happened to me once or twice that a lady wrote to me and I was stressed and I didn't reply that day and the next day I go to the platform, and she deleted the message. I could not answer, yes. I was at work. (Kamila)

> In my private time, yes. When I see an email, I immediately look at it, even [during] my working hours, in my real job I do it too, I look to be able to see what the

customer has written or to be able to answer quickly. (Katarina)

Keller (2022) similarly highlights the anticipation of constant availability and describes it as an encroachment on workers' lives. The dissolution of boundaries in terms of working time, the accelerated pace and expectations of unlimited accessibility, and the permanent "being on call" for new gig possibilities may not only contribute to inequalities between workers with and without elaborate German language skills but also create interaction and availability overload as well as technostress (Borle et al., 2021; Chiappetta, 2017). Given that household workers operate in private spaces and are mostly excluded from labour rights and protections common in other workplaces (Marchetti, 2022), trust-signalling criteria and tools to evaluate clients would be of particular relevance. The one-sided rating functions reflect unequal terms between the parties involved and put platform workers at an unfair disadvantage and security risk. Altogether, these power imbalances result from strategic design decisions of gig economy platforms and carry the potential to alter the landscape of domestic labour with crucial implications for working conditions.

5. Conclusion

This article aims to shed light on the working realities of domestic cleaners in the digital gig economy in Vienna, who predominantly operate in the informal sector. Overall, our results point towards increased power gaps between workers and clients as well as changing working conditions to the detriment of cleaners.

In terms of labour conditions in the on-demand economy, the study offers insights into reserve army mechanisms that are reinforced by the visible oversupply of profiles on digital platforms. Such dynamics can lead to wage degradation, the pressure to immediately respond to requests, and the threat of being permanently replaced if workers are forced to cancel a gig, e.g., due to illness. The unilateral shift of entrepreneurial responsibilities and risks to domestic service providers results in a range of advantages for clients and gig economy platforms, especially the exemption from costs in the case of partial or complete service cancellations from their side. However, for marginalised and unprotected low-wage workers in the informal labour market segment, this subjectification of work and the increasing requirements and demands related to platform work can severely impact their ability to plan and predict their monthly income and renders the organisation of their daily work routines a challenging task.

A further aspect contributing to arduous working conditions are regular experiences of objectification and sexual harassment both virtually and on site. In general, service providers in private households are exposed to this form of violence to a large extent (Figueiredo et al., 2018; Papadakaki et al., 2021; Ribeiro Corossacz, 2019). Working in the gig economy can expand the risk for cleaners of experiencing sexual harassment to the digital space. Due to the privacy of the domestic work environment, the informal setting of the labour relation, and the lack of support from platforms regarding safety and protection, it is particularly difficult to prevent, expose, and fight mistreatment and exploitation in this labour market segment. Related to that, interviewees perceive a growing importance of their visual appearance for job opportunities. Such experiences with lookism appear to be reinforced through the design logic of the platform websites and constitute an additional form of labour market discrimination for domestic cleaners. Taken together, home-based reproductive work has to be seen as an articulation of race, class, and gender inequalities, in which images and practices of degradation are pervasive, including aspects of sexualisation that are historically linked to domestic servitude (Mayer, 2021).

Finally, serious information asymmetries and control mechanisms between customers and cleaners are created by the subscription-based platforms. Whereas workers primarily receive job-related information, service seekers are provided with person-specific details about cleaners. In addition, the opportunity to rate the experience with service providers is restricted to users registered as clients—irrespective of whether they purchased a service or not. In practice, these evaluations do not always reflect the subjectively perceived quality of the cleaning service. For example, cleaners under study also experience being evaluated negatively if they do not respond promptly to requests from clients. In this respect, (potential) customers are granted significant and lasting power to structure prospective job opportunities for workers (Hertwig & Papsdorf, 2022). One-way evaluation systems of this kind do not only serve quality control and matching purposes but are part of a broader shift in the exercise of control over workers who operate "under a regime of structural domination" (Flanagan, 2019, p. 71). As such, they serve a disciplining function, ensuring that workers behave in a "socially desirable" manner, considering that the acquisition of future gigs depends on their online ratings (Gandini, 2019). Consequently, generating a subordinate position and deferential setting on the part of domestic workers reaffirms power status of clients and platforms alike.

Altogether, our study results provide further evidence that gig economy companies do not act as neutral intermediaries or matchmakers, but actively influence work processes and opportunities through forms of control to the benefit of customers and their own interests. Digital enterprises are vital in (re)producing sets of norms and ideas around domestic service and shaping conditions and practices within work relations. Platforms and clients exert authority over labourers through embedded tools and technologies such as ratings, information asymmetries, and algorithmic monitoring, thus restricting workers' autonomy and bargaining power (Anwar & Graham, 2020; Gandini, 2019). For the

economically and socially marginalised group of female cleaners, the use of platforms may not only imply intensified wage pressure and unsafe working conditions but also extended job requirements including digital availability and self-presentation skills. Such dynamics can contribute to new professional standards in the informal low-wage sector, namely the orientation towards a digital entrepreneurial self (Bröckling, 2015).

Overall, it is crucial to consider the externalisation and marketisation of domestic work as a symptom of the structural crisis of social reproduction inherent in late capitalist economic systems (Federici, 2020). Profit-oriented gig economy platforms make use of this social malaise to realise new surplus opportunities in a largely unregulated market that is mainly occupied by a female migrant workforce under precarious conditions. This "care fix" (Dowling, 2022) allows for the continuous pursuit of profitability, sustains the gendered division of domestic chores, and signifies an ongoing coloniality of labour (Gutiérrez-Rodríguez, 2010, 2014). Platform-based household work thus becomes a "hyper-commodified form of labour" (Wood et al., 2019) and the domestic service market a site of multiple exploitations, in many cases perpetuating economic inequalities as well as gendered class dynamics (Haas, 2001). Accordingly, in addition to a comprehensive scientific inquiry, substantial supranational regulation on workers' rights regarding the provision and purchasing of domestic labour is essential.

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Conflict of Interests

The authors declare no conflict of interests.

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About the Authors

Laura Wiesböck (PhD) is a senior researcher at the Institute for Advanced Studies Vienna. She holds a doctorate in sociology from the University of Vienna. Throughout her academic career, she has also studied, conducted research, and/or taught at Oxford University, CUNY Graduate Center, University of Ghana, and National Taiwan University, among others. Her research interests lie in the intersection of labour market, poverty, and gender. The sociologist was granted several prizes in recognition of her academic work.

Julia Radlherr (MSc) is a researcher at the Institute for Advanced Studies Vienna. She holds a master's degree in socio-ecological economics and policy (SEEP) from the Vienna University of Economics and Business and earned her bachelor's degree in politics, psychology, law and economics (PPLE) at the University of Amsterdam. Her research interests include the societal organisation of social reproduction and (un)paid work with a focus on gender and social inequality.

Mai Linh Angelique Vo (BA) is a student assistant at the Institute for Advanced Studies Vienna and currently completes her master's degree in sociology at the University of Vienna. She holds a bachelor's degree in sociology with a minor in art, music and theatre from the Ludwig Maximilian University of Munich. Her research interest lies in the field of social inequality, especially with regard to gender and migration. In her master's thesis, she analyses belonging in the context of migration and intergenerational transmission.

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Article

The Digitalization Boost of the Covid-19 Pandemic and Changes in Job Quality

Teresa Sophie Friedrich * and Basha Vicari

Institute for Employment Research (IAB), Germany

* Corresponding author (teresa.friedrich@iab.de)

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Abstract
The Covid-19 pandemic caused a digitalization boost, mainly through the rise of telework. Even before the pandemic, advancing digital transformation restructured the way of working and thereby changed the quality of jobs—albeit at a different pace across occupations. With data from the German National Educational Panel Study (NEPS), we examine how job quality and the use of digital technologies changed during the first pandemic year in different occupations. Building on this, we analyze change score models to investigate how increased workplace digitalization connects to changes in selected aspects of employees' subjective job quality. We find only a weak association between the digitalization boost in different occupational fields and the overall decrease in subjective job quality. However, telework—as one aspect of digitalization—is connected to a smaller decrease in work–family reconciliation and conformable working hours. Thus, it may buffer some detrimental pandemic effects on job quality. In addition, telework is connected to increased information overload, creating a new burden for specific employee groups.

Keywords
digitalized workplaces; information overload; job quality; occupations; telework; work autonomy

Issue
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1. Introduction

Employees, firms, and society benefit from good working conditions. High job quality is not only associated with higher engagement, better mental and physical health, and well-being of employees but also with enhanced performance of firms and higher labor market participation (e.g., Arends et al., 2017; Bakker & Demerouti, 2017; Eurofound, 2021; Muñoz de Bustillo et al., 2011). Consequently, improving job quality across countries, sectors, and occupations became a national and international public policy goal to, for example, enhance the labor force in societies with a shortage of skilled workers (BMAS, 2020; Cascales Mira, 2021; Cazes et al., 2016; Kortmann et al., 2022). There are several main drivers for the continuous evolution of the way of working, and digital transformation is one crucial among them (Eurofound, 2021).

In the course of increasing digitalization in the workplace and the mass dissemination of telework, digital communication, and digital collaboration during the Covid-19 pandemic (Adams-Prassl et al., 2022; Bellmann et al., 2021; Hansen et al., 2023; OECD, 2021), the association of digitalization and job quality has received great research interest (Hipp & Krzywdzinski, 2023; Laß et al., 2023; Senik et al., 2022; Wöhrmann & Ebner, 2021). This pandemic-driven digitalization boost provides scholars with the unique opportunity to study the positive and negative effects of rapid workplace digitalization on several aspects of job quality. In particular, daily working conditions—one of the various facets of job quality—such as communication, working time arrangements,

autonomy, or work-life reconciliation changed from one day to another during the pandemic.

Job quality, however, is a broad concept that encompasses multiple objective and subjective features of working and employment conditions (Cascales Mira, 2021; Muñoz de Bustillo et al., 2011; Reimann & Tisch, 2021). The pre-pandemic correlations between digital transformation and objective aspects of job quality, such as job security and earnings, have been extensively investigated. For example, there is empirical evidence that automation and the use of information and communication technologies (ICT) influence earnings or the risk of unemployment (Damioli et al., 2021; Dengler & Gundert, 2021; Kristal, 2020). Moreover, advancing digitalization changes job tasks and skill requirements within occupational profiles (Arntz et al., 2017; Dengler & Matthes, 2018). Thus, the resulting debates revolve around the "disruptive social and economic consequences" (Dengler & Tisch, 2020, p. 428; Müller et al., 2021) of digitalization for developments in the world of work. In addition to the objective aspects of job quality describing bundles of observable job characteristics, a subjective perspective considers employees' assessment of job characteristics and to what extent these characteristics meet individual needs, preferences, and experiences in the job (Kortmann et al., 2022).

The subjective perspective of job quality is far less explored, and more comprehensive evidence is needed on positive and negative experiences and subjective evaluation of working conditions associated with digitalized work environments (Kirchner et al., 2023; Kortmann et al., 2022; Reimann & Tisch, 2021). On the one hand, the technostress literature deals with this relationship, emphasizing the downside of exposure to new technologies, such as work intensification, an increase in time pressure and interruptions, information overload, boundaryless work, or a decrease in mental health (e.g., Borle et al., 2021; Chesley, 2014; Lordan & Stringer, 2022; Meyer et al., 2019; Tarafdar et al., 2015). On the other hand, optimistic perspectives of technological transformation highlight that workplaces also become more flexible in time arrangements, safer, socially inclusive, or physically less demanding (e.g., Andries et al., 2002; Bolli & Pusterla, 2022; Dengler & Tisch, 2020; Dragano & Lunau, 2020; Kirchner, 2015; Pfeiffer, 2012; Reinert, 2016). However, these studies often investigated the association between digitalization and job quality for a specific group of employees, a particular firm, or an industry. For example, Kirchner et al. (2023) find a correlation between digital technologies and decreases in work autonomy ("digital Taylorism") for jobs with production and service tasks and an increase in digital self-determination for jobs with knowledge-related tasks.

Apart from different exposures to digitalization in specific industries or technology-related task-performing groups of employees, there are also considerable variations in the dissemination of digitalization across occupational fields (cf., Dengler & Gundert, 2021; Kortmann et al., 2022). Hence, considering occupations may be crucial to address the heterogeneity of digitalized workplace experiences. Moreover, many studies only proximate workplace digitalization by either the use of computers or ICT (e.g., Andries et al., 2002; Bolli & Pusterla, 2022; Borle et al., 2021; Chesley, 2014; Dragano & Lunau, 2020; Kirchner, 2015; Kirchner et al., 2023; Kristal, 2020), which captures only some aspects of digitalization and thereby excludes most blue-collar jobs, or by occupational substitution potentials (e.g., Dengler & Gundert, 2021; Dengler & Tisch, 2020; Kortmann et al., 2022; Müller et al., 2021), which rather represents an outcome of the digital transformation.

Against this background, we aim to answer the following research questions: (a) Did workplace-related digitalization and subjective job quality change during the Covid-19 pandemic? (b) Is there any association between the level of digital transformation and subjective job quality? Moreover, we assess these two research questions in light of the varying progress of digital transformation in different occupational fields to capture the variance in levels of digital dissemination. By investigating these research questions with an occupational focus, our study contributes to a better understanding of the association between advancing digital transformation and changes in subjective job quality in a heterogeneous labor market. Thus, we extend previous research in multiple ways:

First, we use data from the adult survey of the German National Educational Panel Study (NEPS-SC6), which provides several measures for workplace-related digitalization and job quality and for further individual and employment-related information. Thus, we examine a novel, direct indicator for digitalization that captures the usage of technologies of varying complexity (Friedrich et al., 2021). Although this measure cannot objectively quantify the degree of workplace digitalization, it reflects the extent to which new technologies confront employees.

Second, with this annual panel, we benefit from comparing digitalization and several indicators for subjective job quality over two survey waves. One was collected right before the Covid-19 pandemic, the other one year later after the digitalized communication and telework boost. The data also allow for selecting and monitoring changes in subjective job quality aspects that we assume have been most affected by the pandemic. Thus, we can highlight how workplace well-being has developed during this challenging period. Accordingly, we apply change score models to examine how the intrapersonal change in exposure to workplace digitalization is associated with a change in subjective job quality aspects. Therefore, our study moves beyond previous research mainly based on cross-sectional data.

Third, we include an indicator for telework in our models, which enables us to disentangle the association between experienced changes in working conditions and the broader concept of digitalization on the one hand

and the pandemic-related rapid boost in telework on the other hand. Considering telework discretely from digitalization is particularly interesting in the German context, in which digital transformation was somewhat lagging before the pandemic but where firms massively invested in remote infrastructure during lockdowns when a telework obligation was introduced for all eligible jobs (Adams-Prassl et al., 2022; Bellmann et al., 2021; Hansen et al., 2023). Consequently, there was an almost tenfold rise in telework usage after starting from low numbers (Wöhrmann & Ebner, 2021), and even today, the share of telework is above the European average (Aksoy et al., 2023). However, digital transformation and telework adoption have remained very different across occupations. For this reason, we analyze the association separately for occupational fields—a rough aggregation of similar occupations into nine groups because running analyses for every single occupation would exceed our study—and thus capture the differentiated structure of the German labor market during the pandemic-driven digitalization boost better.

2. Previous Research

2.1. Measuring Subjective Job Quality

Digital transformation entails a permanent change in business organization and restructuring of work processes. On the individual level, this transformation influences aspects of daily working and employment conditions in positive and negative ways. Therefore, policymakers and organizations set it on their agenda to create better jobs (Cascales Mira, 2021; Kortmann et al., 2022). Thus, what makes a good job?

Although scholars disagree on a standard definition of job quality, they describe it as a multidimensional concept that refers to a variety of job attributes, all of which relate to the well-being of employees (e.g., Cascales Mira, 2021; Eurofound, 2021; Muñoz de Bustillo et al., 2011) or their productivity (Arends et al., 2017; Bolli & Pusterla, 2022; Tarafdar et al., 2015). Depending on the framework for measuring job quality, there are observable, objective aspects such as earnings, job security, career prospects, or working time arrangements, and subjective aspects focusing on employees' evaluation of their job's nature (Kortmann et al., 2022; for an overview see Cazes et al., 2016). For measuring job quality, Muñoz de Bustillo et al. (2011) proposed using a composition of indicators that clearly and directly impact employees' well-being beyond the oversimplified measure of job satisfaction. However, while Eurofound (2021) establishes a job quality framework that includes predefined working and employment conditions indicators to monitor trends across European countries, scholars choose individual key indicators for their research (Cascales Mira, 2021).

In our study, we focus on those aspects of subjective job quality that we regard as key at the onset of the Covid-19 pandemic. In Germany, the massive implementation of short-time work—a government-subsidized scheme to temporarily reduce regular working hours—preserved many jobs (Bauer & Weber, 2021), and lockdowns were less strict than in other countries, so one of the most severe changes in daily working life was the obligation to work from home if the nature of the job permitted it (Hipp & Krzywdzinski, 2023). For working parents, telework was often complicated by caring for their children during work due to daycare and school closures (Zoch et al., 2022). Considering these circumstances, we chose four indicators for our study: comfortable working hours, work–family reconciliation, autonomy, and information overload, which we assume are crucial to evaluating subjective job quality. We can subsume all these aspects among working conditions, directly translating into employees' well-being. According to Muñoz de Bustillo et al. (2011), such working conditions are, together with employment conditions, the core dimensions of job quality.

2.2. Subjective Job Quality and Digitalized Workplaces

Previous studies have revealed many benefits and drawbacks of digital transformation for employees' working conditions. For instance, ICT use and digitalization are seen as essential drivers of the flexibilization of working time arrangements, which in turn is found to be positively associated with a good work-life balance and high job satisfaction (Dengler & Tisch, 2020; Kortmann et al., 2022; Reinert, 2016). In our study, we consider a subjective evaluation of the employee's working time, measuring whether they perceive their working hours as comfortable. To our knowledge, there is no literature on how comfortable working hours connect to digitalization. However, in line with the findings for working time arrangements, this indicator should also be positively associated with advancing digitalization. In addition, digitalization is also positively connected with an increase in work-life balance, resulting from more flexible working time. As workplaces are embedded in social contexts, work and family life reconciliation is seen as an essential part of work-life balance that may benefit from digitalization (Muñoz de Bustillo et al., 2011; Pfeiffer, 2012). We assess that these two aspects enhance subjective job quality.

The literature on digitalization's effect on job autonomy is more controversial (Kirchner et al., 2023). Higher job autonomy, meaning the freedom to decide when to do what, is associated with less job strain and, thus, well-being (Chesley, 2014). Nevertheless, there is evidence that the link between autonomy and well-being is not uniform. Too much autonomy can lead to work intensification and permanent availability, which is more likely in digitalized workplaces (Gerten et al., 2018). Generally, digital workplaces involve greater job autonomy (Andries et al., 2002; Kirchner, 2015; Meyer et al., 2019). However, again, this association is ambiguous. It depends on the task domain whether job

autonomy increases or decreases with digital transformation (Kirchner et al., 2023).

Finally, as the technostress literature highlights, digitalization is connected to an increase in work intensification, time pressure, interruptions, information overload, and boundaryless work (e.g., Borle et al., 2021; Chesley, 2014; Lordan & Stringer, 2022; Meyer et al., 2019; Tarafdar et al., 2015). This deterioration in working conditions is mainly a result of the acceleration of work and communication processes and raises employees' stress perception (Borle et al., 2021; Meyer & Hünefeld, 2018; Pfeiffer, 2012).

2.3. Subjective Job Quality and Telework

There is not only an ongoing public debate about the impact of digital transformation on employment and working conditions. Additionally, how teleworking influences employees' well-being was the subject of political and scientific debates long before the pandemic (Wöhrmann & Ebner, 2021). Some effects point in the same direction; others contrast digitalization and telework. Scholars have identified increased flexibility in working time and improved work–family reconciliation connected to telework (Pfeiffer, 2012; Sardeshmukh et al., 2012). Although telework seems to enhance job satisfaction, it also involves specific demands, which have become apparent during the widespread use of telework in recent years (Hipp & Krzywdzinski, 2023). These are reduced interactions with coworkers and increased work-life boundarylessness (Wöhrmann & Ebner, 2021), resulting in stress due to constant availability and information overload (Pfeiffer, 2012). Thus, regarding our four selected aspects of job quality, we assume to find a pattern for the associations with telework that is similar to the associations with digitalization: All four indicators that we chose for measuring subjective aspects of job quality—comfortable working hours, work–family reconciliation, autonomy, and information overload—should be positively related with telework because, according to the corresponding literature, they are positively associated with digitalization. In the case of autonomy, jobs eligible for telework are generally associated with digital self-determination and, therefore, higher autonomy.

2.4. Contextualization of Expectations

Our research questions ask whether workplace-related digitalization and subjective job quality changed during the pandemic and whether there is an association between these changes. To capture the context of our observation period, we need to include pandemic circumstances and the occupational structure to embed our assumptions on how each aspect of job quality is associated with digitalization and telework.

Indeed, digital transformation is not the only reason for changing daily working conditions. In addition to demographic and compositional factors (Kortmann et al., 2022), the pandemic impacted job quality. While for example, telework was associated with high job satisfaction before the Covid-19 pandemic, this association turned negative during the pandemic (Laß et al., 2023; Senik et al., 2022). Thus, due to the pandemic circumstances with lockdowns, short-time work, and school and daycare closures, we expect comfortable working hours, work–family reconciliation, and autonomy to decrease. On the other hand, we assume information overload to increase, particularly in telework, where employees were confronted with the rapid introduction of new communication channels such as video conferencing without sufficient technical support.

However, this telework boost spread unevenly across occupations and industries, at least in Germany, and was most dominant in occupational fields with an initial high level of digitalization (Adams-Prassl et al., 2022; Aksoy et al., 2023; Bellmann et al., 2021; Reimann & Tisch, 2021). Nevertheless, considerable variations in the dissemination of digitalization across occupational fields were evidenced even before the pandemic (Dengler & Gundert, 2021; Kortmann et al., 2022). Considering this heterogeneity in the spread and speed of digital transformation, some scholars focus instead on job tasks and requirement levels within occupational profiles rather than on occupations themselves to analyze under what circumstances digitalization substitutes or supplements job activities (Arntz et al., 2017; Dengler & Matthes, 2018; Kirchner et al., 2023). Given that high requirement levels benefit most from new technologies across all occupations in general, in the setting of a digitalization boost, we focus on changes in the levels of digital transformation between occupational fields instead. Moreover, subjective job qualities differ among occupations, each containing typical compositions of positive and negative job features and working conditions. Since we analyze the entire labor market, however, we do not make any assumptions about how and in which occupational field our selected job qualities are compiled. We consider the results of our stratified analyses in the context of the pandemic situation as an open empirical question.

3. Empirical Method

3.1. Data and Sample

Our analyses rely on data from the adult cohort of the German National Educational Panel Study (NEPS-SC6; NEPS Network, 2022). This annual survey has consulted adults in Germany about educational trajectories, returns to education, competence development, further training, and lifelong learning since 2009 (Allmendinger et al., 2019).

Information on workplace digitalization was first collected in the NEPS-SC6 wave from September 2019 to March 2020 (Friedrich et al., 2021)—right before the first

Covid-19 lockdown in Germany. Comparing this information with data from September 2020 to April 2021 enables us to analyze changes in digitalization and the selected aspects of job quality before and during the first year of the pandemic. As we are interested in workplace characteristics, we restricted our sample to all kinds of employees. Additionally, we excluded all respondents who changed occupational fields between the two waves and those who did not provide valid answers for relevant items. This restriction results in a final sample of 3,250 working adults between the ages of 35 and 78 (on average 54 years). In this analysis sample, 61% work full-time and 50% of the sample are men; 4% have no educational degree, 61% have a vocational degree, and 35% have a university degree. Table A1 in the Supplementary File shows statistics for each observed occupational field.

3.2. Measures

Our dependent construct of *subjective job quality* comprises four indicators, which we selected because we regard them as key for analyzing the changes in working conditions during the pandemic. These are comfortable working hours, work–family reconciliation, autonomy, and information overload due to digitalization. The answer scale of the first three variables ranges from 1 (*strongly disagree*) to 5 (*strongly agree*). While these three variables refer to general job quality, information overload refers directly to digitalization. The answers range from 1 (*does not apply at all*) to 5 (*fully applies*). We transformed all indicators into a range of 0–1, with 1 indicating a high value for the corresponding aspect of job quality.

To measure *workplace digitalization*, we exploited the novel digitalization questions in the NEPS (Friedrich et al., 2021), capturing the use of networked digital technologies (NDT) as a Guttman scale. The construct comprises six variables with increasing difficulty levels for technology use at work—searching for information online, creating or editing digital files, exchanging digital files, maintaining websites, creating new websites, and programming algorithms for intelligent systems. We summed all items to generate a Guttman scale ranging from 0–6 and again transformed it to a range of 0–1, with high values indicating a high level of workplace digitalization. To evaluate the goodness of fit of the Guttman scale (i.e., the conformity between expected and observed response patterns), we calculated the reproducibility coefficient (CR). The CR was above the cutoff of 0.90 for both waves (0.97 for wave 2019–2020 and 0.96 for wave 2020–2021). This measure of subjective exposure to workplace digitalization is more comprehensive than just ICT or computer use or the introduction of new technologies from previous studies (e.g., Borle et al., 2021; Chesley, 2014; Dragano & Lunau, 2020; Kirchner et al., 2023; Meyer et al., 2019).

To disentangle the ongoing digital transformation from the pandemic-related digitalization boost, we additionally included an indicator for the frequency of *telework.* Respondents indicated how often they work from home. Their answers were between 0 (*never*), 1 (*once a month or less*), 2 (*several times a month or once a week*), 3 (*several times a week*), and 4 (*almost daily or daily*). Covering the extent of telework instead of just measuring usage creates a more precise indicator (cf., Wöhrmann & Ebner, 2021). Unfortunately, this indicator is only available in the 2020–2021 wave, making it a cross-sectional predictor. Table A2 in the Supplementary File provides the wording of all main variables.

To capture the dissemination of workplace digitalization and telework across *occupational fields*, we used the 1-digit code of the German classification of occupations (KldB-2010), which differentiates between 10 occupational fields: (0) military; (1) agriculture, forestry, farming, and gardening; (2) production and processing of raw materials; (3) construction, architecture, and surveying; (4) science, ICT; (5) traffic, logistics, and security; (6) purchasing, sales, trading, and tourism; (7) business management and organization; (8) health care, education, and teaching; and (9) humanities, social sciences, economics, and arts. Because of the insufficient sample size, we excluded military occupations. The 1-digit code is a rough measure aggregating single occupations according to their similarity of activities within an occupational field and contrasting the various occupational activities between them.

Occupations do not vary only by workplace digitalization; they also systematically vary in the composition of employees with specific sociodemographic and job-related characteristics (Kortmann et al., 2022). Following the literature, we included sex, education (whether participants have a university degree, derived from the highest educational degree), age, and full-time work as important compositional factors. Moreover, to accommodate pandemic containment measures, including contact restrictions, closure of entire industries, and closure of schools and daycare facilities, we also control for children younger than six and 14 years living within the household (0 = *no children younger than 6/14 years*, 1 = *at least one child younger than 6/14 years*) and short-time work. Except for age, we dummy-coded all variables. Table A3 in the Supplementary File displays the main statistics for all variables.

3.3. Analytical Strategy

We calculated analyses of variance (ANOVAs) to confirm our assumption about the variation of digitalization and job quality across occupational fields. Here, digitalization and all job quality indicators in 2019–2020 served as dependent variables, and the occupational fields served as the independent variable. To investigate the changes in digitalization and aspects of job quality between 2019–2020 and 2020–2021, we analyzed t-tests with repeated measures for all indicators in separate analyses for each occupational field.

Finally, we applied hierarchical change score models to examine whether the change in digitalization is associated with changes in subjective job quality (Allison, 1990; Gu et al., 2018). Unfortunately, we cannot calculate fixed-effects models because the indicator for telework, our second main predictor, is available only in the 2020–2021 wave. In addition, change score models can directly represent change over time in a variable that can be examined as an independent or dependent variable. This modeling concept is similar to first difference models. Moreover, Castro-Schilo and Grimm (2018) compare change score models with residualized change models and recommend using the former in non-randomized samples because they are less biased in such instances. We set up 36 (4 × 9) models for each job quality indicator and occupational field. The intraindividual change in perceived job qualities served as the dependent variable and thus enabled us to reduce omitted variable bias by controlling time-constant heterogeneity by design. Our main predictors are the reported intraindividual change in the use of NDT and the cross-sectional indicator for telework frequency. We proceeded in three steps. First, we predicted the job quality change score with the digitalization change score and job quality in wave 2019–2020. Second, we included sex, age, age^2, university degree, and full-time work as control variables in the models. Third, we added our second main predictor, telework, along with the covariates short-time work and children to the models to control for Covid-19-related effects.

4. Results

4.1. Descriptive Results

Before answering our research questions, we had to investigate whether digitalization and all selected aspects of subjective job quality varied across occupational fields. The ANOVA confirmed this variation for workplace-related use of NDT and all aspects of job quality in the 2019–2020 wave. Moreover, all aspects of job quality were highest in occupational fields (OF) science/ICT (OF 4), business management (OF 7), and social sciences (OF 9), while they were lowest in agriculture (OF 1) and logistics/security (OF 5), except for work–family reconciliation, which was rather high in agriculture (OF 1). Information overload was also relatively low in health/education (OF 8) before the pandemic (see Figure 1). Interestingly, we find a similar pattern for workplace-related digitalization, which was particularly

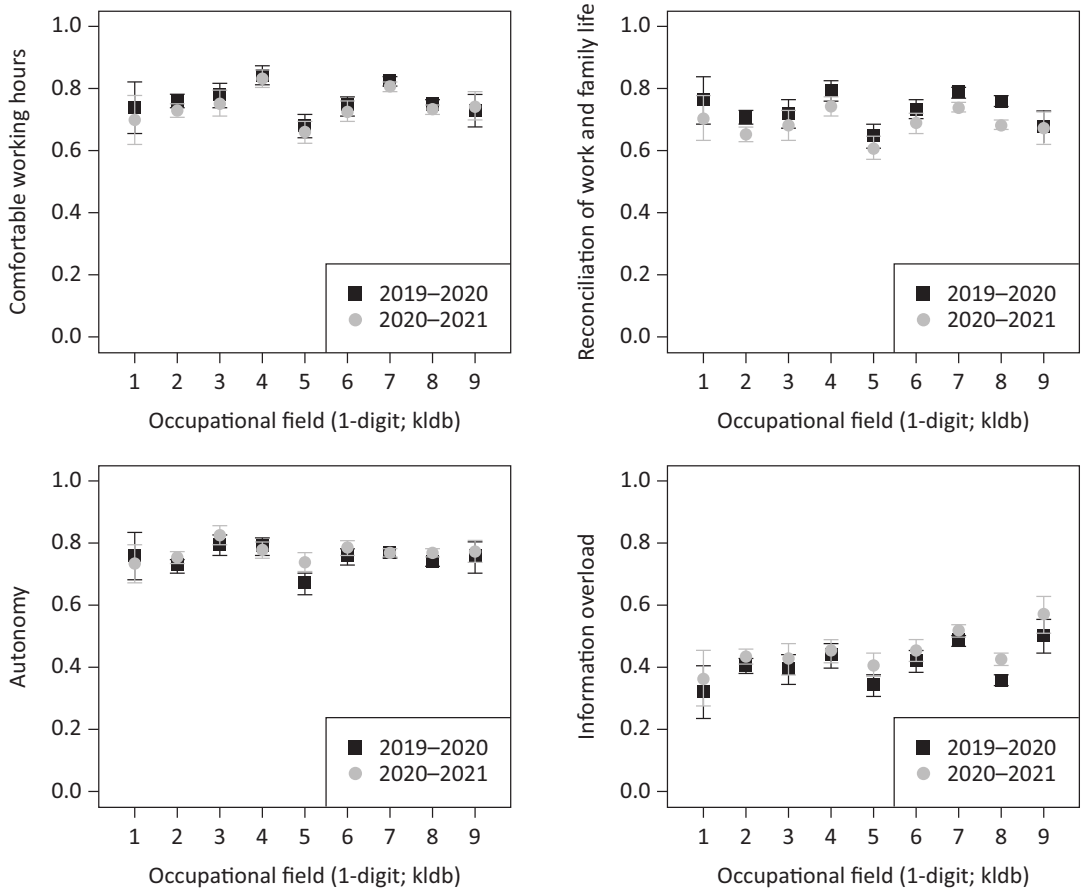

Figure 1. Means and 95% CIs of job quality aspects in the 2019–2020 and 2020–2021 waves for each occupational field. Occupational fields: (1) agriculture; (2) production; (3) construction; (4) science/ICT; (5) logistics/security; (6) trade; (7) business management; (8) health care/education; (9) social sciences. Source: NEPS-SC6, SUF 13.0.0.

high or low in the same occupational fields that scored high or low on the selected indicators of job quality (see Figure 2).

The first research question addressed the change in digitalization and the four subjective job quality indicators between the 2019–2020 and 2020–2021 waves. The repeated measures t-tests revealed that the two job qualities we assess as positive features of a job—comfortable working hours and work–family reconciliation—decreased somewhat in most occupational fields, although not always significantly. Comfortable working hours decreased significantly in production (OF 2) and business management (OF 7). Work–family reconciliation showed significant decreases in all occupational fields besides agriculture (OF 1) and social sciences (OF 9). In contrast, autonomy scored slightly higher in most occupational fields: production (OF 2), construction (OF 3), logistics/security (OF 5), trade (OF 6), and health/education (OF 8), but the changes were minimal. For the aspect of information overload due to digitalization, which we assess as a negative job feature, we again find moderately increased scores between the two waves in most occupational fields: production (OF 2), logistics/security (OF 5), trade (OF 6), business management (OF 7), health/education (OF 8), and social sciences (OF 9; see Figure 1). The results suggest that working conditions tended to slightly worsen during the pandemic in most occupational fields.

Regarding the changes in the use of NDT, Figure 2 shows that, in tendency, digitalization overall intensified. We find significant increases in production (OF 2), logistics/security (OF 5), trade (OF 6), business management (OF 7), and health/education (OF 8). The increase was marginal or insignificant mainly in occupational fields with already high exposure (e.g., OF 4, OF 7, OF 9). Tables A4 and A5 in the Supplementary File provide the results of the ANOVAs and t-tests. Overall, we find both a tendency toward a slight increase in digitalization and a mild depreciation in subjective job quality at the onset of the pandemic, with varying extent of these trends across occupational fields. In the next step, we investigate whether there is an association between these developments.

4.2. Multivariate Results

Our study aims to analyze whether there is an association between the change in workplace digitalization and specific aspects of subjective job quality across different occupational fields. Therefore, we ran hierarchical change score models and summarized their results in Figure 3. These coefficient plots display the effect of the intraindividual change in the use of NDT and of the cross-sectional indicator of telework on change in each aspect of job quality separately for all nine occupational fields (find detailed results of the full models in Table A6 of the Supplementary File). We ran separate regression models for each job quality indicator but combined them into one figure per occupational field. Furthermore, we included all control variables in the models. In an intraindividual change score model, positive (negative) coefficients reveal whether an aspect of job quality has additionally positively (negatively) changed compared to the corresponding reference category (e.g., observed change in the predictor). For example, in health care, education, and teaching occupations (OF 8), information overload

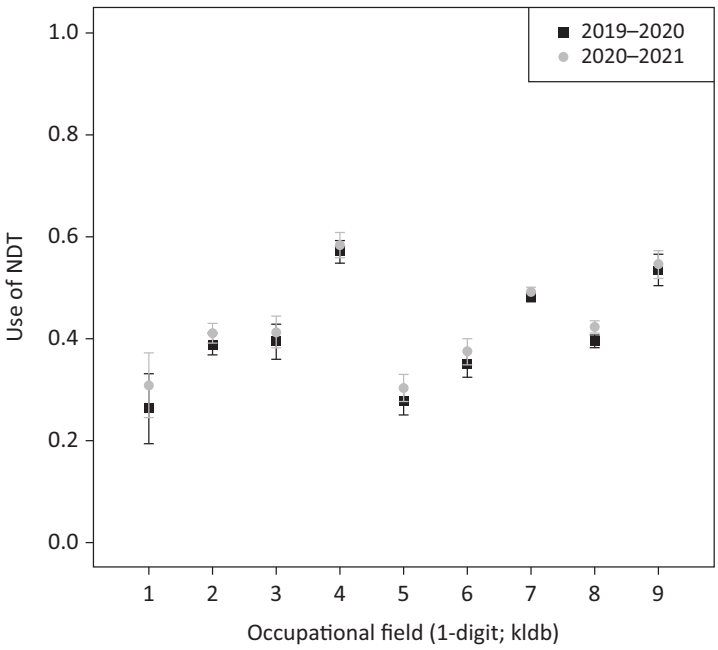

Figure 2. Means and 95% CIs of digitalization in the 2019–2020 and 2020–2021 waves for each occupational field. Occupational fields: (1) agriculture; (2) production; (3) construction; (4) science/ICT; (5) logistics/security; (6) trade; (7) business management; (8) health care/education; (9) social sciences. Source: NEPS-SC6, SUF 13.0.0.

and the use of NDT increased between the two waves. As the regression coefficient of change in NDT on information overload is positive, information overload is associated with even more substantial increases for employees with a more considerable increase in the use of NDT.

Regarding the two job quality aspects we assess as positive job features, our analyses provide the following results: for *comfortable working hours*, we find only a negative association between the use of NDT and this job quality aspect in agriculture (OF 1). However, as we do not observe an increase in digitalization or a change in comfortable working hours in this small occupational field (N = 40), we refrain from interpreting this association. In contrast, we find an association between telework and comfortable working hours in various occupational fields. Employees in production (OF 2), logistics/security (OF 5), trade (OF 6), and healthcare/education (OF 8) who worked more often from home experienced a smaller decrease in comfortable working hours compared to the general decrease in this job quality aspect in most occupational fields after the pandemic offset.

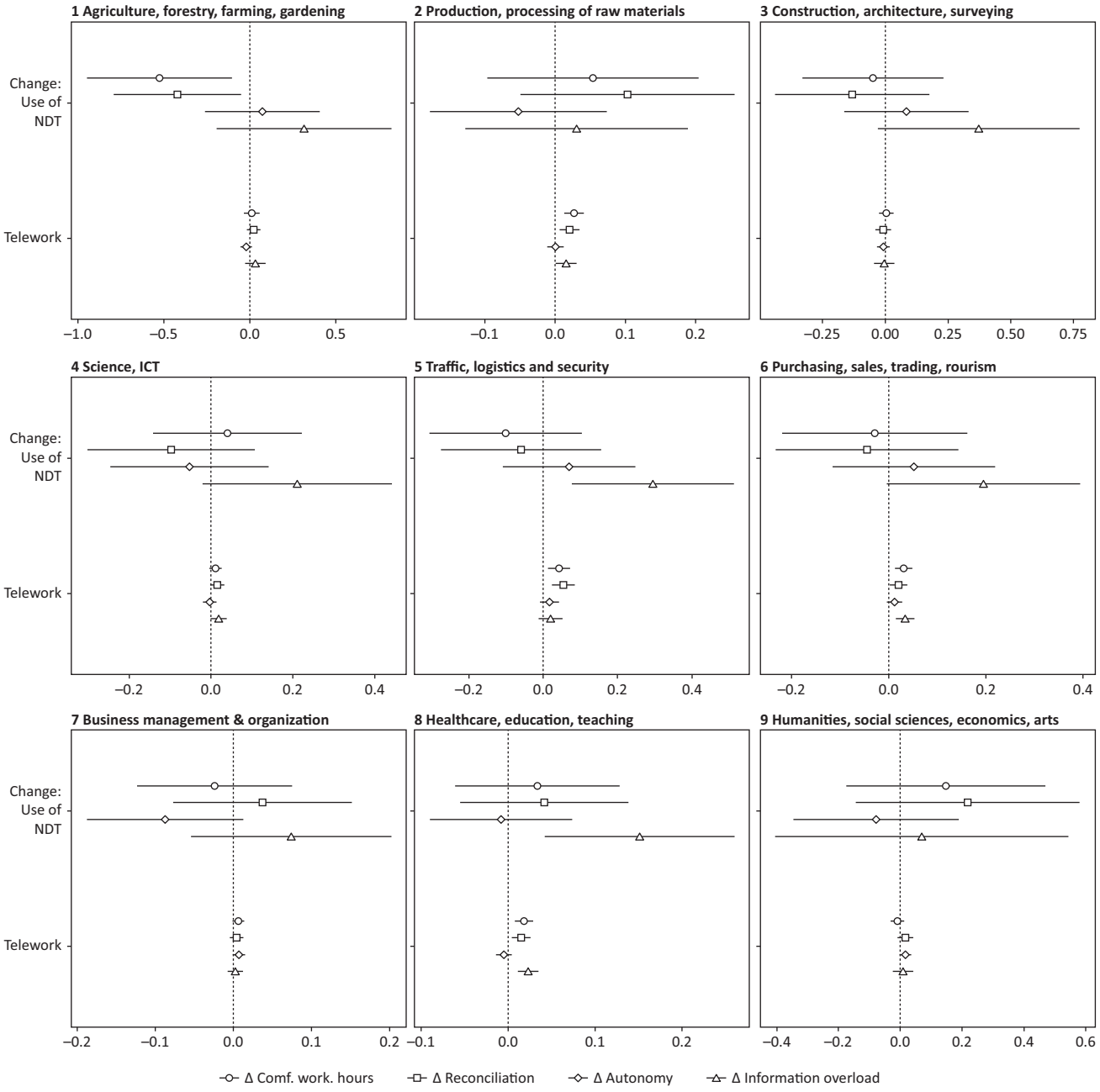

Figure 3. Change score models for each occupational field. Notes: Positive (negative) coefficients indicate an increase (decrease) in the dependent variable in comparison with the reference category; control variables include job quality indicators (2019–2020), sex, university degree, age, age^2, children under 6 and 14 years, full-time work, and short-time work; see Table A5 in the Supplementary File for detailed regression results. Source: NEPS-SC6, SUF 13.00.

The job quality aspect of *work–family reconciliation* results in similar patterns as comfortable working hours. The use of NDT is associated with lower work–family reconciliation in agriculture (OF 1) only. Again, this association should be considered with caution. However, telework again buffers the negative trend of this aspect of job quality in production (OF 2), logistics/security (OF 5), trade (OF 6), and healthcare/education (OF 8). Thus, we hardly find any association between digitalization and these job qualities. Additionally, our assumption about increased comfortable working hours and better work–family reconciliation connected to digital transformation finds no support. However, we observe that telework helps to cope with the decline in job quality caused by the pandemic.

For *autonomy*, we do not find any associations between the more or less pronounced increase in workplace digitalization or the frequency of telework use across occupational fields. This result does not support our assumption about an increase in autonomy that accompanies increasing digitalization or telework use.

Finally, regarding the negatively assessed job quality *information overload*, our models depict positive associations between the significant increase in NDT use and the significant increase in information overload due to digitalization in logistics/security (OF 5), trade (OF 6), and health/education (OF 8). In the other occupational fields, change in digitalization is not significantly related to change in information overload. This finding only partly supports our assumption that increased workplace digitalization connects to increased information overload and work intensification and thus may cause job strains for employees. In addition, we find that telework is associated with an additional enhancement in information overload in production (OF 2), science/ICT (OF 4), trade (OF 6), and healthcare/education (OF 8). These results partially align with our assumptions and with previous findings on the effect of telework on work intensification (Pfeiffer, 2012; Wöhrmann & Ebner, 2021).

4.3. Robustness Checks

We additionally estimated various model specifications to validate our findings. First, we tried to reduce potential selection bias in our restriction of the analysis sample. As the statutory retirement age in Germany was 65 in 2020, we excluded all older individuals from our analysis sample to focus only on regularly working employees. Using the restricted sample (N = 3,118), the change score models provided similar findings to the initial sample.

Second, to check how robust our findings are against the specification of our measure of workplace digitalization, we exchanged our main predictor use of NDT for a variable that records how digitalized employees assessed their workplaces. Again, we reproduced most but not all findings with the change score models. However, this confirms that the use of NDT is the superior indicator, which captures changes better over a short observation period of one year.

Next, to investigate job quality trends over a more extended period—especially before the Covid-19 pandemic—we looked at the means of all three previously available items of job quality since 2018–2019. Comfortable working hours and work–family reconciliation increased, and autonomy decreased from 2018–2019 to 2019–2020. Hence, before the pandemic, most job qualities followed an upward trend while they dipped during the pandemic. Interestingly, all three job qualities almost returned to their initial level in 2020–2021.

Finally, based on our data, it is difficult to tell whether subjective job quality changed due to the pandemic's impact on most people's everyday lives or to advancing digitalization. To address this, we performed additional analyses after splitting the respondents into two groups according to their occupational field with or without changes in digitalization. Those in occupational fields with modified digitalization also experienced significant changes in all selected aspects of job quality. However, those without changes in digitalization only experienced significant decreases in work–family reconciliation and increases in information overload. This finding supports our assumption that changes in job quality may be related to advancing digitalization. In the Supplementary File (Tables A7–A12 and Figure A1) we discuss the robustness checks in more detail and provide corresponding results.

5. Discussion and Conclusions

This study elucidates the association between advancing digital transformation and changes in selected aspects of subjective job quality across occupational fields. Job quality was proclaimed a central priority by the OECD's Job Strategy to increase social inclusion (Kortmann et al., 2022) because ongoing workplace digitalization systematically invades yet unevenly changes the various aspects of working and employment conditions for different employee groups. Thus, digitalization subsequently influences employees' productivity, mental health, and well-being (e.g., Arends et al., 2017; Meyer et al., 2019; Reimann & Tisch, 2021).

We extended previous literature by analyzing which occupational fields experienced changes in workplace digitalization and selected aspects of job qualities and how these were related at the onset of the Covid-19 pandemic. However, this connection is confirmed in surprisingly few occupational fields. Only a differentiated look across the occupational fields reveals that, for example, work–family reconciliation slightly worsened in almost all occupational fields. At the same time, this applies only in a few occupational fields to the decrease in comfortable working hours. In contrast, autonomy and information overload moderately increased in almost all fields. With the change score analyses, we find a relationship

between advancing digitalization and increasing information overload only in some occupational fields. Thus, our findings support the literature on technostress and the negative aspects of digital transformation, at least in some occupational fields (Borle et al., 2021; Meyer et al., 2019; Tarafdar et al., 2015).

Nevertheless, we prefer not to interpret our results in such a negative light. After all, we also recognize the role of telework during this time. Although the boost in telework contributes to a further increase in work intensification through information overload, we also find that telework buffers the unfavorable pandemic effects for most of our selected job qualities. Similar to digital transformation, telework can, in some respects, serve as a job resource to improve workers' well-being (Sardeshmukh et al., 2012); in other respects, it increases job demands and intensifies work (Pfeiffer, 2012; Wöhrmann & Ebner, 2021).

Naturally, our study has several limitations. Looking at the changes between 2019 and 2020 is a double-edged sword. On the one hand, at the beginning of the Covid-19 pandemic, there was a substantial digitalization boost in some occupational fields, which helps us to measure the changes in digitalization in the workplace. On the other hand, the restrictions imposed because of the pandemic had a sizeable impact on daily life and work. For example, the reconciliation of work and family considerably deteriorated due to school and daycare closures. Digitalization or telework had, if any, a beneficial effect on the groups eligible for telework under these circumstances. Unfortunately, since our data on digitalization were collected first in 2019–2020, we cannot properly disentangle the influence of the pandemic on changes in our indicators of job quality from that of digital transformation.

Another limitation is that our results are not necessarily causal. Although we control for the main compositional factors, such as sex, age, education, children, full-time work, short-time work, and occupational fields, many other factors could also impact job quality. Thus, we cannot completely rule out the existence of omitted variables. Additionally, two observation points are insufficient to run a panel analysis, which would rule out this issue. Therefore, future research is needed to examine how advancing digitalization impacts working conditions for different employee groups with a longer observation window.

Despite these limitations, our study provides four main findings. First, occupational fields differ significantly in the levels of digitalization and subjective job qualities. Second, during the Covid-19 pandemic, digitalization increased in many occupational fields, while working conditions worsened simultaneously. Third, the pandemic-driven digitalization boost is not connected to a change in positively assessed job qualities (at least in the short term). However, in some cases, it is connected to increased information overload, which we consider unfavorable job quality, as it may reduce employees' well-being. Fourth, telework partially buffered the pandemic-related deterioration in subjective job qualities but simultaneously increased information overload and, thus, work intensification. Looking at these results, the declared goal of national and international public policy to improve job quality, create better jobs (BMAS, 2020; Cascales Mira, 2021; Cazes et al., 2016; Kortmann et al., 2022) and enhance the labor force was not accomplished during the pandemic. Especially for the implementation of telework in the post-pandemic period, they should keep a close eye on the developments in job quality and how occupational safety measures can be meaningfully applied (Reinert, 2016). These considerations prepare the ground for the upcoming debates on so-called Industry 5.0, which deals with developing a sustainable, human-centric, and resilient business environment by integrating advanced technologies and human values (Karmaker et al., 2023). Such developments are essential for the better inclusion of all working groups in the labor market and the struggle related to shortages of labor forces in aging societies.

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material is available online in unedited format provided by the author.

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About the Authors

Teresa Sophie Friedrich is a junior researcher at the Institute for Employment Research (IAB, Germany) where she is involved in the German National Educational Panel Study (NEPS). Her research focuses on personality development, education, and digitalization.

Basha Vicari (Dr) is a senior researcher at the Institute for Employment Research (IAB, Germany) and head of the project group National Educational Panel Study (NEPS): Adult Education and Lifelong Learning. She holds a doctorate in sociology from the Friedrich-Alexander-University Erlangen-Nuremberg. Her main research interests cover inequalities in the labor market, occupational mobility, and gender inequalities.

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