In a digitalising Europe: Unfolding knowledge from working from home during the COVID-19 pandemic in Italy and Denmark

Ipsen, Christine; Kirchner, Kathrin; Bolisani, Ettore; Scarso, Enrico

Published in:
Work

Link to article, DOI:
10.3233/WOR-220137

Publication date:
2023

Document Version
Peer reviewed version

Citation (APA):
Ipsen, C., Kirchner, K., Bolisani, E., & Scarso, E. (2023). In a digitalising Europe: Unfolding knowledge from working from home during the COVID-19 pandemic in Italy and Denmark. *Work*, *74*(1), 59-74. https://doi.org/10.3233/WOR-220137

Work xx (2022) x–xx
DOI:10.3233/WOR-220137
IOS Press

In a digitalising Europe: Unfolding knowledge from working from home during the COVID-19 pandemic in Italy and Denmark

Christine Ipsen[a,*], Kathrin Kirchner[a], Ettore Bolisani[b] and Enrico Scarso[b]
[a]*Department of Management, Technical University of Denmark, Lyngby, Denmark*
[b]*Department of Management and Engineering, University of Padova, Vicenza, Italy*

Received 6 March 2022
Accepted 12 August 2022

Abstract.
BACKGROUND: Digital applications have been vital to ensuring business continuity during the COVID-19 pandemic. Indeed, digital transformation is considered key to shaping Europe's future, including the opportunity for hybrid work. Consequently, a central issue is the experience and perception of workers and the effect on their mental well-being.
OBJECTIVE: Building on the assumption that the more 'digitalized' and 'experienced with working from home (WFH),' the more positive peoples' perceptions are, this paper explores how workers in Italy and Denmark perceived WFH during the first COVID-19 lockdown from a psychosocial perspective and what lessons could be drawn for policy and industry.
METHODS: Ranking top and bottom respectively on the European Digital Economy and Society Index (DESI) and different pre-pandemic experiences of WFH, data about WFH perceptions and mental well-being were collected among Danes and Italians via a survey from March to May 2020. The data were analyzed using descriptive statistics, t-Tests, and ANOVA.
RESULTS: The combination of high rank and pre-experience of WFH did not result in a positive perception of WFH. Mental well-being of Danes were mostly affected and they experienced WFH to be more challenging than the Italians, where the key disadvantages were related to "Home office constraints" and the isolation that followed.
CONCLUSION: When digitalizing Europe and workplaces are likely to offer people the opportunity to have hybrid work, the results highlight how national conditions affect the prospects of the new ways of working including people's mental well-being and where actions are most needed for policy and industry.

Keywords: Well-being, teleworking, social isolation, policy, gender

1. Introduction

Working from home (WFH) has increased in recent years, especially in industrialized countries [1]. The COVID-19 crisis has also shown that this working modality can be extended to more and more sectors and jobs [2]. Consequently, as stated by some authors [3–6], companies and governments may be pushing toward the continued use of WFH. Supranational institutions, such as the European Union (EU), are also considering how these experiences can be extended [7, 8].

This 'enthusiasm' about WFH is due to its potential benefits, which have been emphasized in the

*Address for correspondence: Christine Ipsen, Associate Professor, PhD, Department of Management, Technical University of Denmark, Akademivej, Building 358, DK-2800, Kgs. Lyngby, Denmark. E-mail: chip@dtu.dk; ORCID: https://orcid.org/0000-0002-2394-5571.

literature [9–12] — from less traffic to more comfortable working conditions, from more free time for workers to reduced office costs. WFH is not a new phenomenon. Since telework was introduced as a way of working and telecommuting was defined as a concept in the 1970 s by Nilles [13], research has been concerned with the positive and negative effects on climate, transport, and people. Regarding the latter, research has looked at the physical and psychosocial hazards where the physical hazards typically relate to sedentary work [14, 15] and the exposure to visual display terminal (VDT) that can affect worker's health such as visual discomfort and musculoskeletal disorders (MSD) and related problems. The psychosocial hazards and mental well-being problems include loneliness, isolation, and poor mental health [16, 17]; however, the change in the work-life balance may also have a positive effect on the mental health [16]. A study of knowledge workers' work situation has come to a similar conclusion; that the same work-related issue or circumstance can be experienced in different ways; as an opportunity or a source of stress affecting people's mental well-being [18].

A key element in telework and WFH is the advancement of digital technologies. Today, low-cost and ubiquitously accessible equipment is increasingly available, and, despite the differences and risk of power concentration [19], the diffusion and interconnection of systems and networks is progressing even in peripheral areas [20]. Accessing an adequate communication infrastructure and using effective information and communications technology (ICT) systems are vital for WFH [21–23]. Therefore, the availability of ICT systems is deemed to set the right conditions for this working modality [7, 24]. The 'new generations' of ICT applications have further heightened the expectations for a 'revolution in the office' [24]. While most of these applications have been in existence for a long time, the COVID-19 crisis has accelerated their employment and raised their perceived utility [25, 26]; consequently, their significant short-and long-term impacts can be expected on work [27].

The profitable adoption of WFH cannot always be taken for granted, while the availability of efficient and modern ICT applications is a prerequisite but not a firm guarantee of success [28, 29]. The individual perception of the usefulness, effectiveness, and user-friendliness of this working modality, which can also affect the efficacy of WFH for companies and societies, also counts [30].

The COVID-19 pandemic, with imposed lockdowns in several countries and the general situation of 'forced' WFH, offered an unrepeatable chance to analyze the perceptions of people's experiences and the effect on their mental well-being. In particularly interesting conditions: workers were in comparable situations even in different countries, and they 'had' to work from home, so this working modality involved large numbers of people well beyond the 'volunteers' or 'enthusiasts,' and this unexpected situation provided a vast amount of data.

Within the coming years, WFH will likely become a new way of working as workers wish for more flexibility and the ability to choose where to work [7, 8, 31]. Consequently, governments and companies need a better understanding of the appropriate conditions to facilitate the adoption of this modality on a large scale across and between countries.

Being a unique situation, many studies have been conducted during and post-pandemic to gain insights into people's experiences [6, 32–34]. The majority of COVID-19 studies have had a national focus and interest, describing the experiences of the pandemic in various jobs like in healthcare [35, 36] or services [37] or different functions such as nurses [38, 39], frontline personnel [40] or teachers [41]. However, few researchers have addressed the experiences of WFH between countries. As many workplaces are international with departments in different countries and the strong international call for increased flexibility and hybrid work, there is a need for studies that understand experiences across countries and not just focus on the countries individually. As information and communication technologies (ICT) enable WFH, it is essential to understand the abovementioned effects and the prerequisites.

According to recent statistics, Denmark and Italy are placed at two extremes regarding pre-COVID-19 WFH adoption [7, 32] and digitalisation levels according to the European Digital Economy and Society Index (DESI) [42]. The DESI summarises indicators of Europe's digital performance and tracks the progress of EU countries [43].

A survey on working conditions and experiences of telework before the pandemic shows that the experiences vary across countries. While Italy recorded just 8% of workers doing telework/ICT-based mobile work before the pandemic, Denmark counted 36% of teleworkers [44]. Thus, with a high digitalization level and an experienced workforce in terms of telework and WFH, one would expect that Danish

workers experience WFH more positively than Italian workers do.

In light of the above, the purpose of this paper is to compare two countries, Italy and Denmark, with different pre-COVID-19 WFH conditions and experiences, focusing on the experiences of WFH in knowledge work from a psychosocial perspective, i.e., mental well-being. Our first aim is to identify key learnings, i.e., potentials and barriers of WFH, from two extreme cases and contribute to discussing digitalization strategies across Europe. Secondly, we want to explore whether prior experience with WFH, telework, or digitalization would be an advantage for workers where existing digital structures and tools were the only way to give continuity to work.

2. Background

The potential benefits of WFH have dominated the discussions of the new normal, post-Covid-19, in which advancement in digital technologies is a key focus. Despite the vast knowledge about technologies and digitalization, learnings from WFH during the COVID-19 pandemic should be considered cautiously. Therefore, this paper combines three topics: defining WFH, the role of technology in telework, and the potentials and barriers of WFH.

2.1. Defining working from home (WFH)

WFH can be defined as 'a working arrangement in which a worker fulfills the essential responsibilities of their job while remaining at home, using ICT' [31]. Indeed, different terms describe similar cases, such as 'telework.' Although there is no universal agreement [45], this term refers to working practices, such as. 'homeworking,' 'remote working,' or 'smart working,' in which people work anywhere away from the 'usual' office through electronic connections [46]. This paper focuses on the restricted case of telework when workers are asked to or are offered the opportunity to work from home. However, although WFH differs slightly from telework (and related terms), literature that refers to either of them will generally be considered in the following sections.

2.2. Centrality of technology

Digital technology is at the core of WFH. It acts as a prerequisite and a pushing factor [47] and allows workers to be dispersed yet accomplish at least some tasks effectively and efficiently [48] across time, geography, and culture [10, 49]. Accessing an adequate communication infrastructure and using effective ICT systems are considered vital for any form of telework [21]. There is often an emphasis on the spread of ICT access, which is deemed to set the right conditions for WFH where workers can 'positively accommodate the latest information technology environment without being constrained by time and place' [50]. The 'new generations' of ICT applications have further raised the expectations for a 'revolution in the office' [51].

The existence of a correlation between the availability of appropriate remote electronic communications and the likelihood of WFH adoption has long been emphasized [52]. The COVID-19 crisis and the keeping of social distance [25] gave further impetus to this idea. The pandemic emergency has shown that it is possible to work from home and ensure the continuity of the work. Therefore, efforts by governments to reduce technical or financial barriers to the exploitation of electronic communication have been welcomed. This 'technological determinism' is not new and has already been publicly questioned [52]. There is a risk of overestimating the beneficial effects of 'technology itself': Indeed, WFH is a revolution that requires a mix of supporting measures to be widely accepted in society; ICT must be not only available but also be user-friendly and fit the real needs of workers [53]. To sum up, digital technologies are essential for WFH and are of significant importance in digitalising Europe; however, like any other technology, it is essential to understand its effects on people and work.

2.3. Potential benefits, enabling factors, and barriers to WFH

Before the COVID-19 pandemic, several studies on the potential advantages, challenges, and barriers to WFH for individuals and organizations were conducted [10, 31]. WFH is expected to provide benefits for individuals, companies, and societies, such as reduction in costs for travel and office space, reduction in pollution and time wasted in commuting, more freedom to adjust the time of work with personal life, increased work flexibility, increased efficiency combined with the comfort of workers, less land consumption for offices [12]. The literature has also examined the factors influencing the successful adoption of WFH for both workers and firms. Hassan and Geleel argued that success depends on the nature of

the job, clearly defined goals and policies that fit the immediate needs of workers, and respect for their personal lives [54]. Kang and Kwon demonstrated that some facilitating factors are at the level of the individual, for example, the capability of people to self-organize their work; others are at the firm level, such as innovation climate, style of personnel evaluation, or characteristics of the information system [50].

The efficacy of WFH can depend on the way work is organized [55]. For instance, teamwork is possible in the WFH modality, but it can be challenging when too many team workers are at home [56]. Job position [57] and leadership style [58] also play a role. WFH can have an impact on socialization processes and personal work habits [59, 60]: it can change the forms of interaction between colleagues, which in turn can modify the processes of knowledge sharing and transfer [61], especially (but not only) for intellectual jobs [62].

The literature has also detected potential problems and implementation obstacles at the organizational and workers' levels, which can counterbalance the expected positive effects. While some studies highlighted increased flexibility and better work conditions [63], others have pointed to its complex implementation and negative impact [64]. Possible obstacles to successful implementation can also come from technical issues, e.g., the required investments in ICT or organizational aspects, including difficult coordination and cooperation among workers, complex management of knowledge transfer, fear of loss of control by top management, or anxiety related to work in isolation [65]. The impact on private life can be particularly critical [66]. WFH commonly provides a better trade-off between work and private life; however, it is sometimes associated with longer working hours and more significant intrusion of working issues into the private space. The recent COVID experience has exacerbated this risk of 'psychological stress' for workers who may feel 'stuck at work' even though they are at home [67]. Another stream of research regarding disadvantages of working from home concerns the lower level of physical activities and physical pain, e.g., in the back [68, 69]. A recent study provides insights into the six advantages and disadvantages of WFH during the pandemic across different countries and how these six factors can be interpreted as the 'common denominator' of peoples' experience of WFH. Where previous studies of telework listed the advantages and disadvantages in random order or focused on single items, Ipsen et al. showed that the different experiences were interrelated and could be grouped into six main factors: (i) work-life balance, (ii) improved work efficiency, and (iii) greater work control. The main disadvantages were (iv) home office constraints, (v) work uncertainties, and (vi) inadequate tools [70].

Balancing the possible advantages and disadvantages of WFH, it is the perception of workers that may be, ultimately, central in their acceptance and, consequently, their success. This perception depends on how individuals see their working experience in combination with their expectations and private lifestyle and local regulatory, cultural, or social conditions [71]. Thus, to extend our knowledge about the factors that affect the diffusion of WFH, we need to investigate workers' perceptions during their WFH experience.

2.4. *Cross-country comparisons of WFH perception*

An interesting point that can provide insights into the possible mechanism of WFH and its success is whether it can detect different conditions in distinct national contexts and how these differences can lead to divergent perceptions. This issue has been addressed in the literature, but with some limitations; Higa et al. (1996) compared the US and Japan and found that workplace organization is a direct reflection of the cultural characteristics of countries, which also influences the pattern of adoption of telework. However, these data are more than two decades old and refer to a completely different context from the present [72]. Peters et al. used a broader sample of countries but focused on specific task controls in different cultures. Recently, Milasi et al. detected the differences between EU countries regarding the penetration of telework before COVID-19, while Sostero et al. also demonstrated the impact of COVID-19 from real-time questionnaire surveys [73]. They concluded that, in general, some jobs might be much more 'tele-workable' than others, substantially in all EU countries. Ollo-Lopez et al., Rubin et al., and van der Lippe and Lippényi analyzed data from several countries (pre-COVID) but did not focus on specific inter-country differences. Consequently, the limited number of cross-country studies and the international trait of work allowed and demanded by digital technologies call for studies that understand the importance of WFH across national differences.

2.5. WFH before COVID-19: differences between Italy and Denmark

Italy and Denmark, which are the targets of this study, are countries in two opposite situations regarding national ICT diffusion and WFH adoption. According to the last European working condition survey [44], the percentage of workers engaged in telework work varied. In particular, Denmark had 37% of teleworkers and was in the first position within the EU28, while Italy, with 7% of teleworkers, was in the last position. Eurostat confirmed these data in 2019 (Denmark had 28.5% and Italy had 4.7% of WFH workers aged 15 to 64 years). The two nations were placed in fifth and nineteenth places among EU countries (the average EU percentage was 16.1%). In both countries, the total percentage of 'regular' or 'occasional' WFH people was similar to 2010. According to Sostero et al., the industrial structure can explain these differences, especially the percentage of workers in knowledge and ICT-intensive services—exceeding 30% in Denmark and less than 25% in Italy. This offers only a partial explanation since the percentage of homeworkers in Italy in 2019—approximately 5%—was low compared to Denmark, which had more than 25%—even in those sectors. In conclusion, the lower diffusion of WFH in Italy compared to Denmark is a structural characteristic. This situation rapidly changed due to the COVID-19 lockdown: according to recent Eurofound statistics, individuals who worked only from home were 58.9% in Denmark and 53.3% in Italy.

Another element of difference is the level of digitalisation. According to the DESI [42], which summarises various features of the penetration and use of digital technologies in societies, this level was about 70 for Denmark (placing it in the third position among EU countries) and about 42 for Italy (placing it fourth to the last), just before the pandemic. This relevant divide was mainly due to Italy's bad performance regarding human capital in ICT (last position) and the use of internet services (third to the last position). At the same time, Denmark stood out in connectivity (first position), use of internet service (fourth position), and digital public services (third position). Specifically, on a scale (zero to 100), Denmark scored better than Italy by more than 30 points regarding the integration of digital technology into businesses, by approximately 30 points in the use of internet services and human capital, by approximately 19 points in digital public services, and by approximately 15 points in connectivity. A final important aspect is work engagement and its underlying factors. Recent surveys show that countries' social contexts and habits can make a difference in WFH perceptions.

Based on the above, it is interesting to compare how workers of the two countries, which differed in their starting conditions, have evaluated their WFH experience during the first COVID-19 lockdown.

In summary, the presented literature provides the foundations of our study. First, it is argued that a punctual analysis of how workers perceive the usefulness and challenges of WFH in their cases is crucial to understanding the real prospects of this working modality. Second, the COVID-19 situation provides a unique opportunity for analysis. Due to the sudden changes imposed by the pandemic, many workers (even those that would not have volunteered for or spontaneously accepted WFH) were forced to adopt it; making it easier to single out specific perceptions of WFH beyond the restricted group of 'enthusiastic adopters' and providing insights into what can happen when this working modality is impelled. Third, the difference between Denmark and Italy in the starting conditions, especially regarding digitalisation, can help understand how much the availability of an easy-to-access ICT infrastructure can be a determinant for workers' positive perceptions of WFH.

Previous telework research with international datasets rarely focused on specific inter-country differences or issues of analysis. In the COVID-19 context, few studies compare different strategies and impacts on workers, and little inter-country comparative research on perceptions of WFH workers during the COVID pandemic. Although digital platforms and tools allowed people across Europe to continue their work from home, little attention has focused on how digitalisation was perceived during the pandemic across countries. However, studying the experience during the pandemic can provide lessons for the future of WFH, even after the COVID-19 era.

3. Methods

A dominant topic during the pandemic was the future work, with an expectation that more people would work from home, as technology has shown. In this exploratory study, we investigated Danish and Italian workers' perceptions of WFH during the first phase of the lockdown between March and May 2020, examining what distinguished Italian from Danish perceptions of WFH, the effect on mental well-being, and how this is connected to the degree of digitalisation of the countries.

3.1. Sample

The data source is an online questionnaire with 23 questions, including perceived advantages and disadvantages and the use of technologies to connect to colleagues [70]. To capture the immediate impact of COVID-19 lockdowns on people's lives and mental well-being, an online survey in Danish and Italian was published on social media platforms and disseminated via email from 21 March 2020. The survey included information on the study, the anonymity of the collected data, the future use of the data, and the respondents' right to delete their answers.

To approach respondents, we sent out the link to the survey via email to the researchers' industry and research networks in Denmark and Italy and social media channels, primarily LinkedIn. Data were thus collected using snowball sampling [74] because this exploratory study required rapid access to data during the COVID-19 lockdowns. Data collection in Denmark started on 21 March 2020 and in Italy on 24 March 2020 (shortly after the lockdown in both countries) and finished on 11 May 2020 when the countries slowly opened up again. The final dataset in this paper includes only workers; thus, managers and students were excluded, with 1771 responses from workers, i.e., 723 responses from Italy and 1048 from Denmark.

At the time of data collection, most workers in the two countries were forced to work from home, and schools and kindergartens were closed. Table 1 gives a demographic overview of the study participants. Of Danish respondents, 67.9% were female, and 44.7% of Italian respondents were female. Most participants had a university degree in both countries (76.2% in Denmark and 64% in Italy). Before COVID-19, most Danish participants (83.8%) had already worked from home to some extent, while most Italian participants (70.7%) had never worked from home. The presence of children below 15 years of age at home was somewhat similar in the two groups.

3.2. Measures

We measured the advantages and disadvantages of working from home across the two countries based on the research results on the advantages and challenges of home-based telecommuting [49], on work or positive experiences [11] and disadvantages [29, 75, 76] of telework. The six factors for the perceived advantages and disadvantages of WFH are the following [70]: i) work-life balance, ii) improved work

Table 1
Demographic overview of study participants

	Denmark (N = 1048)		Italy (N = 723)	
Gender	Female	67.9%	Female	44.7%
	Male	30.8%	Male	54.4%
	Other/prefer not to say	1.1%	Other/prefer not to say	0.9%
Age	18-30	9.8%	18-30	13.3%
	31-40	21.8%	31-40	26.1%
	41-50	28.1%	41-50	33.9%
	51-60	30.2%	51-60	21.9%
	Above 60	9.6%	Above 60	4.6%
	Prefer not to say	0.5%	Prefer not to say	0.3%
Work from home before COVID-19 per week	Never	16.2%	Never	70.7%
	Less than 1 day	59.6%	Less than 1 day	8.0%
	1 day	16.4%	1 day	3.2%
	More than 1 day	8.2%	More than 1 day	18.1%
Work from home. under COVID-19	Only work from home.	93.1%	Only work from home	81.6%
	Sometimes work from home	6.9%	Sometimes work from home	18.4%
Young people and adults at home (including yourself).	1	30.3%	1	23.7%
	2	32.5%	2	26.4%
	3	15.5%	3	24.9%
	4 or more	20.2%	4 or more	24.2%
	not given	1.4%	Not given	0.8%
Children below 15 at home	0	62.0%	0	62.9%
	1	14.2%	1	19.2%
	2 or more	23.9%	2 or more	18.0%

efficiency, and iii) greater work control) and iv) home office constraints, v) work uncertainties, and vi) inadequate tools. An overview of the factors and items is given in Supplementary Table 1.

The six factors were derived in an international study that investigates the experiences of working from home [70] using a principal component analysis, where three factors represented the main advantages and three factors the main disadvantages. The authors propose using the six factors for comparing the WFH situations of different groups, particularly countries with different prerequisites for WFH. The questions asked applied a 5-point Likert scale (1-*strongly disagree* to 5-*strongly agree*). The survey also included demographic questions and a few open-answer questions for further information.

3.3. Analytical strategy

In the data analysis, we applied descriptive statistics to get an overview of the collected data. Cronbach's alpha was used for validating the scales for the six factors of advantages and disadvantages of WFH, and *t*-tests were used to compare Italian and Danish workers' perceived advantages and disadvantages of WFH. To analyze the differences between the two countries in-depth, we applied analysis of variance (ANOVA) to compare workers from Italy and Denmark regarding age and gender. These differences were further explored using Cohen's *d,* and Eta squared for the effect size and the Scheffe Post-hoc test for significant differences between groups. We also analyzed the answers to open questions and provided examples to explore our quantitative findings further.

4. Results

Both Danish and Italian participants used various tools to communicate and collaborate with their colleagues, among them traditional means like telephone and email, and conference systems (Skype, Zoom) and groupware (MS Teams, Slack). Figure 1 provides an overview of the percentage used for each tool category. There is no remarkable difference between the participants, except for text messaging (Danish workers preferred more SMS and fewer communication apps like WhatsApp than Italians) and Facebook groups (used more extensively in Denmark).

The perception of life's situation under COVID-19, was more challenging for Danes (mean = 3.3130; SD = 1.03674) than for Italians (mean = 2.9571; SD = 1.02711) compared to before COVID-19 (Fig. 2). A *t*-test showed a significant result ($t = 7.139$; $p = .000$) with lower effect size (Cohen's $d = .345$).

4.1. Advantages and disadvantages of working from home

The perceptions of the previously mentioned advantages and disadvantages (see Supplementary Table 1 for detail) were calculated. Cronbach's alpha was evaluated for all the factors. The disadvantage factors have Cronbach's alpha values above 0.7, showing acceptable reliability. The advantage factors have Cronbach's alpha values between 0.5 and 0.7, which requires an improvement of these factors with modifications and additions in the future. Furthermore, the mean values of all six factors for Denmark and Italy were compared. The *t*-Tests revealed significant differences between the two countries, as Italians

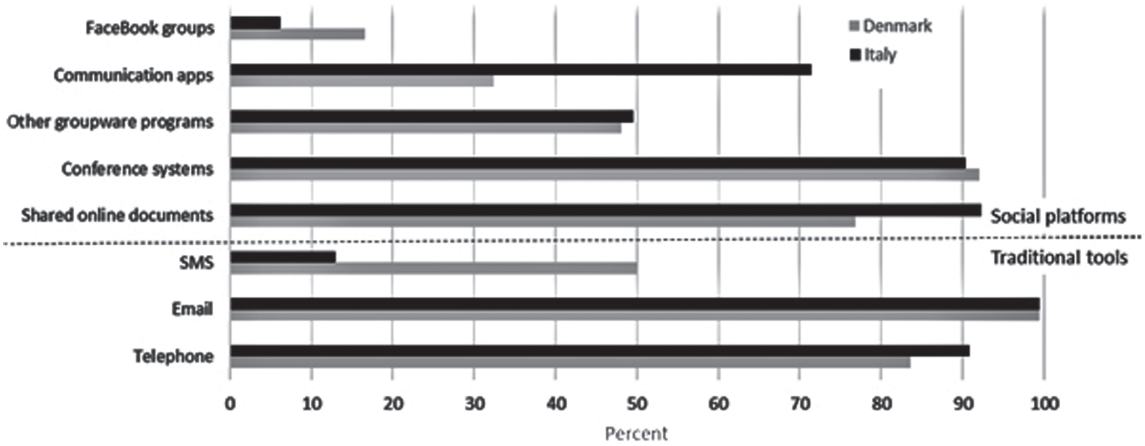

Fig. 1. Percentages of respondents who used a communication tool at least sometimes. Source: authors.

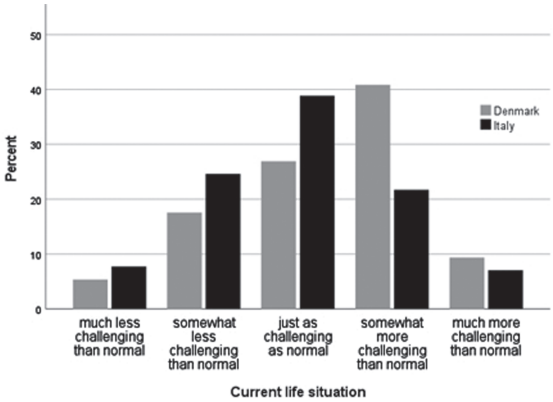

Fig. 2. Perception of the current life situation of Danish and Italian respondents Source: authors.

perceived higher advantages and lower disadvantages than Danes, which is consistent with their evaluation of their current life situation. According to Cohen's *d*, the most significant difference is disadvantage one (Table 2).

4.2. *Zooming in 'Home office constraints' and 'Work-life balance'*

The most considerable differences were found among the advantages in AF1 (work-life balance) and the disadvantages in DF1 (home–office constraints); therefore, these factors were further investigated in more detail. Indeed, Danes scored lower than Italians did in all items concerning AF1 and higher in items concerning DF1 (Table 3). However, the most prominent effect, according to Cohen's *d*, are in 'I do not get to see my colleagues' and 'The physical conditions in my home do not afford a good working environment,' where the latter is further confirmed in Italians saying 'I like the atmosphere of my home' more than Danes. Therefore, Danes miss their colleagues and think that

Table 2
Mean and statistical tests for the three advantages and the three disadvantage factors

	Cronbach's alpha	Denmark Mean value (SD)	Italy Mean value (SD)	*t*-Value	*p*-Value	Cohen's *d*
AF1: Work-Life balance	0.632	3.184 (0.638)	3.511 (0.680)	–10.223	0.000	–0.500
AF2: Work efficiency	0.572	3.092 (0.857)	3.377 (0.857)	–6.888	0.000	–0.333
AF3: Work control	0.510	3.324 (0.748)	3.166 (0.743)	4.391	0.000	0.212
DF1: Home office constraints	0.767	3.323 (0.669)	2.502 (0.718)	24.332	0.000	1.192
DF2: Work uncertainties	0.759	2.127 (0.755)	1.733 (0.642)	11.820	0.000	0.555
DF3: Inadequate tools	0.727	2.596 (0.927)	2.329 (0.982)	5.740	0.000	0.280

Table 3
Mean and statistical tests for the AF1 and DF1 items

Factors	Items	Denmark Mean value (SD)	Italy Mean value (SD)	*t*-Value	*p*-Value	Cohen's *d*
AF1 Work-Life balance	I like the atmosphere in my home better	2.686 (.988)	3.192 (1.128)	–9.704	0.000	–0.481
	I save on the normal commute time	4.220 (1.015)	4.553 (.758)	–7.915	0.000	–0.363
	It is easier to get in contact with people.	2.586 (1.043)	2.607 (1.061)	–0.426	n.s.	–
	I break my old habits and change my routines.	3.331 (1.010)	3.603 (1.019)	–5.541	0.000	–0.268
	I can be close to my family and friends.	3.094 (1.255)	3.600 (1.136)	–8.839	0.000	–0.420
DF1 Home office constraints	I do not get to see my colleagues . . . as much.	4.235 (.887)	2.761 (1.224)	27.741	0.000	1.420
	I miss the food or other benefits.	2.499 (1.228)	1.582 (.881)	18.296	0.000	0.735
	I miss getting out of my home.	3.956 (1.085)	3.501 (1.334)	7.607	0.000	0.382
	I do not get enough exercise.	3.367 (1.318)	2.542 (1.316)	12.966	0.000	0.627
	The physical conditions in my home do not afford a good working environment.	3.669 (1.249)	2.246 (1.247)	23.584	0.000	1.140
	It requires more effort from me that I cannot use my normal routines.	2.878 (1.201)	2.401 (1.113)	8.579	0.000	0.409
	I feel tied to my computer.	3.245 (1.239)	2.895 (1.337)	5.584	0.000	0.274
	I get disturbed by other people in my home.	2.739 (1.427)	2.086 (1.156)	10.602	0.000	0.493

Table 4
Mean and statistical tests for the DF1 items by gender

Items in DF1	Denmark Female (N = 712) Mean value (SD)	Denmark Male (N = 323) Mean value (SD)	Italy Female (N = 323) Mean value (SD)	Italy Male (N = 393) Mean value (SD)	F-Value	p-Value	Eta Squared
I do not get to see my colleagues . . . as much..	4.303 (.889)	4.087 (.866)	2.765 (1.164)	2.761 (1.188)	289.018	0.000	0.332
I miss the food or other benefits	2.473 (1.237)	2.545 (1.203)	1.508 (.809)	1.651 (.936)	97.962	0.000	0.144
I miss getting out of my home	4.303 (.889)	4.086 (.866)	2.764 (1.264)	2.761 (1.188)	21.575	0.000	0.036
I do not get enough exercise	3.334 (1.362)	3.433 (1.211)	2.548 (1.212)	2.545 (1.309)	55.265	0.000	0.087
The physical conditions in my home do not afford a good working environment	3.764 (1.229)	3.461 (1.269)	2.415 (1.293)	2.112 (1.190)	193.201	0.000	0.249
It requires more effort from me that I cannot use my normal routines	2.876 (1.233)	2.898 (1.133)	2.464 (1.143)	2.361 (1.077)	23.979	0.000	0.040
I feel tied to my computer	3.301 (1.232)	3.112 (1.246)	2.879 (1.347)	2.921 (1.325)	11.633	0.000	0.020
I get disturbed by other people in my home	2.725 (1.459)	2.774 (1.356)	2.108 (1.194)	2.076 (1.125)	34.078	0.000	0.055

the physical conditions in their homes do not create a positive working environment much more than Italians do. The effect size of items in AF1 are only on the low and medium level. We repeated our analysis for DF1 by categorising the workers by gender and age.

4.3. Gender and home-office constraints (DF1)

ANOVA was used to investigate differences between male and female Danes and Italians for all items in DF1. All F-Tests showed significant results, but only 'I do not see my colleagues,' 'I miss the food and other benefits,' and 'The physical conditions in my home do not afford a good working environment' had a significant effect size according to Eta squared (Table 4).

A Scheffe Post-hoc test explored the differences for these three items further. For item 'I do not see my colleagues,' three groups were found: male and female Italians can be grouped, with no significant differences between the two genders, while male and female Danes are in different groups—with female Danish participants having the highest mean value and therefore miss their colleagues the most. For item 'I miss the food or other benefits,' two groups significantly differ between the Italian and the Danish groups (regardless of gender). Four significantly different groups were found for the third item (physical conditions at home), with female Danes having the highest mean value. The study shows that nationality of residence has a higher weight than gender.

4.4. Age and home-office constraints (DF1)

The importance of age in the perception of DF1 was also explored. Participants were grouped into 'the younger' (including millennials and generation Z-with a maximum of 40 years of age) and 'the older' (generation X and baby boomers—over 40 years of age). The assumption was that Millennials and Generation Z grew up with technologies like computers, mobile devices, and social media, so an easier shift to WFH using technologies might be expected. For most items and in both countries, younger people had a higher mean value than older people, except for 'I do not get enough physical exercise,' where older Italians complained more than the younger ones. However, the mean values of Danish survey participants were higher in all items than for the Italians. The ANOVA analysis in Table 5 shows the statistically significant results, but only three items show a large age effect according to the Eta squared analysis. Using a Scheffe post-hoc test to investigate the differences between the four groups in more detail, two groups in all three items were found: Italians

Table 5
Mean and statistical tests for the DF1 items by age

Items in DF1	Denmark ≤ 40 years (N = 331) mean value (SD)	Denmark>40 (N = 712) mean value (SD)	Italy ≤ 40 (N = 285) mean value (SD)	Italy>40 years (N = 436) mean value (SD)	F-Value	p-Value	Eta squared
I do not get to see my colleagues . . . as much.	4.230 (.935)	4.240 (.862)	2.818 (1.257)	2.720 (1.200)	288.898	0.000	0.330
I miss the food or other benefits	2.619 (1.305)	2.448 (1.187)	1.597 (.954)	1.573 (.831)	101.523	0.000	0.148
I miss getting out of my home	4.082 (1.069)	3.899 (1.085)	3.565 (1.345)	3.452 (1.325)	23.565	0.000	0.039
I do not get enough exercise	3.526 (1.263)	3.2907 (1.33482)	2.2246 (1.25264)	2.7431 (1.31414)	68.764	0.000	0.105
The physical conditions in my home do not afford a good working environment.	3.737 (1.270)	3.645 (1.235)	2.256 (1.295)	2.239 (1.214)	187.053	0.000	0.242
It requires more effort from me that I cannot use my normal routines	3.042 (1.225)	2.806 (1.183)	2.267 (1.094)	2.493 (1.117)	29.326	0.000	0.048
I feel tied to my computer	3.245 (1.283)	3.246 (1.218)	2.912 (1.408)	2.890 (1.289)	10.446	0.000	0.017
I get disturbed by other people in my home	3.169 (1.518)	2.541 (1.341)	2.098 (1.203)	2.080 (1.127)	52.939	0.000	0.083

significantly differ from Danes—regardless of age. Again, the study shows that nationality of residence is more important than age.

4.5. Insights from open answers

The questionnaire also collected open-answer comments about positive and negative experiences with WFH during the first lockdown. Some Italians declared that WFH can help focus more and that contact with colleagues can be easily kept through video conferences.

> '*It allows you to concentrate better and have a better work-life balance. Remote communication tools allow you to communicate with colleagues as if you were in the office.*' (Male Italian ≤ 40 years old)

> '*An excellent experience. It allows me to concentrate more on activities and to waste less time; I am still in contact with everyone*' (Female Italian > 40 years old)

> '*I love the silence that helps me concentrate much more on my work, compared to the chattering in the office; and it is not so bad as relations with colleagues, have even improved in some cases*' (Female Italian ≤ 40 years old)

> '*There are no continuous distractions caused by people going around in the open space, and there is not that background noise that sometimes becomes annoying and distracting*' (Female Italian ≤ 40 years old)

Some respondents mentioned issues related to being stuck at work at home and having childcare or family members at home during work.

> '*It is difficult if you are not used to it. It requires more discipline, and it is not easy with a small child at home.*' (Female Dane ≤ 40 years old)

> '*Slowly, I created my spaces in a comfortable way with the available tools in order to feel more welcome to work inside a room; it seems trivial, but the little things are very important (for example, arranging the desk as at work, the other spaces with books and small precious objects, gifts, etc.).*' (Female Italian ≤ 40 years old)

> '*At the beginning, I had no issue, but I feel like the more time I am locked at home, the less motivation I have to be productive.*' (Male Dane ≤ 40 years)

Others signaled that WFH influenced the work-life balance:

> '*I love being home with my family, but it is not supporting an efficient working environment. I prefer being in the office to work and being home to relax.*' (Female Dane, 40 years old)

> '*I cook my lunch and eat better*' (Female Italian ≤ 40 years old)

Furthermore, some respondents confirmed they missed their colleagues, especially the incidental contact that was not easily achievable in planned video calls.

> '*I miss the informal talks and surrounding things with colleagues, which I now have to put into writing.*' (Male Dane > 40 years old)

> '*It is good to concentrate, but I miss contact with colleagues and leaders. I miss a bit of motivation. It is a bit lonely, but fortunately, my husband also works at home.*' (Female Dane, 40 years old)

> '*Concentration on work is even greater. On the other hand, there is a lack of interpersonal relationships and sharing with colleagues.*' (Male Italian > 40 years old)

Nevertheless, ICT tools helped to keep in contact and work with colleagues.

> '*Currently available tools make it possible to perform much of the work and maintain human relationships.*' (Male Italian > 40 years old)

> '*By using Skype, I communicated and kept relating with colleagues as if I were in the office.*' (Female Italian, 40 years old)

5. Discussion and conclusion

This study collected and compared data about the experience of WFH during the early months of lockdown in two countries with different levels of familiarity with telework and digitalisation. This study aimed to investigate the experiences of WFH across two countries with different digitalization levels and experiences of WFH prior to the Covid-19 pandemic. The study shows that across the two countries, digital tools allow for WFH but are perceived differently.

5.1. Danes are more challenged during COVID-19 than the Italians

The first topic addressed was the key learnings and overall experience of WFH between Denmark and Italy. The two countries show similarities and differences. First, the respondents of both countries declared that they had been working online (totally or mostly) during the COVID-19 lockdown (Table 1). This means that the biggest rise was for Italian workers, who, according to the available statistics, were partly accustomed to WFH and to a much lesser extent than the Danes were. Though the two countries differed regarding their pre-COVID conditions, the study indicates that workers found themselves in a similar situation during the COVID-19 pandemic.

Although there was a marked difference in the pre-COVID times regarding the availability of ICT tools, Italian workers became accustomed to using technologies very quickly, with Denmark clearly at an advantage. They did not signal particular problems in their employment. Both national samples declared that they used a rich mix of applications that allowed accessible communication and collaboration while WFH (Fig. 1). In some cases, the Italian group was even more 'advanced' than the Danes (for example, for text messaging, Danes used SMS more than Italians, who preferred communication apps).

A major distinction is in the perception of the usefulness and convenience of WFH. The Danish workers found WFH more challenging and demanding than the usual pre-COVID work compared with the Italians (Fig. 2). The detailed analysis of the perceived advantages and disadvantages of WFH (Table 2) shows that, while there is no statistically significant difference with large effect sizes in the perceived advantages, there is a significant distinction with large effect size on the constraints of using the home as an office. In particular, the Danes felt isolated and frustrated by not having the chance to meet colleagues in person and did not appreciate the material conditions of their home as an office. The survey participants also responded consistently to their country of residence, regardless of their age or gender.

The qualitative comments collected provide substantial confirmation of these results. Some Danish respondents explicitly highlighted the lack of social contact with colleagues. Conversely, some Italians declared that the technology was enough to get in contact with colleagues. The analysis shows that, for the Danes, positive socialization with colleagues is an essential factor in their work satisfaction and engagement (as mentioned in section 2). Consequently, forced WFH that does not allow a high level of socialization could be critical.

5.2. High digitalisation does not guarantee a positive perception of WFH

A second goal was to examine whether prior experience with WFH, telework, or digitalisation would be an advantage for workers where digital structures and tools were the only way to give continuity to

work. Differences between the two countries show Danes taking advantage of their higher levels of digitalisation and familiarity with WFH technologies. Consequently, the 'forced' WFH condition caused by COVID-19 should have caused more trouble for Italians. However, despite their higher digitalisation (DESI) index and experience, the mental well-being among the Danes were more affected and they perceived WFH to be more challenging during COVID-19 than the Italians. This indicates that other factors may affect the perception and acceptance of WFH. In conclusion, adopting WFH may not be particularly challenging regarding the 'technical' changes in working modality, but it can impact personal behaviors and attitudes towards work and the balance between work and private life. The musculoskeletal strains [77] of WFH have not been in focus in this study but are recommendable in future studies.

5.3. Digitalisation and well-being

The analysis suggests that the availability of digital platforms and workers' familiarity may be important but not enough to ensure a positive perception of WFH, which several factors may influence. A valuable lesson for public policymakers, governments, and corporate managers is that investing in the implementation of standard digital platforms and networks for WFH does not guarantee work satisfaction. To achieve the potential advantages for societies, the local needs of workers and the specific working habits should be considered, including non-business factors such as the social network and the web of peoples' relationships.

5.3. Implications for policy makers

The vision of digitalising Europe builds on the idea that digital technologies can create better health, public health and competitive jobs. However, the analysis conducted in this paper shows an asymmetric effect between the EU Member States like Denmark and Italy. The increase in blurred boundaries between work and personal life due to the home-office constraints and the level of isolation is another pressing concern. Finally, it is surprising that digital capabilities are not straightforwardly positive regarding working conditions in countries with experience and digital capabilities.

This study draws attention to whether measures to facilitate WFH and reduce its negative impacts on mental well-being can be effective. In particular, public investors and regulatory bodies at the national or supranational (e.g., EU) level should consider that simply providing efficient digital communication platforms may not automatically lead to easier adoption of WFH. For a positive acceptance of WFH, providing only technical support may not be enough. The local social and cultural conditions and how they act as enablers or inhibitors in the transition to digitalized work need to be addressed. The research shows that people's attitudes and habits are essential and could be a discriminant factor in different social/national contexts.

In conclusion, an important message for public decision-makers is that access to technology may be a precondition for successful WFH, but simply investing more in communication platforms and networks is not enough. Widespread adoption of WFH may imply a profound change in social habits and personal lifestyles, and these aspects should not be neglected in the definition of appropriate policies to facilitate WFH. This requires a comprehensive discussion of job legislation and family-supporting policies. Issues such as leaving time for social contact and a right to disconnect should be considered to ensure people's mental well-being.

5.4. Implications for management

The research also shows that the transition to WFH is not just 'providing technology' or 'letting workers get accustomed to it' for companies. To reap the benefits and achieve productivity from WFH, companies must recognize the mental well-being of workers and their positive perceptions of the benefits of this modality. Balancing worker well-being and productivity should therefore be considered in business policies.

While this study did not aim to derive managerial lessons, it still provides valuable insights for human resource management in companies willing to advance WFH for their workers. Again, ICT is a key prerequisite for enabling WFH, and its quality matters significantly for the efficiency of teleworking. However, the social part of work is important, at least for some social contexts, and it has a higher effect. Therefore, when companies discuss how to proceed post-COVID-19 and get requests for increased usage of WFH, managers should understand that simply offering the technology for WFH is not a guarantee of acceptance and adoption in all situations and social environments. The problem is even more complex for

multinational companies that manage international teamwork and different workers' social cultures. They should note that proper management of WFH teams requires not a 'one-fits-all' solution; the peculiar social conditions of the single national context must be considered. Flexible and adaptive organizational solutions for work and job management are crucial for ICT implementation. In continuation of this, to be able to act in line with the change itself, the organizations need to support the managers during the transitions process to ensure that the managers develop skills in tandem with the process, so they match the new ways of working [78].

As our study shows, working from home can lead to social and professional isolation, especially in the Danish sample. It is thus essential to acknowledge the social part of work and how it affects knowledge sharing and peoples' motivation and mental well-being in the hybrid work setting. Video conferencing systems can help overcome the isolation. However, different meeting types (e.g., for brainstorming, diving work tasks, etc.) require different capabilities (hear voices, share screens, see body language, experience co-location) that influence how the meeting should be conducted [79]. Virtual reality could be an alternative to video conferencing systems as it can create a more realistic setting for spontaneous collaboration and knowledge exchange. In the role of an avatar, a person can walk around in the virtual office and meet other avatars (colleagues) for knowledge exchange [80].

Looking beyond the effect on peoples' mental well-being when WFH, it is important to consider the use of the generated behavioural data. While workplace monitoring is a common practice when WFH and thus can be expected to be a new way to manage hybrid workplaces, the increase in generated data about people's behaviour comes with a risk of increased remote control and surveillance practices other forms of bureaucratic control [33]. Consequently, in a digitalising Europe, the new ways of working may introduce considerations regarding the ergonomic suitability of many home offices, the psychosocial positive and negative effects, and digital monitoring and insights into people's lives.

5.5. Limitations

A limitation of the study is that only two countries were considered because of their different pre-COVID 19 conditions of WFH and its technology. The data also has limitations: First, common method bias could have influenced the results. For future research, we suggest that longitudinal data focusing on remote work issues should be collected. Furthermore, objective data should supplement survey data in the study designs, which often rely on self-reports only. Second, only the situation during the COVID-19 lockdown was evaluated. Extending the analysis to a post-pandemic future situation should be considered. Finally, a snowball sampling method with its limitations was used. This approach includes the risk of bias in the data. Consequently, the generalization of the results only considers respondents with similar personal characteristics.

Acknowledgments

This paper and the research behind it would not have been possible without the input from the DTU Management colleagues sharing their experiences of working from home during the first part of the COVID-19 pandemic, providing the authors with insightful comments offered to early versions of the paper. A key inspiration and support comes from their colleague Professor John Paulin Hansen, DTU Management. His enthusiasm and engagement have been an inspiration and got the project on experiences of working from home during the pandemic on track early in the COVID-19 pandemic.

Conflict of interest

None to report.

Informed consent

The participants provided their written informed consent to participate in this study.

Funding

This research received no external funding.

Ethical approval (name of institute and number)

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements.

Supplementary material

The supplementary material is available in the electronic version of this article: https://dx.doi.org/10.3233/WOR-220137.

References

[1] Messenger J, Vargas Llave O, Gschwind L, Boehmer S, Vermeylen G, Wilkens M, et al. Working anytime, anywhere: The effects on the world of work. Luxembourg; 2017.

[2] Eurofound. COVID-19 could permanently change teleworking in Europe. 2020. Available from: https://www.eurofound.europa.eu/nb/news/news-articles/covid-19-could-permanently-change-teleworking-in-europe

[3] McKinsey. The future of remote work: An analysis of 2,000 tasks, 800 jobs, and 9 countries. 2020. Available from: https://www.mckinsey.com/featured-insights/future-of-work/whats-next-for-remote-work-an-analysis-of-2000-tasks-800-jobs-and-nine-countries

[4] Espinoza R, Reznikova L. Who Can Log In? the Importance of Skills for the Feasibility of Teleworking Arrangements across OECDCountries. SSRN Electron J. 2020.

[5] GLOBAL WORKPLACE ANALYTICS. The Business Case for Remote Work 2021 Report. 2021.

[6] Lopez-Leon S, Forero DiA, Ruiz-DIáz P. Recommendations for working from home during the COVID-19 pandemic (and beyond). Vol. 66, Work. 2020.

[7] Eurofound. Living, working and COVID-19, COVID-19 series. COVID-19 Series. 2020. Available from: https://www.eurofound.europa.eu/publications/report/2020/living-working-and-covid-19

[8] Eurofound. Workers want to telework but long working hours, isolation and inadequate equipment must be tackled. 2021. Available from: https://www.eurofound.europa.eu/publications/article/2021/workers-want-to-telework-but-long-working-hours-isolation-and-inadequate-equipment-must-be-tackled

[9] Anderson AJ, Kaplan SA, Vega RP. The impact of telework on emotional experience: When, and for whom, does telework improve daily affective well-being? Eur J Work Organ Psychol. 2015;24(6):882-97.

[10] Bailey DE, Kurland NB. A review of telework research: findings, new directions, and lessons for the study of modern work. J Organ Behav. 2002;23(4):383-400.

[11] Biron M, van Veldhoven M. When control becomes a liability rather than an asset: Comparing home and office days among part-time teleworkers. J Organ Behav. 2016;37(8):1317-37.

[12] Nakrošienė A, Bučiūnienė I, Goštautaitė B. Working from home: characteristics and outcomes of telework. Int J Manpow. 2019;40(1).

[13] Nilles JM, Carlson FR, Gray P, Hanneman G. Telecommuting—An Alternative to Urban Transportation Congestion. IEEE Trans Syst Man Cybern. 1976;SMC-6(2).

[14] Karsh BT. Theories of work-related musculoskeletal disorders: Implications for ergonomic interventions. 2009;7(1):71-88.

[15] Oakman J, Kinsman N, Stuckey R, Graham M, Weale V. A rapid review of mental and physical health effects of working at home: how do we optimise health? BMC Public Health. 2020;20(1):1-13.

[16] Buomprisco G, Ricci S, Perri R, De Sio S. Health and Telework: New Challenges after COVID-19 Pandemic. Eur J Environ Public Heal. 2021 (2):73.

[17] Mann S, Holdsworth L. The psychological impact of teleworking: Stress, emotions and health. New Technol Work Employ. 2003;18(3):196-211.

[18] Ipsen C, Jensen PL, Andersen V. Prevention of work-related stress in practice -a participatory approach. In: Advances in Occupational, Social, and Organizational Ergonomics. 2010.

[19] Broadband Commision. The State of Broadband 2020: Tackling digital inequalities A decade of action. Paris; 2020.

[20] ITU. World Telecommunication/ICT Indicators Database. 2021. Available from: https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx

[21] Green N, Tappin D, Bentley T. Working From Home Before, During and After the Covid-19 Pandemic: Implications for Workers and Organisations. New Zeal J Employ Relations. 2020;45(2).

[22] Bell BS, Kozlowski SWJ. A typology of virtual teams: Implications for effective leadership. Gr Organ Manag. 2002;27(1):14-49.

[23] Hesketh B, Neal AF. Technology and performance. In: The changing nature of performance: Implications for staffing, performance and development. Jossey-Bass; 1999. p. 21-55.

[24] Messenger J, Vargas Llave O, Gschwind L, Boehmer S, Vermeylen G, Wilkens M, et al. Working anytime, anywhere: The effects on the world of work. Luxembourg; 2017.

[25] Brem A, Viardot E, Nylund PA. Implications of the coronavirus (COVID-19) outbreak for innovation: Which technologies will improve our lives? Technol Forecast Soc Change. 2021;163.

[26] Wöhrmann AM, Ebner C. Understanding the bright side and the dark side of telework: An empirical analysis of working conditions and psychosomatic health complaints. New Technol Work Employ. 2021;36(3):348-70.

[27] Lister K. Lessons Learned from Remote Working during COVID-19: Can the Government Save Money Through Maximizing Efficient Use of Leased Space? – Hearings – U.S. Senate Committee on Environment and Public Works]. Available from: https://www.epw.senate.gov/public/index.cfm/2020/7/lessons-learned-from-remote-working-during-covid-19-can-the-government-save-money-through-maximizing-efficient-use-of-leased-space

[28] Felstead A, Henseke G. Assessing the growth of remote working and its consequences for effort, well-being and work-life balance. New Technol Work Employ. 2017;32(3):195-212.

[29] Hesketh I, Cooper CL. Wellbeing at work : how to design, implement and evaluate an effective strategy. 2019. 176 p.

[30] Ollo-López A, Goñi-Legaz S, Erro-Garcés A. Home-based telework: usefulness and facilitators. Int J Manpow. 2020;42(4).

[31] ILO. Teleworking during the COVID-19 pandemic and beyond A Practical Guide. 2020. Available from: www.ilo.org/publns.

[32] Milasi S, Bisello M, Hurley J, Sostero M, Fernandez-Macias E. The potential for teleworking in Europe and the risk of a new digital divide. VOXEU. 2020;

[33] Karanika-Murray M, Ipsen C. Guest editorial: Reshaping work and workplaces: learnings from the pandemic for workplace health management. Int J Work Heal Manag. 2022;15(3):257-61.

[34] Rubin O, Nikolaeva A, Nello-Deakin S, Brömmelstroet M te. What can we learn from the COVID-19 pandemic about how people experience working from home and commuting?. Centre for Urban Studies – University of Amsterdam. 2020. Available from: https://urbanstudies.uva.nl/content/blog-series/covid-19-pandemic-working-from-home-and-commuting.html?cb

[35] Gross JV, Mohren J, Erren TC. COVID-19 and healthcare workers: a rapid systematic review into risks and preventive measures. BMJ Open. 2021;11:42270. Available from: http://bmjopen.bmj.com/

[36] Sizemore LM, Peganoff-O'brien S, Skubik-Peplaski C. Interference: COVID-19 and the Impact on Potential and Performance in Healthcare. Work. 2021;69:767-74.

[37] Xiang S, Rasool S, Hang Y, Javid K, Javed T, Artene AE. The Effect of COVID-19 Pandemic on Service Sector Sustainability and Growth. Front Psychol. 2021;12:633597. Available from: www.frontiersin.org

[38] Meechamnan C, Kunaviktikul W. Nursing and Health Policy Perspectives. 2020. Available from: https://covid19.

[39] Soto-Rubio A, Del Carmen Giménez-Espert M, Prado-Gascó V. Effect of Emotional Intelligence and Psychosocial Risks on Burnout, Job Satisfaction, and Nurses' Health during the COVID-19 Pandemic. Available from: www.mdpi.com/journal/ijerph

[40] Mayer B, Helm S, Barnett M, Arora M. The impact of workplace safety and customer misbehavior on supermarket workers' stress and psychological distress during the COVID-19 pandemic. Int J Work Heal Manag. 2022;15(3):339-58.

[41] Ozamiz-Etxebarria N, Berasategi Santxo N, Idoiaga Mondragon N, Dosil Santamaría M. The Psychological State of Teachers During the COVID-19 Crisis: The Challenge of Returning to Face-to-Face Teaching. Front Psychol. 2021;11:3861.

[42] European Commision. Digital Economy and Society Index (DESI) 2020. Hum Cap. 2020.

[43] European Commission. The Digital Economy and Society Index (DESI) | Shaping Europe's digital future. 2021. Available from: https://digital-strategy.ec.europa.eu/en/policies/desi

[44] EWCS. Sixth European Working Conditions Survey: 2015 Data visualisation. Eur Surv Work Cond 2005. 2015.

[45] Alizadeh T. Planning implications of telework: a policy analysis of the Sydney metropolitan strategy. Aust Plan. 2013;50(4).

[46] Malik A, Rosenberger PJ, Fitzgerald M, Houlcroft L. Factors affecting smart working: evidence from Australia. Int J Manpow. 2016;37(6).

[47] Vescoukis V, Stratigea A, Giaoutzi M. Teleworking: From a technology potential to a social evolution. Reg Sci Inq. 2012;4(3 SPEC. ISSUE).

[48] Fisher K, Fisher MD. The Distance Manager. A Hands-On Guide to Managing Off-Site Employees and Virtual Teams. Vol. 1. McGraw-Hill; 2001. 1-252 p.

[49] Kurland NB, Bailey DE. When workers are here, there, and everywhere: A discussion of the advantages and challenges of telework. Organ Dyn. 1999;28:53-68.

[50] Kang Y-S, Kwon S-D. A Study on the Influencing Factors of Smart-Work Performance. J Inf Technol Appl Manag. 2016;23(1).

[51] Messenger JC, Gschwind L. Three generations of Telework: New ICTs and the (R)evolution from Home Office to Virtual Office. New Technology, Work and Employment. 2016.

[52] Illegems V, Verbeke A, S'Jegers R. The organizational context of teleworking implementation. Technol Forecast Soc Change. 2001;68(3).

[53] Sturesson L. The Paths of Work and ICT into the Home. In 2000.

[54] Hassan SAG, Geleel SA. Smart work and efficiency at the work place. 2016 May 28; Available from: http://dar.aucegypt.edu/handle/10526/4788

[55] Clapperton G, Vanhoutte P. The smarter working manifesto : when, where and how do you work best?. Sunmakers; 2014. 282 p. Available from: https://books.google.com/books/about/The_Smarter_Working_Manifesto.html?id=Yxi1oAEACAAJ

[56] van der Lippe T, Lippényi Z. Co-workers working from home and individual and team performance. New Technol Work Employ. 2020;35(1).

[57] Park K. An Exploratoy Study on Influence Factors for Expectation Effect of Smart Work and the Attitude Difference between Positions and Job Types. J Inf Technol Appl Manag. 2018;25(4):23-39.

[58] Park K, Kim Y-J. Difference in Acceptance Level of Smart Work among Tendencies of Personal Leadership Styles. J Digit Converg. 2013;11(11):197-207.

[59] Mallia K, Ferris S. Telework: A consideration of its impact on individuals and organizations. Electron J Commun. 2000;10(3).

[60] Troup C, Rose J. Working from home: Do formal or informal telework arrangements provide better work-family outcomes? Community, Work Fam. 2012;15(4).

[61] Taskin L, Bridoux F. Telework: A challenge to knowledge transfer in organizations. Int J Hum Resour Manag. 2010;21(13).

[62] Bélanger F, Allport CD. Collaborative technologies in knowledge telework: An exploratory study. Inf Syst J. 2008;18(1).

[63] Govindaraju M, Sward D. Effects of wireless mobile technology on employee work behavior and productivity: An intel case study. In: IFIP Advances in Information and Communication Technology. 2005.

[64] Hertel G, Geister S, Konradt U. Managing virtual teams: A review of current empirical research. Hum Resour Manag Rev. 2005;15(1):69-95.

[65] Sarti D, Torre T. Is smart working a win-win solution? In: Addabbo T, Ales E, Curzi Y, Senatori I, editors. Well-being at and through work. 2017. p. 231-51.

[66] Dockery AM, Bawa S. Is Working from Home Good Work or Bad Work? Evidence from Australian Employees. Aust J L Abour Econ. 2014;17(2):173-90.

[67] Hayes SW, Priestley JL, Ishmakhametov N, Ray HE. "I'm not Working from Home, I'm Living at Work": Perceived Stress and Work-Related Burnout before and during COVID-19. 2020; Available from: https://psyarxiv.com/vnkwa/

[68] Roggio F, Trovato B, Ravalli S, Di Rosa M, Maugeri G, Bianco A, et al. One Year of COVID-19 Pandemic in Italy: Effect of Sedentary Behavior on Physical Activity Levels and Musculoskeletal Pain among University Students. Int J Environ Res Public Heal 2021, Vol 18, Page 8680. 2021 Aug 17;18(16):8680.

[69] Gałczyk M, Zalewska A, Białokoz-Kalinowska I, Sobolewski M. Chronic Back Condition and the Level of Physical Activity as Well as Internet Addiction among Physiotherapy Students during the COVID-19 Pandemic in Poland. Int J Environ Res Public Heal 2021, Vol 18, Page 6718. 2021;18(13):6718.

[70] Ipsen C, van Veldhoven M, Kirchner K, Hansen JP. Six Key Advantages and Disadvantages of Working from Home in Europe during COVID-19. Int J Environ Res Public Health. 2021;18(4):1826.

[71] Peters P, Ligthart PEM, Bardoel A, Poutsma E. 'Fit' for telework'? Cross-cultural variance and task-control explanations in organizations' formal telework practices. Int J Hum Resour Manag. 2016;27(21).

[72] Higa K, Sivakumar V, Yen J, Bui TX. Comparison of telework in the US and Japan. In 1996.

[73] Sostero M, Milasi S, Hurley J, Fernandez E, Bisello M. Teleworkability and the COVID-19 crisis: a new digital divide?. Bruxelles; 2020. Available from: https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/teleworkability-and-covid-19-crisis-new-digital-divide

[74] Baltar F, Brunet I. Social research 2.0: Virtual snowball sampling method using Facebook. Internet Res. 2012;22(1).

[75] Gurstein P. Wired to the World, Chained to the Home: Telework in Daily Life. Vol. 1. Vancouver: UBC Press; 2001. 1-256 p.

[76] Jackson PJ. Virtual working : social and organisational dynamics. Routledge; 2001.

[77] Argus M, Pääsuke M. Effects of the COVID-19 lockdown on musculoskeletal pain, physical activity, and work environment in Estonian office workers transitioning to working from home. Work. 2021;69(3).

[78] Ipsen C, Karanika-Murray M, Hasson H. Intervention leadership: a dynamic role that evolves in tandem with the intervention. Vol. 11, International Journal of Workplace Health Management. Emerald Group Publishing Ltd.; 2018. p. 190-2.

[79] Standaert W, Muylle S, Basu A. Business meetings in a postpandemic world: When and how to meet virtually. Bus Horiz. 2021;in press.

[80] Kirchner K, Nordin Forsberg B. A Conference Goes Virtual: Lessons from Creating a Social Event in the Virtual Reality. In: Proceedings of the 21st International Conference of Innovations for Community Services (I4CS 2021). Springer Science and Business Media Deutschland GmbH; 2021. p. 123-34. Available from: https://link.springer.com/chapter/10.1007/978-3-030-75004-6_9