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Introduction

The current corona virus (COVID-19) pandemic has a profound impact on peoples working live all over the world. The social distancing measures that have been put in place to confine the spread of the virus have triggered an economic crisis with massive job losses, reduced working hours and short-time work as consequences (e.g. Beine et al. 2020; Béland/ Brodeur/Wright 2020; Coibion/Gorodnichenko/Weber 2020). The health measures put in place have just as much shaped the working conditions of the remained workers. To apply social distancing measures at work, many workers are requested to work from other places (in most cases their own home; Di Domenico et al. 2020). This was recognized as an important strategy, as country-specific levels of occupational exposure to contagion driven by social contacts explains a substantial amount of variance of the growth in COVID-19 infections and number of deaths from COVID-19 in the early stage of the pandemic (Lewandowski 2020). Therefore, as an immediate consequence of the COVID-19 situation workers started working from home. According to a recent Eurofound (2020) study, in European countries this is the case for 18.4 % (Romania) to 59 % (Finland) of workers (for the U.S. see Brynjolfsson et al. 2020; Global Workplace Analytics 2020).

Due to the increase of teleworking, the current chapter looks at the merits and demerits of telecommuting and the boundary conditions of successfully working from home. Before doing this, the extent of telecommuting in Luxembourg as well as definitions and different arrangements of telecommuting will be presented. As there exists already extensive reviews and meta-analysis of telecommuting in general (e.g. Allen et al. 2013; Allen/Golden/Shockley 2015; Bailey/Kurland 2002; Gajendran/Harrison 2007; Martin/MacDonnell 2012; Mello 2007; Nicklin/Cerasoli/Dydy 2016), this chapter focus especially on the extraordinary situation under which telework currently takes place under the COVID-19 pandemic. The chapter will close with research

questions of the ongoing Quality of work 2020 survey about the effects of different work arrangements in the COVID-19 pandemic.

Telecommuting in Luxembourg

Using data from the Quality of work survey 2017 Sischka and Steffgen (2018a) found that 13 % of the Luxembourgish workers telecommuted daily or several times a week and 8 % telecommuted at least several times a month before the COVID-19 crisis. Telecommuting was very unequally distributed regarding education, occupational classification and organisational characteristics. Workers with Bachelor (23 % daily/several times a week; nine percent several times a month), Master (30 % daily/several times a week; 14 % several times a month) or doctoral degree (13 % daily/several times a week; 17 % several times a month) had a higher percentage of telecommuters compared to workers with lower formal education, e.g. primary education (two percent daily/several times a week; one percent several times a month) or lower secondary education (two percent daily/several times a week; two percent several times a month; Sischka and Steffgen 2018a). Telecommuting was especially common among managers (26 % daily/several times a week; 21 % several times a month) and professionals (30 % daily/several times a week; 14 % several times a month), whereas telecommuting was less common for technicians and associate professionals (eleven percent daily/several times a week; eight percent several times a month) and clerical support workers (four percent daily/several times a week; six percent several times a month), and virtually absent for plant and machine operators and workers in elementary occupations (Sischka/Steffgen 2018a). Finally, workers who worked for government organizations (28 % daily/several times a week; six percent several times a month) or European/International organization (28 % daily/several times a week; nine percent several times a month) had higher percentages of telecommuters compared to workers who worked in private organizations (eight percent daily/several times a week; eight percent several times a month [Sischka/Steffgen 2018a]). Another study on Luxembourgish workers found that barriers to establish telecommuting stem more often from work characteristics (i.e. telecommuting not possible) or the employer's refusal rather than the worker's decision (Hauret 2019).

According to the Eurofound (2020) study, currently, 56.8 % of workers in Luxembourg started working at home because of the COVID-19 situation, while this percentage is lower in the neighboring countries, Belgium (53.4 %), France (37.2 %), and Germany (36.9 %). Notably, the proportion of (European) workers who began teleworking because of the current situation is higher for workers who have teleworked previously at least sometimes (56 %), compared to workers that have never worked from home prior to the pandemic (24 %). In Luxembourg, the percentages of worker that have completely switched to telecommuting as a result of COVID-19 is highest in the education (74 %) and in the administrative and financial services sector (61 %) and lowest in the construction (28 %) and health sector (17 %; Statec 2020). Moreover, the extent of telecommuting depends on education levels. The percentages of workers that have completely switched to telecommuting is highest in the highest educated group and lowest in the lowest educated group in Luxembourg (STATEC 2020). Thus, the COVID-19 seems to increase already existing unequal distributions of telecommuting across different occupational groups (e.g. Sischka/Steffgen 2018a; STATEC 2020). Nevertheless, about 74 % of workers stated that the telecommuting activities were exclusively due to the COVID-19 pandemic, whereas 17 % stated that they engaged in telecommuting at least sometimes before the COVID-19 situation and 8 % stated that they regularly engaged in telecommuting before COVID-19 and that their working situations did not change that much (STATEC 2020).

In general, with the COVID-19 pandemic, the labour market has seen a sharp increase in telecommuting (at least temporarily) also in Luxembourg and discussion of the feasibility and usefulness are ongoing (Lincoln/Khan/Cai 2020). Especially occupation groups, that have only limited experience with telecommuting, now (have to) adopt this kind of work mode that can have a strong impact on their working life.

Definition and different arrangements of telecommuting

The term telecommuting was coined by Jack Nilles (1975), an engineer working on projects of the National Aeronauts and Space Administration, during the oil crisis in the 1970s. Telecommuting was thought of as a way to reduce energy consumption and alleviate traffic problems and quickly gained the interest of federal and state governments that began to fund pilot projects to examine feasibility and effectiveness of this work mode (Allen/Golden/Shockley 2015). The interest of private organisations in telecommuting as a way to solve some of the issues of their workforce (e.g. helping them to manage and balance work and family responsibilities), and the rapid evolution of communication technologies (ICT) that made work less dependent on time and location boosted the idea of telecommuting further (ibid.; Nicklin/Cerasoli/Dydy 2016).

Thus, telecommuting is not a new phenomenon, and the number of workers that make use of telework as well as the extent of telecommuting has steadily increased with the further advancement of ICTs during the last few decades in Europe, the U.S. and in other parts of the world (Allen et al. 2015; Global Workplace Analytics 2020).

In the meantime, there even exists a plethora of different terms and concepts that refer to or are linked with telecommuting, e.g. telework, remote work, distance work, virtual work, home-work, flexible work arrangement among others (e.g. Allen/Golden/Shockley 2015; Nicklin/Cerasoli/Dydy 2016). These terms do overlap, but also represent different conceptualization of related concepts and highlight different aspects of the phenomenon. For instance, home-work only refers to the work from home, but telecommuting can also take place at other locations (cf. Nicklin/Cerasoli/Dydy 2016). Similarly, flexible work arrangements encompass telecommuting but is a broader term that also includes flextime (e.g. Allen/Golden/Shockley 2015). Importantly, even if the term telecommuting is used, definitions can substantially vary across studies. Thus, sometimes at first glance contradictory results may be just the result of a different definition or conceptualization of telecommuting, making an integrative review challenging (ibid.). The core meaning of telecommuting describes a work arrangement in which workers “perform at least parts of their responsibilities outside the confines of their organisation’s physical boundaries by using various forms of ICTs to maintain a virtual presence” (Nicklin/Cerasoli/Dydy 2016: 42).

There exists many different telecommuting arrangements that can be differentiated according to the following dimensions (cf. Allen/Golden/Shockley 2015; Nicklin/Cerasoli/Dydy 2016): extent of telecommuting (from a few hours per week to full-time), schedule (fixed, flexible), location (fixed, mobile), task interdependence (low, high), synchrony (serial, concurrent), voluntariness of telecommuting arrangement (voluntary, job mandated), technology (extent of ICT use), contract status (regular employee, contract worker). For studies researching the effects of telecommuting, it is important to capture the extent of this work mode. Early studies just compared telecommuters with non-telecommuters. However, a person that engages one day per month in telecommuting is likely to have different experiences compared to a person that telecommutes four days per week (cf. Allen/Golden/Shockley 2015). If the extent of telecommuting is not considered, studies may also miss non-linear effects of telecommuting (e.g. Virick/DaSilva/Arrington 2010). Beside location flexibility, telecommuting may provide workers also with temporal (or scheduling) flexibility. However, this is not always the case, as there are also telecommuting arrangements where workers are required to log in to computer terminals during a fixed schedule while their work is continuously monitored. One might hypothesise that the effects of telecommuting on various outcomes might be moderated by schedule control (cf. Allen/Golden/Shockley 2015). The effect of telecommuting on performance might also be moderated by task interdependence – the degree to which organisational members rely on each other to perform their tasks effectively given the nature of their jobs (cf. Kiggundu 1981) – that often require a high level of coordination and interaction among others. It has been hypothesised that telecommuters in positions with higher levels of task interdependence have to rely more often on telephone, email or video-communication to replace face-to-face interactions that make such coordination difficult (cf. Golden/Veiga 2005). Thus, telecommuting might be less effective for jobs with high levels of task

interdependence. The other dimensions might also have an effect on the relationship between telecommuting and several outcomes. Moreover, it is important to note that experience of telecommuting may influence the relationship between telecommuting and various outcomes as workers gain more insights in this work mode, modify their behaviour and use technologies in order to decrease negative and increase positive effects of telecommuting (cf. Raghuram et al. 2001). Additionally, gender may play a role in the association between telecommuting and several outcomes, as women still have greater responsibilities for familial and domestic tasks compared to men (cf. Leonard 2001). Thus, the different telecommuting arrangements, experience of telecommuting and gender may be important moderators in the relationship between telecommuting and various outcomes. Indeed, meta-analytical evidence indicates more beneficial effects of telecommuting for women and for workers that have some experience with this work mode, indicating a learning curve associated with adjusting to telecommuting (cf. Gajendran/Harrison 2007). However, other important factors (e.g. schedule) in the relationship between telecommuting and outcomes remain often unstudied.

Hence, different arrangements of telecommuting have an influence on the individual, but also on the organisational and the societal level (cf. Allen/Golden/Shockley 2015; Harpaz 2002; Kurland/Bailey 1999; Nicklin/Cerasoli/Dydynd 2016). Thus, in the following, the effects of telecommuting on the individual, the organisation, and the society will be discussed in detail.

Effects of telecommuting on the individual

Major benefits of telecommuting included reduced travel time and costs (cf. Kurland/Bailey 1999). Moreover, with the reduced need to be present, telecommuting allows workers to live in locations with lower living costs (cf. Nicklin/Cerasoli/Dydynd 2016). Indeed, Ory and Mokhtarian (2006) found that telecommuters lived farther from work than did non-telecommuters. However, from an urban-planning perspective, the causal direction of the link between work-home distance and telecommuting is important, as the ability to telecommute might also increase the workers net vehicle-miles traveled (i.e., fewer but longer trips to work). Ory and Mokhtarian (2006) showed that workers who were telecommuting and then moved tend to relocate closer to their workplace, whereas workers who first relocated and then started to telecommute tended to have moved farther from their workplace. Thus, it seems that the ability to telecommute allows rather than motivates workers to live in locations with greater distant to the workplace.

Moreover, telecommuting is often promoted as a mean to help workers manage their work and family responsibilities and to reduce work-family conflict. Meta-analytical evidence indicates only small effects between telecommuting and work interferences with family (i.e., work-family conflict: $r = -.16$, 95 % CI = $[-.19; -.08]$, Gajendran/Harrison 2007; $r = -.08$, 95 % CI = $[-.15; -.01]$, Allen et al. 2013) and family interferences with work (i.e., family-work conflict; $r = -.15$, 95 % CI = $[-.21; -.07]$, Gajendran/Harrison 2007; $r = -.01$, 95 % CI = $[-.07; .05]$, Allen et al. 2013), but both meta-analyses indicated a large amount of heterogeneity regarding the relationship between telecommuting and work-family conflict, indicating possible moderators (cf. Allen/Golden/Shockley 2015). Gajendran and Harrison (2007) showed that experience of telecommuting as well as the extent of telecommuting increased the beneficial effect of telecommuting on work-family conflict. Moreover, Golden, Veiga and Simsek (2006) found that the extent of telecommuting was positively associated with family interferences with work and negatively associated with work interferences with family. The beneficial effect of telecommuting on reduced work interferences with family was especially strong when workers also had high scheduling flexibility, whereas the detrimental effect of telecommuting on family interferences was exacerbated with increasing household size (ibid.). The current telecommuting situation is special as many workers (especially women; Alon et al. 2020) do not only have to do their contractual work, but also must take care of children in parallel as many childcare center, kindergarten and schools are closed or operate only partially. This increases the family interferences with work levels. Thus, it is not surprising that workers with children are less satisfied with the extended telecommuting due to the COVID-19 situation and that conflicts with family

members and disturbance by family members are frequently reported (cf. Baert et al. 2020). Moreover, workers who are more dependent on others report more conflicts with colleagues and family and more disturbances from roommates (ibid.).

Telecommuting has also an impact on interpersonal processes (cf. Allen/Golden/Shockley 2015). As workers cannot interact face-to-face with colleagues and supervisors during the telecommuting, it is often feared that telecommuting leads to social and professional isolation (cf. Charalampous et al. 2019; Feldman/Gainey 1997). Social interaction with colleagues and perception of relatedness have been identified as important predictors for job satisfaction and overall psychological well-being (e.g. Deci/Ryan 2000). Meta-analytical evidence showed no significant association between telecommuting status (telecommuters vs. non-telecommuters) and coworker relationship quality ($r = .00$, 95 % CI = [-.03; .03], Gajendran/Harrison 2007). However, when extent of telecommuting was considered, the meta-analysis showed no association between telecommuting and coworker relationship quality under low-extent telecommuting ($r = .03$, 95 % CI = [-.01; .07]), but a detrimental effect under high-extent telecommuting ($r = -.19$, 95 % CI = [-.30; -.08]). The same effect seems not to be the case for the relationship with supervisors. Gajendran and Harrison (2007) found a positive association between telecommuting and supervisor relationship quality ($r = .12$, 95 % CI = [.08; .15]) that was not moderated by extent of telecommuting. However, the causal direction of these association (telecommuting and coworker/supervisor relationship quality) cannot be determined as the meta-analysis only included cross-sectional studies. Thus, alternative explanations are also possible, e.g. that workers who perceive a low coworker relationship quality tend to telecommute more and that supervisors are more likely to grant telecommuting to workers with whom they have a better relationship (cf. Allen/Golden/Shockley 2015). Additionally, extent of telecommuting was also linked with decreased feedback (cf. Sardeshmukh/Sharma/Golden 2012). Regarding the actual COVID-19 situation, a recent study reported that workers perceived detrimental effects of the extended telecommuting on relationship with colleagues and lowered sense of connectedness with the employer (Baert et al. 2020).

Connected with the fear of social isolation is the fear that telecommuting might have detrimental effects on career prospects and salary growth (e.g. McCloskey/Igbaria 2003). However, research on the effect of telecommuting on career-success and salary has produced mixed results. Meta-analytical evidence (cf. Gajendran/Harrison 2007) showed no association between telecommuting status and perceived career prospects ($r = .00$, 95 % CI = [-.06; .07]). Longitudinal evidence indicated that women who used telecommuting more extensively had lower salary growth than those who used it less often, controlling for many productivity-related characteristics (cf. Glass 2004). Contrarily, based on a nationally representative U.S. sample, a study reported that telecommuting status is positively related with higher salary (Weeden 2005). A third primary study found no salary difference between telecommuters vs. non-telecommuters for the first 40 work hours, but reported a lower salary increase for additional or overtime work hours that was done via telecommuting rather than on-site work (cf. Glass/Noonan 2016). Finally, using survey data matched with corporate data on promotion and salary growth, Golden and Eddleston (2020) found that telecommuters compared to non-telecommuters experienced lower salary growth but that they did not differ regarding the number of promotions. Additionally, they reported that extent of telecommuting was negatively related to promotions and salary growth. Moreover, they found that telecommuters received more promotion and greater salary growth when telecommuting was highly normative in their work context and when the telecommuters performed supplemental work. On the other hand, in work contexts where telecommuting was highly normative, extensive telecommuting led to a stronger decrease in promotion. Thus, Golden and Eddleston concluded that it is not simply telecommuting per se but the extent of telecommuting and the normative context that affects career success. Regarding the actual COVID-19 situation, a recent study reported that some workers perceived the extended telecommuting to diminish their promotion opportunities and hamper their professional development (cf. Baert et al. 2020). Thus, the COVID-19 pandemic is also seen as a career shock (cf. Akkermans/Richardson/Kraimer 2020).

Telecommuting might also have an impact on the nature of work. Telecommuting is also associated with higher

levels of perceived autonomy ($r = .19$, 95 % CI = [.16; .22], Gajendran/Harrison 2007). However, the causal direction of this association (or potential third variables) so far have not been revealed. Thus, it is not clear if telecommuting enhances perception of autonomy or if workers with higher levels of perceived autonomy have greater opportunities (and desire) for telecommuting, or if both applies. Thus, one theory posits that telecommuting increases autonomy perception that in turn drive positive outcomes (cf. Gajendran/Harrison /Delaney-Klinger 2015).

In addition, the introduction of ICTs and telecommuting may lead to a phenomenon that has been referred to as "telepressure" (cf. Barber/Santuzzi 2015). Through the flexibility of ICT-based communications, traditional boundaries between work and private time might be blurred as workers might feel the need to respond to work-related messages. This telepressure can lead to lower psychological detachment from work, resulting in higher levels of physical and cognitive exhaustion (ibid.). Workers in Luxembourg who used ICT outside the workplace showed higher levels of work-life-conflicts (cf. Sischka/Steffgen, 2018).

Hence, telecommuting has an impact on the nature of work; thus, it may also have an impact on job satisfaction and well-being dimensions. However, as telecommuting has both, merits and demerits, it is not easy to predict whether the net effect on job satisfaction and well-being is positive or negative. Moreover, according to Warr's (1994) Vitamin Model work environment features are non-linearly linked to well-being. With increasing telecommuting time, work-family conflict might decline, and autonomy might increase while at the same time family-work conflict might increase and relationship quality with coworkers might decrease. However, the change of these conditions happens in a non-linear way. Thus, one might hypothesise that at a certain point of telecommuting time, there exists an optimal balance between positive and negative effects. Supporting these notions, studies that research the extent of telecommuting on job satisfaction found often curvilinear relationships (Golden/Veiga 2005; Virick, DaSilva/Arrington 2010), i.e. that job satisfaction is highest among medium levels of telecommuting. Moreover, Golden and Veiga reported that the effect of telecommuting on job satisfaction was moderated by task interdependence, i.e. that workers with high interdependence showed lower levels of job satisfaction with higher levels of telecommuting. Telecommuting is also associated with lower work-role stress (meta-analytical effect size: $r = -.11$, 95 % CI = [-.15; -.07]) and this association is moderated by experience with telecommuting (i.e., more experienced telecommuters have lower role stress) and mediated by perceived autonomy and work-family conflict (cf. Gajendran/Harrison 2007). However, as all the studies that were used in the study were cross-sectional, the mediation claim should be interpreted with caution. Moreover, telecommuting has been linked with lower work exhaustion but also with lower engagement (cf. Sardeshmukh/Sharma/Golden 2012). One might also hypothesise a non-linear effect between extent of telecommuting and these and other well-being dimensions. However, until now, it seems that no study has investigated possible functional forms of these associations, other than linear.

Regarding performance and productivity, meta-analytical evidence (cf. Gajendran/Harrison 2007) suggested that telecommuting is positively related with *supervisor-rated* job performance ($r = .18$, 95 % CI = [.09; .26]). Interestingly, the same meta-analysis found no association between telecommuting and *self-rated* job performance ($r = .01$, 95 % CI = [-.01; .03]). Another meta-analysis (Martin/MacDonnell 2012) also found a positive association between telecommuting and performance ($r = .16$, 95 % CI = [.09; .23]), as well as between telecommuting and productivity ($r = .23$, 95 % CI = [.13; .33]). Moreover, Turetken et al. (2011) found a negative association between task interdependence and productivity among a small sample of telecommuters. Regarding the current COVID-19 situation, a recent study found that the majority of workers reported that telecommuting improved their efficiency in performing tasks and increased their work concentration (cf. Baert et al. 2020). However, workers that strongly depend on others in their job and those who usually receive a lot of feedback, were less likely to report improved efficiency and increased concentration due to telecommuting (ibid.).

Telecommuting might also reduce turnover (intentions). Meta-analytical evidence suggested a small beneficial

effect of telecommuting, i.e. that telecommuter status is negatively related with turnover intentions ($r = -.08$, 95 % CI = $[-.11; -.06]$, Gajendran/Harrison 2007). A cross-national study also reported lower actual turnover rates for organisations that offered telecommuting (cf. Stavrou 2005). Moreover, a large-scale study (cf. Choi 2018) showed that non-telecommuters by barrier showed the highest turnover intentions, whereas non-telecommuters by choice showed the lowest turnover intentions (compared with telecommuters). Managerial and institutional support moderated this effect: Telecommuters in a context with low managerial and institutional support reported the highest turnover intentions (ibid.). Thus, the possibility to telecommute alone seems not enough; instead, this possibility has to be accompanied with managerial and institutional support in order to reduce turnover intentions. Regarding absenteeism, two studies found that telecommuting was associated with lower levels of absenteeism even when controlling for several organisational characteristics (Dionne/Dostie 2007; Stavrou 2005). It has been proposed that telecommuting increases organisational commitment because commitment is exchanged in reciprocity for the ability to gain greater work control and flexibility (e.g. Golden 2006). Indeed, meta-analytical research showed that telecommuting is associated with higher levels of organisational commitment ($r = .10$, 95 % CI = $[.03; .18]$, Martin/MacDonnell 2012).

Effects of telecommuting on the organisation

Beside the effects of telecommuting at the individual level that also aggregates to the organisational level (cf. Allen/Golden/Shockley 2015), telecommuting has a direct impact on the organisation. Telecommuting is linked with lower operating costs (cf. Pearce 2009). This is not surprising as organisations can save costs due to reduced office space (cf. Kurland/Bailey 1999). Moreover, as more and more (especially high-educated) employees are in favour of telecommuting (at least for some of their working time) due to the benefits discussed above, the possibility to telecommute can make employers more attractive for these skilled employees (Breaugh/Farabee 2012; Illegems/Verbeke 2004). Moreover, individuals who work in organisations that offer telecommuting show higher levels of engagement (cf. Masuda/Holtschlag/Nicklin 2017).

Telecommuting has also been proposed as a mean to ensure business continuation during unexpected circumstances, events or disasters that might interrupt business operations, e.g. hurricanes, floods, snowstorms (Roitz/Jackson 2006), terrorist attacks (Potter 2003), influenza epidemic (Allen/Golden/Shockley 2015) or the actual COVID-19 pandemic (Belzunegui-Eraso/Erro-Garcés 2020; Koonin 2020).

Some organisations may be reluctant to establish telecommuting arrangements because of start-up costs and extra expenditures that are associated with the implementation and maintenance of this work mode (cf. Illegems/Verbeke 2004). However, these costs may be frequently offset by increased savings (due to e.g. reduced office space) and increased productivity. Additionally, telecommuting concerns may also stem from potential security breaches (cf. Pearce 2009). Nevertheless, this risk can be minimised through security training. Finally, management may have concerns about losing control over employee behaviour (cf. Kurland/Bailey 1999) with difficulties to monitor and manage performance and coordinate work, additional work for supervisors and counterproductive work behaviour (cf. Holland et al. 2016) as possible consequences. However, it is important to note that telecommuting and performance is also associated at the organisation-level, e.g. that organisations with larger proportions of telecommuters also show higher levels of innovation, financial and relational performance according to CEOs' ratings (Martínez-Sánchez et al. 2007, 2008). Of course, not all jobs or tasks are equally suitable for this work mode. However, further advances in ICT will make even more jobs suitable for telecommuting (Allen/Golden/Shockley 2015). A study that adopted a contingency perspective found that telecommuting was negatively correlated with organisational size, and positively correlated with proportion of international employees, and variable/outcome-based compensation (cf. Mayo et al. 2009). Furthermore, a contingent reward leadership style moderated the effects of firm age and internationalisation and the adoption of telecommuting (ibid.).

Effects of telecommuting on the society

At the society level, telecommuting was thought of as a way to reduce energy consumption, traffic and the resultant levels of pollution; to reduce the strain on transportation infrastructure and public transport systems; and also to increase environmental and air-quality standards (Allen/Golden/Shockley 2015; Mello 2007; Pearce 2009). Telecommuting can reduce traffic congestion, traffic accidents and parking issues, problems that are especially pressing in densely populated cities (Mello 2007). Furthermore, telecommuting and ICTs make collaboration around the globe possible, reducing business travel that comes with pollution and a burden for the worker (cf. Nicklin/Cerasoli/Dydy 2016).

It is trivial that reduced trips to work reduce energy consumption. However, it is possible that telecommuting lead to behaviour change, so that telecommuters have the same (or even more) total vehicle distance travelled as non-telecommuters. Choo, Mokhtarian and Salomon (2005) reported that telecommuting across the U.S. reduced the annual national number of passenger vehicle miles travelled by 0.8 % or less using aggregate nationwide data spanning 1966–1999. Contrary, Zhu (2012) reported that, based on repeated cross-sectional data from the 2001 and 2009 National Household Travel Surveys, telecommuters had longer and more frequent daily total nonwork trips compared to non-telecommuters. Using the same dataset, Zhu and Mason (2014) found that telecommuters showed more vehicle miles than non-telecommuters. Thus, research on this issue remains inconclusive.

Moreover, telecommuting can be also beneficial to society by creating a barrier-free workplace for persons with disabilities, chronic pain, or fatigue conditions (Moon et al. 2014; Mello 2007). However, a study by Linden and Milchus (2014) reported that a high percentage of persons with disabilities who engage in telecommuting are dissatisfied with this kind of work mode, indicating that it presents other employment-related barriers. However, more research on this topic is needed in order to better inform policy maker on this issue (Moon et al. 2014).

The different access to telecommuting across occupational groups can be considered as an additional aspect of social inequality (Mergener 2020) that is exacerbated in the COVID-19 situation as some groups can better protect themselves against the virus than others. In particular, lower educated workers and workers in the construction and health sector can use telecommuting less frequently. Moreover, Baert et al. (2020) found that some workers (e.g. worker with lower work autonomy) had more difficulties to convince their employer to introduce extended telecommuting.

Requirements for effective telecommuting

The discussed findings of telecommute research highlight the importance of finding the right telecommuting arrangement for each worker (Nicklin/Cerasoli/Dydy 2016). Thus, there is no one-size-fits-all solution. Workers with family responsibilities have different requirements than workers without these responsibilities (Shockley/Allen 2007). Moreover, workers differ regarding their motives to use telecommuting. For instance, Shockley and Allen (2012) found that workers with higher levels of family responsibilities endorsed more often life-management motives compared to workers with lower family responsibilities. Moreover, in order to be effective, telecommuting workers need organisational and managerial support (Allen 2001; Lautsch/Kossek /Eaton 2009; Choi 2018). Thus, choice and flexibility in the telecommuting arrangements as well as a supportive work climate are critical factors for effective telecommuting (Allen/Golden/Shockley 2015; Putnam/Myers /Gailliard 2014).

Moreover, several things should be considered in order to establish well-being and performance of the telecommuting worker. Many studies have shown that avoiding work rumination (Firoozabadi/Uitdewilligen /Zijlstra 2018) and psychological detachment from work (Sonnentag et al. 2014) are important predictors of

well-being, and that telecommuters might be at risk of telepressure (Barber/Santuzzi 2015). Thus, it is important that workers psychologically detach from work, e.g. through exercise activities (Feuerhahn/Sonnentag/Woll 2014) or mindfulness exercises (Hülshager/Feinholdt/Nübold 2015). Moreover, sufficient sleep is important to stay engaged and concentrated (Litwiler et al. 2017). Furthermore, establishing clear boundaries and expectations with family and friends and with the organisation will help to reduce work-family or family-work interference (Barber/Jenkins 2014; Kossek et al. 2012).

As already mentioned, the COVID-19 pandemic changed the (work-)situation rapidly. Thus, many organisations and workers might not have had the time to prepare and equip themselves adequately. This concerns the technical equipment, technical support and the ergonomic setup. To be at least as productive as at the office, telecommuters need to be equipped with all necessary technical equipment (e.g. computer, monitor, keyboard, mouse, office chair, writing desk). Furthermore, a critical issue that needs to be addressed for telecommuting is technical support that includes IT infrastructure (e.g. VPN clients), computer maintenance, security and access control (e.g. firewalls), and communication and logistic support (e.g. workflow management tools; Bayrak 2012). Additionally, managerial support (e.g. through online chat forums), organisational support (e.g. online guidelines, 'how-to'-instructions), and task support (e.g. remote maintenance) are crucial issues that can increase the productivity of telecommuters (ibid.). Moreover, the ergonomic setup plays a crucial role for the telecommuter's physical health. Whereas in corporate offices, the ergonomic setup and inspection is often done by safety officers, in home offices this is usually done by the telecommuters (cf. Harrington/Walker 2004). However, without employer guidance, the risk for musculoskeletal disorders and other injuries might increase (cf. Ellison 2012). Workplace factors that increase the risk for computer-related musculoskeletal disorders include: incorrect chair height, no or hard armrests, chairs without proper lumbar support, incorrect monitor, mouse, and keyboard placement, improper workstation design, poor posture; improper office lighting, intense typing without resting periods, reliance on laptop keyboards among others (cf. Harrington/Walker 2004). The lack of technical equipment and technical infrastructure and improper ergonomic setup may have an impact on several outcomes of telecommuting (e.g. physical health, work performance, job satisfaction). Regarding the current COVID-19 situation, a recent study found that about one-fifth of workers did not feel well guided by their employer (cf. Baert et al. 2020). This concern was more pronounced for workers working in the creative sector (ibid.).

Finally, it is important to acknowledge that pandemic situations are stressful life events that have detrimental effects on the lives of affected individuals (e.g. Benoy 2020; Huremović 2019). The current COVID-19 situation leads to higher levels of life dissatisfaction, feelings of anxiety, depression and anger as well as sleep disturbance (e.g. de Pedraza/Guzi/Tijdens 2020; Sher 2020; Steffgen/de Boer 2020). Of course, this has also an impact on the work situation and behavior of individuals. Ill-health has been meta-analytically linked with substantial reductions in work performance (cf. Ford et al. 2011). Moreover, sleep quality and quantity have also been meta-analytically linked with various negative work outcomes, such as engagement, turnover cognitions and task performance (cf. Litwiler et al. 2017). Thus, currently there exists various factors that decrease work performance and effectiveness, independent from the telecommuting status of workers.

Conclusion

Some have suggested that the telecommuting surge will last past the COVID-19 pandemic (e.g. Global Workplace Analytics 2020). Although this remains an empirical question, there are good reasons for this prediction. Many workers and organisations that may have been skeptical regarding telecommuting are now confronted with this work mode. The experience they gain during the COVID-19 pandemic may reduce existing prejudices and the majority of workers seem to judge this experience as positive (e.g. Baert et al. 2020; Statec 2020; Global Workplace Analytics 2020). However, not all experiences will be positive, as telecommuting also has some potential pitfalls and the COVID-19 pandemic represents a special situation that may hinder effective

telecommuting. Therefore, it is important to get more empirical evidence about the impact of telecommuting on working conditions, well-being and performance. The study conducted by Baert et al. (2020) provides important first information about the effects of the extended telecommuting due to the COVID-19 crisis on working conditions and well-being. However, the survey contained mainly questions that integrate the cause and the effect (e.g. “I experience less work-related stress due to the extended homework because of the corona crisis”). This kind of survey design is prone to perception errors (Frazier et al. 2009) as respondents have to

1. evaluate their current standing on the respective dimension (e.g. experienced work-related stress),
2. recall their previous standing on this dimension,
3. compare their current and previous standing,
4. assess the degree of change, and
5. determine how much of that change can be attributed to the telecommuting situation.

The ongoing Quality of Work survey 2020 (QoW 2020; Steffgen et al. 2015; Steffgen/Sischka/Fernandez de Henestrosa 2020; Sischka/Steffgen 2020) will contain data about the effects of telecommuting on different working conditions (e.g. perceived autonomy, work disruptions, work insecurity, employability, perceived career and training possibilities), well-being, work performance, and work satisfaction. Thus, the ongoing study will – based on the earlier presented findings and evidence-based reflections – investigate the effects of the extended telecommuting on several aspects of the working life of the affected workers. In addition, the study will also conduct research on workers that do not have the possibility to telecommute. Therefore, the QoW 2020 contains information about COVID-19 protective measures at work (e.g. if the workplace is regularly disinfected). Thus, the ongoing study will investigate the effects of different work arrangements in the COVID-19 pandemic, and will give some answers on recently identified relevant areas of research for work and organisational psychology (Rudolph et al. 2020).

It seems that many workers are satisfied with the current extended telecommuting (e.g. STATEC 2020), so organisations have to consider the increased desire for this work mode, as workers with unfulfilled desire for telecommuting show lower job satisfaction (Grunau et al. 2019) and turnover intentions (Choi 2018). Or as it is stated by Global Workplace Analytics (2020): “The genie is out of the bottle and it’s not likely to go back in”. The normalisation of telecommuting may also decrease the current potential detrimental effects of telecommuting (e.g. decreased career progress). In addition, the COVID-19 pandemic also revealed the merits of telecommuting from the organisational perspective, as telecommuting ensured business continuation. The oil crisis in 1970 set the stage for the idea of telecommuting. With the gained experience of telecommuting during the COVID-19 pandemic, this crisis may serve as a trigger to establish and expand this work mode wherever appropriate in occupations that so far have little experience with telecommuting.

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