# Effective Computer Supported Cooperative Work / Designing An Effective Digital Workspace For Remote Work After the COVID-19 Pandemic

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Abstract — Even before the coronavirus, there was a lot of talk about remote work, but most often the percentage of people who constantly or partially worked remotely was in the single digits. With the lockdowns, this percentage increased sharply. A lot of information has been established that will be useful to us once the pandemic has completely passed around the world, which will ultimately give us the opportunity to organise effective computersupported remote working, with respect for each employee their work performance, preferences psychological state, with the hoped-for increase in work performance through the formation of teams that would have flexible work routines which would be tailor-made according to each employee, so that everyone gives the most in the environment that suits them best.

Keywords: remote work, computer-supported work, pandemic, work performance, efficiency, digitisation

## I. INTRODUCTION

Remote work is something that was imposed by itself with the advent of information and communication technologies, and the Internet only encouraged an increasing number of people to decide to work from home (teleworking) in creative industries (primarily here we mean design, programming and media), the so-called "digital nomads" - and cheap destinations with a nice climate have become the new residences of "digital nomads", and some countries invited them to relocate [1].

Even without «digital nomads», there is pressure for companies to increasingly rely on new technologies [2] or even to change the entire organisational structure, a process that has lasted for more than two decades [3]. There was a lot of talk about how the disruptions that will come from remote work will change many industries forever, and companies provided their employees with adequate software and hardware [4], and then the covid-19 pandemic and shutdowns happened, which forced many industries and economic sectors to rapidly digitise and work from home [5] — namely, earlier than predicted, since the "new normal" during the pandemic normalised remote work and resulted in is the mass adoption

of technologies to support virtual collaboration, communication and teleworking [1].

#### II. LITERATURE OVERVIEW

The development of new communication technologies led to the development of the virtual workplace and remote work, which were used to a great extent during the corona virus pandemic from February-March 2020 until today, although before the pandemic there was not a large number of workers who could perform their tasks fulfill satisfactorily through telecommuting [6]. There's possibility that a huge number of workers will continue to work remotely, and the theoretical interest in creating favourable working environments in remote work, as well as understanding the challenges and advantages of such work has grown rapidly [7].

Organisations have realised that the transition to remote work can be a long-term or permanent change and are analysing the best way to implement it as a standard working modality after the pandemic [8]. *The Economist: The World Ahead:* 2022 states that "at the peak of the epidemic, in the spring of 2020, 60% of all working time in America took place in living rooms, kitchens and – in the case of a lucky few – home offices" [9].

When the environment was already created for the mass transition to working from home, thirty parameters appeared that gained importance and began to be studied in the scientific literature. One of them is the loss of time in transportation from home to the workplace (the so-called commuting), which disappeared, which brought surplus working time and time for rest to employees [10], and thus better concentration and motivation, as well as commitment to work, and that their WLB (work/life balance) has improved [1].

Orzeł and Wolniak in Poland come to the conclusion that 40 out of 50 surveyed architects-designers stated that they would choose to work remotely, as better and more comfortable, due to a multitude of factors [12]. On the other hand, working in the same place as the family gave some people the opportunity to take care of the children themselves and spend time with the family, which was evaluated as positive, and some were demotivated and distracted by the influence of family interactions in the business sphere [13],

and they preferred separate time and space for work and family gatherings [14].

Not everyone found their way in the new, hybrid environment. Of course, there are also the physical parameters of the environment, which are much better controlled at a personal preference level in working at home [15]. The biggest challenges are those related to the corporate culture and the culture of certain societies - working from home is more favorable to workers in those societies where privacy is valued, such as Western societies, which includes Serbia in a broader sense, and especially Anglo-Saxon and Scandinavian societies with their "privacy" [16], and the worst results were shown in Asian societies, which are not individualistic, but collectivistic, and there workers working from home felt "cut off from the group" and showed worse work parameters [17].

Another problem is the problem of self-organisation of working time, which depends on self-discipline and self-control. Alexander S Neill in his bestseller "The Free Children of Summerhill", where he clearly proved that those who failed to self-organise did not fare well [18]. On the other hand, many people do not know how to organise themselves outside of the collective, so in the science fiction book "We" Yevgeny Zamyatin shows how "three freedmen" deprived of work obligations in the company fall into despair, not knowing how to design their time [19].

It goes without saying that working hours from home can be either extremely shortened or extremely extended, because the employee tailors it themselves, which leads to burnout syndrome [21], but they can also set it the way to achieve a balance between work and the private sphere [22].

Creating an effective digital work environment must take into account all these divergent parameters and monitor how "involuntary" remote work will turn into "voluntary" remote work in the post-pandemic years. The motivation for this paper is finding the most appropriate way of working in the times to come, creating flexible and tailor-made work environment. The contribution of this paper will be drawing guidelines for the HR managers to implement and thus enhance the productivity of their companies.

## III. DISCUSSION

The results of numerous studies show a certain divergence, with the majority showing that the benefits of remote work are tangible, although there are also contrary ones, and also a certain number of inconclusive ones [24]. One of the essences is in the employee's mind, i.e. perception: if employees conclude and perceive that remote work is good for them, they feel grateful to the company that provided them with such work (option), so that it increases their commitment and performance [25].

The psychological factors within the employee were also observed by Vega et al., concluding that everything is in the mind: employees believe that they can have better results and work performance if they work from home, because it allows them freedom and flexibility (they can stop work, look series, go to the beach or exercise, eat healthier, etc.) and automatically achieve better results, partly due to

autosuggestion [26]. In Sri Lanka, Idagoda and Opata analysed the behavior and work performance of managers who work from home, and found that they feel more connected to the company and produce better work results, as well as their WLB (work/life balance) improved [11].

As many as 81.8% of respondents in Orzeł and Wolniak's study emphasise autonomy as the most important factor, which is why they choose to work from home [12]. However, not everyone appreciates working from home: those who have a small home space, those who have large families with many children who interrupt them at work and cannot reconcile the private and business spheres, then those who are engaged in service activities outside the creative industries, they have a lot of problems maintaining productivity from the office and even have reduced work performance [8], and many struggle to reconcile the business and private spheres while working at home. This transition during the pandemic was so sudden that it is equivalent to a disruptive technology.

As one of the lessons from the pandemic, Kramer & Kramer's conclusion from 2020 tells us that working from home and similar jobs without external influence and supervision and a fixed corporate schedule in the company building "requires the selection of workers who are more suitable for working from home" [27].

The cognitive change compared to working in the office when working remotely is that the employee has to design his own tasks and solve them step by step, at his own pace, which must be balanced with the pace set by the company [28]. If this is not possible, the employee is not suitable for remote work. HR and HR teams in companies must deal with how to determine which employee is for which role. One of the bad indicators during remote work during the pandemic was the feeling of isolation and loneliness, together with the feeling that there is no progress, exchange of knowledge and progress, but this is characteristic for people who are of this psychological profile, as well as for people from collectivist societies. During the lockdown, the feeling of isolation of all workers is much greater, but it decreases when there is no lockdown, note Orzeł & Wolniak, also giving guidelines that hybrid work could be a solution to the absence of a feeling of isolation, i.e., an occasional trip to the office [12].

At the very end, the question of whether the working day for remote workers has become longer or shorter is also interesting. The answer is given by De Filippis and colleagues, who in their study during the pandemic concluded that, measured in terms of time, the effective working day was extended by 48 min. and 30s when working at home [29], so that the working day performance automatically increases.

This is a strong momentum in the direction of encouraging those employees who are willing and ready to work remotely, to do so. Let's note that here are also included those who reluctantly went to work from home and have reduced work performance, and those who are happy about going to work from home. This result, which is cumulative, shows that, nevertheless, work efficiency has been improved - and that by creating such a digital work environment in which those who feel good when working from home would work from home,

and in which those who feel better when work in the office, worked in the office, got an even greater extension of the working day in minutes, and thus greater global productivity.

The author's experiences from working in his own company are also similar, where the creation of virtual offices in a media company contributed to the rapid completion of tasks of an enormous volume, which otherwise could not be completed in a conventional office.

# IV. THE CLASH BETWEEN THE PRIVATE AND THE PUBLIC SPHERES

However, other studies have shown that telecommuting does not necessarily improve productivity or job satisfaction due to disruption of the work process by family members [30] – it seems that only those who live alone or have living spaces large enough to isolate themselves they can achieve simultaneous escape from the distraction of office colleagues and family members. The studies show the challenges faced by employees during working from home (involuntary during the pandemic) are considerable and difficult [31].

De Valdenebro Campo et al analysed involuntary work from home during the 2020 Covid-19 shutdown in Colombia in a sample of 519 mid-level employees of large service companies across the country, and concluded that there was neither an increase nor a decrease in performance employees, because all the positive effects of working from home are nullified by the constant interference of family members [8]. Some employees, although in a smaller number of studies, have reported that they are less efficient and that their productivity has decreased when they work from home on an involuntary basis [32].

Here we can note that it is one thing when employees themselves choose to work from home, and it is another thing when companies send them to work from home involuntarily during a pandemic. Also, implicit in this study is the conclusion that in societies where families are larger (more generations together, more children), like in Colombia, working from home can be exposed to greater disruptions compared to countries where family units are smaller. The third conclusion is that remote work is more difficult in service industries (519 respondents were all from that sector and not from creative industries), while in creative industries such as media (journalism), IT industry or design (graphic, web- design, projecting in architecture and the like), improvement of work performance can be more easily achieved because it leads to the strengthening of the independent direction of work and development, which is necessary here [33]. Therefore, integration rather than segmentation of work and private life is suggested to minimise burnout, maintain a higher level of work performance [22] and avoid conflict. Everything should be approached carefully. Saura et al., after analysing "tweeters" who create content from home (they analysed 205,204 tweets with hashtags indicating work from home), warn that mass work from home is equal to disruptive technology: namely, "adoption of new digital platforms, radical changes in habits and family reconciliation at home while telecommuting can cause mental

health problems and result in a radical increase in the stress level of teleworkers. These factors can cause situations where work performance decreases, which negatively affects the profitability of the company" [7].

#### V. ISOLATION, INDIVIDUALISM AND COLLECTIVISM

As for direct comparisons of performance when working at home and working in an office work environment, it has been proven that for a certain type of employee, silence and isolation from company noise (although generally considered positive for work) and company culture causes depression and a feeling of isolation [17], so that employees who value a sense of belonging to a community may feel lonely and almost rejected [34] and complain of social isolation [30]. Chen saw this especially in China. Research by Van Zoonen et al in Finland shows that, counterintuitively, there was a sense of isolation in Finland while working from home during the pandemic [35]. Similarly, Wang et al. confirmed this with 522 respondents in Australia and China [5].

In 2016, Peters and colleagues conducted a study in 18 countries with as many as 1,577 surveyed organisations, proving that the stronger the nation's individualism values, the higher the probability that the organisation will use (higher levels of) formal remote work, i.e., in countries that have a strong individualistic culture "it is relatively 'safe' for organisations to allow more of their workforce to telecommute, as strong values of individualism can motivate telecommuters to perform their tasks in line with organisational goals, which can lead to smart telecommuting outcomes, and increasing factors such as motivation, engagement, flow, commitment, productivity' [33].

This is consistent with previous research on individualism and working alone [36]. Isolation has been cited as one of the main negative factors for telecommuting [37], but Orzeł and Wolniak warn that the level of isolation in telecommuting during pandemic lockdowns was significantly higher for all workers, and that working from home in a situation without a lockdown led to a feeling of isolation much [12].

Peters and colleagues come to the conclusion that remote work is compatible with a strong collectivist spirit, if benevolence, tradition and conformity are developed as features of a collectivist society, otherwise it falls into the dark side of remote work much more often than in individualistic societies, and the dark sides are social and professional isolation and loss of commitment, lack of knowledge sharing and lack of productivity [33]. Effective remote work in collectivist societies can be aided by the collectivist trait of "clan control" [33].

As for working from home, very often employees encounter a psychological factor - either they can't bring themselves to do enough to make it happen "before the surveillance" of the workplace, or they can't rest if they don't have a clear "exit from work". Therefore, in working at home, without external incentives, control and coercion, some employees succeeded much better in achieving the assigned tasks, while others did not succeed in this to a sufficient extent. In this first group, there were also those who clearly

shifted the norms. Carver concluded even before the pandemic, 2019, that the crucial trait of self-control: namely, the trait of self-control describes these individual differences and can be defined as "the ability to overcome impulses to act, as well as the ability to initiate or persist in boring, difficult or activities" [38].

Some also use the term "willpower" with the same or mostly the same meaning [39]. Numerous studies claim that the benefits of greater self-control are evident. Individuals with more self-control excel academically and professionally, are physically healthier, have better social relationships, and are less prone to unemployment [40] Wang et al claim that, based on a sample of 522 respondents, it was found that only those with high self-discipline can complete tasks better than in the office, while the rest procrastinate at home [5].

In 2020, Troll and colleagues conducted a study of 266 subjects from Germany assigned to various jobs across the country, who were involuntarily working from home during the lockdown, and proved that self-control is a personal trait that contributes to good task performance and discipline that improves work performance. [28].

It is also worth looking at the results of research conducted at the request of the European Parliament. In the survey, 83.3% of the surveyed men and 74.1% of the women stated that remote work has a positive impact on the balance of their lives [41]. A study by Van Zoonen et al. in Finland of 5452 respondents shows that, counterintuitively, in Finland there was an increase in the sense of autonomy and freedom that positively affected work performance [35].

#### VI. PRESENTEEISM

The push for physical presence at work, known by the English and less gruff name of presenteeism, has attracted a lot of attention from researchers in recent years, and the debate and research has only intensified during and (if one can even say that time has arrived) since covid-19 pandemic. Simpson claimed that presenteeism is "the tendency to stay at work longer than is necessary for effective work" [42]. Aronsson, Gustafsson and Dahlner defined the term as "attending work even when one feels unwell" [43]. In both cases, the pressure to come to work at a time when the coronavirus pandemic is not completely over, and when there is no need to formally come to work if the same task can be completed from home, has shown that presenteeism can impair productivity and lead to mistakes, accidents and injuries to employees, their coworkers and the public [44]. Psychological pressures are a negative motivator for employees, multiplied during the pandemic. On the other hand, Yahoo! in 2013 tried to force all of its workers to be physically present [45], followed by Best Buy, Bank of America, Aetna, and IBM [46]. During the pandemic, all these companies switched to remote work en masse, and the post-pandemic trends in presenteeism are divergent.

# VII. COMMUTING

The journey home and back is such a topical issue that in many countries there has been talk of even counting that time as paid working time. Thus, Tavares notes that most employees feel better and perform better when they work from home due to less time spent on the way to work and back, as well as healthier eating and exercise [47]. There are many studies that show that reducing the time spent traveling from work to home and back increased employee productivity [48].

Galvez and his colleagues in his study conducted in Spain during the pandemic concluded that, since working from home allows a lot of free time that is not spent on commuting to work and back, employees can concentrate on family relationships, allocating that time to family contacts, thus achieving a balance between private and work life [49]. In 2020, Elder in his 2020 study in Sweden, again related to the Swedish "privacy" and solitary lifestyle, concluded that Swedes valued working from home and thus had free time for themselves and family, and were more productive [10].

Weichbrot et al conducted research under the name WorkAnywhere in Switzerland back in 2013 with the question: Can flexible working reduce commuting peaks while increasing productivity and happiness? First of all, they focused on avoiding travel in "peak" traffic, which was and is the most frustrating for workers who do not work from home. To do this, employees of SBB (Swiss State Railways) and Swisscom conducted a two-month self-experiment. Participants were able to take advantage of work flexibility and mobility such that 65% of their travel time was outside peak traffic times. The results were such that the participants in the study reported increased productivity and satisfaction.

The potential of the new mode of operation to relieve public transport during peak times in the whole country was estimated at 7% under realistic conditions [50]. In the best case scenario, telecommuters eliminate commuting and live in a neighbourhood that supports biking, walking, transit, etc. Their flexibility in location increases the demand for real estate near employers so that other commuters can live closer to work [51]. In this scenario, not only the productivity of the individual employee improves, but also the social climate as a whole, as well as the urban development of cities.

#### VIII. CONCLUSION

With a more productive workforce, which experienced lower levels of job stress and increased levels of job satisfaction, companies would likely see positive effects on their overall profitability, which, as a result, would have a strong, positive effect on the economic prosperity of each country [52]. This is exactly what tells us that every company, whether it deals with creative industries and jobs or not, should devote itself to maximising work performance and creating an efficient work environment for its employees; either the digital or real work environment, or their combination, which is imposed as a compromise and flexible solution with the highest efficiency.

Lessons from the covid-19 pandemic, when all workers were involuntarily sent to work from home, tell us that this is not the right solution. Also, presenteeism did not have a positive effect on increasing work performance, but precisely vice versa. It is necessary, in cooperation with the HR teams,

if they exist within the company, to probe which workers are able to work effectively from home and which are not uniformly "forcing" everyone to adopt the same mode of behaviour is not effective. The right and effective team will be created by a mixture of workers located in the company, in physical locations, and those who work remotely.

Certainly, attention should be paid to avoiding involuntary actions, because it is not the same when you choose to work from home yourself or when the company forces you to do so against your will. When we talk about which workers are suitable for working remotely and for whom remote working is beneficial and increases work performance, it is firstly suggested that those who appreciate the opportunity to work remotely are suitable, because they believe that the company has made a good gesture towards them and their motivation and commitment to work increases.

Those who do not feel that remote work is for them should not be forced to do so, "beauty is in the eye of the beholder", and so is the benefit of remote work in the employee's mind everything is in perception. Of course, here we have to exclude banal situations when the employee has no furniture, no table, no space, and no climatic conditions for working from home - then it is better to work in a well-equipped office with well-adjusted physical parameters. One of the things that involuntary home workers complained about was the distraction from the housemates, which makes all the benefits of working from home meaningless. This happens in situations where there is not enough space in the house, or when there are many family members - it is much easier for single people or people with enough space to move from family disruptions.

On the other hand, working from home makes it possible to eliminate disruptions at work, from colleagues, and also frees up a large amount of time that, especially in large works, is spent on the journey from home to work and back, and that time can be used for free time, or interaction with family members, and sometimes for an extended working day (an average effective extension of the working day for teleworkers by 48:30 minutes was observed).

Globally, it has been observed that remote workers have less stress, but only in the post-pandemic age, and with the current development of telecommunication techniques, this will be fully clear. Perhaps the most crucial parameter in the entire organisation of the remote work environment is self-discipline - this is a factor that has been identified as crucial in creating a good remote worker from a bad one. As a psychological factor, whether the worker feels freed when working remotely, or lonely and socially isolated (there is no exchange of knowledge and progress) comes into play. In individualistic cultures, it has been observed that remote working environments are easier to organise than in collectivistic ones, where much comes from belonging to a group rather than a personal drive to prove oneself.

Self-control will also contribute to the remote worker correctly determining the levels of his workload and tasks on a daily basis, so that they are neither too small (inefficient worker) nor too large (burnout syndrome). Individual, creative work, such as IT employees, media employees, designers,

architects/planners and the like, has proven to be much easier to create a quality digital work environment than work in traditional service industries.

As human nature is not completely isolated, and technical capabilities are not at the level of "Star Trek", electronic and video communications cannot be an absolute substitute for live meetings, so it is recommended to create a "hybrid" model, in which telecommuters who are able to show up, show up at workplaces live for meetings at certain intervals, or show up live at work on certain days, which would achieve an optimal balance.

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