Quality is more important than quantity: Social presence and workplace ergonomics control predict perceived remote work performance

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Abstract

The Covid-19 pandemic has caused a widespread disruption to the way that we work. One of its lasting consequences will be the ubiquity of remote work. The effective use of collaboration tools is therefore a critical factor for information systems (IS) research when design the workplaces of the future. We theorize that social presence and workplace ergonomics control are important predictors of perceived performance. Moreover, we investigate how different factors (i.e., collaboration tool efficacy, mode of work, and number of meetings) influence social presence. Using survey data (N = 389), we provide evidence that workplace ergonomics control and social presence are indeed important for perceived performance. Surprisingly, we observe that only collaborative platform efficacy has a significant impact on social presence, and that neither the number of meetings nor the modality were significant factors. Based upon these results, we derive implications for theory and practice.

Keywords: Remote work, collaboration tools, workplace ergonomics control, social presence, perceived performance

1. Introduction

The Covid-19 pandemic ushered worldwide disruption to existing work practices and one of its enduring legacies will likely be the widespread adoption of remote work. While less than 8% of workers in the developed world reported working from home prior to the pandemic, between 35% and 50% of workers performed some sort of remote work in the months following the initial outbreak (Masayuki & Morikawa, 2020). By 2021, it was clear that employees had positive attitudes towards a degree of remote work, as nearly 75% of US employees reported wishing to work from home at least once per week (Barrero et al., 2021). Thus, remote work has a place to play in the post-pandemic workforce. From the perspective of information systems (IS) research, it is natural to raise questions about the socio-technical factors that could influence productive remote work practices and effective remote collaboration tool use.

Recent research has found that remote work may lead to decreased productivity, largely due to challenges with remote workplace collaboration. A recent study conducted at Microsoft leveraged enterprise-wide workplace metrics to reveal that remote work can cause workers to collaborate less deeply and ultimately become more siloed (Yang et al., 2022). While remote workplace technologies facilitated communications between employees, over time it became clear that the quality of the interactions among the employees degraded, which in turn negatively impacted work productivity. This finding corroborates other pandemic-era research which found that experienced social isolation was an important factor in predicting work satisfaction (Toscano & Zappalà, 2020). The quality of social interaction with one's colleagues could thus be an important factor in effective remote workplaces, though this has not been thoroughly explored in the academic literature.

Many employers have responded to the need to generate meaningful social interactions by holding regular remote meetings using collaboration technologies such as Zoom or Microsoft Teams. While these technologies have enabled employees to connect to one another remotely using a combination of auditory, visual and interactive effects, it has also contributed to fatigue and stress (Riedl, 2021). The use of remote collaboration technologies should intuitively facilitate the development of meaningful collaborations with colleagues, researchers have suggested factors such as the amount of screen time

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and degree of asynchronous work could instead have a negative effect on productivity (Riedl 2021; Wiederhold, 2020). So-called "Zoom fatigue" has gained attention as a distinct phenomenon that has negatively influenced workers by either sapping their attention or causing exhaustion. This has been backed by experimental evidence that virtual communications curb desirable cognitive factors such as creativity (Brucks & Levav, 2022).

One possible factor that could help mitigate the negative effects could be an employee's ability to control their work environment. A study by Bergefurt et al. (2021) found that the presence of distractions in a remote work environment negatively impacted productivity and contributed to stress and burnout, though it suggested that increased control over these factors could mitigate the impact. By exerting a greater degree of control over one's work environment, workers can manage these inhibiting factors, for example by closing their door, purchasing a standing desk, or finding a suitable computer monitor. The degree of control over one's workplace could thus be an important factor for creating effective remote workspaces (Lee & Brand, 2010).

In this paper, we conduct exploratory research of two factors that could contribute to effective remote work: the degree of *social presence* experienced by remote workers and their perceived degree of *workplace ergonomics control.* These constructs have been studied in the disciplines of e-learning and ergonomics and concern the development of effective and productive experiences. These constructs may also capture observations made in emerging literature on remote work during Covid-19 related to the impacts of poor social interactions (Yang et al., 2022) and home office ergonomics (Bergefurt et al., 2021). By exploring these concepts in the context of remote work, we can extend existing theories in the context of effective home office productivity.

Throughout the remainder of this paper, we describe the methodology and results of a survey which explored the relationship between social presence and workplace ergonomics control in perceived remote workplace productivity. In addition to the impact of these primary factors, we explored three possible antecedents of social presence: the effective use of collaboration tools, worker's mode of working, and the number of meetings they held in an average day. Our findings suggest that social presence and workplace ergonomics control merit further exploration in research into remote workplaces and workplace collaboration technologies. We conclude by exploring future directions for further research into the roles that social presence and workplace ergonomics control can play in both effective remote work, online collaboration tools, and other information technology artifacts.

2. Conceptual Foundations

2.1 Cognitive IS and Perceived Performance

The overarching objective of this research endeavor is to investigate the role of social presence and work environments in the context of perceived performance. In this context, we are inspired by cognitive IS research that has studied the interaction of technology (e.g., interface design), the users' cognitive processes (e.g., attention) and task fulfillment (e.g., accuracy) in the domain of remote work and collaboration technology (Davern et al., 2012; Todd & Benbasat, 1987; Vessey & Galletta, 1991; Wati et al., 2014). Emerging research has identified a lack of quality social interaction (Yang et al., 2022) and the presence of environmental distractions (Bergefurt et al., 2021) as factors that prevented effective and deep work in a home environment. When recognized as antecedents of productive and focused work, the experience of social presence and one's working environment could play a role in shaping our experience of information technology use, and our findings may guide future experimental research related to these topics.

While collaboration, performance, and remote work are receiving considerable attention in the post-pandemic literature, they are by no means new phenomena. For instance, IS research defined perceived performance as the degree to which workers believe that technology use enhances performance (Tahssain & Zgheib, 2009). Moreover, Staples et al. (1999) have investigated the relationship between remote work self-efficacy and a measure of subjective productivity, with attention to an individual's perception and attitude of their personal productivity and effectiveness of their remote work. Perceived performance, when conceptualized this way, has thus been established as consequent of technology self-efficacy in the context of remote work.

Our goal is to explore relationships between objective evaluations of an individual's work environment beyond an exclusive focus on their attitudes towards their own efficacy. However, it is difficult to explore potential links when surveying a general population with a variety of tasks and job success measures. To address this challenge, literature in management disciplines have established measures of perceived performance that are good proxies for these kinds of questions. For instance, Williams & Anderson (1991) established perceived performance as a measure of productivity rooted in an individual's

perception of in-role behaviors based on objective characteristics of an individual's ability to perform at their role. This measure was used as a dependent measure to assess the impact of subjective constructs, such as job satisfaction and organization commitment. Given that our goal to identify subjective factors, such as social presence, which influences a productive work environment, the measure of perceived performance used by Williams & Anderson (1991) is a useful dependent measure in our model.

2.2 Social Presence

Recent research on remote work has identified the degradation of social relationships and lack of social interactions as important factors contributing to unproductive remote work (Yang et al., 2022; Toscano & Zappalà, 2020). However, these challenges are not new phenomena, and have been explored by IS researchers in the context of a range of technologies. Those studies oftentimes use the concept of *social presence* to explain various phenomena (see for instance Garrison et al., 1999; Brown et al., 2010; Sivunen & Nordbäck, 2015). Social presence describes the ability to perceive others in an online environment, and is often explored in e-learning and cyberpsychology research (Garrison et al., 1999; Richardson et al., 2017). The construct has been shown to impact a wide range of information technology experiences in collaborative information technology use contexts (Biocca et al., 2001; Shen & Khalifa, 2008; Brown et al., 2010) or in virtual environments (Sivunen & Nordbäck, 2015). It is especially notable that social presence is a pivotal construct in the context of e-learning where is has a significant impact on e-learning effectiveness (Richardson et al., 2017).

Social presence is related to but distinct from online community engagement and social immersion. Research in online communities has observed clear connections between contribution or community engagement, which is understood as the ability to participate in an online community, and satisfaction with online communities (Ray et al., 2014). Some researchers have expanded this view of social presence and have identified factors such as involvement and engagement as critical components of the construct (Sivunen & Nordbäck, 2015). However, in the context of remote work, social presence can also reflect an evaluative sense of the social interactions of other community members, such as warmness or trustworthiness.

In the context of broad information technologies, social presence has also been identified as both a characteristic of a technology and as a characteristic of a community. For example, Brown et al. (2010 conducted a study that observed social presence as a perceived characteristic of the collaborative tool and which is anantecedent of performance and effort expectancy. This understanding of social presence can be contrasted with a view of social presence as a feature of a socio-technical system, as described by other researchers in the context of online communities (Biocca et al., 2001; Shen & Khalifa, 2008) or communities of learning (Arbaugh et al., 2008). In the latter view, social presence does not describe a feature of a technology, but rather an experience with a technology-supported intentional community. Workplaces can similarly be understood as intentional communities, in the sense that they exist to achieve a shared collaborative goal.

The parallels between e-learning and remote work are thus strong, in the sense that they both concern the cultivation of an effective community for an intentional purpose, supported by computer mediated communication. In the remote work context, technology users interact not just with a tool, but with a group of colleagues, often with a series of shared goals, such as work productivity. While research in online communities has identified social presence as an important factor in community participation (Shen & Khalifa, 2008), this represents only a portion of the goal of remote work. Influential theories of effective e-learning such as the Community of Inquiry Framework (Arbaugh et al., 2008; Garrison et al., 1999), by contrast, have established the importance of social, cognitive, and teaching presence in the development of effective and productive online education, a similar context to remote work.

We argue that the context of remote work has more in common with the sort of social presence experienced in online learning communities than it does with the experience of individual collaboration technologies. Effective remote work is the result of a collaborative socio-technical process, rather than just the effective use of one technology. Further, like education communities, distinctive social and cognitive presence could play an important role in the experience of achieving a productivity-related goal, though in this case productive work rather than productive learning. For instance, it has been found to be an important antecedent of user trust in the context of virtual worlds used for workplace collaboration (Srivastava & Chandra, 2018). In the case of remote work, we can similarly conceptualize social presence as an indicator of the experienced comfort interacting with employee's colleagues in a context that relies on computer-assisted media, combining both technological and peer evaluative factors (Arbaugh et

al., 2008). We thus hypothesize that social presence is an predecessor to perceived performance.

H1 – Social presence is positively associated with perceived performance of remote work.

Accepting this view of social presence, we can also investigate factors that could contribute to it. For instance, remote work researchers have recently suggested that sub-optimal use of technology contributes to the failure of remote spaces, to a decreased degree of motivation for socializing, and to poor collaboration with colleagues (Conrad et al., 2022; Molino et al., 2020). Computer self-efficacy is known to positively impact students' ability to socialize in online learning contexts (Lin et al., 2008) and has been observed impacting the perceived difficulty students experience in an e-learning context (Conrad et al., 2022; Staples et al., 1999). Building on these findings, we can hypothesize that a user's efficacy with online collaboration tools can influence their ability to experience social presence.

Similarly, we can conceptualize other possible antecedents of social presence that have been recently suggested in the literature. During the Covid-19 pandemic, many managers sought to employ large numbers of meetings in response to the lack of face-to-face meeting time (Riedl, 2021). Yang et al. (2022) also observed that the types of social interactions (i.e., asynchronous interactions) as well as the length and frequency of meetings were associated with the degradation of social relationships over time. Expressed in terms of social presence, this observation suggests that participants would experience decreased social presence when these factors. This leads us to three hypotheses about factors that contribute to social presence during remote work.

H2a – Collaboration tool efficacy is positively associated with social presence.

H2b – Synchronous work styles is positively associated with social presence.

H2c – The number of meetings is positively associated with social presence.

2.3 Workplace Ergonomics Control

In addition to social factors, ergonomic factors could play an important role in the effective use of online collaboration tools and remote work performance. Research from the domain of ergonomics has shown that a sense of perceived control over the physical characteristics of the in-office workspace can decrease the impact of distractions on productivity (Lee & Brand, 2010). For example, research on remote office characteristics during COVID-19 has shown that noise in the home office environment and frustrations with the physical home workspace setup can decrease productivity (Rieth & Hagemann, 2021; Bergefurt et al., 2021). In a remote environment, these factors, as well as other environment-related distractions, could play an important role in supporting workers to separate their work from their personal life and mentally prepare for work (Bergefurt et al., 2021). Conceptualizing ergonomic factors as workplace ergonomics control can help reveal the role that distractions caused by ineffective workspaces play in shaping effective online work.

While workplace ergonomics are largely explored from the perspective of the ergonomics discipline, there are some parallels with past IS research. For instance, the concept of autonomy has been widely explored in IS research. Prior work on job and work method autonomy has described the degree of choice people have over how they perform tasks (Klesel et al, 2019; Weber et al., 2020; Murray & Häubl, 2011). Autonomy has also been shown to have significant effects on users' job performance (Ozer & Vogel, 2015), job satisfaction (Morris & Vankatesh, 2010; Tripp et al, 2016), and innovation quantity (Ye & Kankanhalli, 2018). In many of these works, autonomy has been understood in terms of freedom over the delivery methods of one's job (Morris & Vankatesh, 2010; Weber et al., 2020), as well as freedom of choice over decision making, scheduling, or the method of work (Klesel et al., 2019; Ye & Kankahalli, 2018). These approaches to work autonomy all concerned the ability to conduct one's work, and did not investigate factors related to physical space, specifically.

Our approach is to build on past work related to autonomy in information systems use by exploring control over specific ergonomic factors in the workplace. During the pandemic, many people reported facing frustrations with work-from-home environments, specifically because they were not able to differentiate a distinct workspace that feels separate from their home (Bergefurt et al., 2021). Building on the work conducted by Lee & Brand (2010), we can thus conceptualize a workplace ergonomics control construct considering one's autonomy over specific work environment factors that allow someone to create a distinct work-from-home space. By investigating workplace ergonomics control, we can identify its role in a model of the impact of social presence in online work, which could inform future research into the effects of ergonomic factors during the use

collaboration software, as well as information technology broadly.

H3 – Workplace ergonomics control will be positively associated with perceived performance.

3. Methodology

3.1 Data Collection and Participants

Given that this study concerned an experience that was generally shared among the broad workforce due to the Covid-19 pandemic, we opted to follow accepted recommendations to recruit participants using an online crowdsourced platform (Jia et al., 2017; Steelman et al., 2014). All procedures were reviewed by a university's research ethics board and were found to be in correspondence with the Canadian TCPS-2 on Ethical Conduct with Research Involving Humans. We recruited 400 participants on Prolific, a platform designed to overcome data quality weaknesses with other online platforms. They were paid £2 for their time and compensated regardless of whether they completed the survey. Furthermore, given that this was a formative study, we opted to open the survey to all Prolific users who were fluent in English regardless of country of residence. Of the 400 participants who responded, all but 11 completed the entire survey. We thus analyzed 389 observations from various countries including respondents from Portugal (20.1%), Poland (16.7%), Mexico (14.4%), South Africa (14.4%), and other countries (34.4%).

Table 1. Survey instrument.

Construct	Question
(Perceived) Performance (Williams & Anderson, 1991)	I adequately completed my assigned duties.
	I fulfilled responsibilities specified in my job description.
	I performed tasks that are expected of me.
	I met formal performance requirements of my job.
	I adequately completed my assigned duties.*
Workplace Ergonomics Control (Lee & Brand, 2010)	I was able to personalize my workspace.
	I was able to control the temperature or airflow in my home workspace.
	I was able to determine the organization/appearance of my work area.
	I was able to control the lighting level in my work area.
Social Presence (Arbaugh et al., 2008)	Getting to know my coworkers gave me a sense of belonging to my workplace.*
	I was able to form distinct impressions of some of my coworkers.*
	Online or web-based communication is an excellent medium for social interaction.
	I felt comfortable conversing through the online medium.
	I felt comfortable participating in workplace discussions.
	I felt comfortable interacting with coworkers.
	I felt comfortable disagreeing with coworkers while still maintaining a sense of trust.
	I felt that my point of view was acknowledged by my coworkers.
	Online discussions help me to develop a sense of collaboration.
Collaboration Tool Efficacy (Staples et al., 1999)	I was able to use electronic collaborative platforms to help with remote working.
	I used electronic collaborative platforms to communicate with my coworkers.
	I used electronic collaborative platforms to manage teams.
Mode of working	How would you characterize the modality of your collaboration with others?
Meetings	How many digital meetings do you have on an average day?

Note. * Dropped due to low factor loadings.

The participants had an average age of 24 years ($M = 24.4$, $SD = 5.92$). 52.7% were female, 45.5% were male, 1.54% described their gender as non-binary, and less than 1% did not indicate any option.

All participants had been employed in some way and 80.7% of the participants indicated that they worked primarily from home for at least a period of one month over the last two years. 77.7% reported having no

children at home, 13.4% reported one child at home, while the remaining respondents have more than one child at home or chose not to answer this question.

3.2 Measurements

To measure our constructs, we adapted existing measurement scales to ensure content validity. Most of the constructs were measured using five-point Likert scales ranging from strongly disagree to strongly agree. All participants were asked to identify a specific technology that they most often used to conduct remote work with and answer the instrument questions in the context of that specific technology. *Perceived performance* was adapted from the scale originally described by Williams & Anderson (1991). *Workplace*

ergonomics control was measured using a sub-scale with four items described by Lee & Brand (2010). *Social presence* was measured using a larger scale that was adapted from the *social presence* subscale originally described by Arbaugh et al. (2008) in the context of teaching and learning research. The *collaboration tool efficacy* was measured using items adapted from the self-efficacy instrument described by Staples et al., (1999). Finally, while the items were measured using five-point Likert scales, the *mode of working* and *number of meetings* were measured using single indicator ordinal scales, as described by Rieth & Hagemann (2021) in their study of the impact of telework during Covid-19 closures. Table 1 describes the final questionnaire and corresponding constructs investigated in this study.
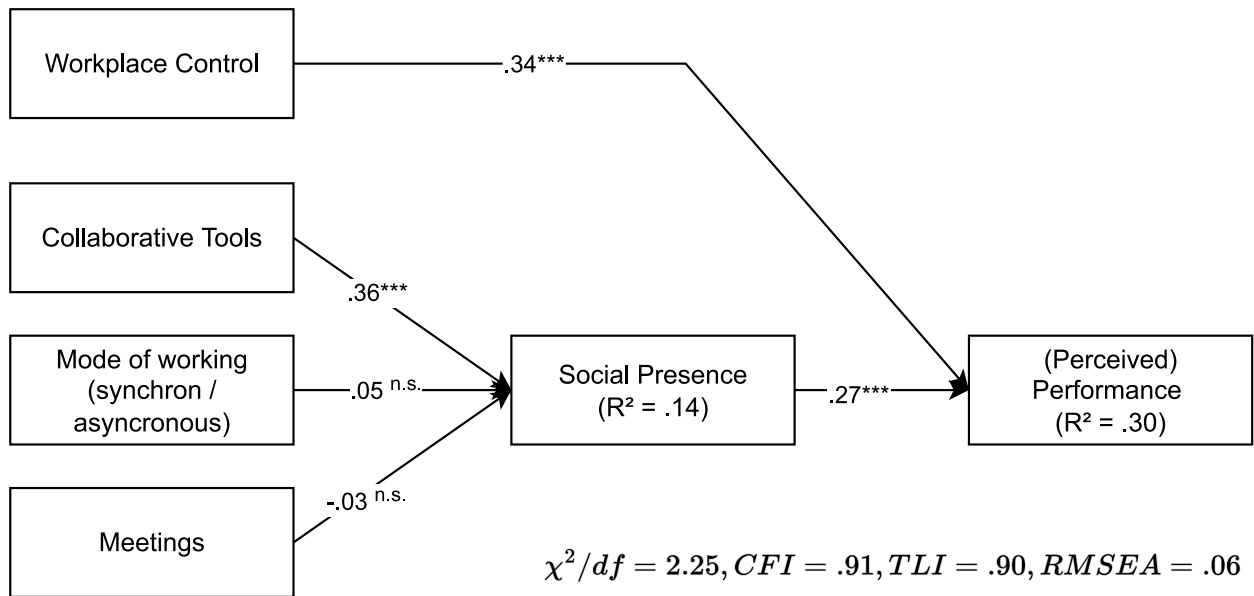

$$\chi^2/df = 2.25, CFI = .91, TLI = .90, RMSEA = .06$$

Figure 1. Model with results

4. Results

We tested our model using Structural Equation Modeling (SEM). Since our constructs are latent, we apply covariance-based SEM using the Maximum Likelihood estimator with the lavaan package (Rosseel, 2012) within the R environment. We used a robust-variant of ML using Satorra-Bentler scaled test statistic to account for non-normally distributed data.

The overall chi-squared test was significant $\chi^2(147, N = 378) = .00$ (χ^2/df = 2.25). Thus, we investigated additional fit measures including the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the robust Root Mean Square Error of

Approximation (RMSEA). Based on our results (CFI = 0.91, TLI = 0.90, and RMSA = 0.06, 90% Confidence Interval [0.05; 0.07]), the data has a closed fit to the proposed research model.

Next, we investigate the measurement model and path coefficients. We delete three measurement items with standardized loadings below .5. After dropping those items, the standardized loadings are sufficiently high and significant ($\lambda > 0.58, p < 0.001$). With regards to the path model, we find a significant relationship between *workplace ergonomics control* and *perceived performance* ($\beta = 0.27, p < 0.001$). Moreover, our data suggests a significant impact of *social presence* on perceived performance ($\beta = 0.34, p < 0.001$).

We proposed three antecedents to *social presence* in our theoretical development. Based on the data, we find only one significant relationship between *collaboration tool efficacy* and *social presence* ($\beta = 0.36$, $p < 0.001$). In contrast, the mode of working (synchronous, asynchronous) as well as the number of meetings are not significant ($p > 0.24$).

The in-sample prediction is determined based on the degree of explained variance (i.e., R^2). The data suggests that 30% of *perceived performance* can be explained with *workplace ergonomics control* and *social presence*. Moreover, the data can explain 14% of *social presence*. The complete model is shown in Figure 1.

5. Discussion

5.1 Theoretical contribution

This study investigates two predictors of perceived performance of remote work: social presence and workplace ergonomics control. It also reveals that using collaborative platforms positively influences social presence. Overall, we found support for our theoretical model. Based on our survey data, hypotheses H1 and H2a and H3 were supported. However, we found no significant impact of work modality or meeting frequency on social presence. Hence, H2b and H2c were not supported.

Our findings makes clear theoretical contributions to the emerging body of knowledge about remote work. First, the extant literature has investigated impacts of autonomy or meetings on productivity or satisfaction when working from home. However, to the best of our knowledge, this the first study that highlights the influence of collaboration tool efficacy on social presence, and in turn, perceived performance. We are also among the first to take steps towards an investigation of ergonomics factors, as understood as workplace ergonomics control. Our model offers a promising starting point for future IS researchers that seek to theorize about the efficacy of collaboration tools in the context of social presence and ergonomics. Future work on this topic could investigate the effectiveness of workplace training or on the users' attitudes towards specific online collaboration platforms on their ability to generate social presence in online work communities.

Our findings also extend knowledge about the role of social presence in collaboration technology use. While past studies of social presence related to collaboration technologies articulated the construct in terms of community participation (Shen & Khalifa, 2008), our social presence measure was rooted in the Community of Inquiry model (Arbaugh et al., 2008;

Gibbins, 2000). The significant impact of social presence on office productivity suggests that an individual's perception of comfort towards colleagues plays an important role in shaping their experience of remote work, as the Community of Inquiry model incorporates these features into its conception of the construct. It is possible that the distinctive features of the selected social presence construct explains why we did not observe significant relationships between the modality of work, number of meetings, and social presence, as articulated by H2b and H2c. While asynchronous work had been previously theorized as an important factor in negatively shaping remote workers' social experience (Yang et al., 2022), it could be that it has no bearing on someone's comfort felt towards peer collaboration. The mode of work may instead contribute to feelings of frustration or isolation which were not captured by the construct employed. Similarly, the number of meetings has been found to contribute to screen fatigue (Riedl, 2021), which might better explain the degradation of social life described by Yang et al. (2022) than the lack of comfort collaborating with one's peers. While there are advantages to drawing from the Community of Inquiry model in the context of research on collaborative tools, future work may benefit by refining the construct observed to incorporate factors such as feelings of social isolation, technology frustration, or find new ways to adapt the model to the specific concerns of the remote work context.

Our findings also contribute to new understandings of workplace ergonomics control which draws from prior work in ergonomics (Rieth & Hagemann, 2021; Bergefurt, 2021). So far, ergonomic factors related to workplaces have been largely excluded from investigations of online collaboration tools and remote workspaces and its impact on technology use or other IS-related variables. Future work into the role of autonomy in IS phenomena may benefit by looking to ergonomic or environmental factors (e.g., noise, light, temperature) in future studies of collaboration technology. Taken together, both the ability to perceive others (social presence) and to personalize one's workspace (workplace ergonomics control) merit further theoretical attention.

Finally, prior evidence suggests that the benefits of tool efficacy extend beyond experienced social presence, so could be of increased importance than suggested by this study alone. Literature has shown that self-efficacy also relates to job satisfaction and innovation quality (Morris & Vankatesh, 2010; Tripp et al, 2016; Ye & Kankanhalli, 2018), which suggests that training or increased autonomy could facilitate even greater returns. Workers may also perceive greater workplace ergonomics control by having the

ability to customize their online work environment; by enabling a degree of individualization and creative freedom (e.g., interface design, casual channels) when using collaborative platforms.

5.2 Practical Implications

The study also has practical implications. We found evidence that collaborating with coworkers online can lead to a sense of social presence, which in turn increases perceived performance. However, the number of meetings did not have a significant impact on social presence. Though there are many possible explanations for this, one relates to the concept of Zoom fatigue (Riedl, 2021), which suggest that employers' tendency to encourage remote meetings is having a negative impact workers' experience. Given that the frequency of meetings or mode of collaboration were not significant factors in predicting social presence, while workplace ergonomics control was an important predictor, it is possible that these were simply not associated with the formation of meaningful workplace relationships (Yang et al., 2022). Employers may thus benefit from giving workers more autonomy over how to organize their home workspaces. Though this warrants further investigation and replication, ideally with a different social presence construct and a more specific measure of the type and the participants of meetings , it corroborates emerging findings which support limiting meetings or encouraging alternative methods of collaborations beyond the screen (Brucks & Levav, 2022; Yang et al, 2022).

The results also offer a practical suggestion for employers seeking to increase perceived performance: foster online collaboration capabilities. Online collaborative tool efficacy played an important role in shaping social presence, which is why we suggest that collaborative platforms should not only be widely applied in the context of remote work, but also specifically designed for remote workers. We suggest that organizations create appropriate training programs that ensure the workers' ability to apply these tools appropriately. Further, since workplace ergonomics control is shown to be significant in affecting perceived performance, this relationship can be further shaped by external interventions designed to enhance self-efficacy. By investing in tools that make it easier to collaborate, employers can increase social presence and perceived performance.

Our results also suggest that the number of meetings do not significantly contribute to social presence. Using collaboration tools can be more important than conducting a (high) number of meetings. Thus, organizations are advised to reduce the number of meetings – which has been already recognized by some leading organizations (Sayer, 2022) – and focus on how collaborative tools (e.g., Mural, Miro, Conceptboard) can be used effectively.

5.3 Limitations

As our model is only a preliminary framework for studying effective remote work, our work comes with several shortcomings. One limitation of this study is the design of the survey, as it was collected using a platform of convenience from workers from very diverse backgrounds, not all of whom worked primarily remotely at the time of collection. This has implications for the validity of some of the constructs, such as the reported number of meetings, which could have radical differences of normal behavior among professions. For example, technicians may meet 1 time per day on average whereas call center professions may meet more than 20 times per day. It also did not capture which individuals (e.g., bosses, co-workers, customers) the meetings were held with. Another limitation is that the data were collected in a cross-sectional manner and could be strengthened using a longitudinal data-collection strategy. The measure of social presence could be replaced by a more refined set of questions that are both rooted in the Community of Inquiry model, while also better adapted to the context of remote work rather than education.

There are also limitations related to concluding from a single method of inquiry. In this case, we used perception-based measures instead of actual behavior, and while these results are promising, they would benefit by cross-reference from other methods of observation. In future research, performance could be assessed by observing the actual performance by the remote workers, although it is oftentimes not practical given our internationally diverse sample. Case studies about effective remote work that focus on employees from one or a few organizations could be promising. Experimental and qualitative approaches could also enhance the internal validity of the results. Likewise, a follow-up survey with a different population can be done to validate our findings.

Finally, there are opportunities to refine our model and overall approach. This study focused on factors leading to remote workers' perception of their behavioral performance and did not incorporate other factors of interest in this context. Furthermore, we incorporated only one type of social presence measure which might be further refined for the context of remote work. Future research could incorporate additional individual and institutional factors to explain effective remote work and study related dependent variables such as creative performance,

well-being, or workplace identification. Given the theoretical and practical relevance of further understanding remote work practices, future studies could shed additional light on the role of social presence and workplace ergonomics control in an organization's efforts to enhance productivity.

6. Conclusion

As the world moves beyond the era of Covid-19, remote work is clearly here to stay. It is thus critical for our society to move towards productive remote work practices and effective approaches to collaboration tools. In this paper we presented evidence that social presence and workplace ergonomics control are strong predictors of perceived performance in remote work environments. We also provide evidence that an individual's perceived self-efficacy with collaboration tool influences experienced social presence, though other factors such as the mode of work and number of meetings held do not. We interpret these results to suggest that employers could benefit from developing practices that encourage workers to become effective users of collaboration tools and develop greater autonomy and control over their work environments.

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