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Professional social media-enabled productivity: a five-wave longitudinal study on the role of professional social media invasion, work engagement and work exhaustion

Professional
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Abstract

Purpose – Social media platforms are increasingly used at work to facilitate work-related activities and can either challenge or make people feel more productive at jobs. This study drew from technostress and employee well-being literature and analyzed longitudinal effects of professional social media (PSM) invasion, work engagement and work exhaustion on PSM-enabled productivity.

Design/methodology/approach – Nationally representative five-wave survey data of Finnish employees were analyzed with hybrid multilevel linear regression analysis. Outcome measure was PSM-enabled productivity and the predictors included PSM invasion, work exhaustion and work engagement. Age, gender, education, occupational sector, managerial position, remote work and personality traits were used as control variables.

Findings – PSM invasion and work engagement had both within-person and between-person effects on PSM-enabled productivity. Higher educated and individuals with open personality reported higher PSM-enabled productivity. No association between work exhaustion and PSM-enabled productivity was found.

Originality/value – The findings are central considering the increasing use of social media and other technologies for work purposes. The authors challenge the dominant view in the literature that has often seen PSM invasion as a negative factor. Instead, PSM invasion's positive association with PSM-enabled productivity and the association of work engagement and PSM-enabled productivity should be recognized in work life.

Keywords Technostress, Professional social media invasion, Work engagement, Professional social media-enabled productivity

Paper type Research paper

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1. Introduction

Digital collaborative tools, such as social media platforms, had already increasingly been used for professional purposes prior to the COVID-19 pandemic and increased as a response to the pandemic (Cao and Yu, 2019; Kodama, 2020; Leonardi, 2020; Nisar *et al.*, 2019). Thus, the popular tools such as Microsoft Teams and Zoom have been surreptitiously conquering employees' private lives for some time (Barnes, 2020; Tams *et al.*, 2020). Professional social media (PSM) use refers to the use of social media platforms for work purposes such as professional social networking; discussing, following, producing, or sharing content related to work or the organization; and working collaboratively and having online meetings regardless of location (Oksa *et al.*, 2020, 2021; Oksanen *et al.*, 2021). These outcomes can occur through public social media services, such as Facebook and LinkedIn, or via organizations' internal social media platforms, such as Workplace from Meta and MS Teams.

Studies suggest that PSM facilitates enhanced working practices, such as improved communication possibilities, information access and sharing (Liu and Bakici, 2019; Nisar *et al.*, 2019; Sun *et al.*, 2020). Moreover, PSM provides good opportunities for task-oriented and relationship-building behaviors, organizational identification and transparency (Ali *et al.*, 2020; Carlson *et al.*, 2016; Men *et al.*, 2020; Oksa *et al.*, 2020). Working virtually provides employees with flexibility in completing their work, considering family responsibilities and work life balance and can foster work performance, productivity and work engagement (i.e. the motivational state of employee well-being; Schaufeli and Bakker, 2004a; Fusi and Feeney, 2018; Leftheriotis and Giannakos, 2014; Nisar *et al.*, 2019; Oksa *et al.*, 2020).

In addition to the positive consequences, PSM can have negative effects on users. One of the main aspects is its invasiveness, a perception that PSM use interferes with one's private life and has negative outcomes for the individual (e.g. Salo *et al.*, 2019; Tarafdar *et al.*, 2020a). In the context of this study, PSM invasion is defined as the invasive effect of social media use on work-related situations, where employees can be technically reached anytime and feel the need to be constantly connected, hence the boundaries of work and private life can be challenged by pervasive technology and social media (Ayyagari *et al.*, 2011; Del Bosque, 2013; Fieseler *et al.*, 2015; Leung and Zhang, 2017; Ollier-Malaterre *et al.*, 2013; Tarafdar *et al.*, 2020b). The conflicts involved in combining the work and home domains can lead to negative psychological outcomes, such as work exhaustion, which is a key stress dimension of employee burnout (Bakker *et al.*, 2005; Demerouti *et al.*, 2004). In addition to boundary-management issues, constant connectivity and interruptions by social media can lower work performance and productivity (Cao and Yu, 2019; Yu *et al.*, 2018). This can also lead to technostress (Bucher *et al.*, 2013), which refers to the stress people experience due to their use of technology, and it is characterized by the struggle to manage the demands caused by technology use (Ayyagari *et al.*, 2011; Tarafdar *et al.*, 2019).

Our article focuses on PSM-enabled productivity that involves a person's positive acknowledgment that the use of social media at work facilitates work tasks and makes them feel more productive (Ali-Hassan *et al.*, 2015; Leftheriotis and Giannakos, 2014). We analyzed the longitudinal effects of PSM invasion, work engagement and work exhaustion on PSM enabled productivity. The study is based on technostress literature and concepts of technology invasion and technology-enabled productivity (Ragu-Nathan *et al.*, 2008; Tarafdar *et al.*, 2019). In addition, the study combines theories of work engagement, burnout, job demands and job resources (e.g. Bakker *et al.*, 2014; Demerouti *et al.*, 2001; Schaufeli and Bakker, 2004a) to study the association of PSM-enabled productivity with work exhaustion and work engagement.

2. Theoretical background and hypothesis development

2.1 Social media invasion as a techno-stressor

Besides the above-mentioned positive impacts of new technologies at work, the use of such technologies at work can trigger stress (i.e. technostress) and related negative consequences

(Ragu-Nathan *et al.*, 2008). Two particularly important concepts in terms of technostress are techno-stressors and strain (Ayyagari *et al.*, 2011; Ragu-Nathan *et al.*, 2008). In line with the transactional view of stress (Lazarus, 1966; Lazarus and Folkman, 1984), techno-stressors refer to the stress creators as demand conditions that form within the interactions between the individual and the technology. In prior research, recurrent techno-stressors included techno-invasion, techno-overload, techno-complexity, techno-insecurity and techno-uncertainty (cf., Fischer and Riedl, 2017; Tarafdar *et al.*, 2019).

Strain refers to an individual's negative psychological, physiological, or behavioral response in relation to techno-stressors (Ayyagari *et al.*, 2011). Furthermore, strain is associated with various behavioral outcomes, such as reduced work productivity (Tarafdar *et al.*, 2010, 2015) and declining organizational commitment (Ragu-Nathan *et al.*, 2008; Tarafdar *et al.*, 2007). Altogether, technostress emerges when techno-stressors exceed an individual's resources for managing them, resulting in strain and other potential negative outcomes such as exhaustion and burnout (Ayyagari *et al.*, 2011; Cooper *et al.*, 2001). Furthermore, a techno-stressor labeled technology invasion (i.e. technology use constantly invading one's life) is one of the core elements creating technostress (Tarafdar *et al.*, 2007, 2019) and has been positively associated with strain (Fischer and Riedl, 2017; Molino *et al.*, 2020; Tarafdar *et al.*, 2019).

As technology is easily invasive, understanding technostress factors more thoroughly is crucial since technostress has rooted itself in the workplace context (Bondanini *et al.*, 2020; Srivastava *et al.*, 2015; Tarafdar *et al.*, 2015) and has raised concerns about how to maintain employees' well-being and support in mitigating stress, especially during COVID-19 (Fieseler *et al.*, 2014; Spagnoli *et al.*, 2020). Moreover, prior studies indicate that technostress can potentially have severe consequences for organizations, such as weaker job satisfaction and commitment, performance and productivity issues, increased absenteeism and burnout and higher intentions to leave, which should gain managerial attention (Ayyagari *et al.*, 2011; Boyer-Davis, 2019; Tarafdar *et al.*, 2015, 2019).

Technology and social media specifically, along with work tasks, more frequently follows employees from their workplaces to their homes, therefore invading employees' private lives (Ayyagari *et al.*, 2011; Del Bosque, 2013; Fieseler *et al.*, 2015; Ollier-Malaterre *et al.*, 2013; Tams *et al.*, 2020). PSM use is ubiquitous, and it absorbs users in dynamic social networks and interactions that make users prone to remaining constantly available and to receiving invading messages or other notifications also outside office hours (Barber *et al.*, 2019; Maier *et al.*, 2015; Salo *et al.*, 2019). Excessive amounts and unpredictable work can be received through digital means (Fusi and Feeney, 2018; Ragu-Nathan *et al.*, 2008), in addition to communication, information and social overload (Yu *et al.*, 2018). PSM can increase cognitive preoccupation, which can restrict employees to combining work with their personal and family lives (Cao and Yu, 2019; Zheng and Lee, 2016). Furthermore, studies on remote workers have demonstrated that technostress and especially technology invasion are associated with work–family conflicts (Barber *et al.*, 2019; Leung and Zhang, 2017; Molino *et al.*, 2020).

Previous research has repeatedly found that invasion and other techno-stressors are negatively associated with technology-enabled productivity and performance at work (Tarafdar *et al.*, 2007, 2015; Tu *et al.*, 2005). Decreased productivity and performance occur when employees are faced with technology-enabled demands to receive and browse through endless digital content and incoming notifications, to stay constantly available and to continue the workday after hours at home or other places (Tarafdar *et al.*, 2007, 2015; Tu *et al.*, 2005). These demands can erode the same resources that employees designate and use for other work tasks. When work can always be accessed, it can lead to social media exhaustion, resulting in decreased job performance (Yu *et al.*, 2018). Furthermore, excessive social media use can stimulate technology–work conflicts and strain, which can reduce job performance (Cao and Yu, 2019). Therefore, we propose the following hypothesis:

H1. PSM invasion predicts low PSM-enabled productivity.

2.2 Employee well-being in the context of work productivity

Employee well-being can be approached in many ways. Its definitions are commonly based on a more general well-being conceptualization by Ryff (1989) that denotes the behavioral elements of well-being and affective well-being conceptualization by Warr (1994) that is work context specific. Based on those conceptualizations also cognitive well-being, professional well-being, social well-being and psychosomatic well-being have been considered as part of employee well-being (Van Horn *et al.*, 2004). Affective well-being, however, is regarded as the principal element of well-being (Diener *et al.*, 2009). Warr's (2007) four quadrant model includes work engagement, workaholism, burnout and job satisfaction. The model has been developed from Russell's (1980, 2003) circumflex model of affect (i.e. emotional states of high versus low activation and pleasure versus displeasure) which is applied more in detail in the work context to regard subjective employee well-being (e.g. Bakker and Oerlemans, 2011; Mäkikangas *et al.*, 2015; Mäkikangas *et al.*, 2016; Salanova *et al.*, 2014). It is evident that examining both positive and negative aspects are needed to understand affective employee well-being holistically. In this article, we focus on work engagement and exhaustion. The latter is a core dimension of burnout and key to its development (Shirom, 2005).

Work engagement is defined as a rewarding, comprehensive and long-lasting affective-cognitive work-related state of mind (Schaufeli and Bakker, 2004a; Schaufeli *et al.*, 2002). Work engagement consists of three dimensions: vigor (e.g. mental resilience while working), dedication (e.g. enthusiasm) and absorption (e.g. full concentration on work; Schaufeli and Bakker, 2004a; Schaufeli *et al.*, 2002). Work engagement is a motivational state commonly explained by high job resources (Bakker, 2011; Schaufeli and Bakker, 2004a). Job resources are positive psychological, physical, social and organizational characteristics that are essential drivers of work engagement – for example, task variety and autonomy (Demerouti *et al.*, 2001; Hakanen *et al.*, 2008a, b; Schaufeli and Bakker, 2004a). Previous studies have found a positive relationship between work engagement and enhanced work productivity and performance (Christian *et al.*, 2011; Halbesleben and Wheeler, 2008; Harter *et al.*, 2002; Rich *et al.*, 2010; Shimazu *et al.*, 2018).

Work engagement and burnout have been developed on same grounds of burnout research (Maslach *et al.*, 1996) and are interrelated, but still independent employee well-being concepts (Bakker *et al.*, 2014). Burnout is a work-stress syndrome that consists of three dimensions: exhaustion (personal fatigue), cynicism (a distant attitude toward work) and reduced professional efficacy (social and nonsocial work accomplishments; Maslach *et al.*, 2001). Job demands are work-related elements that require constant psychological or physical effort from employees, which can decrease work engagement and lead to exhaustion, strain and burnout (Bakker *et al.*, 2014; Demerouti *et al.*, 2001; Schaufeli and Bakker, 2004a). Sufficient resources can buffer strain and burnout (Bakker *et al.*, 2014).

According to Hobfoll's (2001)'s conservation of resources (COR) theory, people try to maintain their valuable resources from depletion against job demands, and if there is potential or actual loss of those resources, stress and burnout can emerge. Work exhaustion is the key individual stress dimension of burnout, the state when individual's mental resources are depleted and decreased by high job demands (Taris *et al.*, 2005). Burnout and its component work exhaustion have been associated with lowered productivity in prior employee well-being studies (Halbesleben and Bowler, 2007; Swider and Zimmerman, 2010; Taris, 2006; Virga *et al.*, 2019).

In addition to its enhancing influence on employee well-being, PSM use can increase job demands, such as time management issues, increased workload and cognitive burden (Fusi and Feeney, 2018; Maier *et al.*, 2015), thus decreasing the resources needed to keep employees engaged at work. Strain experienced from technology use can also decrease

work engagement and, in turn, lead to lower productivity (Tarafdar *et al.*, 2010, 2015). Moreover, the inability to draw boundaries between private and work life and constantly being available for work purposes via social media, can cause negative psychological outcomes for individuals, such as concentration problems, strain, exhaustion and burnout (Cao and Yu, 2019; Maier *et al.*, 2015; Salo *et al.*, 2019; van Zoonen *et al.*, 2016a, 2017), which can compromise work productivity accordingly (Tarafdar *et al.*, 2007, 2010, 2015). Thus, we expect the following:

H2. High work exhaustion predicts low PSM-enabled productivity.

PSM use can, however, promote job resources, including enhanced communication and real-time information accessibility (Sun *et al.*, 2020; van Zoonen *et al.*, 2017), cooperation with colleagues and stakeholders and act as a platform for social support (Kang and Beydoun, 2021; Leidner *et al.*, 2018; Oksa *et al.*, 2020). Past research indicates that there is a link between the use of communication technology and job performance, as employees' beliefs about being effective in their work are prompted by technology usage (Chesley, 2010). In addition to the negative psychological consequences of PSM invasion, using PSM can positively blur the boundaries between work and social lives and, in turn, enhance positive emotions and perceived social, physical, intellectual and psychological resources (Koch *et al.*, 2012). Therefore, PSM use can be seen as a job resource, empowering employees toward better performance and productivity at work (Ali-Hassan *et al.*, 2015; Leftheriotis and Giannakos, 2014; Olmstead *et al.*, 2015).

Notably, PSM use can foster employees' engagement with their work (e.g. Oksa *et al.*, 2020, 2021; Sharma and Bhatnagar, 2016; van Zoonen and Banghart, 2018; van Zoonen *et al.*, 2017). When employees experience work engagement, they are more likely to be proactive at work (Hakanen *et al.*, 2008a, b). There are also studies regarding the association of work engagement, work productivity and performance in different work contexts, such as among dentists (Hakanen and Koivumäki, 2014) and teachers (Bakker and Bal, 2010). Based on the above arguments, we expect the following:

H3. High work engagement predicts high PSM-enabled productivity.

We expect differences between people and within people in time points for all hypotheses. The hypothesized model for all the hypotheses and control variables is shown in Figure 1.

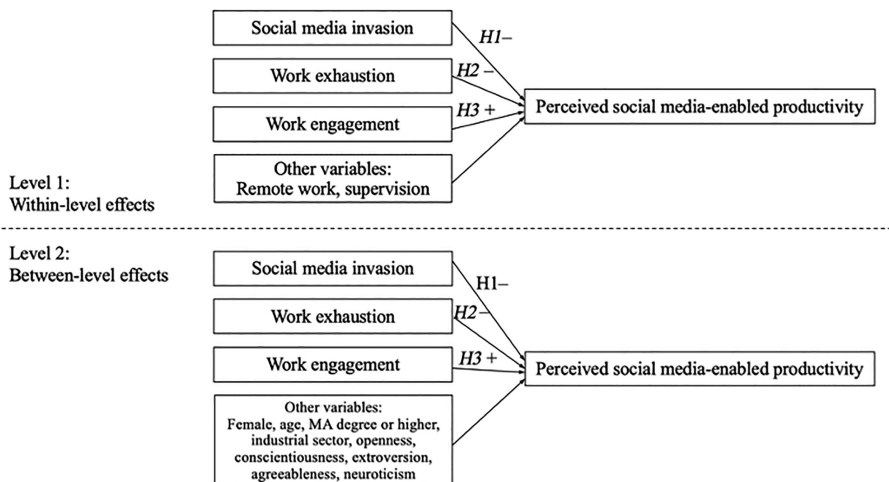


Figure 1.
The proposed model
based on hypotheses

3. Methods

3.1 Participants and procedure

To examine the relationships of PSM invasion, work engagement and work exhaustion with PSM-enabled productivity, we used a longitudinal survey design with five waves. The first wave (T1) of data was collected from Finnish employees of different occupational fields (see [Appendix](#)) during March–April 2019. The survey participants ($N = 1,817$) were aged between 18 and 65 ($M = 41.75$, $SD = 12.19$); 46.84% were female and 53.16% were male. The participants were recontacted in September–October 2019 (Time Point 2 [T2]; $N = 1,318$), March–April 2020 (Time Point 3 [T3]; $N = 1,081$), September–October 2020 (Time Point 4 [T4]; $N = 1,152$) and March–April 2021 (Time Point 5 [T5]; $N = 1,018$). The fourth and fifth surveys were sent to all original respondents, whereas the third was sent only to those who had responded to the second survey. Of the original respondents, 46.23% responded to all five surveys ($N = 840$). The final sample used in this study ($N = 733$, 42.43% female, $M_{\text{age}} = 43.79$, $SD = 10.55$) included only those respondents who were working during each time point. In other words, those retired, unemployed or otherwise temporarily out of work were excluded from the analysis.

Data collection was organized by Norstat, who was our collaborator in this research and who recruited the participants from their pool of volunteers ([Norstat, 2021](#)). The online survey was distributed to participants via email. A representative sample of the Finnish workforce population in terms of age and gender was gathered through our stratified sampling strategy. Nonresponse analyses between each time point was conducted and no major bias was recognized. The samples closely resembled the Finnish working population regarding age, gender, most populated area, and educational level. Additionally, the participants were from different occupational fields ([Oksa et al., 2020](#); [Oksanen et al., 2020](#)).

The survey aimed to discover the usage of social media for professional purposes and the concepts drawn from technostress literature, specifically PSM-enabled productivity and PSM invasion, in addition to the work exhaustion and work engagement factors of employee well-being. The survey was framed to concern PSM use, and it was targeted to employees that were working at the time of the survey. The framing of the survey and guidelines therein informed the respondent that nonwork-related social media was excluded from the study. Participation in the study was voluntary. Participants were informed of the study aims and informed of their right to withdraw from the study during data collection. The Academic Ethics Committee of Finland's Tampere region granted the research approval.

3.2 Measures

3.2.1 Professional social media-enabled productivity. The PSM-enabled productivity scale was adjusted from the technology-enabled productivity scale ([Tarafdar et al., 2007](#)) to measure individuals' perceptions of PSM-enabled productivity. It was measured with the following statements: "social media helps to improve the quality of my work"; "social media helps me to accomplish more work than would otherwise be possible"; and "social media helps me to perform my job better." The answer options used a Likert scale (from 1 = *strongly disagree* to 7 = *strongly agree*). The scale showed excellent internal consistency based on McDonald's omega (T1: $\omega = 0.95$, T2: $\omega = 0.95$, T3: $\omega = 0.95$, T4: $\omega = 0.95$, T5: $\omega = 0.95$). The descriptive statistics of the control variables are provided in [Table 1](#).

3.2.2 Professional social media invasion. The PSM invasion scale was adjusted from the technology invasion scale ([Ragu-Nathan et al., 2008](#)) as there was no existing scale measuring social media invasion in professional contexts. PSM invasion was measured with the following three statements: "I always have to be available due to social media"; "I feel my personal life is being invaded by social media"; and "I have to sacrifice time to keep current on new social media services." The answer options used a Likert scale (from 1 = *strongly*

Outcome variable	Range	T1, mean (SD)	T2, mean (SD)	T3, mean (SD)	T4, mean (SD)	T5, mean (SD)
PSM-enabled productivity	3–21	7.40 (4.51)	7.43 (4.56)	7.76 (4.62)	7.77 (4.55)	7.61 (4.60)
Continuous predictors	Range	T1, mean (SD)	T2, mean (SD)	T3, mean (SD)	T4, mean (SD)	T5, mean (SD)
PSM invasion	3–21	6.96 (4.09)	7.09 (4.28)	7.16 (4.25)	7.06 (4.24)	6.84 (4.14)
Work engagement	0–54	38.66 (12.25)	38.89 (12.35)	39.51 (11.73)	38.39 (12.14)	38.16 (12.09)
Work exhaustion	0–30	14.53 (7.70)	14.41 (7.75)	13.76 (7.42)	14.11 (7.60)	13.88 (7.73)
Categorical predictors	Coding	T1, %	T2, %	T3, %	T4, %	T5, %
Supervisor	0/1	21.09	20.83	19.92	19.92	18.10
Remote work (≥ 3 days a week)	0/1	4.95	5.21	11.20	24.48	33.59

Table 1.
Descriptive statistics of
main study variables

disagree to 7 = *strongly agree*). The internal consistency of the scale was good at all time points (T1: $\omega = 0.82$, T2: $\omega = 0.84$, T3: $\omega = 0.86$, T4: $\omega = 0.86$, T5: $\omega = 0.85$).

3.2.3 Work exhaustion. Five statements from the Maslach Burnout Inventory (MBI-GS; Maslach *et al.*, 2018) were used to measure work exhaustion: “I feel emotionally drained from my work”; “I feel used up at the end of the workday”; “I feel tired when I get up in the morning and have to face another day on the job”; “Working all day is really a strain for me”; and “I feel burned out from my work.” Answer options were “never,” “a few times a year or less,” “once a month or less,” “a few times a month,” “once a week,” “a few times a week,” and “every day,” with answers given numerical values of 0–6, respectively. The scale ranged from 0 to 30 with higher scores indicating higher work exhaustion. The internal consistency of the scale was excellent at all time points (T1: $\omega = 0.93$, T2: $\omega = 0.93$, T3: $\omega = 0.92$, T4: $\omega = 0.93$, T5: $\omega = 0.93$).

3.2.4 Work engagement. Commonly, work engagement is measured with the Utrecht Work Engagement Scale (UWES; Schaufeli and Bakker, 2004b; Schaufeli *et al.*, 2002). In this study, work engagement was measured with the Finnish nine-item version of the UWES (Seppälä *et al.*, 2009). This scale measured all three dimensions of work engagement – i.e. vigor, dedication and absorption. Each dimension had three questions. The answer options were “never,” “almost never/a few times a year,” “rarely/once a month or less,” “sometimes/a few times a month,” “often/once a week,” “very often/a few times a week,” and “always/every day.” The answers were given numerical values of 0–6, respectively. All three dimensions were included in the scale with a range of 0–54. A higher score indicated higher work engagement. The internal consistency of the scale was excellent at all time points (T1: $\omega = 0.96$, T2: $\omega = 0.96$, T3: $\omega = 0.96$, T4: $\omega = 0.96$, T5: $\omega = 0.96$).

3.2.5 Control variables. The sociodemographic and work-related variables included age, gender, education, occupational sector, managerial position, remote work and personality. Education was categorized into a dummy variable indicating those with MA degrees from university or higher. The occupational sector was categorized into those working with the industrial sector and others. Those respondents who indicated that they were working remotely at least 3 days a week were considered remote workers in this study. Each time point includes information about remote working. Similarly, each time point includes information about whether participants acted in a managerial position. We also used the 15-item Big Five Inventory for personality (Hahn *et al.*, 2012). All items had responses ranging from 1 to 7,

leading to five scales ranging from 3 to 21: openness ($M = 14.73$; $SD = 3.31$), conscientiousness ($M = 15.65$; $SD = 3.00$), extroversion ($M = 13.50$; $SD = 4.33$), agreeableness ($M = 14.41$; $SD = 2.99$) and neuroticism ($M = 11.70$; $SD = 3.61$). The internal consistency of the traits varied from acceptable (openness: $\omega = 0.70$, conscientiousness $\omega = 0.70$, agreeableness: $\omega = 0.60$, neuroticism: $\omega = 0.71$) to good (extroversion: $\omega = 0.88$).

3.3 Statistical techniques

The main analyses were conducted using linear multilevel hybrid models (Schunck and Perales, 2017) that allow the estimation of within-person effects and between-person effects at the same time. Within-person effects show how time-variant changes in independent variables are associated with the change in the time-variant dependent variables, PSM-enabled productivity (Schunck and Perales, 2017). Between-person effects involve more static associations between variables, for example how people with high work engagement differ from those people with low work engagement (Schunck and Perales, 2017). Hybrid models combine the strengths of random-effects and fixed-effects approaches and solve their shortcomings (Schunck, 2013; Schunck and Perales, 2017). Models were run with the xthybrid command in Stata 16.1 (Schunck and Perales, 2017). In our models, all main time-varying variables had both within-person and between-person effects. The models also included several between-person control variables. A dummy variable for COVID-19 time (T3–T5) was included in the model. Our sensitivity analyses also involved checking interaction with time to see whether any of the effects were different at different time points.

4. Results

The key results of our study are shown in Table 1 and Figure 2. The main models showed a strong within-person effect of PSM invasion on PSM-enabled productivity ($B = 0.38$; $p < 0.001$). This effect indicates that over-time positive changes, i.e. an increase in PSM invasion are associated with over-time positive change, i.e. an increase in PSM-enabled productivity. In addition, the between-person effect of PSM invasion was statistically

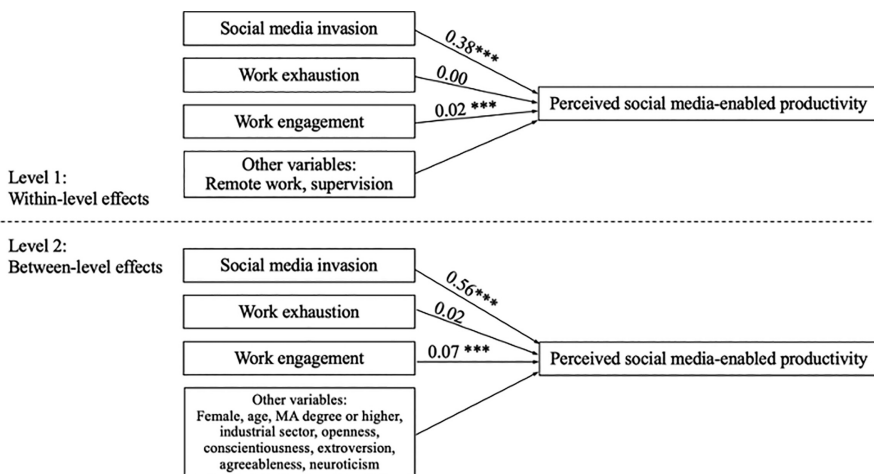


Figure 2. The estimated model based on hypotheses

Note(s): Coefficients are unstandardized

significant, indicating that those individuals who were invaded also reported higher PSM-enabled productivity compared to those who were not ($B = 0.56; p < 0.001$). No statistically significant within-person or between-person association to work exhaustion was discovered.

Out of other variables of our model, work engagement had both within-person ($B = 0.02; p = 0.002$) and between-person ($B = 0.07; p < 0.001$) effect on PSM-enabled productivity. More highly educated people ($B = 0.89, p = 0.003$) and individuals with open personality ($B = 0.08; p = 0.022$) reported higher PSM-enabled productivity than others. Industrial sector workers ($B = -0.57; p = 0.015$) and conscientious individuals ($B = -0.11; p = 0.011$) reported lower PSM-enabled productivity than others.

Descriptive results of our additional analyses showed an increase in the dependent variable of PSM-enabled productivity during the COVID-19 pandemic in Spring 2020 – Spring 2021 (see Table 1). This increase was also statistically significant in our statistical models ($B = 0.24; p = 0.011$; see Table 2). In addition to the dependent variable, we analyzed whether the effects of the three main independent variables were stronger or different before and during the COVID-19 period. However, the main independent variables of PSM invasion, work engagement, and work exhaustion showed no statistically significant differences in the effects between the time points. Hence, these results underline the relevance of the main effects of this study.

5. Discussion

This study investigated the longitudinal effects of PSM invasion, work engagement and work exhaustion on PSM-enabled productivity at work. The study, based on technostress literature, focused specifically on the concept of perceived technology-enabled productivity and technology invasion (e.g. Ragu-Nathan *et al.*, 2008; Tarafdar *et al.*, 2019). In addition, the

	<i>B</i>	Robust SE (<i>B</i>)	95%	CI	<i>p</i>
<i>Within-person variables</i>					
PSM invasion	0.38	0.03	0.32	0.44	<0.001
Work engagement	0.02	0.01	0.01	0.04	0.007
Work exhaustion	0.00	0.01	-0.03	0.02	0.913
Remote work	0.38	0.20	-0.02	0.78	0.061
Supervisor	0.19	0.27	-0.35	0.72	0.491
<i>Between-person variables</i>					
PSM invasion	0.56	0.04	0.47	0.64	<0.001
Work engagement	0.07	0.01	0.04	0.10	<0.001
Work exhaustion	0.02	0.02	-0.02	0.06	0.330
Remote work	0.40	0.47	-0.53	1.33	0.401
Supervisor	0.26	0.31	-0.35	0.87	0.401
<i>Controls</i>					
Female	-0.36	0.24	-0.83	0.12	0.139
Age	-0.02	0.01	-0.04	0.00	0.098
MA degree or higher	0.89	0.30	0.30	1.48	0.003
Industrial sector	-0.57	0.23	-1.03	-0.11	0.015
Openness	0.08	0.04	0.01	0.16	0.022
Conscientiousness	-0.11	0.04	-0.19	-0.02	0.011
Extroversion	0.04	0.03	-0.03	0.10	0.252
Agreeableness	-0.01	0.04	-0.09	0.07	0.870
Neuroticism	-0.04	0.04	-0.12	0.04	0.293
COVID-19-time (T3–T5)	0.25	0.10	0.06	0.44	0.011

Note(s): Statistically significant correlations ($p < 0.05$) highlighted with italics

Table 2.
Hybrid models
showing within-person
and between-person
effects on professional
social media-enabled
productivity

study combined theories of work engagement, burnout, job demands and job resources (e.g. Bakker *et al.*, 2014; Demerouti *et al.*, 2001; Schaufeli and Bakker, 2004a).

H1 examined whether PSM invasion predicts low PSM-enabled productivity. The hypothesis was based on the dominant view in the prior literature of the negative consequences of technology and social media invasion on productivity (Tarafdar *et al.*, 2007, 2015; Tu *et al.*, 2005; Yu *et al.*, 2018). Notably, the first hypothesis was not supported by our findings. On the contrary, we found within-person effects indicating that an increase in PSM invasion leads to higher PSM-enabled productivity. Besides this, we also found between-person effects showing that invaded workers reported that PSM enhances their work quality and performance and helps them accomplish more than would otherwise be possible. Remarkably, this positive association was not found among those workers less invaded. As suggested by prior research, this positive aspect of PSM invasion may be explained by employees' ability to manage and combine their work and private boundaries effectively (Fieseler *et al.*, 2015; Leonardi *et al.*, 2013; Ollier-Malaterre *et al.*, 2013; van Zoonen *et al.*, 2016b).

H2 investigated whether high work exhaustion would predict lower PSM-enabled productivity. Our findings did not support the second hypothesis either. No association between work exhaustion and PSM-enabled productivity was established. This is a noteworthy finding, as prior studies suggest that technostress can manifest strain and exhaustion (Ayyagari *et al.*, 2011), which in turn are associated with lower productivity (Tarafdar *et al.*, 2010, 2015). As noted in previous studies, technology-related demands such as constant connectivity, notifications and after-hour work can decrease productivity (Tarafdar *et al.*, 2007, 2015; Tu *et al.*, 2005). The current nonexistent relationship between exhaustion and decreased PSM-enabled productivity might be explained by the role of social media as a resource-boosting vehicle for productivity (Ali-Hassan *et al.*, 2015; Leftheriotis and Giannakos, 2014; Olmstead *et al.*, 2015).

With H3, we examined whether high work engagement predicts high PSM-enabled productivity. We did find support for the third hypothesis. Moreover, we found that work engagement had both within-person and between-person effects indicating that positive over time changes in work engagement are associated with an increase of PSM-enabled productivity, and individuals reporting higher work engagement have higher PSM enabled productivity. Moreover, individuals with open personalities and higher education reported higher PSM-enabled productivity than others. The relationship between work engagement and PSM-enabled productivity can be explained by the possibility of employees deciding for themselves when and where they should engage with their work considering other factors—for example, family duties, which can boost their work engagement, work performance and productivity (Fusi and Feeney, 2018; Leftheriotis and Giannakos, 2014; Nisar *et al.*, 2019; Oksa *et al.*, 2020). These results indicate that work engaged employees have resources and energy to perform well in their work.

6. Study implications

The current study considers several theoretical and practical implications for scholars, social media users, practice and work life.

6.1 Theoretical implications

Although there are recent articles on holistic technostress (Califf *et al.*, 2020; Fischer and Riedl, 2017; Tarafdar *et al.*, 2019), the current technostress literature is limited in terms of empirically examining the positive side of technostress, especially related to PSM-enabled productivity and PSM invasion, to which this study contributed. Prior research (Brooks, 2015; Brooks and Califf, 2017; Maier *et al.*, 2015) has explored personal social media usage in a work

context and the relation to performance and productivity, but the literature is lacking on the evidence regarding PSM, which this study aimed to add. One of the strengths of this study is also that we were able to measure PSM-enabled productivity longitudinally prior to and during the COVID-19 pandemic. Our longitudinal results are strong and generalizable, and the main investigated effects were equally strong in the pre-pandemic era, and these are contributing to the current literature.

Our study revealed that PSM invasion has positive outcomes—i.e. PSM-enabled productivity, contrary to our [hypothesis 1](#). This finding seems to also deviate significantly from the prior technostress literature, which has underlined the negative role of PSM invasion (e.g. [Fischer and Riedl, 2017](#); [Maier et al., 2015](#); [Tarafdar et al., 2015](#)). The positive side of technostress has indeed received very little attention ([Califf et al., 2020](#); [Fischer and Riedl, 2017](#); [Tarafdar et al., 2019](#)), especially in a work life context. There are only a few studies on the positive aspects of PSM invasion in private life (e.g. [van Zoonen and Banghart, 2018](#); [van Zoonen et al., 2016b](#)). In this way, we offer one answer to the calls for empirically exploring the positive side of technostress ([Srivastava et al., 2015](#); [Tarafdar et al., 2019](#)) by detailing the complexity of both positive and negative outcomes in the context of PSM invasion.

Our results provide further evidence with a strong longitudinal and nationally representative dataset that technostress and social media invasion in the work life context have a positive side despite the global COVID-19 pandemic. Hence, the study introduces the need for researchers to focus on employees' mixed psychological and behavioral responses in relation to PSM invasion. Our findings support the prior research on the positive relationship between social media use to psychologically detach from pandemic stress and enhanced psychological well-being ([Mäntymäki and Riemer, 2016](#)). However, the social media use as coping strategy against COVID-19 stressors can induce social networking site exhaustion and, in turn, reduce the use ([Islam et al., 2022](#)).

To further extend prior technostress research in the work life context, we utilized longitudinal data and found that the effects of social media invasion persist over time. Hence, we address researchers' calls for longitudinal technostress studies that can explore the potentially long-lasting consequences of techno-stressors' ([Fischer and Riedl, 2017](#); [Tarafdar et al., 2015](#)) by uncovering that social media invasion at a given point in time explained PSM-enabled productivity at other time points. Such findings about the longevity of the invasion's positive effects imply that work-related techno-stressors may be even more influential than previously thought.

We also investigated the previously less studied association of work engagement and PSM-enabled productivity indicating a positive within-person and between-person relationship between the two. Recent studies imply that social media usage for work purposes can enhance employees' engagement in work ([Oksa et al., 2020, 2021](#)). Furthermore, studies on work engagement suggest that engaged employees are satisfied with their work (e.g. [Schaufeli et al., 2002](#)), and work engagement has also been linked to enhanced work productivity ([Bakker and Bal, 2010](#); [Christian et al., 2011](#); [Hakanen and Koivumäki, 2014](#); [Halbesleben and Wheeler, 2008](#); [Harter et al., 2002](#); [Rich et al., 2010](#); [Shimazu et al., 2018](#)). Our results enforce these prior findings and contribute by showing this positive relationship in the PSM context. The findings also demonstrate that the increasing relationship between work engagement and PSM-enabled productivity persists over time, i.e. there were no statistically significant differences on the effects of work engagement between the time points.

Moreover, the relationship between work engagement and PSM-enabled productivity can be explained by employees' opportunities for autonomously used social media, irrespective of time and space. Thus, our findings also provide opposing evidence to prior studies ([van Zoonen and Banghart, 2018](#)) regarding technology-enabled boundary management conflicts between work and private lives. These opposing findings may result from the investigation

of different work technologies since social media notably differs from traditional work systems due to its ubiquitous characteristics.

Notably, our findings also demonstrate that work exhaustion is not associated with lower PSM-enabled productivity. The results provide contradicting evidence to the current technostress literature, which proposes that the invasive nature of technology is a core element merely creating negative technostress and outcomes such as work exhaustion which, in turn, can lower work productivity (Maier *et al.*, 2015; Tarafdar *et al.*, 2007, 2015). However, there are studies indicating only weak or no significant negative relationships between work exhaustion and productivity (Demerouti and Cropanzano, 2010; Hakanen and Koivumäki, 2014). Hence, our results support these findings and provide new insights to this relationship in PSM context.

This finding is also outstanding considering the mental burden of COVID-19 and changed working conditions for workers around the globe, which have raised concerns on how to maintain employees' well-being and how to support them in mitigating stress (Fieseler *et al.*, 2014; Spagnoli *et al.*, 2020). After all, increased technology and social media use has induced technostress during COVID-19 (Camacho and Barrios, 2022; Oksanen *et al.*, 2021), but has also been regarded as a tool for maintaining work performance (Saleem *et al.*, 2021) and well-being (Mäntymäki and Riemer, 2016; Oksa *et al.*, 2021).

6.2 Practical implications

Our findings provide implications for practice and work life. The results are very timely and significant considering the current outbreak of COVID-19 and increased use of technology and social media for work purposes from home, which can blur the boundaries of private and work life. Although PSM invasion can cause negative psychological consequences such as strain and exhaustion for employees, our results showed that PSM invasion can improve employees' PSM-enabled productivity. This PSM-enabled productivity means that employees feel that social media can enable them to accomplish more work than would otherwise be possible. This could be because information is easily available, collaboration is effortless between colleagues and stakeholders and work can be completed flexibly wherever and whenever. Hence, in work life it is important to acknowledge the positive side of PSM invasion and that it can boost employees' feelings of working productively.

The possibility of managing the boundaries of work and private life and effectively combine the two can empower employees' performance. For practitioners, it is important to recognize that PSM use and invasion can be a significant positive factor for organizations and their working practices. Notably, the experience of PSM-enabled productivity is higher for employees engaged at work. As job resources have been demonstrated to foster work engagement (e.g. Demerouti *et al.*, 2001; Hakanen *et al.*, 2008a, b), it is important to promote job resources, such as autonomy and the possibility to participate in decision-making at workplaces. Both work-related and nonwork-related social media communication have been associated with enhanced work engagement (Oksa *et al.*, 2020, p. 201); therefore, encouraging social media use and having such communication within organizations is recommended.

7. Limitations and future work

This study is subject to certain limitations. First, we chose to focus on employees' perceptions and thus employed self-reported data. Although stress can also be studied with physiological measures, stress is considered a subjective phenomenon (Lazarus and Folkman, 1984), and similar research designs with self-reported data have been considered reliable for studying technostress (Ayyagari *et al.*, 2011; Maier *et al.*, 2015; Tarafdar *et al.*, 2015). In addition, a body of research has demonstrated that self-assessment is a valid method for measuring

productivity (Bortoluzzi *et al.*, 2018; Gardner *et al.*, 2016; Haynes, 2007). Furthermore, we ran standard analyses on data quality prior to the main analysis and did not find any major issues. Second, our findings reflect Finnish employees. There may be cultural differences regarding employees' experiences of social media invasion and the related factors. Therefore, cross-national investigation on social media invasion could be a potential arena for future research.

8. Conclusion

In conclusion, this nationwide longitudinal study has revealed that PSM invasion has a direct positive association with PSM-enabled productivity with within-person and between-person effects. The findings provide new insights for theory and practice because they highlight that PSM invasion is not only a negative factor but more a positive factor, as it can increase PSM-enabled productivity even in times of the COVID-19 pandemic. Furthermore, PSM-enabled productivity and work engagement were positively associated, indicating both within-person and between-person effects. These findings provide new and timely knowledge for research in technostress and employee well-being with practical implications. Hence, we suggest that PSM use related positive outcomes, in addition to the stress potential, should be recognized in work life and should be investigated further.

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Appendix
Key measures used in the study

Professional Social Media-Enabled Productivity

Social media helps me improve the quality of my work.
Social media helps me to accomplish more work than would otherwise be possible.
Social media helps me to perform my job better.
Response options range from 1 completely disagree to 7 completely agree.

Professional Social Media Invasion

Due to social media I need to be always in touch.
I feel my personal life is being invaded by social media.
I have to sacrifice my time to keep current on new social media developments.
Response options range from 1 completely disagree to 7 completely agree.

Utrecht Work Engagement Scale (UWES)

At my work, I feel bursting with energy.
At my job, I feel strong and vigorous.
I am enthusiastic about my job.
My job inspires me.
When I get up in the morning, I feel like going to work.
I feel happy when I am working intensely.
I am proud on the work I do.
I am immersed in my work.
I get carried away when I'm working.
Response options: Never [0], A few times a year or less [1], Once a month or less [2], A few times a month [3], One a week [4], A few times a week [5], Every day [6]

Work Exhaustion from Maslach Burnout Indicator (MBI-GS)

I feel emotionally drained from my work.
I feel used up at the end of the workday.
I feel tired when I get up in the morning and have to face another day on the job.
Working all day is really a strain for me.
I feel burned out from my work.
Response options: Never [0], A few times a year or less [1], Once a month or less [2], A few times a month [3], One a week [4], A few times a week [5], Every day [6]

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