

Productivity Boost – Five-Wave Longitudinal Study on Social Media Invasion Before and During COVID-19

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Abstract

The balance between work and private life has become vague due to the use of social media and flexible working conditions. The study drew from technostress and wellbeing literature and examined the behavioral and psychological outcomes of professional social media invasion, the perception that work-related social media usage interferes with one's private life. Nationally representative five-wave survey data of Finnish employees (n = 840) were analyzed with hybrid liner regression analysis. Results showed an increase of social media-enabled productivity during the COVID-19 pandemic in Spring 2020 – Spring 2021. Professional social media invasion was associated with both within-person and between person effects on social media-enabled productivity. Additionally, work engagement was associated with within-person and between person effects. Higher educated and individuals with open personality reported higher social media-enabled productivity. We challenge the dominant view that professional social media invasion is solely a negative factor. Instead, perceived social media-enabled productivity should be recognized in organizations.

Introduction

Digital collaborative tools, such as social media platforms, have been increasingly used for professional purposes already prior COVID-19 and further accelerated in 2020's [1]-[4]. Thus, the omnipresent tools such as Microsoft Teams and Zoom have been surreptitiously conquering employees' private lives for some time [5]-[6]. Professional social media usage refers to the use of social media platforms for work purposes such as for professional social networking [7]-[8] and discussing, following, producing, or sharing content related to work or the organization [7] and providing possibility to work collaboratively and have online meetings regardless of location [9]. This can occur through public social media services, such as Facebook and LinkedIn, or organizations' internal social media platforms, such as Workplace from Facebook and MS Teams.

Studies suggest that professional social media usage facilitates enhanced working practices, such as improved communication possibilities, information access, and sharing [4],[10]-[11]. Moreover, social media provides good opportunities for task-oriented and relationship-building behaviors, innovative team collaboration, organizational identification, and transparency [12]-[14]. 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 [4],[14]-[16].

Besides the above-mentioned positive impacts of new technologies at work, the use of technologies at work can trigger stress (i.e., technostress) and related negative consequences [17]. Two particularly important concepts in terms of technostress are techno-stressors and strain [17]-[18]. In line with the transactional view of stress [19], techno-stressors refer to the stress creators as demand conditions that form within the interactions between the individual and the technology. Strain refers to an individual's negative psychological, physiological and/or behavioral response in relation to the techno-stressors [20]-[21]. Furthermore, strain is associated with various behavioral outcomes, such as reduced work

productivity [22]-[24] and declined organizational commitment [17],[25]. Altogether, technostress emerges when the techno-stressors exceed an individual's resources for managing them, resulting in strain and other potential negative outcomes [18]. Furthermore, a techno-stressor labeled technology invasion (i.e., technology use constantly invading one's life) is one of the core elements creating technostress [25]-[26] and has been positively associated with strain [21],[26]-[27].

Technology and social media specifically, along with work tasks, is more frequently following employees from workplaces to their homes, therefore invading employees' private lives [6],[18],[28]-[29]. Social media 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 [28],[30]-[31]. Excessive amounts and unpredictable work can be received through digital means [15],[17], in addition to communication, information, and social overload [32]. Social media can increase cognitive preoccupation, which can restrict employees to combine work with their personal and family life [1],[33]. Furthermore, studies on remote workers have demonstrated that technostress and especially technology invasion are associated with work-family conflicts [27]-[28],[34]. Consequently, the inability to draw boundaries between private and work life, thus constantly being available for work purposes via social media, can cause negative psychological outcomes for individuals, such as concentration problems, strain, exhaustion, and burnout [1],[30]-[31].

Previous research has repeatedly found that invasion and other techno-stressors are negatively associated with technology-enabled productivity and performance at work [22],[25],[35]. Excessive social media use can stimulate technology-work conflicts and strain, which can reduce job performance [1]. When work can be always accessed, it can lead to social media exhaustion, resulting in decreased job performance [32]. These demands can erode the same resources that employees designate and use for other work tasks.

Job resources are positive psychological, physical, social, and organizational characteristics of work that are essential drivers of work engagement, for example, task variety and autonomy [36]-[38]. Work engagement is defined as a rewarding, comprehensive, and long-lasting affective-cognitive work-related state of mind [38]-[39]. 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) [38],[39]. Notably, social media usage can foster employees' engagement with their work [14],[40],[41]. When employees experience work engagement, they are more likely to be proactive at work [37]. There are also studies regarding the association of work engagement, work productivity, and performance in different work contexts, such as among dentists [42] and teachers [43].

Burnout is an opposite concept to work engagement, also consisting of three dimensions: exhaustion (personal fatigue), cynicism (e.g., distance attitude toward work), and reduced professional efficacy (social and nonsocial work accomplishments) [44]. Job demands are work-related elements that require constant psychological or physical effort from employees, which can decrease work engagement and lead to strain, exhaustion, and burnout [36],[38],[45]. Increased job demands can diminish employees' job

resources and work engagement consequently, but sufficient resources can buffer strain and burnout [45]. Therefore, employees may have challenges balancing job demands, such as time management issues, increased workload, and cognitive burden due to social media [1],[15],[30], thus having fewer resources to keep them engaged at work. Strain can decrease work engagement and, in turn, lead to lower productivity [22]-[24].

Technology is easily invasive and thus, understanding technostress factors such as technology invasion as phenomena more thoroughly is crucial since they have rooted in workplace context [22],[46]-[47] and have raised concerns on how to lead employees' wellbeing and support in mitigating stress [48]. Moreover, prior studies indicate that technostress can potentially have severe consequences for organizations' bottom line, such as increased absenteeism and burnout, performance and productivity issues, weaker job satisfaction and commitment and higher intentions to leave, which should gain managerial attention [26],[49].

This article draws from technostress literature by focusing specifically on the concept of technology invasion [17],[26]. In addition, the study combines theories of work engagement, burnout and job demands and job resources [36],[38],[45]. In the context of this study, social media invasion is defined as the invasive effect of social media in work-related situations, where employees can be reached anytime and feel the need to be constantly connected, thus blurring boundaries between professional and personal contexts. This study extends the existing technostress research by longitudinally examining work-related social media invasion and its twofold well-being implications and social media-enabled productivity from technostress perspective, which have been previously unaddressed. We examine work-related social media invasion with longitudinal survey data from five time points collected half a year apart from one another. We propose the following hypotheses:

Hypothesis 1: Less social media invasion predicts high perceived social media-enabled productivity.

Hypothesis 2: High work exhaustion predicts low perceived social media-enabled productivity.

Hypothesis 3: High work engagement predicts high perceived social media-enabled productivity.

Results

Descriptive results showed an increase of social media-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). Main models showed a strong within-person effect of social media invasion on social media-enabled productivity ($B = 0.38$; $P < 0.001$). This effect indicates that over-time changes in social media invasion are associated with over-time changes in social media-enabled productivity. Also between-person effect of social media invasion was statistically significant indicating that those individuals who were invaded also reported higher social media-enabled productivity compared to those who were not ($B = 0.56$; $P < 0.001$).

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 social media-enabled productivity. Higher educated people ($B = 0.89$, $P = 0.003$) and individuals with open personality ($B = 0.08$; $P = 0.022$) reported higher social media-enabled productivity than others. Industrial sector workers ($B = -0.57$; $P = 0.015$) and conscientious individuals ($B = -0.11$; $P = 0.011$) reported lower social media-enabled productivity than others.

Discussion

The aim of this study was to investigate the effects of social media invasion in a work context with a nationwide longitudinal study with five data sets. The current study had threefold aims. Firstly, this is one of the first studies [50] to investigate professional social media invasion as a techno-stressor, considering both positive and negative aspects. Prior research [30],[51]-[52] has explored personal social media usage in work context, but the literature is lacking on the evidence regarding professional social media used specifically for work-related matters, which this study aims to add. Secondly, although there are recent articles on holistic technostress [26],[53], the current technostress literature is limited in terms of empirically examining the positive side of technostress, especially related to social media-enabled productivity, in which this study aimed to contribute. Third, we also extended the prior literature by investigating the relationship of social media-related technostress to wellbeing and work engagement both from psychological and behavioral viewpoints.

Our findings did not support the first hypothesis that less social media invasion predicts high perceived social media-enabled productivity (H1). On the contrary, we found within-person effect indicating that increase in social media invasion leads to social media-enabled productivity. Besides this, we also found between-person effect showing that invaded workers reported that social media enhances their work quality and performance and helps them accomplish more work than otherwise would be possible. Our findings did not support the second hypothesis either that work exhaustion predicts lower social media enabled productivity (H2). We did find support for the third hypothesis confirming that high work engagement predicts high perceived social media-enabled productivity (H3). Moreover, we found out that work engagement had both within-person and between person effects indicating that over time changes in work engagement are associated with increase of social media-enabled productivity, and individuals reporting higher work engagement have higher social media-enabled productivity. This denotes that work engaged employees have resources and energy to perform well in their work.

Previous studies on technostress have underlined the negative role of social media invasion [21],[26],[30], but our results rather indicated positive outcomes. In this way, we offer one answer to the calls for exploring the positive side of technostress [26], which has received very little attention [47],[53]-[55], especially in working life context. A positive relationship between techno-overload and productivity in the context of work-related mobile phone users has been found [56], and there are only a few studies on the positive aspects of professional social media invasion to private life [41],[57]. However, our results provide further evidence with strong longitudinal and nationally representative dataset that technostress

and professional social media invasion in working life context has a positive side even despite the global COVID-19 pandemic.

Our study brought new findings and perspective as to our best knowledge, no technostress research has been conducted regarding the relationship between professional social media invasion and social media-enabled productivity with longitudinal nationally representative data sample. As this is a novel finding, it extends the current technostress literature, which proposes that technology invasion is a core element merely creating negative technostress and outcomes [22],[30]. Our findings indicate that work-related social media invasion can help combine work and private life, which contributes to wellbeing at work literature [58]-[59]. As suggested by prior research, this positive aspect of social media invasion may be explained by employees' ability to manage and combine the work and private boundaries effectively [7],[29],[57]. Hence, our study introduces a need for researchers to focus on employees' mixed psychological and behavioral responses in relation to work-related social media invasion.

To further extend prior technostress research in working life context, we utilized longitudinal data and found that the effects of professional social media invasion persist over time. Hence, we address researchers' calls for longitudinal technostress studies that can explore techno-stressors' potential long-lasting consequences [21]-[22] by uncovering that professional social media invasion at a given point in time explained social media-enabled productivity in another times points. Such findings about the longevity of the invasion's effects imply that work-related techno-stressors may be even more influential than previously thought.

We investigated the previously less-studied association of work engagement and social media-enabled productivity indicating a positive relationship between the two. Although social media invasion has not been studied in relation to social media-enabled productivity, recent studies imply that social media usage for work purposes can enhance employees' engagement in the work [14],[40]. Furthermore, studies on work engagement suggest that engaged employees are satisfied with their work [39], and work engagement has also been linked to enhanced work productivity [42],[43]. Our results are enforcing these prior findings. Moreover, the relationship between work engagement and social media-enabled productivity can be explained by the possibility for employees to decide themselves when and where they engage with their work. Our findings, thus, provide also opposing evidence to prior studies [18] 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.

Our findings provide implications for practice and work life. The results are also very timely 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 social media invasion can cause negative psychological consequences such as strain for employees, our results provided no support for it, but showed that invasion can improve employees' perceived work productivity. This social media-enabled productivity means that employees feel 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. Additionally, possibility to manage the boundaries of work and private life and effectively combine the two can empower employees to perform better. Moreover, social media use can enhance the quality of employees' work and enable them to perform their jobs better [25]. For practitioners is important to acknowledge that professional social media invasion can be a significant positive factor for organizations and their working practices. Notably, the experience of social media-enabled productivity is higher for employees engaged at work. As job resources have been demonstrated to foster work engagement [36],[37], it is important to promote job resources, such as autonomy and the possibility to participate in decision-making at workplaces.

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 [19], and similar research designs with self-reported data have been considered reliable for studying technostress [18],[22],[30]. In addition, a body of research has demonstrated that self-assessment is a valid method for measuring productivity [60]-[61]. Furthermore, we run standard analysis on data quality prior the 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.

In conclusion, this nationwide longitudinal study revealed that work-related social media invasion has a direct positive association with perceived social media-enabled productivity with within-person and between-person effects. The findings provide new insights for theory and practice because they highlight that professional social media invasion is not only a negative factor but more a positive factor, as it can increase social media-enabled productivity. These findings provide new and timely knowledge to the technostress, wellbeing and organizational research and practical implications, and we suggest that professional social media usage related positive outcomes, in addition to stress potential, should be recognized in working life and management and leadership practices and further investigated.

Method

Participants and Procedure

To examine the relationships of social media invasion with strain and social media-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 A) 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 respondents of all five surveys from respondents who were working during each time point.

Data collection was organized by Norstat, who was our collaborator in this research and who recruited the participants from their pool of volunteers. 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 points were conducted, and no major bias was recognized. The samples closely resembled the Finnish working population regarding age, gender, most populated areas, and educational level. Additionally, the participants were from different occupational fields [40],[62].

The survey aimed to discover the usage of social media for professional purposes and the factors related to technostress, specifically social media invasion, work exhaustion and work engagement. Participation in the study was voluntary. Informed consent was obtained from all respondents in the beginning of the survey. Participants were informed of the study aims and advised of their right to withdraw from the study during data collection. The Academic Ethics Committee of Tampere region in Finland granted research approval (no. 90/2018) and the data collection and all procedures were performed in accordance with relevant guidelines and regulations.

Measures

Social media-enabled productivity. The social media-enabled productivity scale was adjusted from the technology-enabled productivity scale [25] and was measured with 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 (1 = *strongly disagree* and 7 = *strongly agree*). The scale showed excellent internal consistency based on McDonald’s omega (T1: $\omega = .95$, T2: $\omega = .95$, T3: $\omega = .95$, T4: $\omega = .95$, T5: $\omega = .95$). The descriptive statistics of the control variables are provided in Table 1.

Social media invasion. The social media invasion scale was adjusted from the technology invasion scale [17] and was measured with the following three statements: “I have to be always 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 (1 = *strongly disagree* and 7 = *strongly agree*). The internal consistency of the scale was good at all time points (T1: $\omega = .82$, T2: $\omega = .84$, T3: $\omega = .86$, T4: $\omega = .86$, T5: $\omega = .85$).

Work exhaustion. Five statements from the Maslach Burnout Inventory [63] 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 0–30 with higher scores indicating higher work exhaustion. The internal consistency of the scale was excellent at all time points (T1: $\omega = .93$, T2: $\omega = .93$, T3: $\omega = .92$, T4: $\omega = .93$, T5: $\omega = .93$).

Work engagement. Commonly, work engagement is measured with the Utrecht Work Engagement Scale (UWES) [39],[64]. In this study, work engagement was measured with the Finnish nine-item version of the UWES [65]. This scale measured all three dimensions of work engagement, that is, 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 that has a range of 0–54. Higher score indicated higher work engagement. The internal consistency of the scale was excellent at all time points (T1: $\omega = .96$, T2: $\omega = .96$, T3: $\omega = .96$, T4: $\omega = .96$, T5: $\omega = .96$).

Control variables. The sociodemographic and work-related variables included age, gender, education, occupational sector, managerial position, remote work, and personality. Education was categorized into dummy indicating those with MA degree from university or higher. Occupational sector was categorized into those working with 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 whether participants acted in managerial position. We also used the 15-item Big Five Inventory for personality [66]. 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: $\omega = .70$, conscientiousness $\omega = .70$, agreeableness: $\omega = .60$, neuroticism: $\omega = .71$) to good (extroversion: $\omega = .88$).

Statistical Techniques

The main analyses were conducted using linear multilevel hybrid models that allow the estimation of the within-person effect of time-variant variables while considering the between-person effects simultaneously. Hybrid models combine the strengths of random-effects and fixed-effects approaches and solve their shortcomings [67]-[68]. Models were run with xthybrid command in Stata 16.1 [68]. In our models, all main time-varying variables had both within-person and between-person effects. Within-person effects show how changes over time in predictors are associated with the change in the outcome variable, social-media enabled productivity. Between-person variables show group differences between individuals. The models also included a number of between-person control variables. A dummy variable for COVID-19 time (T3–T5) was included in the model.

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Tables

Table 1. *Descriptive statistics of main study variables*

Outcome variable	Range	T1, mean (SD)	T2, mean (SD)	T3, mean (SD)	T4, mean (SD)	T5, mean (SD)
Social media -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)
Social media 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 2 *Hybrid models showing within-person and between-person effects on social media-enabled productivity.*

Within-person variables	B	Robust SE (B)	95 %	CI	P
Invasion	0.38	0.03	0.32	0.44	0.000
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
Between-person variables					
Invasion	0.56	0.04	0.47	0.64	0.000
Work engagement	0.07	0.01	0.04	0.10	0.000
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
Controls					
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

Supplementary

Appendix A is not available with this version