Social Support as Technostress Inhibitor:

Even More Important During the COVID-19 Pandemic?

Abstract

Due to ongoing digitalization and the social distancing measures that came along with the COVID-19 pandemic, the working conditions and environments have changed for many individuals. Because of increased telework, the use of digital technologies for communicating and collaborating at work has been intensified which can cause technostress. With longitudinal data from two surveys – one before and one during the COVID-19 pandemic – the paper analyzes the relationship between four social support dimensions (supervisor support, co-worker support, sense of community at work, and family support) and technostress creators. The study shows that social support can be an effective inhibitor of technostress creators. However, social support dimensions have to be differentiated in that regard. Further, the results show that the inhibiting effect of family support has become even more important during the COVID-19 pandemic. The results contribute to technostress research and research with regard to the new normal of working after the pandemic.

Keywords: Technostress, Technostress Inhibitors, Social Support, Longitudinal Data, Structural Equation Modeling

1. Introduction

The COVID-19 pandemic has changed the working conditions for many people. Due to the social distancing measures in order to fight the pandemic, many employees were asked to engage in telework and work from home. In July 2020, one third of employees in the European Union worked entirely from home, almost 50 % at least partly (Ahrendt et al., 2020). This led to a higher amount of digital work and less contact with co-workers. On the other hand, contact with family members increased since many of them were working from home together.

One phenomenon that goes along with digital work is technostress, which refers to "stress that users experience as a result of their use of IS in the organizational context" (Tarafdar et al., 2015, p. 103). Technostress is associated with lower job satisfaction, productivity, and a higher risk of burnout (e.g., Day et al., 2012; Ragu-Nathan et al., 2008; Tu et al., 2008). To address such negative outcomes, literature on technostress has investigated potential mitigation strategies. While coping literature deals with behavioral, cognitive, and perceptional efforts of individuals (Weinert et al., 2020), literature on technostress inhibitors focuses on organizational or environmental mechanisms that reduce technostress creators or its negative consequences (Ragu-Nathan et al., 2008). Such inhibitors are, for example, the fostering of learning to deal with digital technologies, the provision of technical support, or the involvement of employees when launching new digital technologies (Ragu-Nathan et al., 2008).

However, organizational measures have been less available in times of the COVID-19 pandemic. Many companies, for example, introduced communication and collaboration tools almost over night in order to be able to stay connected. This extremely fast introduction of new digital technologies made it impossible for organizations to engage in adequate change management and to involve employees in the collection of the new digital technologies or provide extensive training before the change. Such organizational measures that have been found to inhibit technostress were less available during the COVID-19 pandemic. But, according to results from Ahrendt et al. (2020), the provision of help and social support from supervisors or co-workers did not change despite the increased digital work.

In psychology research, such social support has been considered as inhibitor of workplace stress (e.g., Barrera, 1986; Eisenberger et al., 2002; Sass et al., 2011). There are different sources of social support (e.g., supervisors, co-workers, family members) (Barrera, 1986). To the best of our knowledge, technostress research has not yet considered such variables as technostress inhibitors. Thus, we aim to understand whether social support can inhibit technostress and its importance during times of high telework and pose the following research questions:

RQ1: Are different dimensions of social support effective technostress inhibitors?

RQ2: Is social support as technostress inhibitor more important during the COVID-19 pandemic?

To answer these questions, we draw on literature from psychology on the effect of social support on work stress creators and outcomes and develop hypotheses on the association of different social support dimensions (supervisor support, co-worker support, sense of community at work, and family support) with technostress creators (techno-invasion, techno-overload, techno-complexity, techno-insecurity, and techno-uncertainty) as well as the changes in times of telework. We collect longitudinal empirical data on the constructs at two points of time (i.e., before and during the COVID-19 pandemic) and analyze the data by structural equation modeling and regression analysis with interaction effects.

The paper is structured as follows: Section 2 introduces the theoretical background on technostress literature, technostress inhibitors, and other stress mitigation constructs from psychology literature. Section 3 develops the hypotheses. Section 4 describes the study design and procedures and Section 5 displays the corresponding results. Section 6 discusses the results as well as the theoretical contribution and practical implications of the findings. Finally, Section 7 concludes the paper.

2. Theoretical Background

Studies on technostress can be traced back to the clinical psychologist Brod (1982), who coined the term and described the phenomenon as an individual's inability to deal with new technology in a healthy way, which leads to a stressful experience. In psychology literature, Lazarus and Folkman (1984, p. 19) define stress as a "particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being." For technostress, the demands result from the use of digital technologies. Technostress can be either framed as negative (also called techno-distress; i.e., digital technologies are appraised as a threat) but also as positive (also called techno-eustress; i.e., digital technologies are appraised as challenging or thrilling) (Tarafdar et al., 2019). However, in this paper, we only regard the negative side of technostress and the aim to minimize it.

Tarafdar et al. (2007) and Ragu-Nathan et al. (2008) have defined five technostress creators which, to date, are the most established and researched technostress creators in IS literature: techno-invasion, techno-overload, techno-complexity, techno-insecurity, and techno-uncertainty. Techno-invasion refers to the feeling of blurring boundaries between private and business lives and the need to be constantly

available. Techno-overload describes the feeling of having to work faster and longer. Techno-complexity is the feeling of having inadequate skills to deal with digital technologies. Techno-insecurity refers to the fear of losing ones job due to automation or a lack of skills for dealing with digital technologies. Lastly, techno-uncertainty describes the experience of constant changes and updates of digital technologies and the need for constant learning (Ragu-Nathan et al., 2008).

Since technostress has been found to have negative effects on individuals and organizations such as reduced job satisfaction, increased burnout, or lower organizational commitment (e.g., Day et al., 2012; Ragu-Nathan et al., 2008; Tarafdar et al., 2007), much research focuses on the mitigation of technostress. Thereby, literature can be divided into two streams: technostress inhibitors and coping. Technostress inhibitors refer to "organizational mechanisms that have the potential to reduce the effects of technostress" (Ragu-Nathan et al., 2008, p. 422). Coping, in contrast, focuses on the individual perspective and "investigates how users themselves aim to reduce technostress by deploying behavioral, cognitive, and perceptional efforts" (Weinert et al., 2020, p. 1203). In our study, we focus on mechanisms from the individual's environment and, thus, draw on literature of technostress inhibitors.

Several studies can be found that investigate the effect of technostress inhibitors (e.g., Day et al., 2012; Ragu-Nathan et al., 2008; Tarafdar et al., 2010). While some studies investigate the effect on technostress creators, some focus on the direct effect on technostress outcomes, and some analyze the moderating effect on the relationship of technostress creators and outcomes (Sarabadani et al., 2018). The most studied technostress inhibitors are three organizational mechanisms: literacy facilitation (i.e., promoting the sharing of knowledge on digital technologies), involvement facilitation (i.e., involving employees in the change process when introducing new digital technologies), and technical support provision (i.e., the provision of an adequate end-user support for problems with digital technologies). Tarafdar et al. (2015), for example, find them to be negatively associated with technostress creators. Direct negative effects on technostress creators have also been found by Tarafdar et al. (2010) (for involvement facilitation) and Tarafdar et al. (2011) (for involvement facilitation, technical support provision, and innovation support). For the direct effects on technostress outcomes, the three inhibitors and other inhibitors such as innovation support, stress management trainings, and job control have been found to have a positive effect on, for example, end-user satisfaction, job satisfaction, organizational

commitment, continuance commitment, and productivity (Ahmad et al., 2014; Fuglseth & Sørebø, 2014; Ragu-Nathan et al., 2008; Tarafdar et al., 2010; Tarafdar et al., 2011; Tu et al., 2008) and a negative effect on ICT stress, strain, or burnout (Day et al., 2012). Regarding the moderating effect of technostress inhibitors on the relationship between technostress creators and outcomes, Ahmad et al. (2014), for example, find technical support to moderate the relationship between techno-overload and organizational commitment. Other studies such as Ragu-Nathan et al. (2008), Tu et al. (2008), and Hung et al. (2011) do not find moderating effects of technostress inhibitors.

In psychology literature, different dimensions of social support and their relationship with different types of stress and strain have been researched (Barrera, 1986). One important dimension is perceived social support, that refers to the "perceived availability and adequacy of supportive ties" (Barrera, 1986, p. 416). Another dimension of social support is social embeddedness, which "refers to the connections that individuals have to significant others in their social environments" (Barrera, 1986, p. 415). There are many studies that investigate perceived social support and social embeddedness and their relationship with stress in the organizational context. Witt and Carlson (2006, p. 347), for example, investigated perceived organizational support and define it as "the employee's assessment of the extent to which the organization is 'on my side'." Organizational support (i.e., social support from various sources in the organization) has been found to be associated with increased satisfaction, job performance, and continuance commitment (Eisenberger et al., 1990; Patrick & Laschinger, 2006). More specific than organizational support in general, support for individuals at their workplaces can stem from different groups of people of an individual's environment: supervisors, colleagues, and family members (e.g., Mansour & Tremblay, 2016; Sass et al., 2011; Wolgast & Fischer, 2017).

According to Barrera (1986), social support can relate to stress and stress outcomes in different ways: by directly affecting the occurrence of stress events, perceived stress, or stress outcomes. This is along the lines with prior literature on technostress inhibitors (Sarabadani et al., 2018). Technostress literature has mostly neglected dimensions of social support and their possible consideration as technostress-inhibitors. To close this gap, we aim to transfer knowledge on social support and sense of community from psychology literature to the context of technostress and analyze their effect on technostress

creators. Thereby, we especially want to understand whether the importance of social support and sense of community has changed in times of high mobile and telework (i.e., during the COVID-19 pandemic).

3. Hypotheses Development

According to Lazarus and Folkman (1984), stress is the result of an interplay of environmental demands and the individual's resources. This is in line with related psychology theories like the conservation of resources theory (Hobfoll, 1989) or the job demands-resources model (Demerouti et al., 2001). Thereby, social support is considered as one important resource for inhibiting stress creators (Barrera, 1986).

We aim to understand the relationship of different dimensions of social support with technostress creators. Therefore, we investigate four dimensions of social support: supervisor support, co-worker support, sense of community at work, and family support. The first three of them refers to the "perceived social support" dimension and the last one refers to the "social embeddedness" dimension of Barrera (1986).

Supervisor support is the "degree to which supervisors value their [employees'] contributions and care about their well-being" (Eisenberger et al., 2002, p. 565). Sass et al. (2011) found supervisor support to be negatively associated with workload stressors and job dissatisfaction. Sosik and Godshalk's (2000) results show lower job stress of employees when their leaders engage in a mentoring function. Co-worker support refers to a "cooperative peer-level effort amongst employees to provide work-related assistance" (Jia et al., 2008, p. 307). Sass et al. (2011) as well as Wolgast and Fischer (2017) detected negative effects of co-worker support on job dissatisfaction and strain. McCarty et al. (2007) discovered a negative effect of camaraderie on work-related strain. Family support is defined as the "degree of […] support [from family members] employees perceive as directed at their roles as worker" (King et al., 1995, p. 236). Barnett et al. (2012) as well as Mansour and Tremblay (2016) found it to be negatively associated with job strain and Asbari et al. (2021) found a positive effect on job satisfaction. Lastly, sense of community refers to "the overall quality of social interaction at work" (Leiter & Maslach, 2003, p. 98). Cicognani et al. (2009) found a negative correlation between sense of community and burnout. In the same regard, Gascón et al. (2021) detected negative effects on burnout. They also found sense of community to negatively moderate the relationship between workload and cynicism and lack of job fulfillment (Gascón et al., 2021).

In line with these findings, we propose a negative relationship of social support (i.e., supervisor support, co-worker support, sense of community at work, and family support) with technostress creators. The reasons are as follows: Higher social support from supervisors, co-workers, and family members gives employees the feeling that they can expect help when having problems with digital technologies and, thus, feel less threatened in the first place. For supervisor support, for example, it is easier for an employee to talk to their supervisors about their fear of losing the job (i.e., techno-insecurity) if the supervisor is concerned with the employee's needs. Also, they can more easily take precautions in the task portfolio of the employee so that the feeling of having to much to do (i.e., techno-overload) will not occur.

To sum it up, we pose the following hypothesis:

> *H1: Social support dimensions (a) supervisor support, b) co-worker support, c) sense of community at work, and d) family support) are negatively related with technostress creators.*

The COVID-19 pandemic was a sudden shock for the whole world in general and the working environments in specific. Psychology literature suggests that in such situations of crises, social support can be effective to reduce negative outcomes and promote positive adaptation to the new situation (Saltzman et al., 2020). During the COVID-19 pandemic, many employees were forced to telework and work from home. Thus, their working environment and the availability of organizational resources changed rapidly. But this was also the fact for the employees that still worked in their organization's office. Whereas, before the pandemic, many employees worked in the organization's office and were surrounded by their co-workers and supervisors, individuals now worked from home or in much less frequented offices. Since many organizations were not used to communicating and collaborating remotely, new digital tools such as Zoom or Microsoft Teams were introduced almost overnigt to be able to stay in contact with co-workers and supervisors. (Ben-Zvi & Luftman, 2021). These rapid introductions of new digital technologies made extensive change management impossible. Whereas normally, organizations would involve their employees in the selection of new digital technologies and provide extensive training to learn dealing with the new technologies, this was not possible because of the immediate changes that were necessary. Also, the accessability of the IT helpdesk was more difficult because it was not possible anymore

to visit the respective office of the IT co-workers that would help employees with their IT problems. Thus, the traditional technostress inhibitors such as involvement facilitation, literacy facilitation, and technology support provision were were less available. Therefore, not only demands changed but employees had to adapt to the new environmental conditions and find effective and available sources of support. Thus, we hypothesize:

> *H2: The negative relationship between social support and technostress creators is stronger during the COVID-19 pandemic.*

4. Study Design and Procedures

To test our hypotheses empirically, we conducted a longitudinal online survey and measured all constructs from the research model in the questionnaire at two points of time from the same participants at each point of time. For technostress creators, we used the items from Ragu-Nathan et al. (2008). For supervisor support and family support, we built on the scale by Graen and Uhl-Bien (1995). Items for co-worker support and sense of community at work were collected from Burr et al. (2019). Where possible, we used validated German translations of the items. For all other items, we translated the English versions to German. Appendix A provides an overview of all items.

We recruited participants via a German panel provider. Respondents were paid a small compensation for their participation. The first survey was conducted in March 2019 (T1). In December 2020, during the second lockdown in Germany, we surveyed the same participants for the second time (T2).

5. Results

637 participants completed the survey in both iterations. Of the respondents, 41.1 % were female and 58.9 % were male. On average, respondents were 47 years old at the first time of participation.

Our analysis strategy was threefold: First, we conducted paired t-tests in order to compare the variables at the two points in time (T1 and T2). Second, we assessed two structural equation models at the two points of time through covariance-based structural equation modeling (CB-SEM). Each of the models consisted of the five technostress creators as dependent variables and the four social support dimensions

as independent variables. Each technostress creator was explained by each social support dimension. We started with an evaluation of the measurement models and proceeded by assessing the structural models and testing our first hypothesis. Third and last, we conducted clustered regression analyses to test whether changes in paths between the two points of time were significant and to test our second hypothesis.

5.1 Comparison of Variables for T1 and T2

We started with a mean comparison of our variables at both points of time and conducted paired t-tests to test whether mean differences were statistically significant. Table 1 shows the results. Only techno-invasion, techno-uncertainty, and family support showed significant differences between T1 and T2. Techno-invasion has become higher during the COVID-19 pandemic, techno-uncertainty and family support have decreased. The other technostress creators and social support dimensions did not change significantly.

Construct	Mean T1	Mean T2	Difference (T2 – T1)	sig. of paired t-test
Techno-Invasion	0.902	1.021	0.119	**
Techno-Overload	1.429	1.389	-0.040	
Techno-Complexity	1.063	1.130	0.067	
Techno-Insecurity	1.726	1.467	-0.258	***
Techno-Uncertainty	1.042	0.977	-0.066	
Supervisor Support	2.433	2.390	-0.042	
Co-Worker Support	2.427	2.464	0.037	
Sense of Community	2.925	2.948	0.023	
Family Support	2.838	2.728	-0.110	***

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 1: Results of Paired t-tests

5.2 Assessment of the Measurement Models at T1 and T2

Next, we used CB-SEM to assess the two models at T1 and T2 and started with an evaluation of the measurement models. For the reliability assessment, we used Cronbach's Alpha. All scales' values for Cronbach's Alpha exceeded the threshold of 0.708 with a minimum of 0.810, which indicates internal consistency reliability (Nunnally & Bernstein, 1994). Also, convergent validity is satisfactory as the minimum of all indicators' outer loadings is 0.623 and the minimum average variance extracted (AVE)

is 0.581. For discriminant validity, we examined whether each construct's square root of the AVE was higher than the highest correlation with other constructs (Fornell-Larcker criterion). The data met this criterion. Thus, discriminant validity was supported for both models. Table 1 and Table 2 show means, standard deviations (SD), loadings, Cronbach's Alpha (Alpha) values as well as the AVE values for all constructs at T1 and T2. Information on the Fornell-Larcker criterion can be found in Appendix B.

Construct	# Items	Mean	SD	Loadings	Alpha	AVE
Techno-Invasion	3	0.902	1.213	0.633-0.891	0.815	0.612
Techno-Overload	4	1.429	1.305	0.710-0.892	0.896	0.693
Techno-Complexity	5	1.063	1.166	0.770-0.883	0.912	0.680
Techno-Insecurity	5	1.726	1.197	0.694-0.825	0.871	0.581
Techno-Uncertainty	5	1.042	1.238	0.756-0.875	0.875	0.639
Supervisor Support	6	2.433	1.186	0.720-0.899	0.933	0.706
Co-Worker Support	4	2.499	1.186	0.800-0.852	0.810	0.681
Sense of Community	2	2.925	0.844	0.901-0.909	0.901	0.820
Family Support	5	2.838	1.059	0.623-0.882	0.879	0.604

Table 1: Descriptive Statistics, Main Factor Loadings, Cronbach's Alpha, and AVE at T1

Construct	# Items	Mean	SD	Loadings	Alpha	AVE
Techno-Invasion	3	1.021	1.214	0.659-0.870	0.813	0.605
Techno-Overload	4	1.389	1.252	0.771-0.893	0.915	0.729
Techno-Complexity	5	1.130	1.169	0.755-0.886	0.922	0.705
Techno-Insecurity	5	0.977	1.134	0.709-0.850	0.887	0.618
Techno-Uncertainty	5	1.467	1.205	0.783-0.921	0.906	0.717
Supervisor Support	6	2.390	1.194	0.761-0.904	0.939	0.726
Co-Worker Support	4	2.521	1.003	0.810-0.887	0.836	0.720
Sense of Community	2	2.948	0.838	0.909-0.915	0.908	0.832
Family Support	5	2.728	1.073	0.758-0.886	0.901	0.647

Table 2: Descriptive Statistics, Main Factor Loadings, Cronbach's Alpha, and AVE at T2

5.3 Assessment of Structural Models at T1 and T2

We proceeded with the assessment of the structural models. Table 1 displays several fit-indices that we used to asses the models' fit. Almost all indices comply with the respective thresholds indicating satisfactory model fit for both models.

Fit Measures		Threshold	Source of Threshold	Model T1	Model T2
Global measures	RMSEA	< 0.06	Lei and Wu (2007)	0.054 ✓	0.061 X
	SRMR	< 0.05	Gefen et al. (2000)	0.049 ✓	0.050 ✓
Incremental measures	NFI	> 0.90	Gefen et al. (2000)	0.903 ✓	0.900 ✓
	TLI	> 0.90	Gefen et al. (2000)	0.927 ✓	0.918 ✓
	CFI	> 0.90	Gefen et al. (2000)	0.936 ✓	0.927 ✓
Parsimony	AGFI	> 0.80	Gefen et al. (2000)	0.835 ✓	0.802 ✓

Note: Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Normed Fit Index (NFI), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Adjusted Goodness of Fit Index (AGFI)
✓ indicates that a threshold is met, X indicates that it is not met.

Table 1: Fit Indices for the Research Models at T1 and T2

After the evaluation of the models' fit, we tested our hypothesis about the relationship of social support with technostress creators. Table 2 presents the path estimates for both models as wells as their significance level.

Relationship	Model T1		Model T2	
	Estimate	sig.	Estimate	sig.
Supervisor Support → Techno-Invasion	0.117	*	0.112	*
Supervisor Support → Techno-Overload	-0.035		-0.054	
Supervisor Support → Techno-Complexity	-0.007		-0.018	
Supervisor Support → Techno-Insecurity	0.107	*	-0.029	
Supervisor Support → Techno-Uncertainty	0121	*	-0.026	
Co-Worker Support → Techno-Invasion	-0.100		0.101	
Co-Worker Support → Techno-Overload	-0.044		0.122	
Co-Worker Support → Techno-Complexity	0.006		0.092	
Co-Worker Support → Techno-Insecurity	-0.114		0.172	**
Co-Worker Support → Techno-Uncertainty	-0.060		0.126	
Sense of Community at Work → Techno-Invasion	-0.374	***	-0.303	***
Sense of Community at Work → Techno-Overload	-0.276	***	-0.320	***
Sense of Community at Work → Techno-Complexity	-0.335	***	-0.290	***
Sense of Community at Work → Techno-Insecurity	-0.291	***	-0.434	***
Sense of Community at Work → Techno-Uncertainty	-0.113		-0.138	*
Family Support → Techno-Invasion	0.062		-0.229	***
Family Support → Techno-Overload	0.030		-0.123	**
Family Support → Techno-Complexity	-0.032		-0.174	***
Family Support → Techno-Insecurity	0.012		-0.154	***
Family Support → Techno-Uncertainty	0.093		-0.092	

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 2: Results of Structural Models

The results show differences between the social support dimensions. Supervisor support is significantly related with techno-invasion, techno-insecurity, and techno-uncertainty in T1 and with techno-invasion in T2. However, the relationship is positive and not negative as expected. For co-worker support, we only find one significant relation with techno-insecurity in T2. Again, it is positive other than hypothesized. Sense of community at work is negatively associated as expected with all technostress creators at both points of time except for techno-uncertainty in T1. Family support has a negative effect on techno-invasion, techno-overload, techno-complexity, and techno-insecurity, but only in T2.

To sum it up, supervisor support and co-worker support are associated only with some of the technostress creators and the effect is positive, which means the two dimensions increase technostress creators. However, sense of community as well as family support can be effective measures to inhibit technostress creators as they are negatively related with technostress creators. Thus, we can partially support our first hypothesis.

5.4 Comparison of Relationships between T1 and T2

For the last step of our analysis, we tested whether there are significant changes in relationships between the two points of time in order to test our second hypothesis. Therefore, we conducted clustered regression analyses (accounting for repeated measures for each survey participant) of the interaction of each social support dimension with a binary time variable (T1 = 0, T2 = 1) on each technostress creator. We used factor scores from the prior SEM for the regression analysis. Table 1 presents the results. For purpose of readability, we only include the results for the interactions. The results for the direct effects can be seen in Appendix C.

Relationship	Clustered Std. Error	Estimate	sig.
Supervisor Support x Time → Techno-Invasion	0.055	-0.011	
Supervisor Support x Time → Techno-Overload	0.065	-0.003	
Supervisor Support x Time → Techno-Complexity	0.061	-0.014	
Supervisor Support x Time → Techno-Insecurity	0.053	-0.097	
Supervisor Support x Time → Techno-Uncertainty	0.064	-0.111	
Co-Worker Support x Time → Techno-Invasion	0.067	0.160	*
Co-Worker Support x Time → Techno-Overload	0.074	0.142	
Co-Worker Support x Time → Techno-Complexity	0.066	0.069	
Co-Worker Support x Time → Techno-Insecurity	0.062	0.209	***
Co-Worker Support x Time → Techno-Uncertainty	0.071	0.144	*
Sense of Community at Work x Time → Techno-Invasion	0.080	0.091	
Sense of Community at Work x Time → Techno-Overload	0.092	-0.028	
Sense of Community at Work x Time → Techno-Complexity	0.080	0.063	
Sense of Community at Work x Time → Techno-Insecurity	0.080	-0.108	
Sense of Community at Work x Time → Techno-Uncertainty	0.089	-0.029	
Family Support x Time → Techno-Invasion	0.066	-0.250	***
Family Support x Time → Techno-Overload	0.073	-0.182	*
Family Support x Time → Techno-Complexity	0.063	-0.133	*
Family Support x Time → Techno-Insecurity	0.061	-0.160	**
Family Support x Time → Techno-Uncertainty	0.067	-0.193	**

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 1: Results of the Interaction Analyses

Again, the results show differences between the social support dimensions. Supervisor support as well as sense of community did not significantly change. The relationship between co-worker support with techno-invasion, techno-insecurity, and techno-uncertainty has become more positive in T2. For family support, the effect has become more negative on all five technostress creators. Thus, family support has significantly become more important as technostress inhibitor in T2 in comparison to T1. This is in line with H2. Thus, we also find partial support for our second hypothesis.

6. Discussion

The presented research was motivated in two ways: First, technostress research has increasingly investigated possible mitigation of technostress via individual coping or organizational mechanisms. However, social support as technostress inhibitor has been mostly neglected so far even though it is an inhibitor of stress in general and our results show that it is also an inhibitor of technostress. Second, the COVID-19 pandemic has changed the working environment for many employees by increasing their amount of telework but also for employees that kept working in the organizations' offices. In this

changed environment, organizational measures such as technical support cannot take the same effect as during times of high physical presence in the organizational offices and, thus, individuals had to find other sources of support.

Our results shed light on the effect of social support to inhibit technostress. Thereby, it is important to notice that the amount of supervisor support, co-worker support as well as sense of community at work did not significantly change before and during the pandemic. Thus, the results are not influenced by the availability of each source of support but may be due to other changed conditions during the pandemic. Family support, however, has been slightly less available during the pandemic, which we do not consider as an explanation that family support has become more effective in T2.

We find that sense of community at work is an effective technostress inhibitor and is negatively associated with technostress creators before and during the pandemic. Supervisor support, however, cannot be confirmed as technostress inhibitor as it even increases techno-invasion, techno-insecurity, and techno-uncertainty. This is in contrast to prior findings on the effect of supervisor support on work stress (e.g., Sass et al., 2011). For techno-invasion, the reason might be that if an employee has a close relationship with his or her supervisor, they are more willing to be reachable during non-work hours when this appears important to the supervisor. For techno-insecurity and techno-uncertainty, the explanation for this positive relationship is less intuitive and needs further investigation. The same is the case for the discovered positive relationship between co-worker support and techno-insecurity during the pandemic. Apart from that relationship, co-worker support could not be found as technostress inhibitor.

Family support did become slightly lower during the pandemic. Yet, in this time period, it was important as a technostress inhibitor. While it did not have an effect before the pandemic, it significantly decreased technostress creators during the pandemic. This is one important finding indicating that employees found alternative sources of support during the pandemic and found this source in their own family members. Even though the availability of family support slightly decreased, it helps to inhibit technostress creators.

6.1 Theoretical Contribution

Our results contribute to literature in several ways: First, we extend literature on technostress inhibitors and transfer knowledge from psychology to technostress literature. We find that sense of community at work helps to inhibit technostress creators and that family support has the same effect in work settings with high amounts of telework. This adds to the previously highly investigated technostress inhibitors (literacy facilitation, involvement facilitation, and technical support provision) and may inspire research to further investigate the effects of social support on technostress creators and the relationship between technostress creators and strain. For future research, it is important to investigate whether different groups of employees (e.g., male vs. female employees) lean on different dimensions of social support.

Second, we find evidence that not all social support dimensions are related to technostress creators in the same direction. According to our results, supervisor support does not function as technostress inhibitor. Rather, it increases technostress. This is an important finding and shows that social support dimensions have to be differentiated. Future research should analyze the reasons for the differences between different social support dimensions.

Third, we find differing results between the technostress creators. Prior research often builds a higher-order construct of technostress creators (e.g., Ragu-Nathan et al., 2008) instead of investigating the relationship of the first-order constructs with, for example, antecedents and outcomes of technostress. We show the importance of differentiating the different technostress creators.

6.2 Practical Implications

Our results suggest different practical implications for organizations. Organizations must be aware of the fact that not only organizational mechanisms such as the provision of technical support or training with digital technologies can inhibit technostress but also more soft mechanisms such as the sense of community at work. However, building such a sense of community among the employees takes time and it is hard to influence it by one single measure but by numerous measures (such as trust-building or team-building measures).

Also, it is important for organizations as well as supervisors to notice that their behavior may imply too high expectations in terms of, for example, reachability during non-work hours on their employees when they have a good relationship. According to our results, such a behavior may increase technostress. Thus, supervisors have to challenge their behavior in that regard and actively communicate their expectations.

6.3 Limitations

Our study has several limitations. For answering the first hypothesis, we used data from two cross-sectional surveys which limits the possibility to find causal effects between social support and technostress creators. Even though the causal motivation for each relationship stems from theory and prior literature, future research should follow up with generating further data sets to test robustness and generalizability. Further, the COVID-19 pandemic has come along with a large variety of changes in the private and business environment of employees. Thus, it may be that the surveyed constructs in our study do not completely cover all these changes. Future research should further investigate these changes that have not been regarded in our study. Further research on social support in a high telework setting is also important in order to draw conclusions for the new normal of working after the COVID-19 pandemic. Repeating the study at one point of time after the pandemic could be a promising path towards this.

7. Conclusion

Digitalization as well as the COVID-19 pandemic have dramatically changed workplaces and working environments. The resulting technostress can be inhibited by different organizational mechanisms as well as support from an individual's environment. Our results give evidence that social support can be an effective technostress inhibitor and that it becomes even more important when the amount of telework is high. Even when the social distancing measures due to the COVID-19 pandemic will be terminated, many studies show that the new normal of working will include higher amounts of telework than before the COVID-19 pandemic. Thus, our results remain relevant even after the pandemic and may inspire research and organizations when preparing for the new normal of working.

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Appendix A – Measurement Items

Techno-Invasion (source: Ragu-Nathan et al., 2008)[1)]	
TIV01	I have to be in touch with my work even during my vacation due to this technology.
TIV02	I have to sacrifice my vacation and weekend time to keep current on new technologies.
TIV03	I feel my personal life is being invaded by this technology.
Techno-Overload (source: Ragu-Nathan et al., 2008)[1)]	
TO01	I am forced to change my work habits to adapt to new technologies.
TO02	I am forced by this technology to work with very tight time schedules.
TO03	I am forced to change my work habits to adapt to new technologies.
TO04	I have a higher workload because of increased technology complexity.
Techno-Complexity (source: Ragu-Nathan et al., 2008)[1)]	
TC01	I do not know enough about this technology to handle my job satisfactorily.
TC02	I need a long time to understand and use new technologies.
TC03	I do not find enough time to study and upgrade my technology skills.
TC04	I find new recruits to this organization know more about computer technology than I do.
TC05	I often find it too complex for me to understand and use new technologies.
Techno-Insecurity (source: Ragu-Nathan et al., 2008)[1)]	
TIS01	I feel constant threat to my job security due to new technologies.
TIS02	I have to constantly update my skills to avoid being replaced.
TIS03	I am threatened by coworkers with newer technology skills.
TIS04	I do not share my knowledge with my coworkers for fear of being replaced.
TIS05	I feel there is less sharing of knowledge among coworkers for fear of being replaced.
Techno-Uncertainty (source: Ragu-Nathan et al., 2008) [1)]	
TUC01	There are always new developments in the technologies we use in our organization.
TUC02	There are constant changes in computer software in our organization.
TUC03	There are constant changes in computer hardware in our organization.
TUC04	There are frequent upgrades in computer networks in our organization.
Supervisor Support (source: Graen & Uhl-Bien, 1995; Schyns, 2002)[1)]	
SUS01	My leader understands my job problems and needs.
SUS02	My leader recognizes my potential.
SUS03	My leader would use his/her power to help me solve problems in my work.
SUS04	I have enough confidence in my leader that I would defend and justify his/her decision.
SUS05	Regardless of the amount of formal authority my leader has, he/she would "bail me out", at his/her expenses.
SUS06	I know how my leader generally assesses me.
Co-Worker Support (source: Burr et al., 2019)[2)]	
SSW01	How often do you get help and support from your colleagues if needed?
SSW02	How often are your colleagues willing to listen to your problems at work if needed?
Sense of Community at Work (source: Burr et al., 2019)[2)]	
SCW01	Is there a good atmosphere between you and your colleagues?
SCW02	Do you feel part of a community at your place of work?

Family Support (source: Graen & Uhl-Bien, 1995; Schyns, 2002)[1)]	
FS01	People from my close private environment (e.g., partner, children, parents) understand my job problems and needs.
FS02	People from my close private environment (e.g., partner, children, parents) would use their possibilities to help me solve problems in my work.
FS03	People from my close private environment (e.g., partner, children, parents) would "bail me out", at their expenses.
FS04	People from my close private environment (e.g., partner, children, parents) understand my private problems and needs.
FS05	I know how people from my close private environment (e.g., partner, children, parents) generally assess me.

[1)] Measured on a five-point Likert scale ranging from "strongly disagree" to "strongly agree".
[2)] Measured on a six-point Likert scale ranging from "never" to "always".

Appendix B – Fornell-Larcker Criterion

Inter-Factor-Correlations for T1 (square root of AVE in the diagonal)

	TIV	**TO**	**TC**	**TIS**	**TUC**	**SUS**	**CWS**	**SCW**	**FS**
Techno-Invasion (TIV)	0.782								
Techno-Overload (TO)	0.577	0.832							
Techno-Complexity (TC)	0.608	0.626	0.825						
Techno-Insecurity (TIS)	0.687	0.720	0.621	0.762					
Techno-Uncertainty (TUC)	0.473	0.592	0.477	0.659	0.800				
Supervisor Support (SUS)	-0.020	-0.133	-0.130	-0.021	0.094	0.840			
Co-Worker Support (CWS)	-0.244	-0.190	-0.182	-0.233	-0.057	0.282	0.825		
Sense of Community (SCW)	-0.369	-0.303	-0.343	-0.311	-0.078	0.343	0.525	0.905	
Family Support (FS)	-0.035	-0.070	-0.125	-0.070	0.081	0.307	0.306	0.275	0.777

Inter-Factor-Correlations for T2 (square root of AVE in the diagonal)

	TIV	**TO**	**TC**	**TIS**	**TUC**	**SUS**	**CWS**	**SCW**	**FS**
Techno-Invasion (TIV)	0.778								
Techno-Overload (TO)	0.654	0.854							
Techno-Complexity (TC)	0.634	0.665	0.839						
Techno-Insecurity (TIS)	0.767	0.756	0.711	0.786					
Techno-Uncertainty (TUC)	0.471	0.588	0.508	0.626	0.847				
Supervisor Support (SUS)	-0.064	-0.187	-0.173	-0.059	-0.201	0.852			
Co-Worker Support (CWS)	-0.107	-0.152	-0.161	-0.007	-0.171	0.538	0.849		
Sense of Community (SCW)	-0.273	-0.315	-0.307	-0.106	-0.397	0.475	0.634	0.912	
Family Support (FS)	-0.268	-0.224	-0.260	-0.112	-0.272	0.380	0.337	0.380	0.804

Appendix C – Results for Direct Effects of the Regression Analysis

Relationship	Clustered Std. Error	Estimate	sig.
Supervisor Support → Techno-Invasion	0.044	0.095	*
Supervisor Support → Techno-Overload	0.053	-0.047	
Supervisor Support → Techno-Complexity	0.048	-0.007	
Supervisor Support → Techno-Insecurity	0.044	0.078	
Supervisor Support → Techno-Uncertainty	0.045	0.094	*
Co-Worker Support → Techno-Invasion	0.052	-0.091	
Co-Worker Support → Techno-Overload	0.058	-0.053	
Co-Worker Support → Techno-Complexity	0.052	-0.014	
Co-Worker Support → Techno-Insecurity	0.051	-0.114	*
Co-Worker Support → Techno-Uncertainty	0.055	-0.061	
Sense of Community at Work → Techno-Invasion	0.061	-0.393	***
Sense of Community at Work → Techno-Overload	0.061	-0.327	***
Sense of Community at Work → Techno-Complexity	0.058	-0.368	***
Sense of Community at Work → Techno-Insecurity	0.061	-0.310	***
Sense of Community at Work → Techno-Uncertainty	0.060	-0.122	*
Family Support → Techno-Invasion	0.052	0.023	
Family Support → Techno-Overload	0.058	0.032	
Family Support → Techno-Complexity	0.051	-0.052	
Family Support → Techno-Insecurity	0.050	0.005	
Family Support → Techno-Uncertainty	0.053	0.088	
Time → Techno-Invasion	0.228	0.177	
Time → Techno-Overload	0.262	0.198	
Time → Techno-Complexity	0.239	0.098	
Time → Techno-Insecurity	0.234	0.408	
Time → Techno-Uncertainty	0.249	0.298	

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$