The impact of technostress on small business owners' burnout: the mediating role of strain

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Abstract: A revised stress-strain-outcome (SSO) model of burnout was empirically tested with a large sample of 239 small business owners. Our model differentiates the consequences of strain into short-term and long-term consequences to study the mechanisms through which technostress (technostressors) affects strain (short-term consequence) and job burnout as an outcome (long-term consequence). Our results revealed three technostressors (techno-induced work overload, techno-induced job insecurity, and techno-induced role ambiguity) to be positively and directly associated with small business owners' strain. There was no direct effect of technostressors on burnout. Considering the short-term and long-term consequences, strain fully mediated the relationship between technostressors and burnout. Implications for theory and practice are discussed.

Keywords: small business owners; technostress; technostressors; strain; burnout; information and communication technologies; ICTs.

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1 Introduction

Society has changed drastically since the 1970s due to information and communication technologies (ICTs) (Aleshkovski et al., 2020; Deb, 2014; de Wet et al., 2016; Hoonakker and Korunka, 2014; Roztocki et al., 2019). Indeed, the use of ICTs has improved organisations' effectiveness, but it has also increased individuals' technostress (techno-induced stressors) due to work-home conflict, work overload, invasion of

privacy, role ambiguity and job insecurity (Ayyagari et al., 2011; Gaudioso et al., 2017; Khedhaouria and Cucchi, 2019; Maier et al., 2015; Nimrod, 2018; Pflügner et al., 2021; Tarafdar et al., 2007).

Technostress is defined as a contemporary form of stress related to the inability to cope with the constant and quickly changing environment resulting from the prolonged use of ICTs at work and at home (Afifi et al., 2018; Brod, 1984; Ragu-Nathan et al., 2008; Salanova et al., 2013). This new form of stress has prompted researchers to carry out various studies to understand the consequences of technostress on health and job outcomes for employees (Fuglseth and Sørebø, 2014; Yener et al., 2021) and managers (Khedhaouria and Cucchi, 2019; Sharma and Gill, 2016; Srivastava et al., 2015; Stadin et al., 2021). Studies have revealed that chronic technostress may lead to depression, emotional exhaustion, and job burnout (Ayyagari et al., 2011; Brooks and Califf, 2017; Pflügner et al., 2021; Reinecke et al., 2017; Salanova et al., 2000; Srivastava et al., 2015; Tarafdar et al., 2007).

In 2017, the Eurofound and the International Labour Office published a warning report highlighting the risk of ICT use regarding increased stress and job burnout (Eurofound and the International Labour Office, 2017). Job burnout is defined as a "syndrome of emotional exhaustion, depersonalisation and reduced personal accomplishment" [Maslach and Jackson, (1982), p.228]. In the entrepreneurship literature, some studies have revealed that small business owners may be exposed to a high risk of burnout due to their job position and engagement (Fernet et al., 2016; Palmer et al., 2021; Soenen et al., 2019; Torrès and Kinowski-Moysan, 2019; Torrès et al., 2022).

However, although the effect of occupational stress on job burnout has been examined, little is known about the mechanisms by which technostress may lead to job burnout among small business owners. To address this gap in the entrepreneurship literature, we study the effect of technostress on strain (as a mediator) and job burnout (as an outcome) using an extended version of the stress-strain-outcome (SSO) model (Koeske and Koeske, 1993). Therefore, to answer and study these relationships, we develop two research questions: 'What are the effects of technostressors on short-term exhaustion (strain) and long-term exhaustion (burnout)?' and 'Does strain play a mediating role between technostressors and burnout?'

Our study makes important contributions to the entrepreneurship literature and especially to the burnout literature of entrepreneurs and small business owners (Palmer et al., 2021). First, as specified above, to our knowledge, little is known about how technostress may lead to strain and job burnout among small business owners. Our findings are useful for understanding the mechanisms by which technostress may impact strain and lead to job burnout. Moreover, our study responds to the recent information systems (IS) literature calling for the adoption of interdisciplinary and multidisciplinary perspectives to better understand the impact of technostress on job and health outcomes (Bondanini et al., 2020; Tarafdar and Davison, 2018). Our multidisciplinary study that draws on the IS and entrepreneurship literature (and is conducted with small business owners) is itself an important contribution, as it helps elucidate the complexity of the relationship among technostress, strain, and job burnout. Second, although previous studies have examined the interaction between technostress and job burnout (Srivastava et al., 2015) based on the transactional model of stress and coping (Lazarus and Folkman, 1984), they have not explained the mechanisms by which technostress may impact strain

and job burnout. In our study, we use the SSO model because it helps emphasise the mediating role of strain in the relationship between technostress and job burnout. Third, our research provides reliable results because we employ a large sample of 239 small business owners (Martin et al., 2020; Memon et al., 2020). Our study contributes to theory and practice by yielding useful insights for future research, and it provides decision makers with knowledge that may help them decrease the risk of job burnout related to technostress.

The current paper is organised as follows. In Section 2, we present the theoretical framework. In Section 3, we present the hypotheses and the research model used in this study. In Section 4, we specify the methods including the data collection and the measures. In Section 5, we present the data analysis and the results. In Section 6, we present the discussion and the implications. Finally, in Section 7, we present the limitations of our study and future research directions.

2 Theoretical background: technostress, strain, and job burnout from an SSO perspective

Originating in organisational psychology, the SSO perspective is a theoretical foundation for stress and job burnout (Koeske and Koeske, 1993). It focuses on three major constructs, namely, stress, strain, and outcomes. First, stress describes a person's reactions to the environment, which are also called stressors. Second, strain describes a person's negative reactions due to exposure to stress over a period. Strain can create physical, emotional, and psychological consequences such as emotional exhaustion (burnout). Third, the consequences of stress and strain can influence people's health and job outcomes, such as job satisfaction (Koeske and Koeske, 1993).

According to this perspective, job burnout is conceptualised as a multidimensional construct composed of emotional exhaustion, a sense of failure, and depersonalisation (Maslach and Jackson, 1981). In the SSO model, strain is considered a mediator of the relationship between stress and job outcomes (Koeske and Koeske, 1993).

In the technostress literature, previous studies have been conducted based on the SSO model (Cao et al., 2018; Cao and Sun, 2018; Maier et al., 2015; Nawaz et al., 2018; Shi et al., 2020; Zhang et al., 2016). For instance, based on an online survey conducted with 306 employees, Maier et al. (2015) found that technostress had a significant effect on strain (techno-exhaustion) and job outcomes. Similarly, based on 525 ICT users, Zhang et al. (2016) found that ICT overload stressors related to technostress had an impact on strain (social network fatigue and dissatisfaction). These studies considered strain to be synonymous with burnout, whereas other studies have indicated a difference between strain and job burnout (Srivastava et al., 2015).

In our research building upon the SSO perspective, we conceptualise strain as a mediator of the relationship between technostress and job burnout. Our conceptualisation can be justified by previous reports showing that strain and job burnout are short-term and long-term consequences of stress, respectively (Cooper et al., 2001; Demerouti et al., 2002; Jimenez and Dunkl, 2017; Shirom, 1989). Indeed, in the short-term, individuals may experience strain, i.e., immediate reactions to stressors (Bergefurt et al., 2021; Demerouti et al., 2002; Jimenez and Dunkl, 2017), and over time, the increased levels of stress and strain may induce job burnout, i.e., long-term reactions to chronic strain (Bergefurt et al., 2021; Shirom, 1989, 2003). From this perspective, job burnout has been

measured as a work-related psychological syndrome through three dimensions, namely, emotional exhaustion, physical exhaustion, and cognitive exhaustion (Richter and Hacker, 1998; Shirom, 1989, 2003). Hence, strain may play a mediating role in the relationship between stress and job burnout (Demerouti et al., 2002). Although some studies have examined the short-term and long-term effects of stress on strain and job burnout (Cooper et al., 2001; Demerouti et al., 2002; Shirom, 1989; Sonnentag and Frese, 2003), little is known about the role of technostress in these relationships.

3 Hypotheses and research model

Technostress has been considered to be related to the stress that individuals experience due to the use of ICTs at work and at home (Ragu-Nathan et al., 2008). In our study, we consider technostress to be a contemporary form of stress related to the incapacity to cope with the constant and quickly changing environment resulting from the use of ICTs at work and at home (Afifi et al., 2018; Brod, 1984; Dragano and Lunau, 2020; Ragu-Nathan et al., 2008; Salanova et al., 2013). Technostress is often induced by various stressors, such as the technostressors' work-home conflict, invasion of privacy, work overload, role ambiguity and job insecurity (Ayyagari et al., 2011). To dissociate the 'technostressors' used in the IS literature from the 'stressors' used in the literature on stress, we used Maier et al.'s (2015, p.7) technostressor categories: 'techno-induced work-home conflict', 'techno-induced invasion of privacy', 'techno-induced work overload', 'techno-induced role ambiguity' and 'techno-induced job insecurity'.

In the context of small business owners, technostressors may be a source of strain, and in chronic stress situations, they may lead to job burnout. Indeed, small business owners may be exposed to high levels of stress due to the nature of their business activities and their responsibilities (Fernet et al., 2016; Palmer et al., 2021; Torrès and Kinowski-Moysan, 2019; Torrès et al., 2022).

3.1 Techno-induced work-home conflict and strain

Techno-induced work-home conflict is defined as a perceived conflict induced when work activities interfere with family activities [Ayyagari et al., (2011), p.834]. In other words, it describes situations in which work activity demands invade the family environment due to ICT use (Maier et al., 2015). Indeed, the extensive usage of ICTs at work and at home may blur the boundaries between professional and family demands (Ahuja et al., 2007; Middleton and Cukier, 2006; Mourmant et al., 2009; Pawlowski et al., 2007). Hence, both work life and private life may be negatively affected by the extensive usage of ICTs (Ahuja et al., 2007).

Moreover, the constant connectivity due to ICT usage may force individuals to be available everywhere and all the time, which may induce work-home conflict (Ragu-Nathan et al., 2008; Tarafdar et al., 2010; Turel et al., 2011). Hence, perceived techno-induced work-home conflict may be disruptive and may lead to strain when individuals negatively react to such a situational stimulus (Amick and Smith, 1992; Duxbury and Higgins, 1991).

The relationships between techno-induced work-home conflict and strain have been previously studied, and it has been found that techno-induced work-home conflict is

positively associated with strain (Ayyagari et al., 2011; Maier et al., 2015; Zheng and Lee, 2016). We therefore hypothesise that techno-induced work-home conflict is positively associated with strain among small business owners.

H1a Perceived techno-induced work-home conflict is positively associated with small business owners' strain.

3.2 Techno-induced invasion of privacy and strain

Techno-induced invasion of privacy describes the threat to individual privacy due to the inappropriate usage of ICTs in the workplace (Alge, 2001; Ayyagari et al., 2011). ICT use may threaten individual privacy by increasing the electronic monitoring of individuals at work and at home, increasing the traceability of personal information that can be exploited by malicious individuals, and facilitating online hacking activities. These vulnerabilities may result in an individual's personal network being invaded and the control of that individual's personal and private information being taken over (Ayyagari et al., 2011). These threats may lead individuals to feel that their privacy may be compromised due to inappropriate ICT usage (Best et al., 2006; Lee et al., 2016a; Malhotra et al., 2004; Tarafdar et al., 2011). Thus, techno-induced invasion of privacy may be troublesome and may lead to strain when individuals perceive that their information privacy has been weakened and threatened online (Day et al., 2012; Malhotra et al., 2004; Turel et al., 2011). In their online survey study, Lee et al. (2016a) found that techno-induced invasion of privacy was positively associated with strain. Because small business owners often use ICTs and are potentially exposed to individual privacy threats (Clarke, 1999), we hypothesise that techno-induced invasion of privacy is positively associated with strain.

H1b Perceived techno-induced invasion of privacy is positively associated with small business owners' strain.

3.3 Techno-induced work overload and strain

Techno-induced work overload is associated with the increased pressure generated by the use of ICTs when individuals perceive their work to exceed their resources and capabilities (Ayyagari et al., 2011; Cooper et al., 2001; Moore, 2000). Despite the benefits that ICTs may generate by improving productivity and effectiveness, the intensive use of ICTs may lead to prolonged working hours and an accelerated working rhythm (Buttner, 1992; Katz and Kahn, 1978). Individuals may experience multiple forms of ICT work overload, such as information overload and cognitive overload (Bawden and Robinson, 2009; Kirsch, 2000). Consequently, techno-induced work overload manifests itself as a stress creator that may affect recovery after long working hours and result in psychological fatigue, work exhaustion, and strain (Lee et al., 2016b; Moore, 2000).

Many studies have revealed that techno-induced work overload may be associated with strain (Ayyagari et al., 2011; Lee et al., 2016b). For instance, Lee et al. (2016b) found that information overload and communication overload were associated with strain (social network services fatigue). Similarly, Maier et al. (2015) found that techno-induced work overload was significantly associated with strain (techno-exhaustion). Because

small business owners often use ICTs and are potentially exposed to this stressor, we hypothesise that techno-induced work overload is positively associated with strain.

H1c Perceived techno-induced work overload is positively associated with small business owners' strain.

3.4 Techno-induced role ambiguity and strain

Techno-induced role ambiguity is a potential stressor that arises when the usage of ICTs leads individuals to misevaluate which activities should be prioritised to address work activities or ICT problems (Ayyagari et al., 2011; Khedhaouria and Cucchi, 2019). This stressor occurs when individuals encounter new and numerous tasks that involve interruptions that cause role ambiguity (Maier et al., 2015). Moreover, techno-induced role ambiguity may occur when individuals lack the necessary resources to perform multitasking activities and when ICT tasks exceed the boundaries of their role (Salanova et al., 2013). Consequently, such role ambiguity generated by the extended usage of ICTs may lead individuals to experience psychological fatigue and strain (Ragu-Nathan et al., 2008).

Many previous studies have found a significant and positive association between techno-induced role ambiguity and strain. For instance, Ayyagari et al. (2011) reported techno-induced role ambiguity to be a strong predictor of strain. Similarly, Day et al. (2012) determined that role ambiguity in combination with other job demands and stressors was positively associated with strain. In another study, Maier et al. (2015) found techno-induced role ambiguity to be significantly associated with strain (techno-exhaustion). Because small business owners often use ICTs and are potentially exposed to this stressor, we hypothesise that techno-induced role ambiguity is positively associated with strain.

H1d Perceived techno-induced role ambiguity is positively associated with small business owners' strain.

3.5 Techno-induced job insecurity and strain

Technostress-induced job insecurity describes a form of stress related to individuals' perception of their jobs as compromised and threatened due to the use of ICTs (Maier et al., 2015). The mastery of ICTs may be considered a required technological skill that may challenge less skilled individuals who perceive themselves to be potentially threatened by people who have this technological skill (Ragu-Nathan et al., 2008). Such concerns may lead less skilled people to believe that they may lose their jobs or be replaced by more technologically skilled people (Ashford et al., 1989; Ayyagari et al., 2011; Burke and Cooper, 2000; Cooper et al., 2001).

Techno-induced job insecurity may be a potential predictor of strain (Lee et al., 2016a). When individuals experience techno-induced job insecurity, they tend to believe that ICT use is dangerous and likely to cause stress or strain (Tarafdar et al., 2010). For instance, Ayyagari et al. (2011) carried out a study on technostress creators and showed that techno-induced job insecurity was positively associated with strain. Similarly, Maier et al. (2015) found that techno-induced job insecurity was significantly associated with strain (techno-exhaustion). Because small business owners often use ICTs and are

potentially exposed to techno-induced job insecurity in their work environment, we hypothesise that this stressor is positively associated with strain.

H1e Perceived techno-induced job insecurity is positively associated with small business owners' strain.

3.6 Techno-induced work-home conflict and burnout

Previous studies in the IS literature have identified a significant association between techno-induced work-home conflict and burnout (Sethi et al., 1999; Moore, 2000). Techno-induced work-home conflict may induce chronic stress, which has been identified as a potential cause of job burnout (Ahuja et al., 2007; Mourmant et al., 2009; Richardson and Benbunan-Fich, 2011). Indeed, when the boundaries between private and professional activities merge, individuals may perceive high levels of prolonged stress that may cause job burnout over time due to physical fatigue, cognitive weariness, and emotional exhaustion (Shirom and Melamed, 2006). Maier et al. (2015) conducted an online survey with 306 ICT users and found that techno-induced work-home conflict was positively associated with job burnout. Similarly, Wright et al. (2014) conducted a study with 168 individuals and found that work-life conflict significantly predicted job burnout. Because small business owners often use ICTs and are potentially exposed to techno-induced work-home conflict, we hypothesise that this stressor is positively associated with job burnout.

H2a Perceived techno-induced work-home conflict is positively associated with small business owners' burnout.

3.7 Techno-induced invasion of privacy and burnout

Techno-induced invasion of privacy may lead to prolonged strain and thereby burnout (Hoonakker and Korunka, 2014). Although some studies have failed to find a significant relationship between techno-induced invasion of privacy and burnout (Maier et al., 2015), other studies have suggested that prolonged strain may lead to job burnout (Khedhaouria and Cucchi, 2019; Stieger et al., 2012; Srivastava et al., 2015). For instance, Stieger et al. (2012) carried out a study with ICT (Facebook) users and found that the use of ICTs could threaten individual privacy when private information was accessed through malicious activities. As a result of such activities, victims revealed their identities and lost their personal information and resources, and consequently, they experienced mental exhaustion and, in extreme cases, committed suicide (Stieger et al., 2012). Because small business owners often use ICTs and are potentially exposed to techno-induced invasion of privacy, we hypothesise that this stressor is positively associated with their job burnout.

H2b Perceived techno-induced invasion of privacy is positively associated with small business owners' burnout.

3.8 Techno-induced work overload and burnout

Techno-induced work overload has been found to be associated with strain (work exhaustion) and burnout (Gaudioso et al., 2015). Indeed, job burnout may result from

increased pressure from using ICTs when job demands exceed individuals' resources and capabilities (Ayyagari et al., 2011).

The association between techno-induced work overload and burnout has been documented in past studies. For instance, in their study carried out with 215 individuals, Brown et al. (2014) found that techno-induced work overload had a significant impact on burnout (emotional exhaustion). Similarly, Reinecke et al. (2017) reported that work overload induced by ICTs was positively associated with burnout.

As specified above, because small business owners often use ICTs and are potentially exposed to techno-induced work overload, we hypothesise that this stressor is positively associated with their job burnout.

H2c Techno-induced work overload is positively associated with small business owners' burnout.

3.9 Techno-induced role ambiguity and burnout

Techno-induced role ambiguity may lead to burnout when individuals experience increased stress due to their misevaluation of which activities should be prioritised to address work activities or ICT problems, particularly when they lack the necessary resources to perform activities (Ayyagari et al., 2011; Cho et al., 2019; Khedhaouria and Cucchi, 2019). Moreover, individuals may experience job burnout when the job demands related to multitasking activities generated by techno-induced role ambiguity exceed the available resources (Tarafdar et al., 2007).

The association between techno-induced role ambiguity and burnout has been identified in past studies. For instance, in their study carried out with 434 office workers, Cho et al. (2019) demonstrated that work role ambiguity was significantly associated with emotional exhaustion as a potential symptom of burnout. Similarly, in their study on the use of email in the workplace, Brown et al. (2014) found that work role ambiguity had a positive impact on emotional exhaustion.

Because small business owners often use ICTs and are potentially exposed to techno-induced work role ambiguity, we hypothesise that this stressor is positively associated with their job burnout.

H2d Techno-induced role ambiguity is positively associated with small business owners' burnout.

3.10 Techno-induced job insecurity and burnout

Technostress-induced job insecurity may lead to prolonged stress and burnout when individuals perceive their jobs to be highly compromised and threatened by the use of ICTs (Srivastava et al., 2015). Indeed, the use of ICTs is crucial for multitasking, and individuals who lack technical skills may see themselves as useless and unproductive; such unpleasant emotions may lead them to be highly stressed and emotionally exhausted (Khedhaouria and Cucchi, 2019; Srivastava et al., 2015). Moreover, techno-induced job insecurity may disturb individual equilibrium and stability (Tarafdar et al., 2019). The association between techno-induced role ambiguity and burnout has been reported in past studies (Lee et al., 2016a; Srivastava et al., 2015).

Because small business owners often use ICTs and are potentially exposed to techno-induced job insecurity in a difficult economic context, we hypothesise that this stressor is positively associated with their job burnout.

H2e Techno-induced job insecurity is positively associated with small business owners' burnout.

3.11 Strain and burnout

In stress research, strain and burnout have often been conceptualised interchangeably. For instance, Koeske and Koeske (1993) considered strain to be a negative reaction to prolonged stress and conceptualised it as burnout (emotional exhaustion). However, recent research has posited that the consequences of strain should be separated into short-term and long-term consequences (Bergefurt et al., 2021; Demerouti et al., 2002; Jimenez and Dunkl, 2017). The short-term consequences of strain often result in stress sensations (Demerouti et al., 2002), while the long-term consequences of strain that result from prolonged and chronic reactions to strain are termed burnout (Jimenez and Dunkl, 2017). For this reason, in the present research building upon the SSO model, we differentiate the short- and long-term consequences of strain and consider strain to be a short-term reaction to stress that results in stress sensations and burnout as the long-term consequences of strain. Therefore, we hypothesise that small business owners' strain is positively associated with their burnout.

H3 Small business owners' strain is positively associated with their burnout.

3.12 The mediating role of strain between technostressors and burnout

Building upon the SSO model, previous stress research has conceptualised burnout to be synonymous with strain and considered it to be a mediator linking stress/stressors to job outcomes (Koeske and Koeske, 1993; Rubino et al., 2009). According to this conceptualisation, burnout is viewed as an immediate reaction to stressors that could manifest in an individual as emotional exhaustion, a sense of failure, and depersonalisation (Maslach and Jackson, 1981). However, such a conceptualisation does not differentiate the consequences of strain into short-term consequences – potentially manifested as emotional and physical fatigue – and long-term consequences – potentially manifested as cognitive exhaustion (Bergefurt et al., 2021; Demerouti et al., 2002; Jimenez and Dunkl, 2017). This differentiation is relevant for our study, as we used Shirom and Melamed's (2006) burnout scale (Shirom, 1989, 2003). Indeed, under this new SSO conceptualisation that recognises the short-term and long-term consequences of strain, strain may play a mediating role between stressors and burnout. Individuals may not directly experience burnout; rather, in the short-term, they may experience strain, which often results in stress sensations and fatigue. The long-term consequences of prolonged, chronic reactions to strain result in burnout (Bergefurt et al., 2021; Demerouti et al., 2002; Jimenez and Dunkl, 2017). Based on this new SSO conceptualisation, we suggest that technostressors may have short-term consequences resulting in strain and long-term consequences resulting in burnout. Therefore, we hypothesise that small business owners' strain mediates the relationship between technostressors (i.e., techno-induced work-family conflict (H4a), techno-induced invasion of privacy (H4b),

techno-induced work overload (H4c), techno-induced role ambiguity (H4d), techno-induced job insecurity (H4e) and burnout).

H4a Strain mediates the relationship between techno-induced work-home conflict and burnout.

H4b Strain mediates the relationship between techno-induced invasion of privacy and burnout.

H4c Strain mediates the relationship between techno-induced work overload and burnout.

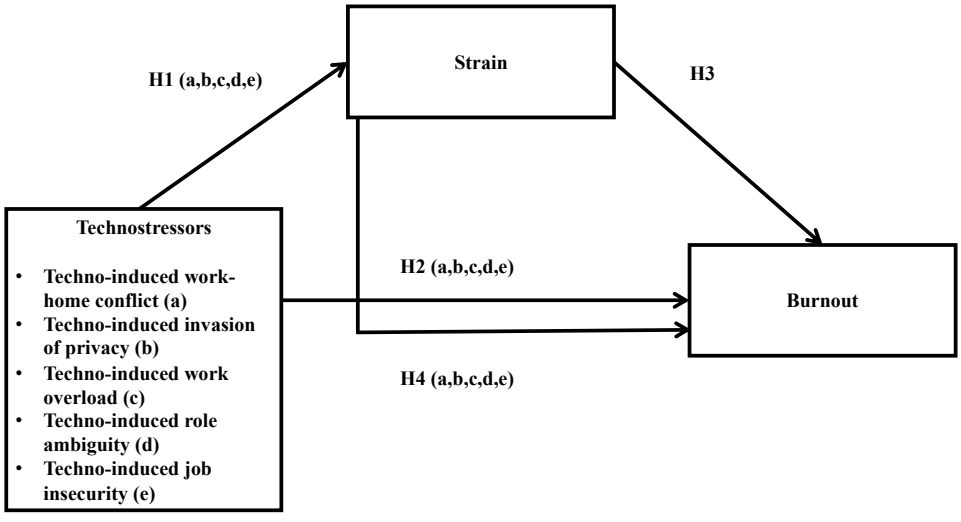
H4d Strain mediates the relationship between techno-induced role ambiguity and burnout.

H4e Strain mediates the relationship between techno-induced job insecurity and burnout.

3.13 Research model

Our research model (Figure 1) based on the SSO perspective summarises all the proposed relationships and hypotheses.

Figure 1 Research model



4 Methods

4.1 Data collection

For our study, we used a cohort constructed by the Amarok Observatory. The data were collected by a research team between September 2016 and January 2017. Founded in 2010, Amarok is a French observatory composed of national and international researchers

aiming to study the health of small business owners from various economic sectors and to provide scientific and societal insights (Torrès and Thurik, 2019). Connected to the University of Montpellier and Montpellier Business School, the Amarok observatory's databases have previously been used in many studies, especially those on stress and burnout (Fernet et al., 2016; Guiliani and Torrès, 2018; Lechat and Torrès, 2016, 2017; Torrès, 2011; Torrès and Kinowski-Moysan, 2019; Torrès et al., 2022). The work of the observatory has recently been praised by the European SME Assembly alongside other organisations grouped in an associative interest group, the Portail du Rebond (SOS Entrepreneur, Re-Créer, Second Souffle, 60,000 Rebonds APESA and Observatoire Amarok), for its actions and innovations in promoting entrepreneurs' recovery from difficult situations, for which the associative interest group received the 2020 European Enterprise Promotion Awards' Grand Jury Prize (European Commission, 2020).

The cohort that we used in the present study includes 239 French small business owners (fewer than 250 employees) from the construction sector. Studying the technostress of small business owners in the construction sector is of great value for research and practice because many previous studies on stress have been conducted on construction professionals and found stress to be a major issue (Bowen et al., 2013; Lingard and Francis, 2004; Loosemore and Waters, 2004), particularly for managers (Djerbani, 1996). Additionally, the construction sector is an understudied industry in management research (Verstraete et al., 2017). Furthermore, previous studies on technostress have suggested that managers intensively use ICTs due to their job position and are more exposed to job strain and burnout than employees (Khedhaouria and Cucchi, 2019; Srivastava et al., 2015). In our study, the most frequent ICTs used by small business owners to manage their tasks, as indicated on a seven-point Likert scale, were cell phones (mean = 6.22; SD = 1.110); electronic mail (mean = 6.10; SD = 1.332); and computers and application software such as word processing, presentation, and spreadsheet software (mean = 5.79; SD = 1.561). Hence, small business owners who are managers in the construction domain may potentially be exposed to technostress and job strain.

Table 1 Sample characteristics

Demographics	*Sample size (n = 239)*	*Mean (SD)*
Firm size (employees)		
Micro firms (< 10)	70 (29%)	5
Small firms (≥ 10)	169 (71%)	33
Sex		
Male	191 (80%)	-
Female	48 (20%)	-
Age (years)		
< 45	81 (34%)	40.6
≥ 45	158 (66%)	53.5

This survey was included in a large research project composed of six surveys, including the one presented in our paper. The recruitment for this survey was performed by our partners in the construction sector and by the team of the Observatoire Amarok. A total of 348 individuals agreed to participate in the large research project (n = 348). However,

29 of them were not small business owners (n = 29), and 2 of them were not located in France (n = 2). Therefore, 31 individuals were excluded from the study (n = 31). A total of 317 small business owners agreed to participate in the large research project and the six surveys, including the one reported in our study (n = 317). However, 241 small business owners completed the survey (n = 241). The final sample considered in the study and the analysis is composed of 239 small business owners (n = 239), which represents a 'large sample's size' because small business owners are individuals who are difficult to recruit and engage in research, especially in studies on health (Martin et al., 2020). Additionally, it is normal to have smaller samples for this population in top management compared to others (Memon et al., 2020). Table 1 shows that 71% of the firms employed more than ten employees (10 to 250) and that 29% employed fewer than ten employees. Most small business owners were male (80%), 34% of them were less than 45 years old, and 66% were more than 45 years old (the average age was 49.2 years).

4.2 Measures

Our model consists of three constructs that we measured using reliable and validated items from previous studies. All the retained items generated from the principal component analysis (PCA) are reported in Appendi. All items were measured with a seven-point Likert scale ranging from 1 = 'strongly disagree' to 7 = 'strongly agree'.

The outcome variable, job burnout, was measured as a reflective construct with 12 items (α = 95) retained from the 14 items from the Shirom-Melamed burnout measure (SMBM; Shirom and Melamed, 2006). The SMBM consists of three subscales: physical fatigue (4 items, including 'I feel burned out', 'I feel physically drained', 'I have no energy for going to work in the morning', and 'I feel like my 'batteries' are 'dead''); emotional exhaustion (3 items, including 'I feel I am not capable of being sympathetic to coworkers', 'I feel I am unable to be sensitive to the needs of co-workers', and 'I feel I am not capable of investing emotionally in co-workers'); and cognitive weariness (5 items, including 'I have difficulty concentrating', 'I feel I am not thinking clearly', 'I have difficulty thinking about complex things', 'I feel I am not focused in my thinking', and 'My thinking process is slow').

The independent variables were strain and technostressors. Strain was measured using 4 reliable and valid items (Moore, 2000) (α = 0.92; 'I feel drained from activities that require me to use ICTs', 'I feel tired from my ICT activities', 'Working all day with ICTs is a strain for me', and 'I feel burned out from my ICT activities').

Technostressors were measured as a reflective construct using reliable and valid items encompassing five subscales (Ayyagari et al., 2011): techno-induced work-home conflict, which was measured with three items (Kreiner, 2006; Netemeyer et al., 1996) (α = 0.79; 'Using ICTs blurs boundaries between my job and my home life', 'Using ICTs for work-related responsibilities creates conflicts with my home responsibilities', and 'I do not get everything done at home because I find myself completing job-related work due to ICTs'); techno-induced invasion of privacy, which was measured with four items (Alge, 2001; Eddy et al., 1999) (α = 0.87; 'I feel uncomfortable that my use of ICTs can be easily monitored', 'I feel my privacy can be compromised because my activities using

ICTs can be traced', 'I feel enterprises could violate my privacy by tracking my activities using ICTs', and 'I feel that my use of ICTs makes it easier to invade my privacy'); techno-induced work overload, which was measured with three items (Moore, 2000) ($\alpha = 0.83$; 'ICTs create many more requests, problems, or complaints in my job than I would otherwise experience'; 'I feel busy or rushed due to ICTs'; and 'I feel pressured due to ICTs'); techno-induced role ambiguity, which was measured with two items (Moore, 2000) ($\alpha = 0.85$; 'I am unsure whether I have to deal with ICT problems or with my work activities' and 'I am unsure what to prioritise: dealing with ICT problems or my work activities'); and techno-induced job insecurity, which was measured with three items (Agho et al., 1992) ($\alpha = 0.76$; 'ICTs will advance to an extent where my present job can be performed by a less skilled individual', 'I am worried that new ICTs may pose a threat to my job', and 'I believe that ICTs make it easier for other people to perform my work activities').

To test our model and its associated hypotheses, we included some control variables used in the previous research on technostress (Ayyagari et al., 2011), such as sex, firm size, age, ICT professional use intensity (intensity of the use of eight ICTs) and negative affectivity [measured with five items adapted from Agho et al. (1992)].

5 Data analysis and results

5.1 Reliability and validity analysis

The convergent validity, discriminant validity, and accuracy of the measurement scales were first tested using confirmatory factor analysis. To test the convergent validity, we conducted PCA with varimax rotation. Convergent validity can be established if similar items load on their corresponding constructs as theoretically conceptualised, while discriminant validity assesses whether constructs are unrelated. Convergent validity is best interpreted relative to discriminant validity. Good convergent and discriminant validity is considered to have been achieved when the factor loadings of the items used to measure the corresponding constructs exceed the threshold of 0.5 (Hair et al., 2014). In our study, all items that did not load on their corresponding constructs and that had factor loadings below the recommended threshold were omitted. Table 2 shows that all retained items were related to their corresponding constructs and had good factor loadings, which provided evidence of good convergent and discriminant validity.

We also assessed the reliability of the constructs to control for the internal consistency between items by computing Cronbach's (1951) alpha (α). Table 2 shows that most of the constructs had good reliability, exceeding the recommended threshold of 0.70 (Nunnally, 1978).

Finally, to determine whether there were issues with common method variance (CMV) related to self-reported measures, we conducted Harman's (1976) one-factor test by running a single unrotated PCA. The results show that the percentage of variance explained by one factor among all items did not exceed the recommended threshold of 50% (31.345%), indicating that there were no CMV issues.

Table 2 Factor loadings and reliability of the measurement scales

Items	*Mean*	*SD*	*Factor loadings*
Burnout (12 retained items; $\alpha = 0.95$) *	2.64	1.21	-
I have difficulty concentrating. (CW)	3.18	1.660	0.80
I feel I am not thinking clearly. (CW)	2.84	1.630	0.83
I feel I am not capable of being sympathetic to co-workers. (EE)	2.29	1.305	0.77
I have difficulty thinking about complex things. (CW)	2.91	1.599	0.82
I feel burned out. (PF)	2.98	1.700	0.78
I feel I am unable to be sensitive to the needs of co-workers. (EE)	2.47	1.308	0.70
I feel I am not focused in my thinking. (CW)	2.76	1.492	0.84
I feel physically drained. (PF)	2.85	1.702	0.77
I have no energy for going to work in the morning. (PF)	2.05	1.231	0.65
I feel like my 'batteries' are 'dead'. (PF)	2.52	1.636	0.71
My thinking process is slow. (CW)	2.49	1.382	0.84
I feel I am not capable of investing emotionally in co-workers. (EE)	2.45	1.471	0.61
Strain (4 retained items; $\alpha = 0.92$)	2.95		
I feel drained from activities that require me to use ICTs.	2.70	1.669	0.65
I feel tired from my ICT activities.	2.93	1.737	0.74
Working all day with ICTs is a strain for me.	3.46	1.870	0.71
I feel burned out from my ICT activities.	2.73	1.834	0.68
Technostressors			
Techno-induced work-home conflict (3 items; $\alpha = 0.79$)	3.40		
Using ICTs blurs boundaries between my job and my home life.	4.33	2.204	0.84
Using ICTs for work-related responsibilities creates conflicts with my home responsibilities.	2.93	1.844	0.77
I do not get everything done at home because I find myself completing job-related work due to ICTs.	2.95	1.959	0.78
Techno-induced invasion of privacy (4 items; $\alpha = 0.87$)	4.09		
I feel uncomfortable that my use of ICTs can be easily monitored.	3.86	2.181	0.75
I feel my privacy can be compromised because my activities using ICTs can be traced.	4.26	2.087	0.85
I feel enterprises could violate my privacy by tracking my activities using ICTs.	4.14	2.086	0.88
I feel that my use of ICTs makes it easier to invade my privacy.	4.08	2.032	0.84

Notes: *The burnout measure (SMBM; Shirom and Melamed, 2006) corresponds to three components: CW = cognitive weariness; PF = physical fatigue; EE = emotional exhaustion.

Table 2 Factor loadings and reliability of the measurement scales (continued)

Items	*Mean*	*SD*	*Factor loadings*
Techno-induced work overload (3 items; $\alpha = 0.83$)	3.68		
ICTs create many more requests, problems, or complaints in my job than I would otherwise experience.	3.54	1.959	0.72
I feel busy or rushed due to ICTs.	3.76	2.029	0.77
I feel pressured due to ICTs.	3.72	2.076	0.64
Techno-induced role ambiguity (2 items; $\alpha = 0.85$)	2.94		
I am unsure whether I have to deal with ICT problems or with my work activities.	3.03	1.739	0.69
I am unsure what to prioritise: dealing with ICT problems or my work activities.	2.85	1.821	0.66
Techno-induced job insecurity (3 items; $\alpha = 0.76$)	2.58		
ICTs will advance to an extent where my present job can be performed by a less skilled individual.	2.68	1.683	0.77
I am worried that new ICTs may pose a threat to my job.	2.28	1.520	0.74
I believe that ICTs make it easier for other people to perform my work activities.	2.79	1.605	0.80

Notes: *The burnout measure (SMBM; Shirom and Melamed, 2006) corresponds to three components: CW = cognitive weariness; PF = physical fatigue; EE = emotional exhaustion.

5.2 Correlation and collinearity analysis

Before testing our hypotheses, we first examined the correlation between variables. Table 3 shows that the five technostressors were highly correlated with strain: techno-induced work-home conflict ($r = 0.35$, $p < 0.01$); techno-induced invasion of privacy ($r = 0.33$, $p < 0.01$); techno-induced work overload ($r = 0.59$, $p < 0.01$); techno-induced role ambiguity ($r = 0.54$, $p < 0.01$); and techno-induced job insecurity ($r = 0.44$, $p < 0.01$). Furthermore, all five technostressors were highly correlated with burnout: techno-induced work-home conflict ($r = 0.31$, $p < 0.01$); techno-induced invasion of privacy ($r = 0.27$, $p < 0.01$); techno-induced work overload ($r = 0.47$, $p < 0.01$); techno-induced role ambiguity ($r = 0.46$, $p < 0.01$); and techno-induced job insecurity ($r = 0.32$, $p < 0.01$). Strain and job burnout were also highly correlated ($r = 0.65$, $p < 0.01$). A complementary analysis showed that strain was highly correlated with the 3 subdimensions of burnout: physical fatigue ($r = 0.70$, $p < 0.01$); emotional exhaustion ($r = 0.43$, $p < 0.01$); and cognitive weariness ($r = 0.63$, $p < 0.01$).

To ensure the absence of multicollinearity issues between the predictor variables in our model, we computed the variance inflation factor (VIF) of the correlations. Our results show that all the VIF values (max = 2.20 and average = 1.43) were below the threshold of 3.30, confirming that there were no serious multicollinearity concerns (Diamantopoulos and Siguaw, 2006).

Table 3 Descriptive statistics and correlations

Variable		*Mean*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1	Sex	0.20	0.40											
2	Age	49.16	7.58	0.01										
3	Negative affectivity	3.76	1.21	0.05	-0.08									
4	Firm size	25.67	32.76	-0.12	-0.06	0.07								
5	ICT usage	5.08	1.04	0.10	-0.11	0.11	0.14*							
6	Techno-induced work-home conflict	3.40	1.68	-0.05	-0.11	0.29**	0.06	0.13*						
7	Techno-induced invasion of privacy	4.09	1.78	0.12	0.03	0.26**	-0.05	0.05	0.15*					
8	Techno-induced work overload	3.68	1.75	0.13*	-0.06	0.40**	0.02	0.14*	0.30**	0.44**				
9	Techno-induced role ambiguity	2.94	1.66	0.07	-0.08	0.36**	0.04	0.20**	0.36**	0.35**	0.59**			
10	Techno-induced job insecurity	2.58	1.32	0.15*	0.09	0.21**	-0.10	0.05	0.21**	0.10	0.34**	0.37**		
11	Strain	2.95	1.60	0.13*	-0.04	0.55**	-0.00	0.09	0.35**	0.33**	0.59**	0.54**	0.44**	
12	Burnout (SMBM)	2.64	1.21	0.11	-0.04	0.58**	0.05	0.10	0.31**	0.27**	0.47**	0.46**	0.32**	0.65**

Notes: *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Table 4 Models of the hierarchical multiple regression analysis

Predictor	*Dependent variable = STRAIN*				*Dependent variable = BURNOUTa*					
	Step 1		*Step 2*		*Step 1*		*Step 2*		*Step 3*	
Control variables										
Sex	0.10		0.04		0.08		0.05		0.03	
Age	0.00		-0.01		0.00		0.01		0.01	
Negative affectivity	0.54	***	0.32	***	0.57	***	0.42	***	0.30	***
Firm size	-0.04		-0.01		0.02		0.03		0.03	
ICT USAGE	0.03		-0.03		0.03		-0.02		-0.01	
Technostressors										
Work-home conflict			0.08				0.08		0.05	
Invasion of privacy			0.04				0.02		0.01	
Work overload			0.26	***			0.14	*	0.04	
Role ambiguity			0.15	*			0.15	*	0.09	
Job insecurity			0.21	***			0.11	*	0.04	
Strain									0.38	***
R^2 (Adjusted R^2)	0.31	(0.30)	0.55	(0.53)	0.35	(0.33)	0.45	(0.42)	0.51	(0.49)
R^2 change			0.23	***			0.10	***	0.07	***
F-statistic	21.42	***	27.44	***	24.66	***	18.40	***	21.66	***
Max VIF	1.05		1.86		1.05		1.86		2.20	
Average VIF	1.03		1.30		1.03		1.30		1.43	

Notes: N = 239. *p < 0.05, **p < 0.01, ***p < 0.001.
Beta-coefficients are reported.
VIF: variance inflation factor.
[a]Assessed by the Shirom-Melamed Burnout Measure (SMBM).

5.3 Hypothesis testing

To test our hypotheses, we performed a three-step hierarchical multiple regression in SPSS. In step 1, we incorporated all five control variables (sex, age, negative affectivity, firm size, and ICT usage). In step 2, we added the five technostressors as main predictors. Finally, in step 3, we added the strain variable to predict job burnout. The regression results for our hypotheses are shown in Table 4.

In step 1, taken together, all control variables explained 31% of the variance in strain and 35% of the variance in job burnout (step 1). Among the control variables, negative affectivity was significantly associated with strain ($\beta = 0.54$, $p < 0.001$) and job burnout ($\beta = 0.57$, $p < 0.001$). The large amount of variance explained by the control variables indicates the effective choice of control variables in our model.

Table 5 Summary of the results

Hypotheses	*Status*
H1a: Techno-induced work-home conflict is positively associated with strain.	No ($\beta = 0.08$, ns)
H1b: Techno-induced invasion of privacy is positively associated with strain.	No ($\beta = 0.04$, ns)
H1c: Techno-induced work overload is positively associated with strain.	Yes ($\beta = 0.26$, $p < 0.001$)
H1d: Techno-induced role ambiguity is positively associated with strain.	Yes ($\beta = 0.15$, $p < 0.05$)
H1e: Techno-induced job insecurity is positively associated with strain.	Yes ($\beta = 0.21$, $p < 0.001$)
H2a: Techno-induced work-home conflict is positively associated with burnout.	No ($\beta = 0.05$, ns)
H2b: Techno-induced invasion of privacy is positively associated with burnout.	No ($\beta = 0.01$, ns)
H2c: Techno-induced work overload is positively associated with burnout.	No ($\beta = 0.04$, ns)
H2d: Techno-induced role ambiguity is positively associated with burnout.	No ($\beta = 0.09$, ns)
H2e: Techno-induced job insecurity is positively associated with burnout.	No ($\beta = 0.04$, ns)
H3: Strain is positively associated with burnout.	Yes ($\beta = 0.38$, $p < 0.001$)
H4a: Strain mediates the relationship between techno-induced work-home conflict and burnout.	No (no association with burnout or strain)
H4b: Strain mediates the relationship between techno-induced invasion of privacy and burnout.	No (no association with burnout or strain)
H4c: Strain mediates the relationship between techno-induced work overload and burnout.	Yes (positive full mediation = 0.10, $p < 0.001$)
H4d: Strain mediates the relationship between techno-induced role ambiguity and burnout.	Yes (positive full mediation = 0.06, $p < 0.05$)
H4e: Strain mediates the relationship between techno-induced job insecurity and burnout.	Yes (positive full mediation= 0.08, $p < 0.001$)

In step 2, the incorporation of technostressors into the regression model showed a significant change in the variance in strain (ΔR^2 = 23%, $p < 0.001$) and job burnout (ΔR^2 = 10%, $p < 0.001$) compared with that in the control variable models. Three technostressors, namely, techno-induced work overload (H1c: $\beta = 0.26$, $p < 0.001$), techno-induced role ambiguity (H1d: $\beta = 0.15$, $p < 0.05$), and techno-induced job insecurity (H1e: $\beta = 0.21$, $p < 0.001$), were positively associated with strain, as hypothesised, and explained 23% of the variance in strain (ΔR^2 = 23%). The fit of this regression model was significant ($R^2 = 0.55$, $F = 27.44$, $p < 0.001$) and explained 55% of the variance in strain. Furthermore, techno-induced work overload ($\beta = 0.14$, $p < 0.05$), techno-induced role ambiguity ($\beta = 0.15$, $p < 0.05$), and techno-induced job insecurity ($\beta = 0.11$, $p < 0.05$) were also associated with job burnout and explained 10% of the variance in job burnout (ΔR^2 = 10%). The fit of this regression model was significant ($R^2 = 0.45$, $F = 18.40$, $p < 0.001$) and explained 45% of the variance in job burnout.

In step 3, the inclusion of strain in the regression model showed a significant change in the variance in job burnout (ΔR^2 = 7%, $p < 0.001$) but induced nonsignificant effects of some technostressors (techno-induced work overload, techno-induced role ambiguity, and techno-induced job insecurity). These results indicated the full mediating role of strain in the relationship between technostressors and burnout, which was further tested as described in the next paragraph, because strain was strongly associated with job burnout, as hypothesised (H3: $\beta = 0.38$, $p < 0.001$). The overall model fit was significant ($R^2 = 0.51$, $F = 21.66$, $p < 0.001$) and explained 51% of the variance in job burnout. A summary of the results is presented in Table 5.

5.4 Mediation testing

Finally, for hypothesis H4, we predicted a mediating role of strain in the relationship between technostressors and burnout. As recommended by Hayes (2018), the mediation test was performed using the bootstrap resampling procedure with 5,000 resamples based on a 95% confidence interval. The results of the mediation test are shown in Table 6.

Table 6 Mediation test

Technostressors	*Effects on burnout through strain*[a]					
	Direct	*Indirect*	*Confidence interval (CI = 95%)*	*Sign.*	*Total*	*Sign.*
Techno-induced work-home conflict	0.05	0.03	[–0.014–0.079]		0.08	
Techno-induced invasion of privacy	0.01	0.02	[–0.023–0.061]		0.02	
Techno-induced work overload	0.04	0.10	[0.043–0.164]	***	0.14	*
Techno-induced role ambiguity	0.09	0.06	[0.004–0.127]	*	0.15	*
Techno-induced job insecurity	0.04	0.08	[0.028–0.140]	***	0.11	*

Notes: [a]Completely standardised indirect effects reported. The significance was assessed by the bootstrap procedure (bias-corrected confidence intervals).
*p < 0.05, **p < 0.01, ***p < 0.001.

Table 6 shows that the indirect effect of strain is positive and significant only for three technostressors, namely, techno-induced work overload (H4c: $\beta = 0.10$, CI = [0.043–0.164]; $p < 0.001$); techno-induced role ambiguity (H4d: $\beta = 0.06$, CI = [0.004–0.127], $p < 0.05$); and techno-induced job insecurity (H4e: $\beta = 0.08$, CI = [0.028–0.140], $p < 0.001$). Indeed, strain played a positive full mediating role because the indirect effects of the three technostressors on burnout were significant and the direct effect was non-significant. Notably, strain mediated 71% (indirect effect/total effect) of the effect of techno-induced work overload on burnout, 40% of the effect of techno-induced role ambiguity, and 73% of the effect of techno-induced job insecurity. All our results are summarised in Table 5.

6 Discussion and implications

The present study aimed to understand 'What are the effects of technostressors on short-term exhaustion (strain) and long-term exhaustion (burnout)?' and 'Does strain play a mediating role between technostressors and burnout?' Previous studies have suggested that small business owners are potentially exposed to high levels of stress and burnout due to the nature of their business activities and their responsibilities (Fernet et al., 2016; Palmer et al., 2021; Soenen et al., 2019; Torrès and Kinowski-Moysan, 2019). Although previous studies have examined the health of small business owners and their level of burnout, little is known about the effect of the stress generated by ICT use (i.e., technostressors) on strain (as a short-term consequence) and burnout (as a long-term consequence) among small business owners.

Based on our research questions and building upon the SSO perspective (Koeske and Koeske, 1993), we empirically tested a revised model that differentiates the consequences of strain into short-term consequences, which may manifest as emotional and physical fatigue, and long-term consequences, which may manifest as cognitive exhaustion (Bergefurt et al., 2021; Demerouti et al., 2002; Jimenez and Dunkl, 2017). Indeed, considering the short-term and long-term consequences, strain may mediate the relationship between technostressors and burnout.

Our results showed that three technostressors, namely, techno-induced work overload, techno-induced job insecurity, and techno-induced role ambiguity, were positively and directly associated with strain. These results support previous studies on technostress suggesting that work overload, job insecurity and role ambiguity are the main stressors that may be generated by the use of ICTs and that may lead to stress sensations and fatigue (Ayyagari et al., 2011; Cao and Sun, 2018; Khedhaouria and Cucchi, 2019; Maier et al., 2015). Two technostressors were not found to be positively associated with strain, namely, techno-induced work-home conflict and techno-induced invasion of privacy. However, contrary to our results, these two technostressors have been found to be associated with strain in previous studies (Ahuja et al., 2007; Mourmant et al., 2009; Ragu-Nathan et al., 2008; Turel et al., 2011). Our results showed that they may not be a source of strain for small business owners. However, based on this, additional research should be conducted to further explore our results.

Furthermore, our findings showed that these three technostressors, techno-induced work overload, techno-induced job insecurity and techno-induced role ambiguity, had no

direct effect on burnout; rather, their effects were fully mediated by strain. In the short-term, small business owners may not directly experience job burnout due to technostressors, but they may experience strain resulting in stress sensations and fatigue; in the long-term, prolonged and chronic reactions to strain may result in burnout (Bergefurt et al., 2021; Demerouti et al., 2002; Jimenez and Dunkl, 2017; Richter and Hacker, 1998; Shirom and Melamed, 2006). Additional research based on the model developed in the current study should be conducted.

6.1 Theoretical implications

Our study makes important contributions to the entrepreneurship literature and especially to the burnout literature of entrepreneurs and small business owners (Palmer et al., 2021). First, our study clarifies the mechanisms through which technostress may impact strain and job burnout. We empirically tested a revised model based on the SSO perspective (Koeske and Koeske, 1993) to consider the short-term and long-term consequences of strain. Our results emphasise that strain fully mediates the relationship between technostress (technostressors) and job burnout. These results are original because, to our knowledge, our model has never been tested before.

Second, our study responds to the recent IS literature calling for the adoption of interdisciplinary and multidisciplinary perspectives to better understand the impact of technostress (Bondanini et al., 2020; Tarafdar and Davison, 2018). Our multidisciplinary study that draws on the IS and entrepreneurship literature (and is conducted with small business owners) is itself an important contribution, as it helps elucidate the complexity of the relationship among technostress, strain, and job burnout.

Third, our research provides reliable results because we used a large sample of 239 small business owners (Martin et al., 2020; Memon et al., 2020). It contributes to the entrepreneurship literature by providing useful insights into SME owners' health and presents directions for future research on this issue (Lechat and Torrès, 2017; Martin et al., 2020; Palmer et al., 2021; Stephan, 2018; Soenen et al., 2019; Torrès and Thurik, 2019; Wiklund et al., 2019).

6.2 Practical implications

Important practical implications for small business owners can be formulated based on our study. ICTs are commonly used at home and at work and can be a source of strain and job burnout. Our findings revealed that small business owners frequently use ICTs and are potentially exposed to three main technostressors, namely, techno-induced work overload, techno-induced job insecurity, and techno-induced role ambiguity. Indeed, small business owners should manage their use of ICTs to prevent such technostressors (Brown et al., 2014; Lee et al., 2014). Even if the 'right to disconnect' applies only to employees and managers, to prevent work overload, small business owners should disconnect from work and not engage in work-related ICTs at home (Degryse, 2016; Khedhaouria and Cucchi, 2019; Pansu, 2018). Similarly, to prevent stress related to perceived job insecurity, small business owners should be updated about novel ICTs and develop their technological skills through training (Ayyagari et al., 2011; Degryse, 2016). Moreover, to prevent role ambiguity, small business owners should participate in training

sessions on time management to help them prioritise tasks and manage work-related ICTs (Ayyagari et al., 2011).

7 Limitations and future research

The current study has various limitations that should be addressed in future research. First, the present study is cross-sectional. Although the study makes meaningful contributions, a longitudinal study of the short- and long-term consequences of strain should be carried out (Demerouti et al., 2002). Further research should be conducted to employ different measures of strain over time.

Second, in the present study, we carried out our research with small business owners without considering individual differences such as personality traits. Individual differences in technostress have been studied and should be considered (Khedhaouria and Cucchi, 2019; Srivastava et al., 2015). Additionally, entrepreneurs' ICT usage has been studied in past studies (Orser and Riding, 2018; Sevä et al., 2016). Individual differences such as gender or entrepreneurs' profiles should be considered in future research on technostress. Moreover, future studies should also consider other industries, such as handicrafts, while focusing on entrepreneurs' health and well-being (Loarne-Lemaire et al., 2020) and investigating various countries.

Third, moderator variables such as social support and personal accomplishment have been studied in the empirical literature and have been considered to play a buffering role in the relationship among stress, strain, and burnout (Koeske and Koeske, 1993). Further research should be carried out to consider the role of such moderator variables.

Fourth, ICT and technology in general represent a key factor for SME internationalisation and development (Dana, 2017). Further research should focus on technostress in the context of SME internationalisation.

Finally, ICT strategies have been recognised to create performance and innovative effects in companies in specific contexts (Gërguri-Rashiti et al., 2017). Future studies should examine the links between ICT strategies, performance, innovation, and technostress for entrepreneurs.

Despite these limitations, our study provides considerable insights that may enrich the entrepreneurship literature and help small business owners prevent technostress and especially burnout (Palmer et al., 2021).

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Appendix

Table A1 Measurement scales

Measurement scales	*Items and source*	
Negative affectivity	Agho et al. (1992)	
Indicate to what extent you disagree or agree with each statement (1 = 'strongly disagree' to 7 = 'strongly agree')		
NEGAF1	I often find myself worrying about something.	
NEGAF2	My feelings are hurt rather easily.	
NEGAF3	I suffer from nervousness.	
NEGAF4	My mood often goes up and down.	
NEGAF5	I often lose sleep over my worries.	(Omitted)
ICT usage		
For your work-related tasks, how often do you use the following information and communication technologies (ICTs)?		
(1 = 'never or rarely' to 7 = 'intensively')		
ICTUSE1	Electronic mail.	
ICTUSE2	Desk phone.	(Omitted)
ICTUSE3	Cell phone.	
ICTUSE4	Enterprise intranet.	
ICTUSE5	Networks and enterprise servers.	
ICTUSE6	Geolocalisation tools.	
ICTUSE7	Computer and application software (word processing, presentation, spreadsheet).	
ICTUSE8	Computer and specialised software related to my job.	

Table A1 Measurement scales (continued)

Measurement scales	*Items and source*	
Techno-induced work-home conflict	Kreiner (20060, Netemeyer et al. (1996)	
Indicate to what extent you disagree or agree with each statement (1 = 'strongly disagree' to 7 = 'strongly agree')		
WHOMEC1	Using ICTs blurs boundaries between my job and my home life.	
WHOMEC2	Using ICTs for work-related responsibilities creates conflicts with my home responsibilities.	
WHOMEC3	I do not get everything done at home because I find myself completing job-related work due to ICTs.	
Techno-induced invasion of privacy	Alge (2001), Eddy et al. (1999)	
Indicate to what extent you disagree or agree with each statement (1 = 'strongly disagree' to 7 = 'strongly agree')		
INVPRIV1	I feel uncomfortable that my use of ICTs can be easily monitored.	
INVPRIV2	I feel my privacy can be compromised because my activities using ICTs can be traced.	
INVPRIV3	I feel enterprises could violate my privacy by tracking my activities using ICTs.	
INVPRIV4	I feel that my use of ICTs makes it easier to invade my privacy.	
Techno-induced work overload	Moore (2000)	
Indicate to what extent you disagree or agree with each statement (1 = 'strongly disagree' to 7 = 'strongly agree')		
WOVERL1	ICTs create many more requests, problems, or complaints in my job than I would otherwise experience.	
WOVERL2	I feel busy or rushed due to ICTs.	
WOVERL3	I feel pressured due to ICTs.	
Techno-induced role ambiguity	Moore (2000)	
Indicate to what extent you disagree or agree with each statement (1 = 'strongly disagree' to 7 = 'strongly agree')		
ROLAMBIG1	I am unsure whether I have to deal with ICT problems or with my work activities.	
ROLAMBIG2	I am unsure what to prioritise: dealing with ICT problems or my work activities.	
ROLAMBIG3	I cannot allocate time properly for my work activities because my time spent on ICTs-activities varies.	(omitted)
ROLAMBIG4	Time spent resolving ICT problems takes time away from fulfilling my work responsibilities.	(omitted)

Table A1 Measurement scales (continued)

Measurement scales	*Items and source*	
Techno-induced job insecurity	Ashford et al. (1989)	
Indicate to what extent you disagree or agree with each statement (1 = 'strongly disagree' to 7 = 'strongly agree')		
JOBINSEC1	ICTs will advance to an extent where my present job can be performed by a less skilled individual.	
JOBINSEC2	I am worried that new ICTs may pose a threat to my job.	
JOBINSEC3	I believe that ICTs make it easier for other people to perform my work activities.	
Strain	Moore (2000)	
Indicate to what extent you disagree or agree with each statement (1 = 'strongly disagree' to 7 = 'strongly agree')		
STRAIN1	I feel drained from activities that require me to use ICTs.	
STRAIN2	I feel tired from my ICT activities.	
STRAIN3	Working all day with ICTs is a strain for me.	
STRAIN4	I feel burned out from my ICT activities.	
Burnout (SMBM)	Shirom and Melamed (2006)	
When thinking about your work, indicate to what extent you disagree or agree with the following statements (1 = 'strongly disagree' to 7 = 'strongly agree')		
BURNOUT1	I feel tired.	(Omitted)
BURNOUT2	I have difficulty concentrating.	
BURNOUT3	I feel I am not thinking clearly.	
BURNOUT4	I feel I am not capable of being sympathetic to co-workers.	
BURNOUT5	I feel fed up.	(Omitted)
BURNOUT6	I have difficulty thinking about complex things.	
BURNOUT7	I feel burned out.	
BURNOUT8	I feel I am unable to be sensitive to the needs of co-workers.	
BURNOUT9	I feel I am not focused in my thinking.	
BURNOUT10	I feel physically drained.	
BURNOUT11	I have no energy for going to work in the morning.	
BURNOUT12	I feel like my 'batteries' are 'dead'.	
BURNOUT13	My thinking process is slow.	
BURNOUT14	I feel I am not capable of investing emotionally in co-workers.	