J Bus Econ (2015) 85:349–387
DOI 10.1007/s11573-014-0759-8

ORIGINAL PAPER

Information technology as daily stressor: pinning down the causes of burnout

Christian Maier · Sven Laumer · Andreas Eckhardt

Published online: 6 January 2015

Abstract The research presented in this article aims to identify information technology-related stressors in daily work life that might contribute to burnout. We provide a detailed analysis of techno- and work-stressors, techno- and work-exhaustion, as well as the consequences of and interrelations among these perceptions. Techno-stressors and techno-exhaustion are theorized as antecedents of work-stressors, work-exhaustion, and work-related outcomes, such as job satisfaction, organizational commitment, and turnover intention. The proposed model assesses whether using information technology (IT) or other work-stressors cause exhaustion and consequently negative outcomes in terms of low job satisfaction, low organizational commitment, and high turnover intention. The results of an empirical study with 306 employees show that IT usage causes exhaustion because techno-stressors contribute to techno-exhaustion, which in turn influences work-exhaustion significantly. Our results also reveal that work-exhaustion negatively impacts job satisfaction, organizational commitment, and turnover intention, whereas techno-exhaustion only indirectly causes these psychological and behavioral responses through work-exhaustion. Finally, post hoc analyses identify that employees who use IT as a supporting tool for their daily work process (such as HR workers) report

C. Maier (✉) · S. Laumer
Lehrstuhl für Wirtschaftsinformatik, insb. Informationssysteme in Dienstleistungsbereichen, Centre of Human Resources Information Systems, Otto-Friedrich Universität Bamberg, An der Weberei 5, 96047 Bamberg, Germany
e-mail: christian.maier@uni-bamberg.de

S. Laumer
e-mail: sven.laumer@uni-bamberg.de

A. Eckhardt
Goethe-Universität Frankfurt am Main, Institut für Wirtschaftsinformatik, Centre of Human Resources Information Systems, Grüneburgplatz 1, 60323 Frankfurt am Main, Germany
e-mail: eckhardt@wiwi.uni-frankfurt.de

higher levels of techno-exhaustion than employees for whom IT is the core of their work (IT professionals, such as software developers).

Keywords Techno-stress · Work-stress · Techno-exhaustion · Work-exhaustion · IT professionals · Job satisfaction · Turnover intention · Organizational commitment

JEL Classification M15 · O15 · O33

1 Introduction

Employee burnout is an ever greater social challenge for organizations because an increasing number of employees are either at high risk of developing or already suffer burnout (Maslach et al. 2001). This psychological illness causes long-term psychological and physiological problems and can raise existential fears among employees. According to a recent study, ten percent of sick days in German organizations resulted from employee burnout (Sicking 2011). This results in billions of euros in costs for organizations, hence reducing organizations' overall profits.

Due to the economic, organizational, and societal relevance, researchers have made great efforts to understanding the sources and consequences of burnout (Maslach et al. 2001), which is generally defined and characterized as the state of long-term exhaustion accompanied by diminished interest and performance. Exhaustion, the hallmark of burnout (e.g., Kristensen et al. 2005; Shirom and Melamed 2005), is the focus of two streams of research. One stream investigates overall work-related stressors as causes of work-exhaustion (Moore 2000; Ahuja et al. 2007; Podsakoff et al. 2007; Rutner et al. 2008) and the second stream identifies the increasing and deep embeddedness of information technology (IT) in daily working processes (Tarafdar et al. 2010) as a source of techno-exhaustion (Ayyagari et al. 2011).

Although IT usage is postmarked as a main contributing factor for work-exhaustion and employee burnout in the public mind (e.g., Der Spiegel 2011; Süddeutsche Zeitung 2012), the extent to which IT usage and techno-exhaustion is the actual breeding ground for work-exhaustion has not been explored. To address this research gap, we theorize the role of techno-stressors and techno-exhaustion in the context of overall work-stressors, work-exhaustion, and work-related outcomes. Accordingly, this research aims answer the following research question:

> *How do techno-stressors and -exhaustion influence work-stressors, -exhaustion, and work-related outcomes?*

The results of an online survey of 306 employees reveal that techno-stressors have a significant effect on work-stressors and that techno-exhaustion is a contributing factor to work-exhaustion. The results also show that techno-exhaustion has no direct effect on job satisfaction, organizational commitment, and turnover intention. Instead, techno-exhaustion has an indirect effect on the three work-related outcome variables mediated by work-exhaustion. Hence, work-exhaustion is the main contributing factor for decreasing job satisfaction and

organizational commitment and increasing turnover intention. Moreover, the results of post hoc analyses show that employees' reactions to stressors and exhaustions differ according to their professional occupation. Particularly noteworthy, while focusing on different occupations, such as IT professionals, for whom IT is the core of their working process (e.g., software developers, who design, implement, and test systems), and non-IT professionals, who only use IT as supporting instrument for their daily working process (e.g., recruiters in HR using Microsoft Excel or logisticians using SAP), we show that non-IT professionals suffer from techno-exhaustion to a significantly higher extent than IT professionals. In addition, although techno-exhaustion only indirectly affects work-related outcomes through work-exhaustion among IT professionals, techno-exhaustion is also a significant cause of low job satisfaction and organizational commitment and high turnover intention for non-IT professionals.

The remainder of this article is structured as follows. We first present the stressor–strain–outcome model (Koeske and Koeske 1993) as the underlying theoretical lens and discuss stressors, strains and outcomes in detail. Then we develop the research model and describe the research method, including data collection procedure and measures. Finally, the research results, implications and limitations are discussed and the paper's contributions are summarized.

2 Theoretical background and hypotheses development

2.1 Theoretical background

Prior research has studied exhaustion in two different streams. One stream of research has focused on the sources and consequences of work-exhaustion. Here, work-stressors, which depict work-related stimuli encountered by employees, have

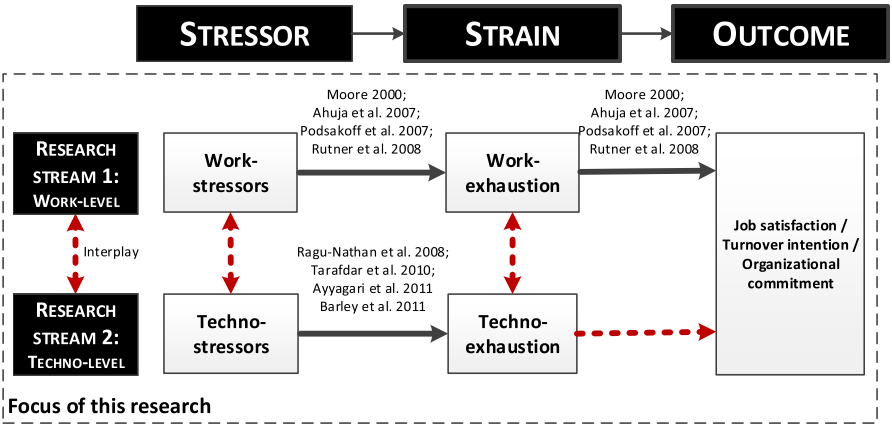

Fig. 1 Scope of this research based on the stressor–strain–outcome model (*red dotted arrows* have not been investigated in prior research)

been identified as a source of work-exhaustion, which in turn causes low levels of job satisfaction and organizational commitment and high intention to quit (e.g., Moore 2000; Ahuja et al. 2007; Podsakoff et al. 2007; Rutner et al. 2008). A second stream of research discussed different techno-stressors as sources of techno-exhaustion (e.g., Ayyagari et al. 2011; Barley et al. 2011; Riedl et al. 2012). These streams and their foci are summarized in Fig. 1.

The research streams of techno- and work-stress have in common that both make a distinction between the three concepts of stressor, strain and outcome. This distinction is suggested by the stressor–strain–outcome model (Koeske and Koeske 1993), which provides an overall explanation of the interplay of stressors, strain and the respective consequences (see Fig. 1). The model illustrates the overall stress process, which is initiated by stressors, which are defined as stimuli, events, or demands encountered by individuals in the environment (Ragu-Nathan et al. 2008; Ayyagari et al. 2011). The model then posits that these stressors cause strain, which is defined as an immediate unconsciously psychological response to stressors (de Croon et al. 2004; Ayyagari et al. 2011), which in turn leads to further reactions, which are summarized as outcome variables and conceptualized as "*enduring behavioral or psychological consequences of prolonged … strain*" (Koeske and Koeske 1993, p. 111).

Based on this understanding and the fact that prior research does not state how techno-exhaustion influences outcome variables, we focus on identifying stressors influencing work-related outcomes and theorize how these stressors influence employees. In order to minimize redundancies while doing so, we first focus on work-related outcomes in terms of job satisfaction, organizational commitment, and turnover intention and the relationships among them. Afterwards, the two strain variables techno- and work-exhaustion are presented and their interplay as well as their effect on work-related outcome variables are theorized. Finally, techno- and work-induced stressors are introduced and the interplay as well as the influence of these stressors on the exhaustion variables is hypothesized.

2.2 Outcome: job satisfaction, organizational commitment, and turnover intention

Prior research has discussed multiple reactions to employee exhaustion. One of the most widely studied and observed reactions to employee exhaustion is employee turnover (e.g., Ahuja et al. 2007; Podsakoff et al. 2007), which is when employees quit their job and change their employer.

In general, employee turnover has been discussed in more than 1,500 research studies over the last decades (Barrick and Zimmerman 2005). Based on different models and theories (e.g., March and Simon 1958; Porter and Steers 1973; Mitchell et al. 2001), turnover is investigated from different perspectives and for specific occupations (e.g., Joseph et al. 2007; Lacity et al. 2008) with the common objective to explain why and how employees develop the intention to quit (Joseph et al. 2007). Such turnover intentions reflect the deliberate and conscious willingness to quit a job and leave the organization (Tett and Meyer 1993) and are mostly influenced by two different kinds of attitudes. The first, job satisfaction, subsumes

"*the sum of the evaluations of the discrete elements of which the job is composed*" (Locke 1969, p. 330) and reflects the degree to which an employee enjoys working for her employer (Hoppock 1935). The second one, organizational commitment, is defined as "*enduring feelings about shared norms and individuals' willingness to exert effort on behalf of the organization*" (Thatcher et al. 2002, p. 234) and describes the emotional attachment to the employer. Based on a wealth of prior research suggesting low levels of job satisfaction and organizational commitment as sources of high turnover intention (e.g., Joseph et al. 2007; Lacity et al. 2008), we hypothesize that:

H1: The higher an individual's job satisfaction, the lower the turnover intention.
H2: The higher an individual's organizational commitment, the lower the turnover intention.

2.3 Strain: techno-exhaustion and work-exhaustion

Much research based on employees reporting low job satisfaction, low emotional attachment to the employer, or high turnover intentions has focused on the concept of strain (Podsakoff et al. 2007). An increasing number of employees report being exhausted either as a consequence of their daily work (Ahuja et al. 2007; Rutner et al. 2008) or due to the usage of IT (Ayyagari et al. 2011). Techno- and work-exhaustion thus represent unconscious psychological reactions to stressors caused by different stimuli. Work-exhaustion is the state of being drained or fatigued after a long working day, while techno-exhaustion is the state of fatigue exhaustion caused by using IT (Ayyagari et al. 2011).

We theorize that techno- and work-exhaustion are related, in that both are forms of exhaustion, but also distinct, in that they relate to different objects and consequently have different antecedents. Regardless of the cause of exhaustion, we argue that employees respond to techno- and work-exhaustion either psychologically, with decreasing job satisfaction or organizational commitment, or behaviorally, by developing a high intention to quit their job (Podsakoff et al. 2007; Ragu-Nathan et al. 2008). We theorize that employees who are drained from work and from using IT will like their job less and report lower job satisfaction. In addition, since exhausted employees are in disharmony with the prevailing occupational circumstances causing these negative perceptions, techno- and work-exhaustion also decrease the level of emotional attachment to the employer. Finally, techno- and work-exhaustion also cause employees to rethink whether to continue working for this organization, as negative perceptions might only diminish when they quit their job. Consequently, as employees aim to avoid such undesired perceptions, they develop turnover intentions (e.g., Maier et al. 2013b), so that we hypothesize that:

H3: The higher an individual's work-exhaustion the lower the (a) job satisfaction and (b) organizational commitment, as well as the higher the (c) turnover intention.

H4: The higher an individual's techno-exhaustion the lower the (a) job satisfaction and (b) organizational commitment, as well as the higher the (c) turnover intention.

In addition, we theorize that techno- and work-exhaustion influence each other, since both describe states of being drained (Ayyagari et al. 2011), although work-exhaustion considers this from a more general perspective (Moore 2000). This is because a great number of employees have to deal with IT during their working day (Alter 2008, 2013; Ragu-Nathan et al. 2008). Employees exhausted from using IT will also report being exhausted from work if IT is needed regularly to accomplish daily working tasks. On the contrary, work-exhaustion is not reducible to techno-stress, but can, rather, have non-IT-related causes (e.g., interpersonal problems). Based on this we hypothesize that:

H5: The higher an individual's techno-exhaustion, the higher the work-exhaustion.

2.4 Stressor: overall work-stressors

An employee's state of exhaustion does not arise in a vacuum, but rather develops when stressful stimuli are perceived. Work-related stressors have been discussed as stimuli causing work-exhaustion (e.g., Podsakoff et al. 2007; Moore 2000; Ahuja et al. 2007; Rutner et al. 2008). Particularly, increasing workload has been discussed as a stressful stimulus. In fact, an employee's overall workload is identified as a central cause of work-exhaustion (Ahuja et al. 2007; Moore 2000). Rutner et al. (2008) identify fairness of rewards as another factor contributing to work-exhaustion. Finally, work-home conflict is considered a further stressful stimulus of exhaustion (e.g., Ahuja et al. 2007; Mourmant et al. 2009). This means that the demands of employees' work interfere with non-work activities and blur the boundaries, which is perceived as a source of work-exhaustion.

As the relation between these three work-stressors (Table 1) and work-exhaustion is well established in prior stress literature (e.g., Podsakoff et al. 2007; Moore 2000; Ahuja et al. 2007; Maslach and Leiter 2008; Rutner et al. 2008; Chawla and Sondhi 2011), we assume that:

Table 1 Definition of work-stressors

Concept	Description	References
Overall workload	Reflects that an employee has too much work to accomplish	Ahuja et al. (2007), Moore (2000)
Fairness of rewards	Reflects that the balance between work and reward is satisfactory	Moore (2000), Rutner et al. (2008)
Overall work-home conflict	Reflects that the boundaries between work and private life blur and merge with each other	Ahuja et al. (2007)

H6: The higher an individual's (a) overall workload and (b) overall work-home conflict as well as the lower the (c) perceived fairness of rewards, the higher the work-exhaustion.

2.5 Stressor: techno-stressors

Techno-stress is a phenomenon which has arisen as IT usage has gained increasing significance in organizations (Ayyagari et al. 2011; Barley et al. 2011) as well as in private households (Maier et al. 2012, 2014). It particularly concentrates on the relationship between IT usage and IT users and reflects the extent of stress experienced by IT users (Ragu-Nathan et al. 2008).

Prior techno-stress research theorizes that IT forces employees to work more and faster, invades employees' personal lives, and stokes fears of being replaced (Tarafdar et al. 2010). Generally, IT is perceived as complex, intrusive and dynamic (Ayyagari et al. 2011), so employees perceive techno-stressors, such as techno-induced work-home conflict, invasion of privacy, work overload, role ambiguity, and job insecurity. These five techno-stressors are discussed as major sources of techno-exhaustion (Ayyagari et al. 2011). Techno-induced work-home conflict describes blurring boundaries between work demands and family demands as a result of extensive IT usage (Pawlowski et al. 2007; Mourmant et al. 2009). Techno-induced invasion of privacy reflects employees' perceptions that their privacy is threatened due to IT usage (Alge 2001; Malhotra et al. 2004). Techno-induced work overload suggests that IT usage creates problems so that employees feel pressured and ultimately have more work to do than they can handle (Eckhardt et al. 2012, 2013). Techno-induced role ambiguity reflects employees' lack of clarity about whether they should deal with regular work tasks or with technological problems (Ayyagari et al. 2011). Techno-induced job insecurity describes the perceived threat of losing a job due to insufficient skills or because jobs can be performed by less

Table 2 Definition of techno-stressors

Concept	Description	References
Techno-induced work-home conflict	Perceived conflict between the demands of technologies used at work and the demands of family life	Ayyagari et al. (2011)
Techno-induced invasion of privacy	Perception that privacy is compromised when using technologies at work	Ayyagari et al. (2011)
Techno-induced work overload	Perceived pressure to work faster and longer due to the usage of technologies	Tarafdar et al. (2010)
Techno-induced role ambiguity	Perceived lack of clarity about whether one has to deal with technology-related problems or with work activities	Ayyagari et al. (2011)
Techno-induced job insecurity	Perceived threat of losing one's job because technologies might replace them or because other individuals might have greater technology-related skills	Tarafdar et al. (2010)

skilled individuals supported by IT (Ragu-Nathan et al. 2008). Hence we follow prior research assuming that these five techno-induced stressors (Table 2) cause techno-exhaustion and hypothesize that:

H7: The higher an individual's (a) techno-induced work-home conflict, (b) techno-induced invasion of privacy, (c) techno-induced work overload, (d) techno-induced role ambiguity, as well as (e) techno-induced job insecurity, the higher the techno-exhaustion.

In addition to techno-induced stressors causing techno-exhaustion, we theorize that techno-stressors also influence work-stressors, which is discussed below.

2.5.1 Techno-stressors as antecedents of overall workload

As discussed above, the work-stressor overall workload describes employees' perception that they have too much work to accomplish (e.g., Schaufeli et al. 1995; Leiter and Schaufeli 1996). Recently, the ubiquity of using IT has been revealed as a factor tightening time schedules (Tarafdar et al. 2010), because IT might cause additional unexpected problems or requests that go beyond the daily stable work routine so that the techno-induced workload increases employees' overall workload. In addition, employees are confronted with another stressful stimulus when IT causes unexpected problems; should they try to solve the IT problem or should they accomplish work tasks by applying workarounds. Hence, employees are confronted with techno-induced role ambiguity that also increases the overall workload, so that we theorize techno-induced role ambiguity as an influencing factor for overall workload. Next to these stimuli, some IT, such as smart-phones or laptops, tempt employees to check work-related emails at home. This means that employees are connected to work due to technology-induced 24/7 availability (Barley et al. 2011). We therefore theorize that the more, longer, and more frequently employees are virtually connected to work at home, the higher the overall workload. In summary, we hypothesize that:

H8: The higher an individual's (a) techno-induced work overload, (b) techno-induced role ambiguity, as well as (c) techno-induced work-home conflict, the higher the overall workload in general.

2.5.2 Techno-stressors as antecedents of overall work-home conflict

Overall work-home conflict means that the demands of work are incompatible with the obligations of private life, so that the quality of both domains is adversely affected (Ahuja et al. 2007). This is particularly the consequence of an increasing amount of work-related IT, so that employees are not able to free their minds from work-related input when at home. Since mobile IT such as smartphones, tablets, or laptops are used to accomplish work-related tasks or to check work-related messages, these technologies might be considered a particular organizational element inducing blurred boundaries (Middelton and Cukier 2006), causing work to interfere with private life.

Next, employees will bring home organizational problems if they fear being replaced by less skilled employees as IT simplifies work dramatically or if they fear not meeting the increasing demands for advanced IT skills (Tarafdar et al. 2010). Thus, techno-induced job insecurity can cause perceived work-home conflict. Furthermore, some employees who perceive IT-induced pressure at work and have an increased techno-induced workload (Eckhardt et al. 2012, 2013) cannot relax their minds at home. This means that the techno-induced workload is one particular source of increased overall work-home conflict. Finally, employees might also spend time at home considering whether they have prioritized correctly between dealing with techno-related problems or general work activities. Hence, we assume that four techno-stressors contribute to employees' overall work-home conflict and hypothesize:

H9: The higher an individual's (a) techno-induced work-home conflict, (b) techno-induced job insecurity, (c) techno-induced workload, as well as (d) techno-induced role ambiguity, the higher the overall work-home conflict.

Based on these hypotheses Fig. 2 presents our research model of techno- and work-stress.

3 Research method

3.1 Data collection

We collected data to evaluate our research model by conducting an online survey. This procedure seems suitable because it allowed us to reach a lot of employees in different occupations and organizations. The target group for this research setting is the total office-job workforce, including individuals of all age groups and of different educational backgrounds. To invite individuals with such a profile to take part in the online survey, we collected email addresses over several years. Some participants signed up on our institute's website to participate in forthcoming surveys, and we asked some participants in past surveys on different issues such as e-recruiting, e-commerce, computer personnel-related issues, and social media whether we might invite them to participate in future surveys. These sources resulted in a list of individuals we can contact and invite to participate in surveys. We pre-screened the demographics of these individuals based on the answers given in prior research and extracted individuals working for an organization, so that pupils, students, or pensioners, who are not included in the target group for this research, were not invited. Based on the resulting list, we invited a sample of 1,000 individuals to take part in the survey. Each individual was invited via email only once to avoid biasing participants by sending them multiple emails and thus exerting pressure on them. In order to increase individuals' response rate, we raffled three shopping vouchers worth € 200 each. The procedure was completed between July 2012 and September 2012.

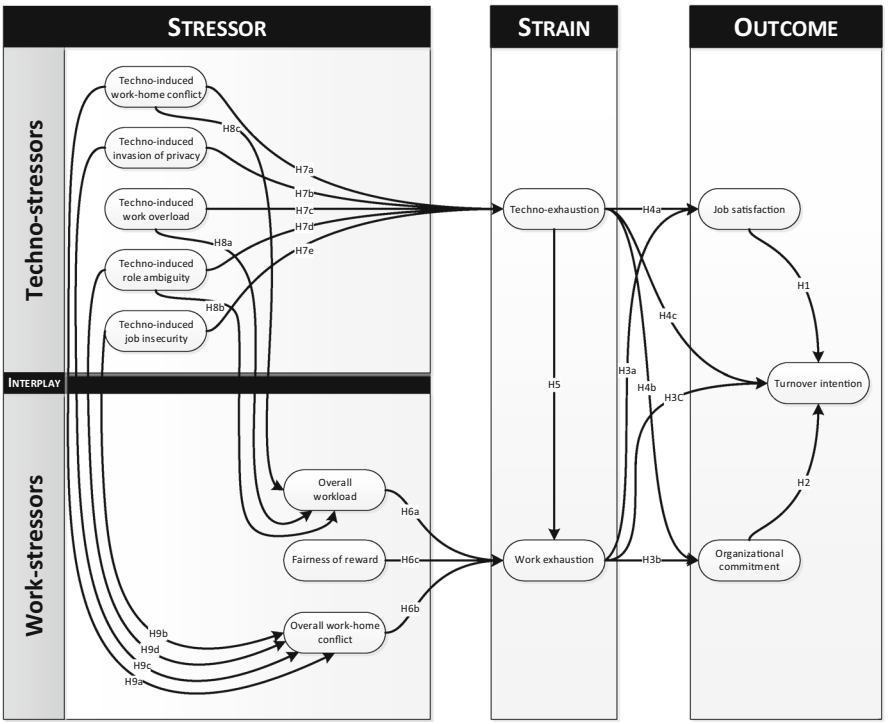

Fig. 2 Research model of techno- and work-stressors

3.2 Measures

3.2.1 Stressors

Overall work–home conflict is measured with five items and a 7-point Likert scale anchored by 1 (strongly disagree) and 7 (strongly agree) as suggested by Ahuja et al. (2007). The work-stressor *overall workload* is based on Moore (2000) and uses four items. The scale *fairness of rewards* is also based on Moore (2000) and is measured with two items on a 7-point Likert scale. Next, the five *techno-stressors* are all measured with the items suggested by Ayyagari et al. (2011) on a 7-point Likert scale, with the exception of *job insecurity*, which is extended by including two additional items suggested by Ragu-Nathan et al. (2008).

3.2.2 Strain

Prior research suggests emotional exhaustion as a conceptualization of strain (Ayyagari et al. 2011). Hence, techno- and work-exhaustion were used in order to measure the degree to which an employee feels strained due to work tasks and IT usage. The measurement of *work-exhaustion* is based on Moore (2000) and *techno-*

exhaustion is measured as suggested by Ayyagari et al. (2011). Both were measured with scales anchored by 1 (never) and 7 (daily).

3.2.3 Outcomes

Job satisfaction is measured with a scale based on Bartol (1983), Thatcher et al. (2002), and Lee et al. (1999). It includes three items reflecting an employee's evaluation of the overall job and is measured with a 7-point Likert scale, anchored by 1 (strongly disagree) and 7 (strongly agree). *Organizational commitment* is measured with five items on the same 7-point Likert scale. The dependent variable *turnover intention* is based on prior articles focusing on voluntary turnover research (e.g., Hom and Katerberg 1979; Lee et al. 1999; Thatcher et al. 2002; Maier et al. 2013b) and includes four items. Again a 7-point Likert scale is used, whereby 1 indicates strong disagreement with the statement and 7 indicates strong agreement.

3.3 The structure of the online survey

The online survey consists of four separate parts to ensure that participants can clearly distinguish (1) demographic data, (2) work-stressors and work-exhaustion, (3) techno-stressors and techno-exhaustion, and (4) reactions to stressors and exhaustion. Participants first provided demographic data, such as their age, gender, and occupation. Second, we asked participants to imagine a usual working day and after the next mouse click, participants evaluated their perceptions of work-stressors and work-exhaustion. Third, participants were asked to focus on IT used at work. Again, after the next mouse click, participants evaluated the perception of the five techno-stressors as well as techno-exhaustion. Fourth, participants evaluated their job satisfaction, organizational commitment, and turnover intention.

4 Research results

4.1 Sample characteristics

A total of 342 individuals participated in the survey, but 36 participants had to be removed from the final data set because of incomplete or incorrect data. Consequently, the final data set includes 306 participants who completed the survey without any missing value. As a consequence of the data collection procedure, the data sample includes individuals from different organizations who are full-time employees and who use IT daily to accomplish working tasks. The demographic characteristics of the data sample are presented in Table 3.

Based on this data, we investigated the hypotheses of the research model. To validate these hypotheses, we use the partial least squares (PLS) method and SmartPLS 2.0 M3 (Ringle et al. 2005).

Table 3 Demographics and IT-related characteristics of 306 participants

Demographics and characteristics											
Age					Gender		IT usage at work			Occupation	
<25	25–34	35–44	45–54	>54	Men	Women	<3 h	3–6 h	>6 h	IT professionals	Non-IT professionals
1.0 %	28.5 %	37.1 %	24.9 %	8.5 %	60.7 %	39.3 %	9.8 %	29.2 %	61.0 %	35.6 %	64.4 %

4.2 Common method bias

Empirical research has to consider common method bias (CMB) in self-reported data (Podsakoff et al. 2003). To determine the extent of CMB, we ran two tests. The first one is the Harman's single factor test, which indicates whether or not the majority of the variance can be explained by one single factor. The results show that only 24.9 % of the variance of the data is explained by one factor. The second one was proposed by Williams et al. (2003). They suggest determining the extent of CMB with the help of PLS by including a CMB factor into the model. All remaining factors are transformed into several single-item constructs and the ratio of R^2 with a CMB factor to R^2 without a CMB factor is compared. The CMB factor explains an average delta R^2 of 0.004. Without a CMB factor, the average R^2 is 0.640. This indicates ratios of 1:160 so that we cannot observe signs of CMB influence (Liang et al. 2007).

4.3 Measurement model

As constructs are measured by reflective indicators, content validity, indicator reliability, construct reliability, and discriminant validity have to be observed in order to validate the measurement model (Bagozzi 1979).

4.3.1 Content validity

To ensure content validity, items used in prior research were adapted to this research. These scales discussed in section data collection and items are provided in the Appendix (Table 10).

4.3.2 Indicator reliability

The indicator reliability indicates the rate of the variance of an indicator that has its origins in the latent variables. In order to explain at least 50 % of the variance of a latent variable by the indicators, each value has to be 0.707 or more (Carmines and Zeller 2008). This is fulfilled for all indicators and in addition all loadings have a significance level of at least 0.001 and are thus highly significant (Appendix, Table 11). This is tested using the bootstrap method with 5,000 samples.

4.3.3 Construct reliability

To determine the quality at the construct level, the concepts composite reliability (CR) and average variance extracted (AVE) are used (Fornell and Larcker 1981). Here, AVE should be higher than 0.5 and CR higher than 0.7. As seen in the "Appendix" (Table 11), both criteria are fulfilled.

4.3.4 Discriminant validity

Discriminant validity describes the extent to which measurement items differ from others (Campell and Fiske 1959). Therefore, the square root of AVE is included in the "Appendix" (Table 11) on the diagonal of the latent variable correlations. As these square root values are greater than the corresponding construct correlations (Fornell and Larcker 1981; Hulland 1999), we can state that this requirement is fulfilled and the measurement model is valid.

4.4 Structural model

We evaluate the structural model by considering coefficients of determination (R^2) and significance levels of path coefficients (Chin 1998). Concerning R^2, results indicate that 27.8 % of the variance of overall workload and 33.4 % of the variance of overall work-home conflict is explained by techno-stressors. Moreover, the five techno-stressors explain 58.6 % of the variance of techno-exhaustion, which in turn explains—together with three work-stressors—58.2 % of the variance of work-exhaustion. The two exhaustion variables explain 27.3 % of the variance of job satisfaction and 15.1 % of the variance of organizational commitment. Eventually, 26.1 % of the variance of turnover intention is explained by job satisfaction, organizational commitment, techno- and work-exhaustion.

As indicated by path coefficients, techno-induced work-home conflict, techno-induced work overload, and techno-induced role ambiguity contribute significantly to an employees' overall workload. In addition, the three techno-stressors work-home conflict, invasion of privacy, and job insecurity have a significant influence on an employees' overall work-home conflict. Only techno-induced invasion of privacy is not a significant influencing factor for techno-exhaustion and fairness of reward is not significantly related to work-exhaustion. Although techno-exhaustion has an influence on work-exhaustion, it does not significantly influence job satisfaction, organizational commitment, and turnover intention. Nevertheless, these three work-related outcomes are influenced significantly by work-exhaustion. Finally, turnover intention is influenced by job satisfaction and organizational commitment (Fig. 3).

To compare the strength of effect of work-stressors and -exhaustion and techno-stressors and -exhaustion on work-related outcomes, we calculate the strength of effect of each. Based on the results, we can conclude that techno-exhaustion has no significant impact on job satisfaction, turnover intention, and organizational commitment, but work-exhaustion is a significant contributing factor with a low effect on job satisfaction and organizational commitment and a medium effect on turnover intention (Table 4).

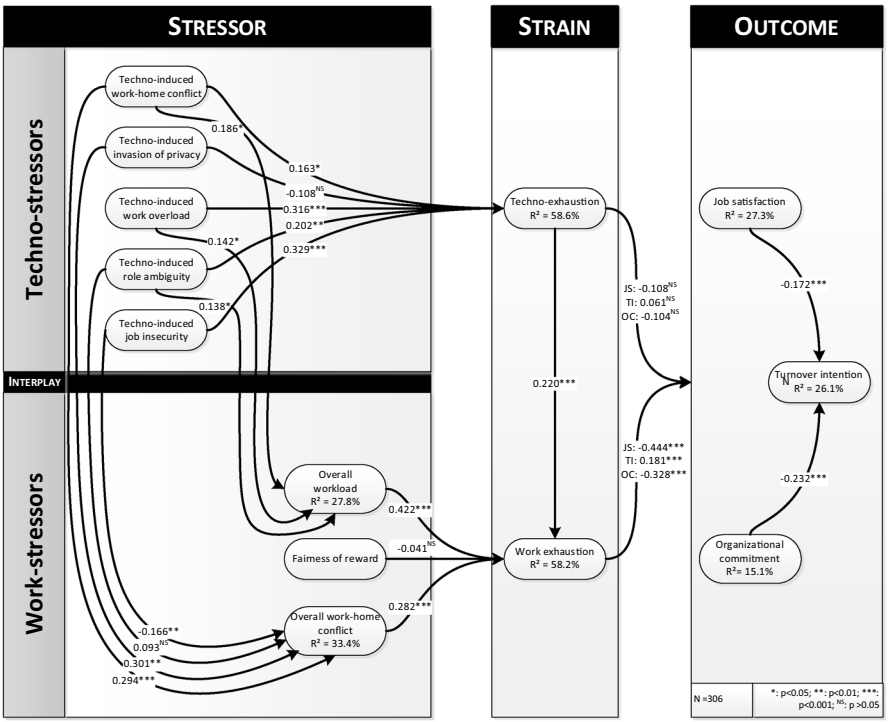

Fig. 3 Research results

As our results do not support hypotheses 4 a, b, c, the following two additional post hoc analyses investigate the influence of techno-exhaustion on work-related outcomes in detail. First, a mediation analysis evaluates whether techno-exhaustion has an indirect effect on the three work-related outcomes such that the results illustrate a mediation effect. Second, as one third of our survey participants report being in the IT profession, we focus on occupation to see whether it is important whether IT is the core of the individuals' daily working process (IT professionals, such as software developers) or whether IT is just a supporting instrument for them (non-IT professionals, such as recruiters). As a consequence of that we investigate whether the results differ when focusing either on IT professionals or on non-IT professionals.

4.5 Post-hoc analysis: work-exhaustion as mediating effect of techno-exhaustion on work-related outcomes

As discussed above, our results indicate that techno-exhaustion has no direct effect on work-related outcomes. Nevertheless, our results also reveal a significant influence of techno-exhaustion on work-exhaustion, which in turn influences job satisfaction, organizational commitment, and turnover intention. Hence, the effect of techno-exhaustion on work-related outcomes might be mediated by work-exhaustion.

Table 4 Strength of effect of techno- and work-exhaustion on work-related outcomes

Dependent variable	Job satisfaction		Organizational commitment		Turnover intention	
Independent variable	Work-exhaustion	Techno-exhaustion	Work-exhaustion	Techno-exhaustion	Work-exhaustion	Techno-exhaustion
f^2	0.04	0.01	0.10	0.01	0.19	0.00
Interpretation	Low effect	No effect	Low effect	No effect	Medium effect	No effect

f^2 means effect size

Cohen (1988) interprets effect sizes as follows: >0.35 = high effect; >0.15 = medium effect; >0.02 = low effect

To investigate whether techno-exhaustion has an indirect effect on the three work-related outcomes, we performed two analyses. First, Baron and Kenny (1986) posit that a mediating effect only exists if three conditions are fulfilled: (1) the independent variable has to be a significant direct antecedent of the mediator, (2) the independent variable has to be a direct significant antecedent of the dependent variable as well, and (3) the predictive power has to decrease when the mediator is entered into the relation between independent and dependent variable. Transferred to the question of whether work-exhaustion is a mediator of techno-exhaustion on outcomes, the results reveal that techno-exhaustion has a significant direct influence on the mediator work-exhaustion ($\beta = 0.495$; $p < 0.001$) and the three outcomes job satisfaction ($\beta = -0.375$; $p < 0.001$), organizational commitment ($\beta = -0.274$; $p < 0.001$), and turnover intention ($\beta = 0.255$; $p < 0.001$). By entering the mediator work-exhaustion to the relation between techno-exhaustion and each outcome variable, the effects of techno-exhaustion on job satisfaction ($\beta = -0.112$; $p > 0.05$), organizational commitment ($\beta = -0.117$; $p > 0.05$), and turnover intention ($\beta = 0.097$; $p > 0.05$) become insignificant, such that work-exhaustion fully mediates the effect of techno-exhaustion on job satisfaction, organizational commitment, and turnover intention.

Second, a bootstrapping method is used as suggested by Preacher and Hayes (2004) as well as Shrout and Bolger (2002). Table 5 includes the result of the mediation analysis and can be interpreted to mean that work-exhaustion mediates the effect of techno-exhaustion on job satisfaction, organizational commitment, and turnover intention. This is the case because the lower and upper thresholds of the 95 %-bias corrected confidence interval (1,000 numbers of bootstrap resamples) do not include zero. Moreover, Table 5 also includes the indirect effects.

4.6 Post-hoc analysis: IT and non-IT professionals

Although recent research suggests that techno-exhaustion is not limited to any specific occupation (Ayyagari et al. 2011), scholars have called for research that does not generalize statements across different occupations (Pawlowski et al. 2007) and thus allows meaningful statements to be made about specific occupations. In general, occupations vary in their IT usage behavior as some use IT as core of their individual working process and business such as software developers, IT

Table 5 Results of the mediation analysis

Independent variable	Mediator	Dependent variable	Bootstrapping results		
			Lower	Upper	Indirect effect
Techno-exhaustion	Work-exhaustion	Job satisfaction	−0.156	−0.082	−0.12
		Organizational commitment	−0.197	−0.063	−0.13
		Turnover intention	0.074	0.175	0.12

evangelists, or system administrators (all subsumed under "IT professionals"), whereas others (here subsumed under "non-IT professionals") use IT (e.g., ERP) as supporting instruments for their daily work tasks or to manage content and information (e.g., enterprise content management system; Laumer et al. 2013). Based on that, this post hoc analysis focuses on the influence of techno-stressors and techno-exhaustion for IT and non-IT professionals separately. Therefore, the data set is split into two data samples. The first sample includes only IT professionals and the second sample includes only non-IT professionals. The results of this post hoc analysis are presented below (see model validation: Tables 12, 13).

Table 6 indicates that techno-stressors explain 28.5 % of the overall workload for IT professionals and 29.7 % for non-IT professionals. The overall work-home conflict explains 38 % for IT professionals and 35.2 % for non-IT professionals. The presented research model also explains both work (55.4 % for IT professionals and 61.1 % for non-IT professionals) and techno-exhaustion (71.2 % for IT professionals and 53.1 % for non-IT professionals) to a good extent. The coefficients of determination of job satisfaction (32.0, 29.3 %), organizational commitment (13.6, 17.7 %), and turnover intention (32.2, 32.8 %) are comparable for IT professionals and non-IT professionals.

Next, we concentrate on path coefficients and their significance levels (Table 7). First, we can show that turnover intention is influenced by job satisfaction and organizational commitment for both occupational groups. Second, work-exhaustion is a significant contributing factor for each of the three work-related outcome variables for IT professionals as well as for non-IT professionals. Third, techno-exhaustion only influences the three outcomes for the group of non-IT professionals, and not for IT professionals. Nevertheless, techno-exhaustion has a significant effect on work-exhaustion for both groups. Fourth, work-exhaustion is influenced by overall workload and overall work-home conflict for both groups, but fairness of rewards is only a contributing factor for non-IT professionals. Fifth, techno-exhaustion is influenced by techno-induced work-home conflict, work overload, role ambiguity, and job insecurity for both groups. Sixth, overall workload is influenced by techno-induced work-home conflict for IT professionals and additionally by techno-induced role ambiguity for non-IT professionals. Moreover, overall work-home conflict is only influenced by techno-induced work-home conflict for IT

Table 6 Results of the post hoc analysis of R^2 values

R^2 of …		IT professionals (%)	Non-IT professionals (%)
Stressor	Overall workload	28.5	29.7
	Overall work-home conflict	38.0	35.2
Strain	Work-exhaustion	55.4	61.1
	Techno-exhaustion	71.2	53.1
Outcome	Job satisfaction	32.0	29.3
	Organizational commitment	13.6	17.7
	Turnover intention	32.2	32.8

professionals, whereas techno-induced job insecurity and role ambiguity are additional contributing factors for non-IT professionals.

These results inspired us to focus on the differences between IT professionals and non-IT professionals in more detail. Additionally, we will investigate whether the mean values of and path coefficients between stressors, strains, and outcomes differ for IT and non-IT professionals.

4.6.1 Mean value and path coefficient comparison for IT and non-IT professionals

In order to identify differences for IT and non-IT professionals, we compared both occupational groups with respect to mean values and path coefficients. When we compared mean values, we found that only the stressor techno-induced work-home conflict and techno-exhaustion significantly differ between the two groups (see "Appendix", Table 14). IT professionals report more often than non-IT professionals that the usage of IT blurs boundaries between job and home life. In addition, the mean value of techno-exhaustion is significantly higher for non-IT professionals, i.e. they report more often that they are exhausted from using IT than IT professionals.

When we compared path coefficients, we concluded that all path coefficients are significantly different for IT than for non-IT professionals (see "Appendix", Table 15). We were particularly interested in revealing whether techno-stressors and techno-exhaustion have different consequences on work-stressors, work-exhaustion, and work-related outcomes for IT and non-IT professionals. Here, our data analysis showed that the path coefficients of techno-induced role ambiguity, workload, and job insecurity on overall workload and overall work-home conflict are significantly higher for non-IT professionals. Only the path coefficients of techno-induced work-home conflict on both work-stressors are higher for IT professionals. Concerning the path coefficients of techno-stressors on techno-exhaustion, our results show that techno-induced work-home conflict has a significantly higher path coefficient for non-IT professionals, but the path coefficients of the other techno-stressors are significantly higher for IT professionals. Furthermore, the path coefficient of techno-exhaustion on work-exhaustion is significantly higher for non-IT professionals. Finally, we focused on the path

Table 7 Research results of the post hoc analysis of path coefficients and levels of significance

Hypotheses				IT Professionals	Non-IT Professionals
	Outcome	→	**Outcome**		
H1	Job satisfaction	→	Turnover intention	−0.126**	−0.386***
H2	Organizational commitment	→	Turnover intention	−0.440***	−0.101**
	Strain	→	**Outcome**		
H3a	Work-exhaustion	→	Job satisfaction	−0.504***	−0.397***
H3b	Work-exhaustion	→	Organizational commitment	−0.376***	−0.262***
H3c	Work-exhaustion	→	Turnover intention	0.116*	0.170**
H4a	Techno-exhaustion	→	Job satisfaction	-0.056^{NS}	−0.208***
H4b	Techno-exhaustion	→	Organizational commitment	0.022^{NS}	−0.214***
H4c	Techno-exhaustion	→	Turnover intention	-0.047^{NS}	0.138*
	Strain	→	**Strain**		
H5	Techno-exhaustion	→	Work-exhaustion	0.147***	0.265***
	Work-Stressor	→	**Strain**		
H6a	Overall workload	→	Work-exhaustion	0.402***	0.424***
H6b	Overall work-home conflict	→	Work-exhaustion	0.350***	0.248***
H6c	Fairness of rewards	→	Work-exhaustion	0.021^{NS}	−0.069*
	Techno-Stressor	→	**Strain**		
H7a	Techno-induced work-home conflict	→	Techno-exhaustion	0.108*	0.142*
H7b	Techno-induced invasion of privacy	→	Techno-exhaustion	-0.083^{NS}	-0.023^{NS}
H7c	Techno-induced workload	→	Techno-exhaustion	0.351***	0.291***
H7d	Techno-induced role ambiguity	→	Techno-exhaustion	0.249***	0.132*
H7e	Techno-induced job insecurity	→	Techno-exhaustion	0.350***	0.342***
	Techno-Stressors	→	**Work-Stressors**		
H8a	Techno-induced workload	→	Overall workload	0.092^{NS}	0.135*
H8b	Techno-induced role ambiguity	→	Overall workload	0.019^{NS}	0.265***
H8c	Techno-induced work-home conflict	→	Overall workload	0.446***	0.244***
H9a	Techno-induced work-home conflict	→	Overall work-home conflict	0.596***	0.478***
H9b	Techno-induced job insecurity	→	Overall work-home conflict	0.002^{NS}	0.185***
H9c	Techno-induced workload	→	Overall work-home conflict	0.081^{NS}	0.137*
H9d	Techno-Induced role ambiguity	→	Overall work-home conflict	-0.095^{NS}	0.241***

^{NS} $p > 0.05$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.005$

coefficients of techno-exhaustion on the three work-related outcomes and observed that these path coefficients are significantly higher for non-IT professionals.

4.6.2 Mediation analysis

Although prior research discusses stressors as direct antecedents of work-related outcomes, such as job satisfaction, organizational commitment, or turnover intention (e.g., Ahuja et al. 2007; Rutner et al. 2008), the stressor–strain–outcome model (Koeske and Koeske 1993) theorizes exhaustion as a mediator. This means that the influence of stressors does not directly result in psychological and behavioral consequences. Instead, stressors have an influence on exhaustion, which in turn impact work-related outcomes. In order to verify this empirically, we again perform a mediation analyses (Preacher and Hayes 2004; Shrout and Bolger 2002). Table 16 includes the lower and upper thresholds of the 95 %-bias corrected confidence interval (1,000 bootstrap resamples). Whenever zero is not included within the bias-corrected confidence interval, the influence of the independent variable on the dependent variable is mediated through the mediator variable. In such cases, the indirect effect is also included in Table 16. Except for the stressor techno-induced invasion of privacy, which does not influence techno-exhaustion among IT professionals or non-IT professionals, the results are consistent. First, the stressors overall workload and overall work-home conflict have an indirect mediated effect through work-exhaustion on job satisfaction, organizational commitment, and turnover intention for both groups. Second, no techno-induced stressor has a mediated influence on any work-related outcome through techno-exhaustion for IT professionals. Third, the techno-stressors have an indirect effect through techno-exhaustion on all three outcome variables for non-IT professionals. Fourth, as mentioned above, the stressor techno-induced invasion of privacy has no mediated effect on the three outcomes of both groups.

Finally, as the research model includes two different kinds of strain variables, Table 16 illustrates whether techno-exhaustion mediates the influence of stressors on work-exhaustion. Our results reveal that techno-exhaustion is a mediator of the relation between stressors and work-exhaustion for each stressor as well as among IT professionals and non-IT professionals.

We also again investigated whether the influence of techno-exhaustion is mediated by work-exhaustion on job satisfaction, organizational commitment, and turnover intention. The bootstrapping mediator analysis indicates that techno-exhaustion has an indirect effect on job satisfaction, organizational commitment, and turnover intention through work-exhaustion among IT professionals and non-IT professionals (Table 8). Moreover, the results of the three-step approach of Baron and Kenny (1986) posit that work-exhaustion is a full mediator of the influence of techno-exhaustion on job satisfaction, organizational commitment, and turnover intention.

Table 8 The indirect effect of techno-exhaustion on outcomes through work-exhaustion

Independent variable	Mediator	Dependent variable	IT professionals			Non-IT professionals		
			Lower	Upper	Indirect effect	Lower	Upper	Indirect effect
Techno-exhaustion	Work-exhaustion	Job satisfaction	−0.193	−0.062	−0.12	−0.159	−0.057	−0.11
		Organizational commitment	−0.254	−0.054	−0.13	−0.205	−0.023	−0.11
		Turnover intention	0.034	0.178	0.09	0.061	0.201	0.14

4.7 Control variables

In our research model, we focus on three particular overall work-stressors which have been proposed as the most important stressors in prior research articles. However, prior research also posits that a wide range of additional work-stressors exist that might influence strain and work-related outcomes. In addition to further work-stressors, recent research in the field of stress identifies that demographics factors, user personality, or user experience might influence whether or not users are exhausted (Ragu-Nathan et al. 2008; Ayyagari et al. 2011; Eckhardt et al. 2012, 2013; Maier et al. 2013a). Hence, we include control variables in the research model and results are included in Table 9.

5 Discussion, implications, future research, and limitations

Motivated by recent media reports that the increasing number of employees suffering burnout costs the German economy several billion euros (Sicking 2011) and presumptions by researchers, politicians, and workers' councils that IT bears the primary responsibility for this development (Ayyagari et al. 2011; Barley et al. 2011; Süddeutsche Zeitung 2012; Der Spiegel 2011), this research aims to outline the role of techno-stressors on different kinds of exhaustion as well as on work-related outcomes. We theorize how techno-stressors and techno-exhaustion influence work-related outcomes, such as job satisfaction or turnover intention, when also considering work-stressors and work-exhaustion. Accordingly, we extend recent research in the field of techno-stress research (Ayyagari et al. 2011) by theorizing the role of work-stressors, work-exhaustion, job satisfaction, organizational commitment, and turnover intention.

Our results confirm prior research that techno-stressors are contributing factors for techno-exhaustion and additionally contribute that they also influence work-stressors. Furthermore, we show that techno-exhaustion and work-stressors have an influence on work-exhaustion and, most interestingly, that techno-exhaustion is a direct contributing factor for non-IT professionals' work-related outcomes, but has only an indirect effect on IT professionals' job satisfaction, organizational commitment, and turnover intention. This study's contribution to various fields of

Table 9 The influence of control variables for the groups IT and non-IT professionals

Control Variable	Work-exhaustion		Techno-exhaustion		Job satisfaction		Organizational commitment		Turnover intention	
	IT prof.	Non-IT prof.	IT prof.	Non-IT prof.	IT prof.	Non-IT prof.	IT prof.	Non-IT prof.	IT prof.	Non-IT prof.
Age	0.027^{NS}	0.036^{NS}	0.08^{NS}	0.023^{NS}	0.082^{NS}	-0.092^{NS}	0.136**	0.053^{NS}	-0.089^{NS}	-0.035^{NS}
Gender	-0.019^{NS}	0.026^{NS}	-0.048^{NS}	0.019^{NS}	-0.075^{NS}	-0.080^{NS}	-0.067^{NS}	-0.090^{NS}	0.017^{NS}	0.011^{NS}
Extent of IT usage	0.051^{NS}	0.110*	0.064^{NS}	0.091*	0.037^{NS}	-0.005^{NS}	-0.048^{NS}	-0.016^{NS}	-0.063^{NS}	0.096*
Negative affect	0.286***	0.231***	0.309***	0.309***						
Job autonomy	-0.076^{NS}	-0.049^{NS}								
Role conflict	0.030^{NS}	-0.027^{NS}								
Role ambiguity	-0.058^{NS}	-0.061^{NS}								
Emotional dissonance	0.121*	0.074^{NS}								

^{NS} $p > 0.05$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.005$

IS research, such as (techno-) stress, employee turnover, and computer personnel research is discussed below.

5.1 Techno-stressors increase employees' perceptions of work-stressors

In this research, we theorize that techno-stressors are a contributing factor for overall work-stressors and that employees view IT use at work as being responsible for an increasing overall workload and work-home conflict. We further hypothesize that employees' overall workload is influenced by techno-induced workload, role ambiguity, and work-home conflict and that employees' overall work-home conflict is influenced by the same techno-stressors and moreover by techno-induced job insecurity. Our research results indicate that we can confirm these hypotheses with the exception that techno-induced role ambiguity has no significant influence on overall work-home conflict. These results contribute to prior research in the field of techno-stress research, which discusses techno-stressors as influencing factors of strain (Tarafdar et al. 2010; Ayyagari et al. 2011), by theorizing and validating that techno-stressors also influence other stressful stimuli.

5.2 Techno-exhaustion causes work-exhaustion

Although prior research examines techno-exhaustion (Ayyagari et al. 2011) and work-exhaustion (e.g., Moore 2000), no article has theorized their mutual relationship. Based on recent studies showing that the usage of e-mails is considered a cause of work-exhaustion (Barley et al. 2011), we theorize and empirically validate that employees exhausted from using work-related IT are also more frequently exhausted by their work. This means that techno-exhaustion is—next to work-related characteristics studied in prior research (e.g., Ahuja et al. 2007)—another factor causing work-exhaustion. Consequently, our contribution to theories and models explaining sources of work-exhaustion (e.g., Moore 2000) is that these theories and models need to incorporate techno-exhaustion as an additional influencing factor.

5.3 Work-exhaustion causes low job satisfactions, low organizational commitment, and high turnover intention

Prior IS research has discussed the consequences of work-exhaustion either in terms of turnover intention (Moore 2000), job satisfaction and turnover intention (Rutner et al. 2008), or organizational commitment and turnover intention (Ahuja et al. 2007). In contrast, we investigate the influence of work-exhaustion building on a well-known research model theorizing job satisfaction and organizational commitment as the most influential antecedents of turnover intention (Lacity et al. 2008). We find that work-exhaustion significantly influences turnover intention and its antecedents, and argue that work-exhaustion should be included in theories and models explaining employee turnover. In their seminal work, which represents one of the first theory in this research stream, March and Simon (1958) consider perceived desirability of moving and perceived ease of movement as perceptions

influencing turnover intention; however, they did not consider the influence of work-exhaustion. The *Met Expectation Theory* (Porter and Steers 1973) theorizes dissatisfaction as a cause for turnover but also does not theorize the role of work-exhaustion. In summary, we maintain that work-exhaustion, which explains turnover intention to a significant degree, should be included in theories and models focusing on turnover research like March and Simon's (1958) model or the *Met Expectation Theory* (Porter and Steers 1973).

5.4 The perception of techno-stressors and -exhaustion depends on employees' profession

Next to the presented contributions to research in the fields of work-exhaustion and turnover, our results show that IT professionals and non-IT professionals perceive techno-stressors and techno-exhaustion differently and, moreover, techno-exhaustion influences work-related outcomes differently. These results and the contributions they represent are presented in detail in the following sections.

5.4.1 Techno-stressors influence non-IT professionals' work-stressors stronger than IT professionals' work-stressors

As discussed above, techno-stressors increase work-stressors and a more differentiated picture can be achieved through post hoc analyses of data collected from IT professionals and non-IT professionals. All of the proposed hypotheses can be confirmed for the group non-IT professionals, whereby only techno-induced work-home conflict is a contributing factor for both work-stressors among IT professionals.

Based on these results, we recommend that research discussing antecedents of work-related stressors (e.g., Podsakoff et al. 2007) should concentrate on techno-stressors, since techno-stressors are determinants for work-stressors particularly for non-IT professionals. In addition, we conclude that techno-stressors are of minor importance when concentrating on sources of IT professionals' work-stressors (e.g., Moore 2000), so research should identify other stressors influencing IT professionals' work-stressors. Summing up, we contribute to a more general understanding of techno-stress by identifying that whether or not an employee is an IT professional influences whether techno-stressors cause work-stressors.

5.4.2 Techno-exhaustion influences IT and non-IT professionals' work-related outcomes differently

Although Ayyagari et al. (2011) explain sources of techno-exhaustion, they do not reveal the consequences of it. Instead they recommend that future research extend their results by considering the consequences, for example on turnover intention, organizational commitment, and job satisfaction. In order to close the identified research gap, we theorize techno-exhaustion in the context of work-related outcomes and find that techno-exhaustion has an indirect impact on job satisfaction, organizational commitment, and turnover intention. In order to respond to Pawlowski et al.'s (2007) call for occupation-specific research, we focus on IT

and non-IT professionals separately. This offers detailed insights into whether techno-stressors and techno-exhaustion are perceived differently and have diverse consequences depending on the occupational group. Based on the results, we contribute that techno-exhaustion has an indirect effect on job satisfaction, organizational commitment, and turnover intention for IT professionals and non-IT professionals, but that techno-exhaustion also has a direct influence on these three work-related outcomes for non-IT professionals.

Such different consequences of techno-exhaustion for IT professionals and non-IT professionals might be grounded in the fact that the role of IT varies between these two professional categories. For IT professionals, IT is the core of their daily work, whereby non-IT professionals use IT only as a supporting instrument for daily working process, such as a spreadsheet program for calculating costs. Based on this result, we contribute that research focusing on techno-exhaustion and its consequences (Tarafdar et al. 2010; Ayyagari et al. 2011) have to consider employees' occupation and especially the role of IT in daily working processes as an important control variable as the role of IT is considered differently by IT and non-IT professionals.

5.4.3 IT professionals perceive techno-induced work-home conflict stronger than non-IT professionals

By focusing on techno-stressors, we compare means of stressors for IT professionals and non-IT professionals. Our results reveal that techno-induced work-home conflict is the only techno-stressor that has both a significantly higher mean value for IT professionals and significant higher path coefficients on the two work-stressors overall workload and overall work-home conflict. Hence, we can contribute that techno-induced work-home conflict is of high importance for IT professionals and perceived a stressful stimulus by a large number of IT employees. Based on this, future research might identify reasons why this particular stressor is so influential compared to the other stressors. Mobile technologies might be the key to the importance of the stressor techno-induced work-home conflict. Future research should investigate whether mobile technologies are primarily used by IT professionals and hence cause perceptions of blurring boundaries. Nevertheless, we contribute that techno-induced work-home conflict is a crucial stressor for IT professionals that should be discussed in research focusing on IT professionals' exhaustion (e.g., Ahuja et al. 2007).

5.4.4 Non-IT professionals experience techno-exhaustion stronger than IT professionals

Based on the mean values of IT professionals' and non-IT professionals' techno-exhaustion, we can conclude that techno-exhaustion a particularly problematic issue among non-IT professionals. Techno-exhaustion is also a stronger contributing factor influencing non-IT professionals' work-exhaustion than IT professionals' work-exhaustion. This is of particular interest because IT professionals use IT considerably longer at work than non-IT professionals. Based on this finding, we

recommend that organizations train particularly non-IT professionals so that they do not suffer techno-exhaustion and organizations should discuss with non-IT professionals that IT has become a central part of the working process across all job descriptions.

From a theoretical perspective, we align with the stressor–strain–outcome model (Koeske and Koeske 1993) and theorize techno-exhaustion as a mediator variable between techno-stressors and work-related outcomes. Our results reveal a mediating effect of four out of five techno-stressors on job satisfaction, organizational commitment, and turnover intention through techno-exhaustion for non-IT professionals. In contrast, no techno-stressor has an indirect effect only through techno-exhaustion on outcome variables with regard to IT professionals.

In summary, we conclude that techno-exhaustion is perceived differently by IT professionals and non-IT professionals and moreover, that the theoretical embeddedness of techno-exhaustion in stress research should differ depending on whether IT is at the core of the work performed by the target group.

5.5 Implications for practice

The diagnosis burnout is more than just a human tragedy for each individual concerned. It also challenges organizations to continue with their business despite the loss of productivity or employees. To reduce techno-exhaustion, some multinational organizations have agreed to stop sending emails to their employees after work (Gallo 2012) to ensure that the boundaries between home and work do not blur further. As the results of this research indicate that techno-induced work-home conflict is a source of work-exhaustion, not sending emails after work is a first step to reducing employee burnout.

Organizations should consider several approaches to addressing employee burnout. For example, technical training might be a meaningful instrument to reduce the danger of employee burnout as techno-induced role-ambiguity is a driver of employee exhaustion. Particularly during the implementation of new IT or techno-induced change processes, training courses should be offered to demonstrate how to operate IT effectively. This is necessary because employees who are aware of the functionality and know how to operate IT suffer burnout more seldom (e.g., Salanova et al. 2002). Hence, there is a need for ongoing training courses focusing directly on how to reduce techno-stress. Apart from training courses, an organizational help desk that answers questions about IT might be a way to reduce techno-exhaustion. Furthermore, an organizational culture and management role models that positively exemplify experimenting with new IT might increase the chances that employees will approach new IT without negative bias. As techno-induced job insecurity is also confirmed as a determinant of employee burnout, organizations should implement more focused personnel development strategies to illustrate to their employees that the organization values their contribution even when some tasks are run by IT.

5.6 Limitations and future research

As with all empirical research, this study is limited by several issues. For one, our data were collected in one country. The results and especially the perception of work or techno-exhaustion might differ across countries. Moreover, the group of non-IT professionals used for post hoc analyses subsumes a wide range of different professions. The results might also differ if other specific occupational groups were in focus. The results are also limited for IT professionals because the sample includes different job descriptions (e.g., software developers, IT evangelists, and system administrators).

Future research might address these shortcomings or extend the presented research findings in some ways. One possibility would be to focus on employee performance as a consequence of techno- and work-exhaustion, as performance is—next to job satisfaction and turnover behavior—another behavior of great interest to organizations. In this context, future research might investigate whether the results differ if other work-related outcomes are chosen. Our study, like Ayyagari et al.'s (2011), focuses on the general usage of IT and uses the term IT rather generically. However, future research might focus on a particular IT (e.g., ERP systems such as SAP or Oracle applications, communication technologies such as e-mail, or collaborative technologies such as instant messaging) and investigate how the characteristics of such an IT influence stressors and how the level of exhaustion associated with using one particular IT causes work-exhaustion and other negative consequences for the individuals and the organization.

6 Conclusion

Due to the societal challenge of burnout influencing employees and organizations as well as the fact that IT is considered a cause of stress, we provide theoretical and empirical evidence *that* and *how* IT at work can cause exhaustion. The study identifies techno-stressors as contributing factors for techno-exhaustion and work-stressors, which both induce work-exhaustion. Moreover, we reveal that work-exhaustion has a profound influence on employees in terms of low job satisfaction and organizational commitment as well as high turnover intention, whereby the influence of techno-exhaustion varies depending on whether or not employees are IT professionals. Although techno-exhaustion is also a source of low job satisfactions and organizational commitments and high turnover intention of non-IT professionals, techno-exhaustion among IT professionals only indirectly affects these psychological and behavioral responses through work-exhaustion.

Appendix

See Tables 10, 11, 12, 13, 14, 15 and 16.

Table 10 Measurement items

Measurement items		
Work-stressors	Perceived overall workload	I feel that the number of requests, problems, or complaints I deal with is more than expected
		I feel that the amount of work I do interferes with how well it is done
		I feel busy or rushed
		I feel pressured
	Overall work-home conflict	The demands of my work interfere with my home and family life
		The amount of time my job takes up makes it difficult to fulfill family responsibilities
		Things I want to do at home do not get done because of the demands my job puts on me
		My job produces strain that makes it difficult to fulfill family duties
		Due to work-related duties, I have to make changes to my plans for family activities
	Fairness of rewards	I think my level of pay is fair
		Overall, the rewards I receive here are quite fair
Techno-stressors	Techno-induced work overload	IT creates many more requests, problems, or complaints in my job than I would otherwise experience
		I feel busy or rushed due to IT
		I feel pressured due to IT
	Techno-induced role ambiguity	I am unsure whether I have to deal with IT problems or with my work activities
		I am unsure what to prioritize: dealing with IT problems or my work activities
		I cannot allocate time properly for my work activities because my time spent on IT-activities varies
		Time spent resolving IT problems takes time away from fulfilling my work responsibilities
	Techno-induced work-home conflict	Using IT blurs boundaries between my job and my home life
		Using IT for work-related responsibilities creates conflicts with my home responsibilities
		I do not get everything done at home because I find myself completing job-related work due to IT

Table 10 continued

Measurement items		
	Techno-induced invasion of privacy	I feel uncomfortable that my use of IT can be easily monitored
		I feel my privacy can be compromised because my activities using IT can be traced
		I feel my employer could violate my privacy by tracking my activities using IT
		I feel that my use of IT makes it easier to invade my privacy
	Techno-induced job insecurity	IT will advance to an extent where my present job can be performed by a less skilled individual
		I am worried that new IT may pose a threat to my job
		I believe that IT makes it easier for other people to perform my work activities
		I am threatened by coworkers with newer technology skills
		I have to constantly update my skills to avoid being replaced
Strain	Work-exhaustion	I feel emotionally drained from my work
		I feel used up at the end of the work day
		I feel fatigued when I get up in the morning and have to face another day on the job
		I feel burned out from my work
	Techno-exhaustion	I feel drained from activities that require me to use IT
		I feel tired from my IT activities
		Working all day with IT is a strain for me
		I feel burned out from my IT activities

Table 10 continued

Measurement items		
Outcomes	Job satisfaction	Overall, I am satisfied with my job
		I am satisfied with the way I work at the moment
		I am satisfied with the important aspects of my job
	Organizational commitment	I really care about the fate of this organization
		I feel very little loyalty to this organization
		I am willing to put a great deal of effort beyond that normally expected in order to help this organization be successful
		I talk up this organization to my friends as a great organization to work for
		I find that my values and the organization's values are very similar
	Turnover intention	I think often about quitting my job at my current employer
		I intend to quit my actual job
		I think about leaving my actual employer
		I will look for a new job within the next months

Table 11 Measurement model validation and bivariate correlation coefficients

	Construct	Mean	Loadings	AVE	CR	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Tec. workload	3.15	0.734–0.969	0.806	0.925	0.898												
2	Tec. role ambiguity	3.00	0.887–0.912	0.811	0.945	0.668	0.901											
3	Tec. work-home conflict	3.35	0.878–0.911	0.794	0.921	0.495	0.517	0.891										
4	Tec. job insecurity	2.71	0.730–0.868	0.653	0.882	0.560	0.550	0.363	0.808									
5	Tec. invasion of privacy	3.25	0.825–0.906	0.751	0.857	0.359	0.437	0.723	0.420	0.867								
6	Ov. perceived workload	4.29	0.866–0.947	0.840	0.940	0.393	0.410	0.462	0.317	0.431	0.917							
7	Ov. work-home conflict	4.32	0.850–0.900	0.781	0.947	0.289	0.330	0.532	0.155	0.508	0.640	0.884						
8	Fairness of rewards	3.76	0.942–0.952	0.897	0.946	−0.172	−0.057	−0.099	−0.082	−0.098	−0.137	−0.108	0.947					
9	Techno-exhaustion	2.71	0.913–0.941	0.856	0.960	0.676	0.630	0.464	0.630	0.349	0.400	0.299	−0.139	0.925				
10	Work-exhaustion	4.17	0.869–0.952	0.842	0.955	0.350	0.390	0.414	0.270	0.336	0.697	0.623	−0.160	0.479	0.918			
11	Job satisfaction	3.17	0.790–0.836	0.665	0.856	−0.185	−0.229	−0.229	−0.242	−0.199	−0.375	−0.320	0.389	−0.347	−0.509	0.815		
12	Organizational commitment	4.77	0.767–0.886	0.696	0.919	−0.173	−0.167	−0.049	−0.190	−0.087	−0.179	−0.129	0.423	−0.261	−0.378	0.655	0.834	
13	Turnover intention	3.20	0.866–0.925	0.810	0.945	0.145	0.167	0.211	0.187	0.336	0.295	0.245	−0.210	0.268	0.385	−0.437	−0.429	0.900

Square root of AVE is listed on the diagonal of bivarriate correlations

Table 12 Measurement model validation and bivariate correlation coefficients for IT professionals

	Construct	Mean	Loadings	AVE	CR	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Tec. workload	3.02	0.711–0.973	0.781	0.913	0.884												
2	Tec. role ambiguity	2.85	0.886–0.935	0.823	0.949	0.680	0.907											
3	Tec. work-home conflict	3.76	0.869–0.950	0.817	0.930	0.623	0.548	0.904										
4	Tec. job insecurity	2.83	0.721–0.855	0.627	0.833	0.588	0.541	0.370	0.792									
5	Tec. invasion of privacy	3.34	0.708–0.856	0.598	0.815	0.193	0.180	0.193	0.140	0.773								
6	Ov. perceived workload	4.32	0.715–0.946	0.718	0.908	0.382	0.324	0.513	0.364	0.111	0.847							
7	Ov. work-home conflict	4.19	0.859–0.914	0.786	0.948	0.305	0.206	0.578	0.192	0.131	0.682	0.887						
8	Fairness of rewards	3.67	0.934–0.970	0.907	0.951	−0.190	−0.047	−0.273	−0.156	−0.073	−0.276	−0.142	0.952					
9	Techno-exhaustion	2.35	0.876–0.950	0.841	0.955	0.755	0.703	0.520	0.694	0.167	0.308	0.259	−0.052	0.917				
10	Work-exhaustion	4.10	0.892–0.960	0.857	0.960	0.291	0.363	0.456	0.351	0.111	0.680	0.658	−0.148	0.361	0.926			
11	Job satisfaction	3.17	0.742–0.828	0.626	0.893	−0.244	−0.217	−0.307	−0.387	−0.106	−0.367	−0.269	0.421	−0.310	−0.553	0.791		
12	Organizational commitment	4.67	0.827–0.887	0.695	0.919	−0.061	−0.083	−0.265	−0.187	−0.135	−0.161	−0.079	0.382	−0.114	−0.368	0.514	0.834	
13	Turnover intention	3.14	0.882–0.933	0.811	0.945	0.092	0.013	0.490	0.088	0.059	0.184	0.275	−0.284	0.054	0.291	−0.465	−0.553	0.901

IT professionals square root of AVE is listed on the diagonal of bivarriate correlations

Table 13 Measurement model validation and bivariate correlation coefficients for non-IT professionals

	Construct	Mean	Loadings	AVE	CR	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Tec. workload	3.22	0.782–0.970	0.826	0.934	0.909												
2	Tec. role ambiguity	3.08	0.884–0.917	0.802	0.942	0.657	0.896											
3	Tec. work-home conflict	3.27	0.874–0.894	0.780	0.914	0.439	0.513	0.883										
4	Tec. job insecurity	2.67	0.756–0.916	0.738	0.894	0.553	0.566	0.360	0.859									
5	Tec. invasion of privacy	3.13	0.762–0.875	0.778	0.875	0.231	0.190	0.165	0.120	0.882								
6	Ov. perceived workload	4.28	0.708–0.934	0.708	0.905	0.408	0.473	0.435	0.294	0.139	0.841							
7	Ov. work-home conflict	4.40	0.847–0.914	0.780	0.946	0.381	0.401	0.544	0.164	0.102	0.623	0.883						
8	Fairness of rewards	3.82	0.923–0.960	0.886	0.940	−0.179	−0.074	−0.072	−0.052	−0.002	−0.066	−0.096	0.941					
9	Techno-exhaustion	3.05	0.885–0.964	0.864	0.962	0.628	0.584	0.458	0.638	0.249	0.472	0.319	−0.205	0.930				
10	Work-exhaustion	4.20	0.856–0.963	0.834	0.953	0.384	0.406	0.394	0.237	0.220	0.698	0.603	−0.176	0.558	0.913			
11	Job satisfaction	3.17	0.703–0.796	0.592	0.879	−0.223	−0.292	−0.213	−0.184	−0.154	−0.417	−0.330	0.427	−0.430	−0.513	0.769		
12	Organizational commitment	4.82	0.731–0.890	0.697	0.920	−0.243	−0.219	−0.038	−0.210	−0.038	−0.182	−0.158	0.444	−0.358	−0.383	0.558	0.835	
13	Turnover intention	3.24	0.849–0.922	0.809	0.944	0.222	0.276	0.265	0.274	0.120	0.355	0.228	−0.167	0.394	0.440	−0.523	−0.358	0.899

Non-IT Professionals square root of AVE is listed on the diagonal of bivarriate correlations

Table 14 Mean comparison

Variable	IT Prof.	Non-IT Prof.	Mean Difference
Tec. workload	3.02	3.22	0.20^{NS}
Tec. role ambiguity	2.85	3.08	0.23^{NS}
Tec. work-home conflict	3.76	3.27	−0.49**
Tec. job insecurity	2.83	2.67	-0.16^{NS}
Tec. invasion of privacy	3.34	3.13	-0.21^{NS}
Ov. perceived workload	4.32	4.28	-0.04^{NS}
Ov. work-home conflict	4.19	4.40	0.21^{NS}
Fairness of rewards	3.67	3.82	0.15^{NS}
Techno-exhaustion	2.35	3.05	0.70**
Work-exhaustion	4.10	4.20	0.10^{NS}
Job satisfaction	3.17	3.17	0.00^{NS}
Organizational commitment	4.67	4.82	0.15^{NS}
Turnover intention	3.14	3.24	0.10^{NS}

** $p < 0.001$; ^{NS} $p > 0.05$

Table 15 Comparison of path coefficients

Comparison of path coefficients				IT professionals	Non-IT professionals	Mean difference
	Outcome	→	**Outcome**			
H1	Job satisfaction	→	Turnover intention	−0.126	−0.386	−0.260**
H2	Organizational commitment	→	Turnover intention	−0.440	−0.101	0.339**
	Strain	→	**Outcome**			
H3a	Work-exhaustion	→	Job satisfaction	−0.504	−0.397	0.107**
H3b	Work-exhaustion	→	Organizational commitment	−0.376	−0.262	0.114**
H3c	Work-exhaustion	→	Turnover intention	0.116	0.170	0.054**
H4a	Techno-exhaustion	→	Job satisfaction	−0.056	−0.208	−0.152**
H4b	Techno-exhaustion	→	Organizational commitment	0.022	−0.214	−0.236**
H4c	Techno-exhaustion	→	Turnover intention	−0.047	0.138	0.185**
	Strain	→	**Strain**			
H5	Techno-exhaustion	→	Work-exhaustion	0.147	0.265	0.118**
	Work-Stressor	→	**Strain**			
H6a	Overall workload	→	Work-exhaustion	0.402	0.424	0.022**
H6b	Overall work-home conflict	→	Work-exhaustion	0.350	0.248	−0.102**
H6c	Fairness of rewards	→	Work-exhaustion	0.021	−0.069	−0.090**
	Techno-Stressor	→	**Strain**			
H7a	Techno-induced work-home conflict	→	Techno-exhaustion	0.108	0.142	0.034**
H7b	Techno-induced invasion of privacy	→	Techno-exhaustion	−0.083	−0.023	0.060**
H7c	Techno-induced workload	→	Techno-exhaustion	0.351	0.291	−0.060**
H7d	Techno-induced role ambiguity	→	Techno-exhaustion	0.249	0.132	−0.117**
H7e	Techno-induced job insecurity	→	Techno-exhaustion	0.350	0.342	−0.008*
	Techno-Stressors	→	**Work-Stressors**			
H8a	Techno-induced workload	→	Overall workload	0.092	0.135	0.043**

Table 15 continued

Comparison of path coefficients				IT professionals	Non-IT professionals	Mean difference
H8b	Techno-induced role ambiguity	→	Overall workload	0.019	0.265	0.246**
H8c	Techno-induced work-home conflict	→	Overall workload	0.446	0.244	−0.202**
H9a	Techno-induced work-home conflict	→	Overall work-home conflict	0.596	0.478	−0.118**
H9b	Techno-induced job insecurity	→	Overall work-home conflict	0.002	0.185	0.183**
H9c	Techno-induced workload	→	Overall work-home conflict	0.081	0.137	0.056**
H9d	Techno-Induced role ambiguity	→	Overall work-home conflict	−0.095	0.241	0.336**

** $p < 0.001$; * $p < 0.05$; ^{NS} $p > 0.05$

Table 16 The indirect effect of stressors on outcomes through strain

Independent variable	Mediator	Dependent variable	IT professionals			Non-IT professionals		
			Lower	Upper	Indirect effect	Lower	Upper	Indirect effect
Overall workload	Work-exhaustion	Job satisfaction	−0.370	−0.118	−0.25	−0.256	−0.090	−0.17
		Organizational commitment	−0.552	−0.158	−0.35	−0.506	−0.184	−0.34
		Turnover intention	0.030	0.347	0.17	0.112	0.352	0.24
Overall work-home conflict		Job satisfaction	−0.397	−0.177	−0.28	−0.207	−0.088	−0.14
		Organizational commitment	−0.604	−0.228	−0.41	−0.357	−0.133	−0.23
		Turnover intention	0.038	0.361	0.16	0.146	0.307	0.22
Tec. workload	Techno-exhaustion	Work-exhaustion	0.223	0.430	0.33	0.111	0.506	0.29
		Job satisfaction	−0.244	0.038		−0.205	−0.085	−0.15
		Organizational commitment	−0.298	0.085		−0.285	−0.107	−0.18
		Turnover intention	−0.087	0.258		0.103	0.298	0.18
Tec. role ambiguity		Work-exhaustion	0.207	0.420	0.31	0.024	0.350	0.15
		Job satisfaction	−0.202	0.007		−0.206	−0.073	−0.13
		Organizational commitment	−0.242	0.131		−0.309	−0.123	−0.20
		Turnover intention	−0.079	0.223		0.081	0.239	0.16
Tec. work-home conflict		Work-exhaustion	0.147	0.333	0.24	0.004	0.238	0.11
		Job satisfaction	−0.155	0.002		−0.160	−0.066	−0.10
		Organizational commitment	−0.192	0.060		−0.262	−0.113	−0.18
		Turnover intention	−0.099	0.091		0.064	0.176	0.12
Tec. invasion of privacy		Work-exhaustion	0.171	0.388	0.27	0.040	0.234	0.11
		Job satisfaction	−0.104	0.011		−0.104	0.015	
		Organizational commitment	−0.102	0.036		−0.253	0.038	
		Turnover intention	−0.098	0.012		−0.062	0.193	
Tec. job insecurity		Work-exhaustion	0.355	0.588	0.47	0.037	0.419	0.21
		Job satisfaction	−0.099	0.023		−0.257	−0.130	−0.19
		Organizational commitment	−0.165	0.231		−0.355	−0.129	−0.23
		Turnover intention	−0.169	0.112		0.102	0.281	0.19

References

Ahuja MK, Chudoba KM, Kacmar CJ, McKnight HD, George JF (2007) IT Road Warriors: Balancing work-family conflict, job autonomy, and work overload to mitigate turnover intentions. MIS Q 31(1):1–17

Alge BJ (2001) Effects of computer surveillance on perceptions of privacy and procedural justice. J Appl Psychol 84(6):797–804

Alter S (2008) Defining information systems as work systems: implications for the IS field. Eur J Inf Syst 17(5):448–469

Alter S (2013) Work system theory: overview of core concepts, extensions, and challenges for the future. J Assoc Inf Syst 14(2):72–121

Ayyagari R, Grover V, Purvis R (2011) Technostress: technological antecedents and implications. MIS Q 35(4):831–858

Bagozzi RP (1979) The role of measurement in theory construction and hypothesis testing: toward a holistic model. In: Ferrell OC, Brown SW, Lamb CW (eds) Conceptual and theoretical developments in marketing. American Marketing Association, Chicago, pp 15–32

Barley S, Meyerson D, Grodal S (2011) E-mail as a source and symbol of stress. Organ Sci 22(4):887–906

Baron RM, Kenny DA (1986) The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. J Pers Soc Psychol 51(6):1173–1182

Barrick MR, Zimmerman RD (2005) Reducing voluntary, avoidable turnover through selection. J Appl Psychol 90(1):159–166

Bartol KM (1983) Turnover among Dp personnel: a casual analysis. Commun ACM 26(10):807–811

Campell DT, Fiske DW (1959) Convergent and discriminant validation by the multitrait-multimethod matrix. Psychol Bull 56(2):81–105

Carmines EG, Zeller RA (2008) Reliability and validity assessment. Sage Publications, Newbury Park

Chawla D, Sondhi N (2011) Assessing work-life balance among indian women professionals. Indian J Ind Relat 47(2):341–352

Chin WW (1998) The partial least squares approach to structural equation modeling. In: Marcoulides GA (ed) Modern methods for business research. Erlbaum, Mahwah, pp 295–336

Cohen J (1988) Statistical power analysis for the behavioral sciences. Lawrence Erlbaum Associates, Hillsdale

de Croon E, Sluiter JK, Blonk RWB, Broersen J, Frings-Dresen M (2004) Stressful work, psychological job strain, and turnover: a 2-year prospective cohort study of truck drivers. J Appl Psychol 89(3):442–454

Eckhardt A, Maier C, Büttner R 2012 The influence of pressure to perform and experience on changing perceptions and user performance: a multi-method experimental analysis. Proceedings of the 33rd International Conference on information systems (ICIS), Orlando (FL)

Eckhardt A, Maier C, Hsieh JJ, Chuk T, Chan A, Hsiao J, Buettner R 2013 Objective measures of IS usage behavior under conditions of experience and pressure using eye fixation data. Proceedings of the 34th International Conference on information systems (ICIS), Milan

Fornell C, Larcker DF (1981) Evaluating structural equation models with unobservable variables and measurement error. J Mark Res 18(1):39–50

Gallo A 2012 Stop email overload. http://blogs.hbr.org/hmu/2012/02/stop-email-overload-1.html

Hom PW, Katerberg RHC (1979) Comparative examination of three approaches to the prediction of turnover. J Appl Psychol 64(3):280–290

Hoppock R (1935) Job satisfaction. Harper, New York

Hulland JS (1999) Use of partial least squares (PLS) in strategic management research: a review of four recent studies. Strateg Manag J 20(2):195–204

Joseph D, Kok-Yee N, Koh C, Soon A (2007) Turnover of information technology professionals: a narrative review, meta-analytic structural equation modeling, and model development. MIS Q 31(3):547–577

Koeske GF, Koeske R (1993) A preliminary test of a stress–strain–outcome model for reconceptualizing the burnout phenomenon. J Soc Serv Resh 17(3–4):107–135

Kristensen TS, Borritz M, Villadsen E, Christensen KB (2005) The Copenhagen burnout inventory: a new tool for the assessment of burnout. Work Stress 19(3):192–207

Lacity M, Iyer V, Rudramuniyaiah S (2008) Turnover intentions of Indian IS professionals. Inf Syst Front 10(2):225–241
Laumer S, Beimborn D, Maier C, Weinert C (2013) Enterprise content management. Bus Inf Syst Eng 5(6):449–452
Lee TW, Mitchell TR, Holtom BC, McDaniel LS, Hill JW (1999) The unfolding model of voluntary turnover: a replication and extension. Acad Manag J 42(4):450–462
Leiter M, Schaufeli WB (1996) Consistency of the burnout construct across occupations. Anxiety Stress Coping Int J 9(3):229–243
Liang H, Saraf N, Hu Q, Xue Y (2007) Assimilation of enterprise systems: the effect of institutional pressures and the mediating role of top management. MIS Q 31(1):59–87
Locke EA (1969) What is job satisfaction? Org Behav Human Perform 4(4):309–336
Maier C, Laumer S, Eckhardt A, Weitzel T 2012 online social networks as a source and symbol of stress: an empirical analysis. Proceedings of the 33rd International Conference on information systems (ICIS), Orlando (FL)
Maier C, Laumer S, Weitzel T 2013a Although i am stressed, i still use IT! Theorizing the decisive impact of strain and addiction of social network site users in post-acceptance theory. Proceedings of the 34th International Conference on information systems (ICIS), Milan (Italy)
Maier C, Laumer S, Eckhardt A, Weitzel T (2013b) Analyzing the impact of HRIS implementations on HR personnel's job satisfaction and turnover intention. J Strat Inf Syst 22(3):193–207. doi:10.1016/j.jsis.2012.09.001
Maier C, Laumer S, Eckhardt A, Weitzel T (2014) Giving too much social support: social overload on social networking sites. Eur J Inf Syst. doi:10.1057/ejis.2014.3 (advance online publication 4 March 2014)
Malhotra NK, Kim SS, Agarwal R (2004) Internet users' information privacy concerns (IUIPC): the construct, the scale, and a causal model. Inf Syst Res 15(4):336–355
March J, Simon H (1958) Organizations. Wiley, New York
Maslach C, Leiter M (2008) Early predictors of job burnout and engagement. J Appl Psychol 93(3):498–512
Maslach C, Schaufeli WB, Leiter MP (2001) Job burnout. Annu Rev Psychol 52(1):397–422
Middelton C, Cukier W (2006) Is mobile email functional or dysfunctional? Two perspectives on mobile email usage. Eur J Inf Syst 15(3):252–260
Mitchell TR, Holtom BC, Lee TW, Sablynski CJ, Erez M (2001) Why people stay: using job embeddedness to predict voluntary turnover. Acad Manag J 44(6):1102–1121
Moore JE (2000) One road to turnover. an examination of work exhaustion in technology professionals. MIS Q 24(1):141–168
Mourmant G, Gallivan MJ, Kalika M (2009) Another road to IT turnover: the entrepreneurial path. Eur J Inf Syst 18(5):498–521
Pawlowski SD, Kaganer EA, Cater JJ III (2007) Focusing the research agenda on burnout in IT: social representations of burnout in the profession. Eur J Inf Syst 16(5):612–627
Podsakoff PM, MacKenzie SB, Lee J-Y, Podsakoff NP (2003) Common method biases in behavioral research: a critical review and recommended remedies. J Appl Psychol 83(5):879–903
Podsakoff NP, LePine J, Lepine MA (2007) Differential challenge stressor-hindrance stressor relationships with job attitudes, turnover intentions, turnover, and withdrawal behavior: a meta-analysis. J Appl Psychol 92(2):438–454
Porter LW, Steers RM (1973) Organizational work and personal factors in employee turnover and absenteeism. Psychol Bull 80(2):151–176
Preacher KJ, Hayes AF (2004) SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behav Res Methods, Instrum Comput 36(4):717–731
Ragu-Nathan TS, Tarafdar M, Ragu-Nathan BS, Qiang T (2008) The consequences of technostress for end users in organizations: conceptual development and empirical validation. Inf Syst Res 1(4):417–433
Riedl R, Kindermann H, Auinger A, Javor A (2012) Technostress from a neurobiological perspective: system breakdown increases the stress hormone cortisol in computer users. Bus Inf Syst Eng 4(2):61–69
Ringle CM, Wende S, Will A (2005) SmartPLS. University of Hamburg, Hamburg
Rutner PS, Hardgrave BC, McKnight HD (2008) Emotional dissonance and the information technology professional. MIS Q 32(3):635–652

Salanova M, Peiró JM, Schaufeli WB (2002) Self-efficacy specificity and burnout among information technology workers: an extension of the job demand-control model. Eur J Work Organ Psychol 11(1):1–25

Schaufeli WB, Leiter M, Kalimo R 1995 The general burnout inventory: a self-report questionnaire to assess burnout at the workplace. Proceedings of the work, stress and health '95: creating healthier workplaces, pp 10–23

Shirom A, Melamed S (2005) Does burnout affect physical health? A review of the evidence. In: Antoniou A-SG, Cooper CL (eds) Research companion to organizational health psychology. Edward Elgar, Cheltenham, pp 599–622

Shrout PE, Bolger N (2002) Mediation in experimental and nonexperimental studies: new procedures and recommedations. Psychol Methods 7(4):422–445

Sicking M 2011 Burnout weiter auf dem Vormarsch. http://www.heise.de/resale/artikel/Burnout-weiter-auf-dem-Vormarsch-1230727.html

Der Spiegel (2011) Blackberry-pause: VW-Betriebsrat setzt E-Mail-Stopp nach Feierabend durch. http://www.spiegel.de/wirtschaft/service/blackberry-pause-vw-betriebsrat-setzt-e-mail-stopp-nach-feierabend-durch-a-805524.html

Süddeutsche Zeitung (2012) Von der Leyen will Arbeitnehmer vor Computerstress schützen. http://www.sueddeutsche.de/karriere/erreichbarkeit-bei-der-arbeit-von-der-leyen-will-arbeitnehmer-vor-computerstress-schuetzen-1.1380168. Accessed 16 November 2012

Tarafdar M, Tu Q, Ragu-Nathan TS (2010) Impact of technostress on end-user satisfaction and performance. J Manag Inf Systems 27(3):303–334

Tett RP, Meyer JP (1993) Job satisfaction, organizational commitment, turnover intention, and turnover: path analyses based on meta-analytic findings. Pers Psychol 46(2):259–293

Thatcher JB, Stepina LP, Boyle RJ (2002) Turnover of information technology workers: examining empirically the influence of attitudes, job characteristics, and external markets. J Manag Inf Syst 19(3):231–250

Williams LJ, Edwards J, Vandenberg R (2003) Recent advances in causal modeling methods for organizational and management research. J Manag 29(6):903–936