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Life is tough so you gotta be rough: How resilience impacts employees' attitude towards ICT use

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Wirtschaftswissenschaftliche Fakultät

**Life is tough so you gotta be rough – How resilience
impacts employees` attitude towards ICT use**

Heike Diller

Diskussionsbeitrag Nr. B-24-16

Betriebswirtschaftliche Reihe

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Life is tough so you gotta be rough -

How resilience impacts employees' attitude towards ICT use

Heike Diller

Abstract

A new era characterized by ubiquitous computing and continual information flows due information and communication technologies (ICT) has arrived in our work environment. Both practitioners and researchers are arguing about whether organizations should enforce ICT use or not. However, it is the individual employee who is confronted with ICT every day. The increase in ICT enables employees to work regardless of time and space, creating a new form of workplace flexibility. This techno-impact often results in an inner conflict among employees, with ICT perceived either as an instrument to improve effectiveness or as a potential risk causing overload. Using structure equation modeling on survey data from a recruitment company in Germany, this study examines the dichotomous perceptions of employees towards ICT use. Data suggests that individuals' resilience level has a major impact on their different ICT perceptions. Resilience helps to alleviate the negative effect of techno-overload perceptions and reinforces the positive effects of ICT use, such as perceived usefulness. Employees try to benefit from this new flexibility by using ICT also outside of regular working hours. The role of working after work is therefore often mentioned at the same time as ICT use and is found to be an important mediator within the proposed research model.

Keywords:

ICT perceptions, techno-overload, perceived ICT usefulness, resilience, working after work

Introduction

It is all about individual perception. It is not the organization that perceives information and communication technologies (ICT) use as useful or overload-evoking; it is the employee him- or herself. The use of ICT (Duxbury, Higgins & Thomas, 1996) enables a new work arrangement that offers the individual a choice when, where, and how long to work by reducing the amount of downtime (Fenner & Renn; 2010; Luthans, Vogelsang & Lester, 2006). The authors of recent studies have claimed the necessity of preserving a work-life balance to prevent chronic stress or burnout (Kreiner, 2006; Edwards & Rothbard, 2000). However, the opposition votes for employees integrating their work into their personal life to increase performance by accessing their individual performance curve. Neither is there a homogenous mass of employees who generally perceive ICT as a source of overload, nor is there a majority of completely ICT-addicted employees. A plethora of current research has emphasized the negative outcomes of ICT use such as work-home conflict (Tarafdar, D'Arcy, Turel & Gupta, 2015; Tarafdar, Tu, Ragu-Nathan & Ragu-Nathan, 2011; Scholarios & Marks, 2004; Kreiner, 2006), but still neglect possible antecedents or preventers of this negative techno-impact. Less attention has been devoted to any mechanism promoting the positive perception and possibilities of telecommuting, such as increased personal effectiveness, facilitation of information flow due to ICT (Ayyagari, 2011; Tu, Wang & Shu, 2005), or reducing the techno-overload perception with one exception: self-efficacy. Self-efficacy, along with optimism, hope and resilience, being one of the “positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement in today’s workplace” (Luthans, 2002, p. 698) has already been addressed within IT/ICT context in terms of computer self-efficacy (Thatcher & Perrewe, 2002; Compeau & Higgins, 1995; Fagan, Stern & Woolridge, 2003; Chau, 2001; Torkzadeh & Van Dyke, 2002). A closely related concept to self-efficacy is resilience, a phenomenon that prevents stress and frustration as well as positive, but potentially overwhelming events (Luthans, 2007; Avey, Reichard, Luthans & Mhatre (2011). Resilience, originally a clinical psychology issue, has not been adequately researched in this context, although it is generally believed to be the key factor and major positive resource reservoir for proactively handling daily hassles in the workplace (Avey, Luthans & Jensen, 2009; Shin, Taylor & Seo, 2012). Daily hassles may comprise frustration or stress but also result in positive challenges, such as growing responsibility or changes within the work environment. Aided by positive emotions, which are immanent in resilient individuals, these individuals can overcome daily hassles more easily.

In order to provide a holistic view of today's work setting, I also want to stress the role of working at home after work in this context. Work-related connectivity often comes along with excessive ICT use as wireless connection does not stop at the front door. Therefore employees easily may transfer their work to their home in terms of working after work.

The primary objective of this study is to examine the relationship between resilience and ICT use perceptions. The second, more general purpose is to provide an understanding of the role of positive psychology within the IT domain. Although the negative consequences of ICT use have attracted strong interest, the positive or preventive effects of it have not yet garnered sufficient attention in the literature. A third important aspect in this regard is the role of permanent connectivity, which is addressed by including working at home after work. Does resilience directly affect ICT use perceptions and is there a connective link through working after work?

My aim is to illuminate the positive effects of ICT such as increased perceived usefulness, which enhances one's working style and performance. Resilience, as part of the psychological capital construct, is expected to increase the positive effects of ICT use and also alleviates the negative effects such as techno-overload. According to Luthans, Vogelgesang and Lester (2006) resilience has - apart from its usual context - strong relevance for today's workforce and especially for employees' work environment. Keywords such as "survivor syndrome" are becoming increasingly significant in light of the ongoing pressure on employees. Therefore, resilience, or the ability to bounce back, is becoming the condition sine qua non to survive in a world of work dominated by ICT that continues to change by the second and sometimes overwhelms its users.

There is no better description of today's work environment than phrases such as "life is tough so you gotta be rough", which also demonstrates the need for a new virtue, namely resilience, to overcome daily hassles in one's personal and working life. The positive dynamics of the resilience construct is only just emerging in organizational behavior research (Luthans & Youssef, 2007). By contrast, from an information systems (IS) point of view Tarafdar, Tu, Ragu-Nathan and Ragu-Nathan (2011) emphasize the absence of research on a reduction mechanism to anticipate negative ICT impacts. This study directly addresses this topic by connecting resilience to ICT use perceptions.

The remainder of the paper is organized as follows. First, I discuss the prevalent literature and key findings from positive psychology perspective, build a bridge between positive organizational behavior (POB) and IS research by developing my research model, and present my hypotheses. I then explain my approach by showing the methodology and data collection. Finally, I conclude by discussing my findings and implications from my study.

Theoretical Framework

Although psychological capital (PsyCap) is an enormous field with many perspectives for future research of its own, I concentrate on one of its components, resilience, which has so far been only indirectly addressed and plays a minor role (Luthans et. al., 2006) within the whole PsyCap construct. Resilience is defined as “a class of phenomena characterized by patterns of positive adoption in the context of significant adversity or risk” (Masten & Reed, 2002). Since research in this field began in the early 1960s the conceptualization of resilience has undergone an iterative development; first conceived of as a personality trait similar to coping or adaptability (Block, 1961), it was later recognized as a state-like phenomenon with an increasing influence on human resource development (HRD). Garmezy (1971) examined resilience from a clinical psychology angle in connection with schizophrenia and identified it as being not dispositional but developable. Its impact outside of clinical and positive psychology with special reference to the workplace has suffered unwarranted neglect, and is frequently mentioned only in connection with work attitudes such as satisfaction, happiness, and commitment (Luthans et al., 2008; Larson & Luthans, 2006; Youssef & Luthans, 2008) and optimistic thinking (Kumpfer, 1999). There is therefore an excellent opportunity for advances in this field. Regarding theory-building, resilience was conceptualized for the first time by Masten and Reed (2002) until recently Frederickson identified the link between her broaden-and-build theory and its adaptability to the resilience construct. Masten and Reed (2003; 2006) initially concentrated on the adaptional processes which are inherent in individuals with strong resilience, who are able to diminish risk factors which evoke setbacks by using their individual assets.

Considerable efforts have been made in recent years to study the positive effects of resilience, such as its positive influence on emotional stability when faced with personal setbacks (Bonanno, Papa & O'Neill, 2001) and its positive impact on flexibility vis-à-vis changing demands and openness to new experiences (Tugade & Frederickson, 2004).

Other studies provide an insight into the positive relationship with state positive affect and commitment to change (Shin, Taylor & Seo, 2012) as well as the ability to “bounce back” from stressful experiences quickly and efficiently (Tugade, Frederickson & Barrett, 2004). These attributes of resilience play an important role especially within the workplace. Luthans (2002, p.702) defines this resilience from an organizational behavior perspective as “the psychological capacity to rebound, to “bounce back” from adversity, uncertainty, conflict, failure, or even positive change, progress and increased responsibility”. Further resilience increases through negative and positive events (Luthans, Norman, Avolio & Avey, 2008).

Fredrickson’s well-established broaden-and-build theory (2001) can serve as a framework for a deeper understanding of the resilience phenomenon, since it states that resilient individuals can handle positive or negative events better than non-resilient individuals. This is because a high level of positive emotionality is immanent in resilient individuals helping them to activate their resources so they can rebound from stress or other adverse events (Tugade & Fredrickson, 2004). The theory holds that positive emotions broaden people’s thought-action repertoires, helping them to discover new ways of thinking and behaving. As individuals discover new scopes of action or in this case, ways to improve their performance due to ICT and diminish their overload, they build up physical, intellectual, social, and psychological resources (Fredrickson & Joiner, 2002). In response to Tarafdar et al. (2011) I provide a framework that answers a fundamental question: what prevents and counters the negative effect of ICT use? I build a bridge between the previous field of application of resilience by adding the IS topic of today’s workplace challenges such as ICT influence.

This approach is consistent with Gorgievski, Halbesleben and Bakker (2011) who state that positive resources theory is not limited to any specific research domain such as organizational psychology. They strongly support the idea of integrating general psychological metatheories into an occupational and organizational context. Therefore, a kaleidoscopic view on previous psychology-inherent theories to adapt them and extend their applicability to HRD seems a logical next step. ICT use, a necessity within the organizational sphere, should thus be the focus of research in connection with resilience.

To develop my hypotheses, I share Luthans and Youssef (2007)’s assumption that resilience incorporates a proactive and a reactive element. The proactive assessment of

risks and assets is characteristic for resilience (Luthans, Vogelsang & Lester, 2006). Therefore in line with Youssef & Luthans (2007) individuals may proactively learn and grow through conquering challenges and can prevent the emergence of stress in case of actual threats. ICT is often regarded as a necessary evil in an individual's life (Ayyagari, 2012) due to its disruptive impact on the way they work.

In order to get the big picture of ICT use perceptions, I illustrate the dual nature of ICT by examining the positive and negative aspects. Leading IS researchers specify the negative concomitants and antecedents of increased ICT use which comprise workload, antisocial behavior and in particular, techno-stress (Brod, 1984; Ayyagari, 2011; Mazmanian, Yates & Orlikowski, 2006; Ayyagari, Grover & Purvis, 2011; Ragu-Nathan, Tarafdar, Ragu-Nathan, Tu & Ragu-Nathan, 2007). In this context I focus on techno-overload, an ICT-induced stressor, which implies an inability to disconnect from work due to changed or increased demands regarding ICT (Ragu-Nathan et al., 2008). Other aspects of techno-overload are the perceptions of a greater workload, a faster work speed, or a need to change one's habits due to ICT (Tu, Wang & Shu, 2005) which results in the perceived need to work all the time. I choose techno-overload as a proxy for techno-stress, as it is a construct that "is treated as a cause of techno-stress rather than a dimension" (Ayyagari, 2011, p. 19). Thus, if it is possible to reduce techno-overload, it should be possible to stifle the techno-stress effect from the beginning. I would like to take up an aspect already mentioned above, namely that resilience is a preventer of negative perceptions and setback risk factors such as techno-overload. Masten (2001) states that resilience places a unique positive value on risk factors which are otherwise seen as threats, such as in this case techno-overload. This assumption is in line with previous research by Avey, Luthans and Jensen (2009) who examine the negative association between psychological capital and stress symptoms, as well as Utsey, Giesberecht, Hook and Stanard (2000), who state that resilience decreases distress. Applying this to the ICT context, I therefore hypothesize:

H1. Resilience is negatively related to techno-overload.

Apart from all criticism about the invasive nature of technology use, and how many changes it evokes in the world of work, awareness is needed of the paradox of ICT use. In this context it is important to address the dual nature of ICT use. The question therefore

is what causes employees to accept information technology? One should bear in mind that technically literate workers profit from strong ICT use and understand that a special amount of ICT use helps them to enhance job performance (Davis, 1989). This also involves positive beliefs referring to the compatibility of ICT with one's preferred way of working. Perceived (ICT) usefulness measuring the extent to which the ICT use increases an individual's job performance (Karahanna, 2006; Venkatesh et. al., 2003) is a symbol for this technology acceptance as well as a key determinant of user acceptance (Davis, 1989). Resilience helps to put a positive value on risk factors such as overwhelming ICT use and is, according to Avey et al. (2009, p. 682), "the most important positive resource to navigating a turbulent and stressful workplace".

I therefore hypothesize:

H2. Resilience is positively related to perceived usefulness.

Working after work is an issue within this context (Porter & Kakabadse; 2006) since the use of ICT offers the option of constant availability, which evokes an increased workload and urgency. Thus, employees are urged or urge themselves to remain connected to the organization anytime and anywhere, which results in 24/7 availability. Tarafdar et al. (2007) with reference to Cooper, Dewe and O'Driscoll (2001) and Porter and Kakabadse (2006) emphasize that excessive ICT use has been linked to extended work hours in such a way that individuals are internally driven to work long hours due to their techno-addiction. According to the broaden-and-build theory mentioned above, positive emotions broaden individuals' thought-action repertoires, helping them to discover new ways of thinking. This is in line with Bakker (2008, p.28) stating that employees who have a high resilience level "are well able to mobilize their job resources, and generally are more engaged in their work." I thus assume that working after work helps resilient employees to decide when to tap their individual capacities to fulfil their tasks.

To the best of my knowledge there is no research on the role of resilience in regard to working after work. Generally speaking, resilience helps people to overcome obstacles and remain resistant during stressful periods. Thus resilient individuals are less vulnerable as they have learned how to handle hassles and protect themselves from being overwhelmed. This "propensity to rise to meet challenges" (Grant, Curtayne & Burton, 2009, p. 5) together with the "individual's sense of personal control" helps individuals to fully realize their potential.

I therefore derive the following hypothesis:

H3. Resilience is positively related to working after work.

Working after work induces employees to let ICT invade their private life. With technologies becoming more pervasive and allowing for connectivity all over the world, the office is expanding into new settings and “pushes e-mail” on the user no matter where they are (Mazmanian et al., 2006) and how much work there is left to do. As a result, working after work is inseparably linked to ICT use. This “demise of standard working hours” (Wajcman, Bittman & Brown, 2008, p. 636) is seen controversial by authors. It is both intuitive and well-established in the literature that the use of BlackBerry devices invades private life and causes an information overload (Mazmanian, Yates & Orlikowski, 2005; Kossek, Lautsch & Eaton, 2009; Mazmanian, Orlikowski & Yates, 2013). While some studies depict the spillover of work matters into private life as disruptive (Barber & Jenkins, 2014; Middleton & Cukier, 2006; Mazmanian, 2005) other authors (e.g. Allen & Shoard, 2005, p. 8) describe in their study that “the intrusion of mobile technology into users' personal lives was seen by interviewees as an acceptable trade-off for the personal productivity and flexibility benefits.” Therefore I include the time individuals work beyond their regular or contracted working hours as a mediation effect in my proposed research model, as this phenomenon often occurs in combination with a strong ICT impact. Ubiquitous computing and continual information flow are buzzwords that infiltrate not only the world of work, but everyday life. On the one hand, employees link working after work to information-overload but otherwise they try to benefit from the newly gained flexibility of technology use by incorporating ICT beyond their regular working hours.

Therefore I hypothesize:

H4a: Employees' working after work mediates the relationship between their resilience and perceived ICT usefulness.

H4b: Employees' working after work mediates the relationship between their resilience and techno-overload.

Method

Sample and Procedure

Survey data was collected from the database of a recruitment company in Germany with special focus on the ICT/IT industry. After a pretest with 37 participants, the survey was sent out in June 2013 and addressed mainly the following topics: flexible work arrangements, influence of ICT use on everyday professional life, and personal attitudes towards job conditions. I also asked participants to provide basic information regarding tenure, job level, personal expertise, and industry sector, as well as their gender and family situation. Participation was voluntary and the results were and are kept strictly confidential. I informed the potential participants one week in advance of the arrival of the online survey. I then e-mailed the personalized online survey to the professionals listed in the database. Participants had two weeks to respond. A total of 877 employees responded to the survey. I eliminated surveys with large amounts of missing data, which resulted in 479 completed questionnaires.

The final sample includes 479 employees (19.8% in nonsupervisory roles; 37.6% were coordinator/technical experts; 24% were managers/directors and 7.4% worked at board level). The respondents' mean age was 45.42 ($SD = 9.97$), their average professional experience was 19.44 ($SD = 10.48$) years. The share of male participants is 71.1%, 28.9% of participants were female. As for educational background, 63.5% were university graduates, with 16.3% holding a degree in computer science or IT. 37.4% stated they had expertise in ICT.

Respondents worked in a variety of sectors such as automotive, engineering, banking & finance, consulting and services. Most (36.8%) worked in ICT. The mean contractually agreed working hours was 37.59 ($SD = 6.60$), actual working hours numbered 42.70 ($SD = 10.61$) on average.

Measures

Table 1 (Appendix) gives an overview of the scale items used for the main variables resilience, techno-overload, perceived usefulness with a reliability measure (Cronbach's Alpha), means, standard deviations, and sources.

First participants were asked to choose the ICT medium that influences their daily workflow most.

Perceived usefulness. I measure this variable by using the perceived usefulness construct by Karahanna, Agarwal & Angst (2006) adapted to ICT use. A sample question is “Due to this technology I will improve my job performance.”

Techno-overload. Overload induced by technology use is measured by using the five-item subscale of Tarafdar et al.’s (2007) validated techno-stress scale. Two sample questions are “Due to this technology I am forced to do more work than I can handle” and “Due to this technology I am forced to work within very tight time schedules.”

Resilience. This construct comprises three items and is based on the validated 12-item PsyCap questionnaire by Luthans et al. (2007). A sample question is “I usually take stressful things at work in stride.”

Working after work is indexed by the single item “Outside my regular working time I work about xx% hours per week at home.” The participant has to fill in the (1 to 60) number of hours that he/she works additionally. The mean is 3.37. All other items are measured on a Likert scale from 1 (strongly disagree) to 7 (strongly agree).

The following **control variables** are included in the model: gender, marital status, ICT expertise, use of e-mail, messaging, and telephone on a mobile device on a regular day. I choose the last-mentioned variables to control for their influence with regard to the findings of Jeffrey, Diller and Fiedler (2014).

Data Analysis

To examine the validity of my model across the factors I conduct an exploratory factor analysis followed by a confirmatory factor analysis, using maximum likelihood extraction method with varimax rotation. Beforhand I test the Kaiser-Maier Olkin and Bartlett to test sphericity and the general use of factor analysis.

I extract based on an eigenvalue > 1 and drop items that do not load at least 0.40 or higher (Bennett & Robinson, 2000) or which are cross-loaded on other factors. Table 2 (Appendix) contains the three identified factors.

Results

Table 3 summarizes means, standard deviations, and intercorrelations of all study variables.

Table 3: *Descriptive statistics and correlations of variables within the study*

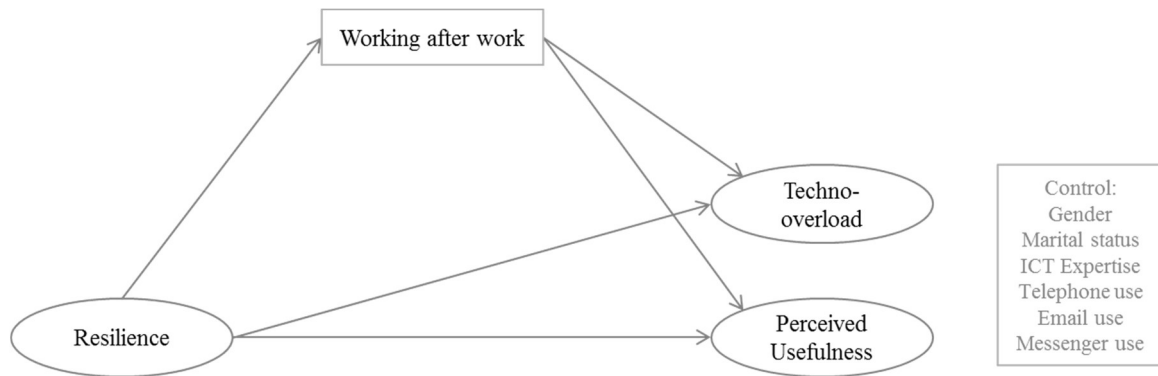
| Variables | Mean | SD | (1) | (2) | (3) | (4) |
|--------------------------|------|------|--------|-------|-------|-----|
| (1) Resilience | 5.49 | 0.81 | 1 | | | |
| (2) Techno-overload | 3.89 | 1.93 | -.15** | 1 | | |
| (3) Perceived Usefulness | 4.86 | 1.57 | .25** | -.11* | 1 | |
| (4) Working after work | 3.38 | 4.19 | .18** | .21** | .16** | 1 |

*** = $p < .001$ sig.; ** = $p < .05$ sig.; * = $p < .1$ sig.; n.s. = not significant.

Model Overview and Assessment

To test my proposed research model in Figure 1, I use structural equation modeling and the software SPSS extended by the AMOS module.

Figure 1. *Research model*



To test the suitability of my research model, I provide a selection of goodness-of-fit indices.

With reference to the global fit of the model ($\chi^2/\text{d.f.} = 2.596$, comparative fit index (CFI) = .94, root mean square error of approximation (RMSEA) = .058, standardized root mean square residual (SRMR) = .069, the global fit measures of this model indicate a good fit of the model (Baumgartner & Homburg, 1995; Browne & Cudeck, 1993; Hu & Bentler, 1999). Further information is provided in Table 4 below and Table 5 (Appendix).

Table 4. *Fit indices*

| Model | χ^2 | <i>df</i> | CFI | TLI (NNFI) | RMSEA | $\Delta\chi^2$ | Δdf |
|---------|----------|-----------|-----|------------|-------|----------------|-------------|
| Model 1 | 363.39 | 140 | .94 | 0.93 | .058 | | |
| Model 2 | 359.15 | 140 | .94 | 0.93 | .057 | 4.24 | 0 |
| Model 3 | 331.06 | 138 | .95 | 0.94 | .054 | 28.09 | 2 |

Note. *df* = degrees of freedom; CFI = comparative fit index; TLI (NNFI) = Tucker-Lewis index; RMSEA = Root mean square error; $\Delta\chi^2$ = change in chi-square; Δdf = change in degrees of freedom.

I include mediation in my model by applying the well-established method by Baron and Kenny (1986) and estimating the following three steps. First I verify the impact of the independent variable (resilience) on the dependent variable (techno-overload). Then I examine whether the independent variable affects the mediator (additional working hours) significantly. In the third equation the mediator must also affect the dependent variable. After testing all these conditions, the direct effect of the independent variable on the dependent variable must be zero or at least less than the impact of the mediator on the dependent variable, which is the case in my model. Therefore I have a partial mediation in my model, showing that resilience has less significant effect when controlled for the impact of working after work on techno-overload. This is also the case for the impact of working after work on perceived usefulness. I am aware of the findings by Zhao, Lynch and Chen (2011), which reconsider Baron and Kenny's well-known method. Using their typology of mediation effects I test whether I have a complementary, a competitive mediation, indirect/direct-only or a no-effect non-mediation in my study. I can confirm a complementary mediation as well as a competitive mediation. The "effect to be mediated" is a condition sine qua non for the well-established Baron and Kenny (1986) approach but can be neglected according to Zhao et al. (2011). A complementary mediation occurs when the indirect and the direct path are significant and are of the same sign. The existence of a mediated and a direct effect, both significant but having opposite signs, indicates a competitive mediation.

Hypothesized Relationships

First I estimate my proposed model, without any mediation effects. Table 4 and 5 (Appendix), model 1 demonstrates the results. The model fit statistics are all in the satisfactory range. All coefficients are significant at least at the 5% level.

In Hypothesis 1 I presume that resilience has a negative impact on techno-overload which means that with a higher level of resilience, perceived techno-overload is less pronounced. I can support this hypothesis ($-.16, SE = .10, t = -3.13, p < .05$).

Hypothesis 2 states that resilience is positively related to perceived usefulness. The results in Table 4 and 5 show support for this hypothesis ($.23, SE = .09, t = 4.29, p < .001$).

Hypothesis 3 focuses on the impact of the resilience level on working after work, stating that resilience has an increasing effect on working after work. I can confirm this as well ($.17, SE = .21, t = 3.25, p < .05$). I predict in hypothesis 4a that working after work mediate the effect of resilience on perceived usefulness. The last hypothesis states that the relationship between resilience and techno-overload is mediated through working after work. I do bootstrapping with the result that the confidence interval around the indirect effects does not include 0 ($.03$, H4a: 95% CI: $b_{\text{lowerbound}} = .010, b_{\text{upperbound}} = .053, p < .05$; $.04$, H4b: 95% CI: $b_{\text{lowerbound}} = .019, b_{\text{upperbound}} = .077, p < .05$). This is the case for both hypotheses. The proposed indirect effect of working after work is statistically significant; therefore both Hypotheses 4a and 4b are supported. Working after work partially mediates the effect of resilience on the dependent variables techno-overload and perceived usefulness. According to Zhao et al. (2011) I have a complementary mediation in Hypothesis 4a as well as a competitive mediation in Hypothesis 4b.

I find a significant influence of messaging on working after work ($.09, p < .1$) and a significant influence of telephone ($.15, p < .05$), messenger ($.10, p < .05$) and e-mail use ($.13, p < .05$) on my dependent variable, techno-overload. This is consistent with the study by Jeffrey, Diller and Fiedler (2014) which deals with the impact of ICT use on techno-overload and preferred ICT working styles which, in turn, influences commitment. Other control variables such as gender, marital status and ICT expertise are not significant in this context.

The overall results can be summarized as follows. Resilience is shown to impact individuals' ICT use perceptions and has an important role in determining how employees respond to ICT. Techno-overload is perceived as less harmful by resilient employees. ICT use is perceived as more useful due to their resilience. Working after work reduces the decreasing effect of resilience on overload, but also increases perceived usefulness.

Discussion

The paper contributes to the current state of research in several ways. Generally speaking, I have embedded resilience in organizational behavior research which has shown that it can contribute to an improvement in today's workplaces in several ways. First, using Fredrickson's broaden-and-build theory resilience is shown to increase the perceived usefulness of ICT use. Thus a high resilience level helps employees making the most of their situation and take advantage of their ICT-induced opportunities. Secondly, I show that resilience, which is still strongly anchored in positive psychology, can be linked to a certain phenomenon, namely the overload of ICT, that is primarily discussed within IS literature to denote a challenge in today's work. Individuals with a higher level of resilience will more easily adapt to challenges and thus perceive a lower level of techno-overload. Thirdly, I integrate working after work as a mediator, showing that resilient employees are more engaged and work after work, which in turn threatens the positive effect of resilience. This is an insight into the counterproductive effect of working after work. Working after work usually forces individuals to use more ICT, which, at best, can be used to be more productive on the one hand, however on the other hand may lead to a perception of overload. The study allows me to propose several suggestions for HRD managers. Resilience, which is state-like and therefore open for development (Masten, 2001; Youssef & Luthans, 2005) and training interventions, seems to help individuals who very frequently work with ICT. Thus individuals need to invest in increasing their resilience so they can face the challenges of ICT use. Organizations for their part shall monitor their employees in order to avoid the impact of working after work in an unhealthy manner.

Theoretical Implications and Future Research

To my knowledge, this work is the first demonstration of a link between resilience and a techno-stress creator. Therefore it represents an initial step in combining resilience and IS literature in order to provide a better understanding of the techno-stress phenomenon (Avey, Luthans & Jensen, 2009). This leads to new insights regarding the proactive dimension of resilience which has been poorly documented so far (Shin et al, 2012). It seems fruitful to choose a cross-disciplinary perspective to combine two emerging phenomena: the growing importance of resilience and the challenge of a growing impact of ICT use. For future research it may be interesting to take the interaction with mindfulness into account. A second interesting aspect would be to integrate further mediators or moderators such as other elements of psychological capital or playfulness

regarding ICT. This is in line with Zhao et al. (2011) who state that the existence of complementary and competitive mediations point to the likelihood of further omitted mediators. According to Linley, Joseph, Harrington and Wood (2006), there are certainly opportunities for major scientific research, because so little attention has been devoted to these topics. A new spectrum of application areas could prompt researchers to expand their research horizons, as psychology instruments have so far been under-represented in the IS literature. Fredrickson et al. (2003) made a start with their broaden-and-build theory, but there is still a dearth of research on how people actually create resilience in themselves or others (Luthans et al., 2006) and its wide range of applications.

Limitations

This study is not without limitations. First, as my data was collected at a single point in time (June 2013) mono-method bias is a concern, as always when variables are measured using a single survey (Olson-Buchanan & Boswell, 2006). I was therefore not able to study temporal effects. Secondly, as my data originates from one source, I have attempted to incorporate several remedies to minimize common method variance (Podsakoff et al., 2003). I have also attempted to avoid the common rater effect by using a large number of variables to control bias due to the observable relationship between the predictor and criterion variable by survey participants. To avoid social desirability as a bias source, I clearly assured the survey participants that the survey was absolutely confidential. Moreover, I have controlled for common method bias by integrating a CFA with marker construct as a moderator (Williams et. al, 2010). I choose decision making comprehensiveness by Dean and Sharfman (1996) as the marker variable for the common method bias analysis because it is theoretically unrelated to the dependent variables. After including this marker construct in the model, the goodness of fit indices and especially NFI, TLI, and RMSEA are not significantly different no matter whether I set the paths to zero or not. I therefore assume that common method bias is no serious threat to the interpretation of the results.

Practical Implications

According to Csikszentmihalyi's flow theory (1991, p. 84) "it is not the skills we actually have that determine how we feel but the ones we think we have". People act according to their beliefs about ICT use. Thus although it is not objective reality, it is their own

perceived reality that is more relevant to their work attitude. A dysfunctional impact such as techno-overload therefore depends on one's perception rather than on objective criteria. The findings of this study should facilitate managers' approach to ICT use in work environments. The enhancement of resilience, specifically one's resilience capacity, is an important factor in this context, as resilient employees are better equipped to deal with stressors.

Apart from the necessity to include psychological capital within (human resource development) HRD methods to foster employees' personal and skill development, I show that even as a single factor, resilience has enormous influence on employees who have to use ICT. A high level of resilience makes up the difference of perspective whether an event is conceptualized as traumatic or can be seen as an opportunity to learn and flourish. The interdisciplinary perspective taken by this study should reflect the reality or perceived reality of an employee in today's world of work. Employees are not only confronted with and sometimes overwhelmed by the augmenting impact of ICT in their workspaces, but also have to deal with this challenge by tapping into their inherent resources. Although resilience is shown to have an appreciable positive impact on ICT use, this effect is endangered by excessive working after work. Therefore it is important to create awareness inside organizations of the importance of taking a kaleidoscopic approach also with reference to IS-focused challenges such as ICT use.

Conclusion

At times like these where employees feel they are being controlled by their devices rather than vice versa, it is of prime importance to support employees in becoming more resilient. It is a core HRD concern to develop employees' skills in the workplace, especially when it comes to their expertise and competence (Ardichvili, 2011). The growing use of telework and ICT in general is changing the world of work as well as the interventions an employee has to deal with every day. Telework, with all of its idiosyncrasies, can be a challenge or a hindrance and sometimes even both at the same time. The challenges of ICT use are far-reaching and also affect employees' cognitive and affective abilities and skills as well as their social nature. Sometimes these dynamics can be overwhelming. Of course resilience cannot completely prevent them from suffering stress due to ICT, but increasing their resilience helps to reduce the techno-impact to an appropriate level. In this context, self-preservation is one important key area (Van der Vegt, Essens, Wahlström & George, 2015) which should be addressed in future

research. In this study I examine the role of resilience combined with techno-overload and perceived usefulness. Taking into account Frederickson's broaden-and-build theory, I can explain the positive effects of resilience in the face of ICT-induced challenges such as overload as well as the benefits that result from the usefulness of ICT. Thus, on the one hand resilient employees do not experience techno-overload in such a negative way; on the other they take advantage of the possibilities ICT may offer to beat the odds in this completely new, challenging virtual setting. Although research into "corresponding biological processes of resilience, from genes to neurological development and functioning" (Lopez & Snyder, 2009, p. 129) is still in its infancy, there is certainly awareness of its positive effect. It may be necessary to break through the boundaries of psychological science to fully benefit from resilience and its role in creating a positive (virtual) workplace.

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Appendix

Tables

Table 1. *Scales, reliabilities, means, standard deviations, and sources of main variables.*

| | <i>Mean</i> | <i>SD</i> |
|---|-------------|-----------|
| Techno-overload (Reliability = 0.90) (Tarafdar et al., 2007) | 3.89 | 1.93 |
| Due to this technology... | | |
| (1) ... I am forced to work much faster | 4.18 | 1.96 |
| (2) ... I am forced to do more work that I can handle | 3.42 | 1.90 |
| (3) ... I am forced to work within very tight time schedules | 4.02 | 1.94 |
| (4) ... I am forced to change my work habits | 3.83 | 1.90 |
| (5) ... I have a higher workload | 4.02 | 1.95 |
| Perceived Usefulness (Reliability = 0.90) (adapted from Karahanna et al., 2006) | 4.86 | 1.57 |
| Due to this technology... | | |
| (1) ... I will increase my job productivity | 4.84 | 1.61 |
| (2) ... I can enhance the effectiveness on the job | 4.75 | 1.60 |
| (3) ... it is easier to do my job | 5.09 | 1.52 |
| (4) ... I can improve my job performance | 4.78 | 1.57 |
| Resilience (Reliability =0.720) (Luthans et al., 2007) | 5.49 | 1.24 |
| (1) ... I can be “on my own” so to speak if I have to. | 5.58 | 1.15 |
| (2) ... I usually take stressful things at work in stride. | 4.96 | 1.43 |
| (3) ... I can get through difficult times at work because I've experienced difficulty before. | 5.92 | .99 |
| Working after work | | |
| Outside my regular working time I work about ___ % hours at home. | 3.38 | 4.17 |

Table 2. *Factor loadings*

| | Techno-overload | Perceived Usefulness | Resilience |
|-----|-----------------|----------------------|------------|
| TO1 | 0.789 | | |
| TO2 | 0.856 | | |
| TO3 | 0.919 | | |
| TO4 | 0.756 | | |
| TP1 | | 0.895 | |
| TP2 | | 0.956 | |
| TP3 | | 0.679 | |
| TP4 | | 0.781 | |
| RE1 | | | 0.530 |
| RE2 | | | 0.643 |
| RE3 | | | 0.890 |

Table 5. *Structural equation model*

| Structural estimates | Model 1 (initial) | Model 2 | Model 3 |
|---|------------------------------|------------------------------|------------------------------|
| | $\chi^2/\text{d.f.} = 2.596$ | $\chi^2/\text{d.f.} = 2.565$ | $\chi^2/\text{d.f.} = 2.399$ |
| | $\chi^2 = 363.39$ | $\chi^2 = 359.15$ | $\chi^2 = 331.06$ |
| | $df=140$ | $df=140$ | $df=138$ |
| | SRMR=.07 | SRMR=.08 | SRMR=.06 |
| | TLI=.93 | TLI=.93 | TLI=.94 |
| | CFI=.94 | CFI=.94 | CFI=.95 |
| | RMSEA=.058 | RMSEA=.057 | RMSEA=.054 |
| Resilience → Perceived usefulness | .23 (4.29)*** | | .20 (3.72)*** |
| Resilience → Techno-overload | -.16 (-3.13)** | | -.22 (-4.09)*** |
| Working after work → Perceived usefulness | | .19 (4.05)*** | .15 (3.21)** |
| Working after work → Techno-overload | | .19 (4.08)*** | .22 (4.89)*** |
| Resilience → Working after work | .18 (3.40)*** | .17 (3.25)*** | .18 (3.42)*** |
| $\Delta \chi^2$ | | 4.24 | 28.09 |
| Δdf | | 0 | 2 |

Control Variables

| | | | |
|---|---------------|--------------|--------------|
| Gender → Usefulness | -.10 (-2.10) | (n.s) | (n.s) |
| Marital status → Usefulness | (n.s) | (n.s.) | (n.s) |
| ICT Expertise → Usefulness | (n.s.) | (n.s) | (n.s) |
| Gender → Techno-overload | (n.s) | (n.s.) | (n.s) |
| Marital status → Techno-overload | (n.s.) | (n.s) | (n.s) |
| ICT Expertise → Techno-overload | (n.s) | (n.s) | (n.s) |
| Messenger Intensification → Techno-overload | .12 (2.73)** | .10 (2.18)** | .10 (2.30)** |
| E-mail Intensification → Techno-overload | .14 (2.92)** | .12.(2.56)** | .13 (2.73)** |
| Telephone Intensification → Techno-overload | .16 (3.40)*** | .15 (3.09)** | .15 (3.20)** |
| Messenger Intensification → Work after work | .09 (1.96)** | .09 (2.00)** | 0.10 (1.96)* |
| E-mail Intensification → Work after work | (n.s) | (n.s) | (n.s) |
| Telephone Intensification → Work after work | (n.s) | (n.s) | (n.s) |

Note. *df* = degrees of freedom; SRMR = standardized root mean square residual; TLI (NNFI) = Tucker-Lewis index; CFI = comparative fit index; RMSEA = Root mean square error; $\Delta \chi^2$ = change in chi-square; Δdf = change in degrees of freedom; *** = $p < .001$ sig.; ** = $p < .05$ sig.; * = $p < .1$ sig; n.s. = not significant.

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