

The Leadership Dimension of Coping with Technostress

Christian Fieseler
University of St.Gallen
Christian.Fieseler@unisg.ch

Miriam Meckel
University of St.Gallen
Miriam.Meckel@unisg.ch

Stephanie Grubenmann
University of St.Gallen
Stephanie.Grubenmann@unisg.ch

Severina Müller
University of St.Gallen
Severina.Mueller@unisg.ch

Abstract

One pathway to alleviate the consequences of technology-induced stress may lie in the role that supervisors may or may not play in mitigating the negative consequences of ICT usage. Based on survey research with 491 salespersons using ICT in their work environment, and tested with structural equation modeling, we discuss the impact of two forms of leadership on individual and organizational outcomes. We differentiate between supervisor influence on ICT use and general leadership, and their influence on ICT-strain (i.e. technostress) as well as on general strain (i.e. work exhaustion). The data show that, in the context of ICT-induced stress, leadership has a significant compensatory influence on work exhaustion and on job satisfaction. The results lead us to the interpretation that leadership constitutes a potential further instrument to ease the negative outcomes of ICT usage in work contexts, and to propose further study into the role of ICT specific supervisor influence.

1. Introduction

Increasingly mobile and social information and communication technologies (ICTs) permeate professional life. They are becoming more and more omnipresent in today's working environments, bringing many positive effects such as gain in productivity efficiencies and effectiveness [1] [2] [3]. Particularly in professions where mobility constitutes a key component for employees, as in *mobile* or *nomadic work* (e.g. sale or customer service), companies make use of increased flexibility offered by such new technologies [4] [5]. However, the increased use of ICT in the work environment does not only lead to positive outcomes: The proliferation of these technologies increases the level of dependence on them, as organizational structures and processes are more and more tailored to the affordances of (new) ICTs. Not only organizations need to adapt in order keep pace with current changes

– the workforce also has to constantly keep up with new soft- and hardware, with updates getting more and more frequent and changing work practices according to ICT requirements. The phenomenon of stress caused by the use of ICT is discussed in the literature under the term *technostress* [6] [7] [8]. Technostress is related to several negative outcomes, such as psychological, physical, or behavioural strain [9], that it turn have ramifications not for the employees concerned, but also the organizations as such, through lower employee productivity, job satisfaction, organizational commitment and continuance commitment [10] [11]. These far-reaching economic effects should potentially put technostress on management's agenda, pointing to the question whether there are ways to alleviate the workforce's technostress and its negative consequences via management action. While there are several studies on the predictors or antecedents of technology-induced stress (see [12], [13], [14], [15], [16], [17] and [18]) as well as on its consequences (see [10]), to date, little research focuses on the compensating influence management action (or inaction) could exert on the negative consequences resulting from technostress.

Prior studies connecting management and the use of ICT, such as the one by Salanova, Llorens, and Cifre [19] show that a lack of job resources such as transformational leadership (as well as autonomy, social support, and facilitators), in combination with certain job demands (i.e. work load, role ambiguity, emotional overload, mobbing, and obstacles) as well as the lack of personal resources (mental competence) are related to technostress (i.e. anxiety, fatigue, scepticism, and inefficacy). Avlonitis and Panagopoulos [20] showed that supervisor influence leads to higher salesperson's acceptance of the CRM system.

Based on these first results, we see leadership as a potential variable of influence on the consequences of technostress. In this paper, we are interested in the question of how leadership, as a crucial factor in employee's job environment, affects employee's perception of technostress and his/her general perception of

the work situation and his/her job satisfaction. Under the postulation that leadership has a considerable impact on an employee's perception of technostress, his/her work situation and his/her job satisfaction, we expand the current notion of technostress by including the role of management. We see considerable potential to extend research into the role of management to balance the negative consequences of technostress. In our study we focus on salespersons, who's work as boundary spanners between the company and the client [21] relies to a large extent on the use of ICTs to communicate either with customers or the company.

The present paper is structured as follows. First, a brief literature review will shed light on the most relevant constructs and generations of technology-induced stress research. Second, we propose and empirically test an extension to the Transaction-Based Approach [22] [23] [24], expanding the mental dimensions of technostress with a construct on a more general level of strain and additionally taking into consideration the role of management. The third part summarizes and discusses the findings of the literature review and the empirical survey and presents implications for technology-induced stress research. The fourth and last part provides an outlook on potential avenues for future research and for leveraging the compensatory influence of managerial supervision on strain and work outcomes.

2. Conceptual Model and Hypothesis

New information and communication technologies, media channels and applications are generally implemented to increase employee's efficiency and reduce their perceived stress level. Recent studies showed the dark side of ICT: the use of ICT may prove to be a double-edged sword as their adoption often leads to a redefinition of organizational structures and business processes [10]. The permanent adoption to new applications, functionalities and workflows may lead to the increase of general task complexity [25] [10]. If such a situation is combined with the lack of training, increased workload, increased pace of change and the perceived high reliability on and importance of the new technologies, the results may be feelings of stress for employees [26]. Based on such experiences, changes in the organisation of information exchange and communication in organizations is often related to anxiety and tension, perceived higher work pressures, job dissatisfaction and ambiguity about job demands, demoralization and frustration [10] [11]. Such emotions in turn influence directly or indirectly the use of technology [27]. Such adverse mental affects of technology are

discussed in the literature under the term 'technostress', defined by Brod [28, pp. 16] as a "modern disease of adaptation caused by an inability to cope with new computer technologies in a healthy manner". Ragu-Nathan et al. [10] define technostress more generally as stress experienced by individuals due to the use of information and communications technologies: "Technostress relates to the phenomenon of stress experienced by end users in organizations as a result of their use of ICTs" [10, pp. 417f.]. Himma [29, pp. 268] notes that technostress is generally associated with "more content out there than we can invest attention in" and that this causes psychological discomfort in the form of depression, anxiety or a sense of being overwhelmed. In the literature, technostress is also called *technophobia*, *computerphobia*, *computer anxiety*, *computer stress* and *negative computer attitude* [30]. In the mobile communication context, Hung et al [31] have coined the term "*ubiquitous technostress*".

2.1 The Transaction-Based Approach

Based on McGrath's definition of stress as an "environmental situation that is perceived as presenting a demand which threatens to exceed the person's capabilities and resources for meeting it" [32, pp. 1351], one may regard technostress as a typical case for such a situation. Several studies on the outcomes of stress are founded in the Transaction-Based Approach [22] [23] [24], describing the phenomenon of stress as a combination of a *stimulation condition* and the individual's *response* to it. In the model, the stimulation condition represents a *stressor*, which can be a certain condition, an event, demands or other stimuli to which an employee is exposed to in his/her work environment. The difficulty or ambiguity of a certain task, e.g. the use of ICT, may be seen as such a *stressor* [10]. The stressor may lead to *strain* in form of behavioural, psychological, and physiological outcomes [22] [33]. Strain in turn may lead to *organizational outcomes* such as job dissatisfaction [34], poor task performance, lack of creativity [35], absenteeism or *turnover* [36] [37]. This impact of the stressor can be buffered or reduced by *situational factors* of the work environment as e.g. job redesign, stress management training, information sharing, social support, and counselling and assistance [38]. In a typical case, stressors *increase* strain and situational factors in turn *decrease* strain. Situational factors can also influence organizational outcomes directly [10, pp. 419]. Some studies have further proposed a *moderating effect* of situational factors on the relationship between stressors and strain.

However, although the direct link between situational factors and strain has found strong empirical support, evidence for the moderating effect of situational factors has been conflicting [22] [33].

2.2 Model and Hypotheses

The Transaction-Based Approach was used as a starting point in deriving the initial model. Here, the use of ICT by employees was regarded as the stimulating situation, which might or might not lead to strain. In our study the resulting strain is *technostress* [39]. Ragu-Nathan et al [10] define five factors as *technostress creators* (in the model: *stressors*): *Techno-Overload*, *Techno-Invasion*, *Techno-Complexity*, *Techno Insecurity* and *Techno-Uncertainty*. Each of the five factors can be broken down into several items. *Techno-Overload* describes the change of one's work due to complexity and pace of technology (*I have a higher workload because of increased technology complexity*). *Techno-Invasion* describes the intrusion of work and technology into private life and spare time (*I feel my personal life is being invaded by this technology*). *Techno-Complexity* describes employee's feeling to be overextended by the technology's complexity (*I often find it too complex for me to understand and use new technologies*). *Techno Insecurity* refers to job insecurity due to new technologies (*I am threatened by co-workers with newer technology skills*). *Techno-Uncertainty* describes objections concerning the constant change regarding new soft- and hardware (*There are frequent upgrades in computer networks in our organization*). We expected that each of the five factors could lead to the experience of technostress by the employee.

In the study we focused on salespersons, as this profession enacts a boundary spanning function for organizations and is confronted with an extremely mobile work environment, with high dependency on ICT. Several studies were concerned with the effects of salesperson's use of ICTs in their daily work on different stress factors [39] [40] [5]. These studies point to the influence of salesperson's ICT usage on perceived *job stress/strain* [39] [5] and on *role stress* in particular [40]. This leads to the first set of hypotheses:

Hypothesis 1a. Perceived Techno-Overload leads to perceived technostress.

Hypothesis 1b. Perceived Techno-Invasion leads to perceived technostress.

Hypothesis 1c. Perceived Techno-Complexity leads to perceived technostress.

Hypothesis 1d. Perceived Techno Insecurity leads to perceived technostress.

Hypothesis 1e. Perceived Techno-Uncertainty leads to perceived technostress.

2.2.1 Work Exhaustion

In a next step we introduced an additional variable: We propose to not regarding strain (i.e. technostress) as directly leading to organizational outcomes as the Transaction-Based Approach proposes, but expect technostress to account for *work exhaustion* (see [41]; based on [42]) as a more general form of strain, which in turn may lead to organizational outcomes on a general level. With this in mind, we introduced a second, more general level of strain. In our initial model, we assume technostress to be one form of specific strain, which accounts to some degree, beside other specific forms of stress, for the general level of strain of employees. Therefore, we first measure ICT specific strain (i.e. technostress), induced by technostress creators, which in turn may account for the experience of general work exhaustion. Our assumption is based on the results of [39] and [10], who describe work environments, which are marked by a high degree of technostress, to be related to experiencing a variety of negative effects on one's wellbeing. Hu and Cheng [43] furthermore associate technology induced stress in the workplace with increased job burnout (job burnout is an equivalent used for work exhaustion [44]). Based on these findings, we hypothesize that:

Hypothesis 2. The experience of technostress has a positive influence on the experience of work exhaustion.

2.2.2 Job Satisfaction

If technostress accounts for more stress on a more general level, we expect this form of general stress to influence organizational outcomes in the form of a decreased *job satisfaction*. The relationship between *work exhaustion* [42] and different organizational outcomes such as *job satisfaction*, *organizational commitment*, and *turnover intention* was shown by [45] [46] [41] [42]. In our assumptions we see technostress affecting work exhaustion, which in turn leads to organizational outcomes. We consider *job satisfaction* as an organizational outcome, in keeping with [10] who

show in their study the direct influence technostress creators exert on job satisfaction, which in turn is related to organizational commitment. Organizational commitment is positively related to continuance commitment. However, we differ from the authors in so far as that we do not regard job satisfaction as an equivalent to strain but rather as an organizational outcome, which is influenced by *work exhaustion*. Based on the above discussion we formulate the following hypothesis:

Hypothesis 3. The experience of work exhaustion has a negative influence on job satisfaction.

2.2.3 Leadership as a Situational Factor

Turning to the situational factors we propose a slightly more complex connection between *situational factors* and corresponding dependent variables: We expect situational factors to influence *ICT specific strain* (i.e. *technostress*), *general strain* (i.e. *work exhaustion*) or *organizational outcomes*. We are particularly interested in leadership, constituting a potential management lever to influence salesperson's work outcomes [36]. Management constitutes a crucial factor in employee's work environment and a powerful leverage for organizations to influence employee's behaviour, attitudes and emotional state. Therefore, we see considerable potential to extend research into the role of management to balance the negative consequences of technostress.

In our study we differentiate two forms of leadership: *supervisor influence on ICT usage*, the behaviour of a manager to influence employees ICT use, and *leadership*, the general leadership of salesperson's supervisor. Based on the work of [20], we expect *supervisor influence on ICT use* (see also [40]) to influence *strain* (i.e. *technostress*), as this form of supervisor influence aims at affecting the ICT use of the employee and is therefore

rather specific. We further expect *supervisor influence on ICT use* affecting the *general strain level* (work exhaustion).

In a second set of hypothesis we expect (general) *leadership* to affect work exhaustion and job satisfaction. The supervisor is a crucial person in the employee's work environment with influence on the subordinate's behaviour [48]. According to [49], leadership may contribute to prevent stress and burnout and help employees to cope with stress factors. Mulki et al. [50] showed that participative leadership is a key factor in reducing emotional exhaustion. Leadership style is also related to employee attitudes and behaviours; specifically, it has been linked to role perceptions, job anxiety, job satisfaction, propensity to leave, and turnover [51]. However, certain forms of leadership can also increase stress if a supervisor asks too much of its subordinates or is too much control-orientated [52] [53]. Based on these results we expect leadership influencing *strain* (i.e. *work exhaustion*) and *organizational outcomes* (i.e. *job satisfaction*), leading to the following hypotheses:

Hypothesis 4a. Supervisor influence on ICT usage has a negative influence on technostress.

Hypothesis 4b. Supervisor influence on ICT usage has a negative influence on work exhaustion.

Hypothesis 5a. Leadership has a negative influence on work exhaustion.

Hypothesis 5b. Leadership has a positive influence on job satisfaction.

Based on the above derivations, the conceptual model of our study is presented in Figure 1.

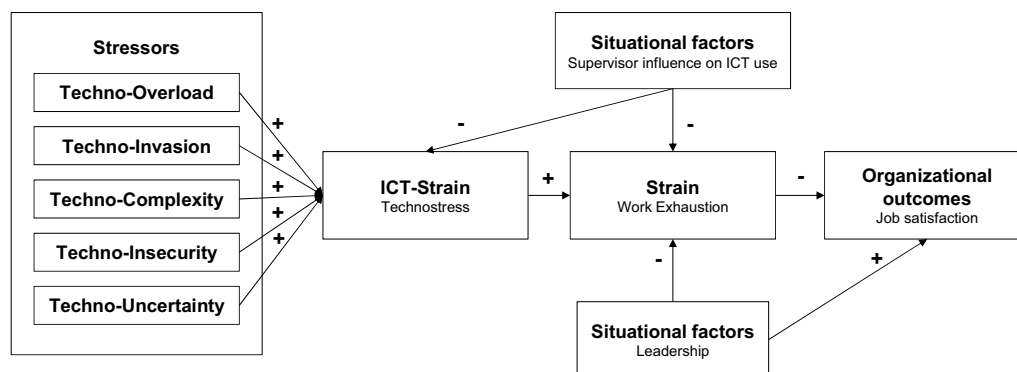


Figure 1. Conceptual model

3. Research Methodology and Measures

In this section, we present the findings of a quantitative investigation of the role of leadership in relation to technostress. Our sample represents the database of an international industrial enterprise with a high proportion of salespersons, who were invited to participate in an Internet-based survey during August and September 2012. Overall, 491 professionals from 25 different European countries completed the online questionnaire. As the vast majority of the employees were male, men were over-represented within the sample, composing 78.5% of all participants. Most participants were between 36 and 52 years of age, had tertiary education and a seniority of five to ten years. They mainly had no staff responsibility and worked in the field. The profiles and demographics of the respondents are summarized in Appendix 1.

The questionnaire was based on measures found in the literature on salesperson's use of technology, TAM, technostress, leadership and organizational outcomes literature. The scales for the five stressor constructs were derived from [10]. The ICT-strain (technostress) scales were used from [39]. The work exhaustion scales we adapted from [41]. The scales for supervisor influence on ICT use were derived from [20]. To measure leadership we used 9 items, adapted from the multifactor leadership questionnaire form 5X (MLQ; [51]). The organizational outcomes scales (job satisfaction) were developed by [21]. The precise phrasing of all items had been adjusted based on a pretest conducted among 10 salespersons as well as three experts from the field of media and communication management, who were asked to comment on the wording of the listed items. Each item was rated by the survey participants based on a five-point Likert scale (from "1=Does

not apply at all" to "5= Applies absolutely "). All scales are listed in Appendix 2

3.1 Measurement Model

As suggested by [54], we evaluated the measurement model before testing the structural model. Therefore, a confirmatory factor analysis was conducted to test for uni-dimensionality and scale reliability on the indicator and construct level. On the construct level, we used Cronbach's alpha (α), composite reliability (C.R.) and average variance extracted (AVE) to assess the internal consistency of the scales. This procedure resulted in the elimination of one item from the techno-overload scale and of three items from the job satisfaction scale, the inclusion of which decreased the reliability coefficients. Furthermore, *techno-insecurity* did not load on its underlying factor, and was excluded from further analysis. After these adjustments, Cronbach's alpha, C.R. and AVE were above the required criterion values, except for *job satisfaction* (AVE = 0.416). The other measures for these constructs showed good results; therefore, (scale) reliability can be assumed. In addition to the confirmatory factor analysis, R^2 was calculated: Four items (V_130, V_190, V_266 and V_299) fell below the threshold of 0.40 [55] [56]. Nevertheless, they were retained because of their importance for the overall construct. The measurement model is shown in Appendix 3

Due to the applied pretest and scale development process, content and convergent validity can be assumed. Discriminant validity can be assumed if squared multiple correlations with any other construct is below the constructs' AVE. Hence, as shown in Appendix 4, the measurement model has discriminant validity. In the overall picture, these statistics indicate an acceptable fit of the model.

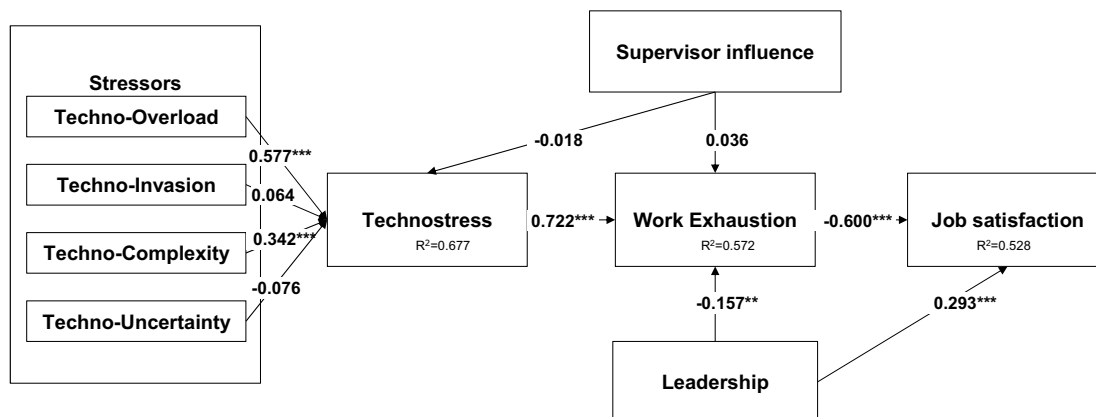


Figure 2. Structural equation model

3.2 Results: Structural Model

To test the hypothesized causal relationships among the constructs of the model, an appropriate statistical analysis is structural equation modeling with latent variables. Based on the postulated hypotheses, we initially estimated the model shown in Figure 2 with Mplus for the adjusted sample ($N=269$). The results include the standardized coefficients based on robust Maximum-Likelihood-estimation (MLM) and the total variance explained (R^2) for each dependent construct for all participants without missing values. The results of the analysis are displayed in Appendix 5 and 6. Six of the ten hypothesized and estimated paths were highly significant ($p < 0.01$). As shown in Appendix 5, the model provided good fitness indices. As we see in Figure 2, our analysis partly confirms the impact of stressors on perceived technostress. Techno-Overload ($\beta = 0.577$) and Techno-Complexity ($\beta = 0.342$) do impact technostress, but we could not find a significant direct influence from Techno-Invasion and Techno-Uncertainty on technostress. Likewise, supervisor influence on ICT usage could not be identified as a significant direct impact on technostress. Work exhaustion was mostly influenced by the perceived technostress ($\beta = 0.722$), however, leadership also showed a significant impact on work exhaustion ($\beta = -0.157$). Again, no significant impact could be found for the influence of the supervisor on work exhaustion. Job satisfaction was mostly affected by work exhaustion ($\beta = 0.600$), but leadership ($\beta = 0.293$) as well had a significant influence on it. In general, leadership influences job satisfaction more strongly than work exhaustion, although its effect on job satisfaction is strongly moderated through work exhaustion. In total, the two latent variables Techno-Overload and Techno-Complexity accounted for approximately 68% of the observed variance in perceived technostress. In conjunction with leadership, technostress accounted for approximately 57% of the observed variance in work exhaustion. Overall, we were able to explain approximately 53% of the observed variance in job satisfaction. Techno-Overload and Techno-Complexity affected work exhaustion and job satisfaction indirectly. Likewise, the two latent variables technostress and leadership had an indirect impact on job satisfaction. As shown Appendix 7, Techno-Overload and Techno-Complexity affected work exhaustion and job satisfaction indirectly. Likewise, the two latent variables technostress and leadership had an indirect impact on job satisfaction.

4. Discussion and Implications

Our results support the relationship of technostress creators leading to technostress, which is positively related to work exhaustion, which in turn is negatively related with work satisfaction. This relationship constitutes the main connection in our study and represents the relevance of research on technostress. With this, we document our assumption, that technostress creators lead to a 'techno specific' form of strain, which in turn is positively correlated to the general strain level, i.e. to the experienced level of work exhaustion. This perspective is new in its specific approach and elaborates the connection between strain and organizational outcomes (although already used by [39], they choose a slightly different model in their final study). Even though the connection between the specific level of strain, i.e. technostress, and organizational outcomes such as job satisfaction have been observed before (see e.g. [10]), our study adds an important element for the further foundation of this assumption by working out the more detailed, strong connection between technostress and job satisfaction over the level of general strain in form of work exhaustion. This detail is important as it constitutes an additional toehold to influence the negative outcomes of technostress. By influencing the experienced level of work exhaustion one might influence the negative outcomes of technostress.

Based on these assumptions, the purpose of this study is to examine the potential of leadership to influence the consequences of technostress, and thus to offer some useful and practical insights for supervisors striving to protect their employees from negative outcomes which may result from the use of ICT in their daily work. In our considerations we differentiated between two specific forms of leadership: On the one hand we expected supervisor influence on ICT use as a specific form of leadership aiming for the influence on employee's use of ICT, to alleviate perceived technostress and work exhaustion. On the other hand we expected leadership as a more general form of supervisor influence to have an effect on the general strain level, i.e. experienced work exhaustion, and on job satisfactions as an organizational outcome. Using this distinction, we proposed two different leverages of leadership to affect the outcomes of technostress.

4.1 Specific Supervisor Influence on Technostress and Work Exhaustion

Our results showed that supervisor influence neither had an effect on the experienced level of tech-

nostress, nor on the experienced level of work exhaustion. According to our data, a supervisor cannot impact the negative effects, which may result out of the use of ICT by specifically influencing employee's use of ICT through the application of motivational and convincing language and attitude. Turning to work exhaustion as the dependent variable, the results seem comprehensible as the measure form of supervisor influence might be too specific to have a measureable influence on the general level of strain.

However, for the techno specific level of strain (i.e. technostress), the outcomes seem to contrast the results of [39], which showed that the supervisor may influence the perceived ease of use of salesperson's use of ICT (i.e. CRM). The problem might lie in the term 'communication tools' we are referring to in our questionnaire. [39] research the specific antecedents and consequences for the use of a CRM system and therefore refer to one specific ICT. As in our study the salespersons work with different ICT, which in their combination may lead to the experience of strain, we had to bundle different tools. We did so by referring to the term 'communication tools' and by adding the instruction, to consider under the term 'communication tools' a specific, defined set of ICT salespersons were using in their daily work. To apply an item such as "*My supervisor believes that there are true merits from using the communication tools*" to a bundle of (defined) ICT could prove problematic and might be too general to measure the impact of specific supervisor influence. A replication of this study is recommended to test supervisor influence on ICT use by referring to a less complex independent variable that applies to only one or several specific ICTs.

Another possible reason, why we were not able to prove a significant impact of ICT specific supervisor influence on technostress might be based on the scale we used in our questionnaire. [39] developed the scale based on [47] to measure the influence on salesperson's perceived ease of use (of CRM). In their interpretation they do not account for what exactly they intended to measure with their developed scale. For the requirements of the study presented here, a slightly adapted scale would have been more adequate, which measures the support a supervisor provides to the employees to take off some (time and workload) pressure from them by his/her language and attitude. Eventually we might need an extended scale as well to integrate the different aspects of technostress creators (overload, insecurity, uncertainty, invasion and complexity) a supervisor intends to deal with. Therefore, we do not propose to denote specific supervisor influence on ICT use as irrelevant for the management of

technostress, but we suggest putting further refining the measurement tool for this construct.

4.2 Leadership Influence on Work Exhaustion and Job Satisfaction

With regard to the influence of general leadership on work exhaustion on the one hand, the model shows that leadership contributes significantly to prevent work exhaustion ($\beta = -0.157$) and positively influences job satisfaction ($\beta = 0.293$). For the purpose of our study, this indicates that leadership constitutes a valuable instrument to either shields employees to a certain degree from the negative impacts that may result from the use of ICT by affecting the perceived level of work exhaustion, which might result out of the perception of technostress, or to at least buffer the negative outcomes of work exhaustion on organizational outcomes by positively influencing job satisfaction. Therefore, we conclude that even if an employee's work environment leads to a certain level of perceived technostress, which in turn can result in work exhaustion, an employee might experience some relief if s/he is led by the 'right' manager. In this case, the 'right' manager would be constituted by the supervisor's management style. In our questionnaire, the used items attest to a leader who is supportive, inspirational and motivating. S/he sets challenging but achievable targets and helps the employees to achieve a good work/life balance. These characteristics are evidence of a supervisor who is not so much of a *laissez-faire* type but much more of a supportive leadership personality.

Our data do not provide insight into how to decrease strain in employee's work environment. However, the results show that leadership may serve as a powerful tool to compensate the negative outcomes of technostress on employees experienced work exhaustion and organizational outcomes such as job satisfaction. With these results we deliver a starting point to alleviate the consequences of technostress on individuals and on organizations.

5. Limitations and Suggestions for Further Research

Several limitations of this study should be noted. First, our model relies solely on data gathered among industrial salespersons and thus is assumed to be most valid when applied to this context. Consequently, we cannot afford to generalize the findings in other types of work environment. To test for further generalization of the model, salespersons from other departments

should be taken into account. Second, the sample consisted of employees from two various sectors: field workers and office workers. In addition, the vast majority of the respondents had no staff responsibility. Testing the model also for division and position might make it even more robust. Third, we assume a self-reporting bias that affects strain perception. Some employees might find it difficult to admit problems with overload, invasion, complexity and uncertainty. Thus we assume that at least a small group of respondents either overrated their aptitude or underestimated their strain vulnerability in the questionnaire. To mitigate this issue, collecting performance data could provide a useful complement to the survey. Fourth, the data are cross-sectional, and hence it is not possible to determine causal relationships.

The direction for future research, which emerged from our findings, is concerned with the further investigation of the possibilities to influence the negative consequences of technostress for individuals and organizations by management. Given the high costs associated with physical and mental consequences for employees, as well as strategic and financial issues for companies evolving from the experience of technostress, there is an urgent need to uncover processes through which management might compensate or even avoid such consequences. Out of our results the role of specific supervisor influence on ICT use did not become clear and needs further investigation, as by developing a more accurate scale or by referring to a single ICT, what makes it easier for respondents, to apply existing items to their labor situation. To further investigate the documented influence of leadership on work exhaustion and job satisfaction we propose an experimental study to test specific leadership aspects in the implementation. With such results practice might benefit from detailed recommendations on the configuration of leadership to disburden employees from the negative consequences of technostress.

References

- [1] Brynjolfsson, E., and Hitt, L., "Productivity, Profitability and Consumer Surplus: Three Different Measures of Information Technology Value", *MIS Quarterly*, 1996, 20(2): pp. 121–142.
- [2] Dos Santos, B., and Sussman, L., "Improving the Return on IT Investment: The Productivity Paradox", *International Journal of Information Management*, 2000, 20(6): pp. 429–431.
- [3] Kudyba, S., and Diwan, R., "The Impact of Information Technology on U.S. Industry", *Japan and the World Economy*, 2002, 14(3): pp. 321–333.
- [4] Su, N. M., and Mark, G., "Designing for Nomadic Work", *Human Factors*, 2008, pp. 305–314.
- [5] Yun, H., Kettinger, W. J., and Lee, C. C., "A New Open Door: The Smartphone's Impact on Work-to-Life Conflict, Stress, and Resistance", *International Journal of Electronic Commerce*, 2012, 16(4): pp. 121–152.
- [6] Brillhart, P. E., "Technostress in the workplace: Managing stress in the electronic workplace", *Journal of American Academy of Business*, 2004, 5(1/2): pp. 302–307.
- [7] Clark, K. B., and Kalin, S., "Technostressed out? How to cope in the digital age", *Library Journal*, 1996, 21(8): pp. 30–32.
- [8] Weil, M. M., and Rosen, L. D., "Don't let technology enslave you: Learn how technostress can affect the habits of your employees and yourself", *Workforce*, 1999, 78(2): pp. 50–59.
- [9] Al-Fudail, M., and Mellar, H., "Investigating teacher stress when using technology", *Computers & Education*, 2008, 51: pp. 1103–1110.
- [10] Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., and Tu, Q., "The Consequences of Technostress for End Users in Organizations: Conceptual Development and Empirical Validation", *Information Systems Research*, 2008, 19(4): pp. 417–433.
- [11] Tarafdar, M., Tu, Q., Ragu-Nathan, B. S., and Ragu-Nathan, T. S., "The Impact of Technostress on Role Stress and Productivity", *Journal of Management Information Systems*, 2007, 24(1): pp. 301–328.
- [12] Davis, F. D., Bagozzi, R. P., and Warshaw, P. R., "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models", *Management Science*, 1989, 35(8): pp. 982–1003.
- [13] Delone, W. H., and McLean, E. R., "Information Systems Success: The Quest for the Dependent Variable", *Information Systems Research*, 1992, 3(1): pp. 60–95.
- [14] Heide, J. B., and Weiss, A. M., "Vendor Consideration and Switching Behavior for Buyers in High-Technology Markets", *Journal of Marketing*, 1995, 59(3): pp. 30–43.
- [15] Jiang, J. J., Klein, G., and Carr, C. L., "Measuring Information System Service Quality: SERVQUAL from the Other Side", *MIS Quarterly*, 2002, 26(2): pp. 145–166.
- [16] Moore, G. C., and Benbasat, I., "Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation", *Information Systems Research*, 1991, 2(3): pp. 192–222.
- [17] Pinsonneault, A., and Heppel, N., "Anonymity in Group Support Systems Research: A New Conceptualization,

- Measure, and Contingency Framework", *Journal of Management Information Systems*, 1997, 14(3): pp. 89–108.
- [18] Weiss, A. M., and Heide, J. B., "The Nature of Organizational Search in High Technology Markets", *Journal of Marketing Research*, 1993, 30(2): pp. 220–233.
- [19] Salanova, M., Llorens, S., and Cifre, E., "The dark side of technologies: Technostress among users of information and communication technologies", *International journal of psychology*, 2012, December: pp. 37–41.
- [20] Avlonitis, G. J., and Panagopoulos, N. G., "Antecedents and consequences of CRM technology acceptance in the sales force", *Industrial Marketing Management*, 2005, 34(4): pp. 355–368.
- [21] Rhoads, G. K., and Singh, J., "Do Organizational Practices Matter in Role Stress Processes? A Study of Direct and for Effects Moderating Boundary Spanners", *Journal of Marketing*, 1996, 60(3): pp. 69–86.
- [22] Cooper, C. L., Dewe, P., and O'Driscoll, M. P., *Organizational Stress: A Review and Critique of Theory, Research, and Applications*, Sage, Thousand Oaks (CA), 2001a
- [23] Lazarus, R. S., *Psychological Stress and the Coping Process*, McGraw-Hill, New York, 1966.
- [24] Lazarus, R. S., and Folkman, S., *Stress, Appraisal, and Coping*, Springer, New York, 1984.
- [25] Bawden, D., and Robinson, L., "The dark side of information: Overload, anxiety and other paradoxes and pathologies", *Journal of Information Science*, 2009, 35: pp. 180–191.
- [26] Ennis, L. A., "The Evolution of Technostress", *Computer in Libraries*, 2005, September: pp. 10–12.
- [27] Beaudry, B. A., and Pinsonneault, A., "The Other Side of Acceptance: Studying the Direct and Indirect Effects of Emotions on Information Technology Use", *MIS Quarterly*, 2010, 34(4): pp. 689–710.
- [28] Brod, C., *Technostress: The Human Cost of Computer Revolution*, Addison-Wesley, Reading (MA), 1984
- [29] Himma, K. E., "The concept of information overload: A preliminary step in understanding the nature of a harmful information-related condition", *Ethics and Information Technology*, 2007, 9(4): pp. 259–272.
- [30] Wang, K., Shu, Q., and Tu, Q., "Technostress under different organizational environments: An empirical investigation", *Computers in Human Behavior*, 2008, 24(6): pp. 3002–3013.
- [31] Hung, W., Chang, L., and Lin, C., "Managing the risk of overusing mobile phones in the working environment: a study of ubiquitous technostress", *Proc 15th pacific Asia conference on information systems*, Brisbane, 2011, pp. 1–12.
- [32] McGrath, J. E., "Stress and behavior in organizations", In M. D. Dunnette (Ed.), *Handbook of Industrial and Organizational Psychology*: pp. 1351–1395. Rand-McNally, Skokie (IL), 1976.
- [33] Kahn, R., and Byosiore, P., "Stress in organizations", In M. Dunnette & L. Hough (Eds.), *Handbook of Industrial and Organizational Psychology*: pp. 571–650, Consulting Psychologists Press, Palo Alto (CA), 1992.
- [34] Jackson, S., and Schuler, R., "A meta-analysis and conceptual critique of research on role ambiguity and role conflict in work settings", *Organizational Behavioral Human Decision Processes*, 1985, 36: pp. 16–78.
- [35] Hackman, J. R., "Tasks and task performance in research on stress", In J. E. McGrath (Ed.), *Social and Psychological Factors in Stress*: pp. 202–237, Holt, Rinehart and Winston, Inc., New York, 1970.
- [36] Beehr, T., "An organizational psychology meta-model of occupational stress", In C. Cooper (Ed.), *Theories of Organizational Stress*: pp. 6–27, Oxford University Press, New York, 1998.
- [37] Nelson, D. L., and Kletke, M. G., "Individual adjustment during technological innovation: A research framework", *Behaviour & Information Technology*, 1990, 9(4): pp. 257–271.
- [38] Davis, A., and Gibson, L., "Designing employee welfare provision", *Personnel Review*, 1994, 23(7): pp. 33–45.
- [39] Ayyagari, R., Grover, V., and Purvis, R., "Technostress: Technological Antecedents and Implications", *MIS Quarterly*, 2011, 35(4): pp. 831–858.
- [40] Rangarajan, D., Jones, E., and Chin, W. W., "Impact of Sales Force Automation on Technology-Related Stress, Effort, and Technology Usage Among Salespeople", *Industrial Marketing Management*, 2005, 34(4): pp. 345–354.
- [41] Moore, J. E., "One Road to Turnover: An Examination of Work Exhaustion in Technology Professionals", *MIS Quarterly*, 2000, 24(1): pp. 141–168.
- [42] Schaufeli, W. B., Leiter, M., and Kalimo, R., "The General Burnout Inventory: A Self-report Questionnaire to Assess Burnout at the Workplace", *Work, Stress and Health '95: Creating Healthier Workplaces*, Washington D.C., 1995.
- [43] Hu, H.-H., and Cheng, C.-W., "Job stress, coping strategies, and burnout among hotel industry supervisors in Taiwan", *The International Journal of Human Resource Management*, 2010, 21(8): pp. 1337–1350.
- [44] Leiter, M. P., and Robichaud, L., "Relationships of Occupational Hazards with Burnout: An Assessment of Measures and Models", *Work, Stress and Health '95: Creating Healthier Workplaces*, Washington DC, 1995.
- [45] Leiter, M. P., and Schaufeli, W. B., "Consistency of the Burnout Construct Across Occupations", *Anxiety, Stress, and Coping*, 1996, 9: pp. 229–243.
- [46] MacKenzie, S. B., Podsakoff, P. M., and Rich, G., "Transformational and Transactional Leadership and Sales-

person Performance", *Journal of the Academy of Marketing Science*, 2001, 29(2): pp. 115–134.

[47] Schillewaert, N., Ahearne, M. J., Frambach, R. T., and Moenaert, R. K., *The acceptance of information technology in the sales force*, ISBM Report, University Park (PA), 2000.

[48] Kozlowski, S. W. J., and Doherty, M., "Integration of climate and leadership: examination of a neglected issue", *Journal of Applied Psychology*, 1989, 74: pp. 546–553.

[49] Rowney, J. I. A., and Cahoon, A. R., *A preliminary investigation of burnout dimensions in intact work groups*, International Congress of Psychology, Sydney, 1988.

[50] Mulki, J. P., Jaramillo, F., and Locander, W. B., "Emotional exhaustion and organizational deviance: Can the right job and a leader's style make a difference?", *Journal of Business Research*, 2006, 59(12): pp. 1222–1230.

[51] Avolio, B. J., and Bass, B. M., *Multifactor Leadership Questionnaire: Manual and Sampler Set* (3. ed.), Mind Garden, Menlo Park (CA), 2004.

[52] McConnick, C. P., and Powell, B., "Management for the 1990s", *Newsweek*, 1988, April: pp.47–48.

[53] Misumi J., *The Behavioral Science of Leadership: An Interdisciplinary Japanese Research Program*, University of Michigan Press, Ann Arbor (MI), 1985.

[54] Gerbing, D. W., and Anderson, J. C., "An Updated Paradigm for Scale Development Incorporating Unidimensionality and Its Assessment", *Journal of Marketing Research*, 1988, 25(2): pp. 186–192.

[55] Bollen, K. A., *Structural Equations with Latent Variables*, Wiley, New York, 1989.

[56] Netemeyer, R. G., Bearden, W. O., and Sharma, S., *Scaling Procedures: Issues and Applications*, Sage Publications, London, 2003