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The effects of technostress within the context of employee use of ICT

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ABSTRACT

The main purpose of the present study is to help managers cope with the negative effects of technostress on employee use of ICT. Drawing on transaction theory of stress (Cooper, Dewe, & O'Driscoll, 2001) and information systems (IS) continuance theory (Bhattacherjee, 2001) we investigate the effects of technostress on employee intentions to extend the use of ICT at work. Our results show that factors that create and inhibit technostress affect both employee satisfaction with the use of ICT and employee intentions to extend the use of ICT. Our findings have important implications for the management of technostress with regard to both individual stress levels and organizational performance. A key implication of our research is that managers should implement strategies for coping with technostress through the theoretical concept of technostress inhibitors.

1. Introduction

The purpose of this paper is to enhance the understanding of how managers can cope with the negative effects experienced by their employees due to the use of information and communication technology (ICT) at work. We focus, particularly, on what managers can do in order to influence employee willingness to extend the use of ICT.

The following downsides of ICT are well known to most employees: "you can't find the latest version of a document you saved yesterday", "you are continuously interrupted from tasks to answer urgent email and voicemail messages", "the job tasks you missed at work are easily accessible from home in the evening", "your smart phone disturbs you with notifications during a meeting with a customer", and so on. An unmanageable amount of these situations in an organizational context may be associated with negative stress and may, in the long-run, be a source of health-related problems among employees (Tu, Wang, & Shu, 2005). Negative psychophysical effects of the use of ICT at work are usually termed *technostress* by IS-researchers. Technostress can generally be defined as the mental stress that employees experience due to the use of ICT at work (Weil & Rosen, 1997), for example, when they are asked to learn and use a new technology.

Based on present research efforts focusing on technostress, we know today that extreme technostress can result in job burnout, job dissatisfaction and even an intention to quit (Tu et al., 2005). However, we have limited knowledge of how technostress influences underlying factors such as employee satisfaction with the use of ICT and their willingness to extend the use of ICT at work. In the absence of such understanding, the actions of managers and IS professionals that wish to implement ICT-related measures against technostress may be partially blinded.

This paper is a response to recent calls for research to enhance the understanding of how technostress may influence the employees' ICT-related psychological strain and organizational performance. We agree with Wang, Shu, and Tu (2008) and Tu et al. (2005) that managers must take practical measures to cope with technostress. Our study extends their research on the influences of the internal environment on technostress levels in two ways: we focus on specific measures to reduce technostress, and we include factors from the research on information systems (IS) continuance (Bhattacherjee, 2001) as dependent variables. For our study, we have chosen the dependent variables: user satisfaction and continuance intentions. These variables are considered strong predictors of organizational benefits accruing from the use of ICT (Bhattacherjee, 2001; DeLone & McLean, 2003).

In addition to testing the effect of technostress on ICT use variables, we have responded to a call for research from Ragu-Nathan, Tarafdar, Ragu-Nathan, and Tu (2008: 430) to use formative modelling to identify technostress creators and inhibitors. We believe that formative modelling is more consistent with the conceptual nature of technostress creators and inhibitors as these variables

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have been measured in previous research[2]. The practical implication of formative modelling is that it allows us to identify the technostress creators and inhibitors that contribute most to employee dissatisfaction/satisfaction with ICT. In turn, such knowledge can be used to advise managers to implement specific measures to increase employee levels of satisfaction with ICT.

As indicated above, we have chosen "employee satisfaction with ICT use" and "employee intentions to extend the use of ICT" as dependent variables. In contrast to Ragu-Nathan et al. (2008), who chose "job satisfaction" as the core strain variable, our strain variable is linked direct to the employees' satisfaction/dissatisfaction with their current use of ICT at work. We believe this difference is important because employees may be satisfied/dissatisfied with their current job situation for many reasons other than their use of ICT tools. Our outcome variable "intentions to extend the use of ICT" indicates employee willingness, not only to extend the use of current ICT tools, but also willingness to learn new tools.

Summarized, the main purpose of the present paper is to investigate direct and moderating effects of technostress variables on employee use of ICT at work, particularly in order to identify specific measures to cope with negative effects of technostress, both to support the employees and to improve organisational performance. An important related sub-goal is to demonstrate that technostress creators and inhibitors as they have been measured in previous research should be treated as formative variables. To our knowledge, a technostress study has not been conducted on specific IS continuance constructs. Furthermore, no studies have modelled technostress creators and inhibitors as formative second order variables.

The rest of this paper is organized as follows: the next section elaborates on the phenomenon of technostress and on creators and inhibitors of technostress. Then, we present arguments for the chosen research model and the hypotheses. In the fourth section we describe the research methodology and data analysis techniques that were utilized to test the research model. The fifth section presents the results, and the paper concludes with a discussion of implications for theory and practice, limitations, and suggestions for further research.

2. Transaction theory perspective on technostress

When examining technostress and factors that create and inhibit such stress in organizations, recent studies have relied mainly on the transaction theory of stress; see, for example, the papers by Al-Fudail and Mellar (2008) and Ragu-Nathan et al. (2008). This theory is rooted in a cognitive paradigm where stress emerges through a phenomenological process reflected in the relationship between the individual and the demands placed by the environment (Ayyagari, Grover, & Purvis, 2011). In connection with use of ICT, this means that stress arises when e.g. ICT competence requirements exceed the users' actual competence level, thereby threatening user well-being. This overall transactional process, where demands placed by the environment exceed individual resources, is referred to as stress (Ayyagari et al., 2011).

The transaction theory consists of four major components (Cooper, Dewe, & O'Driscoll, 2001): stressors, situational factors, strain and outcomes. Stressors are, in general, all of the conditions, events, demands or stimuli in an environment with a potential to create stress. Typical examples of stressors in connection with an employee's use of ICT include frequent changes in work habits and a feeling of one's personal life being invaded by job email, job SMS and business-oriented social networking sites. Situational factors are organizational mechanisms that can buffer or reduce the impact of stressors. In connection with ICT usage, such factors might typically be user participation in change processes and computer training. Strain refers to psychological and behavioural responses to stressors that are observed in employees that utilize ICT in work environments. Such responses can typically constitute a combination of high levels of discomfort, exhaustion and a distant attitude toward ICT use (Salanova, Llorens, & Cifre, 2013). We propose employee dissatisfaction with ICT use as an important strain variable in connection with employee use of ICT at work. Dissatisfaction can be classified as a mental state that reflects the perception of the use of ICT as a threat, and the perception of a lack of control over its consequences (Beaudry & Pinsonneault, 2010). Finally, the outcome component refers to potential outcomes of strain, such as absenteeism and turnover. We propose employee intentions to extend the use of ICT as an important outcome variable in connection with employee use of ICT at work. Intentions to extend the use of technology deal with users' postadoptive intentions (Jasperson, Carter, & Zmud, 2005), and therefore, a user's willingness to continuously exploit and extend the functionality built into ICT applications. Both the variable satisfaction with ICT use (i.e. strain) and the variable usage intentions (i.e. an outcome) are among the most widely used measures of information systems success (DeLone & McLean, 2003).

The present study is based on the transaction theory of stress, with a focus on stressors, situational factors, strain and outcome. In recent IS research, stressors are termed technostress creators, and situational factors are called technostress inhibitors (Ragu-Nathan et al., 2008; Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2011; Wang et al., 2008); therefore, these concepts will be used in the following. Strain will be used interchangeably with "employee dissatisfaction with ICT" and outcome interchangeably with "employee intentions to extend the use of ICT". The next two sections elaborate on the phenomena of technostress creators and inhibitors.

2.1. Technostress creators

Ragu-Nathan et al. (2008) described technostress as a problem of adaptation resulting from an employee's inability to cope with or to become used to ICT. The phenomena that create this potential ICT adaptation problem are referred to as technostress creators. Stated differently, technostress creators refer to ICT circumstances or factors that have the potential to create ICT and job-related strain outcomes among employees in an organization. Examples of such creators include frequent software and hardware updates, continuous information overload and expectations of constant connectivity. Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan (2007) conceptualized technostress creators as consisting of five main categories or components:

- *Techno-overload* refers to ICT's potential to drive an employee to work faster.
- *Techno-invasion* refers to ICT's potential to invade an employee's personal life with possibilities to, for example, perform job tasks.
- *Techno-complexity* refers to an inherent quality of ICT that makes employees feel incompetent.
- *Techno-insecurity* refers to the premise that ICT's nature is to change regularly, and that this may threaten employee job security.
- *Techno-uncertainty* refers to the constant changes and upgrades of software and hardware that may impose stress on employees.

[2] It should be noted that Detmar Straub (cf. Petter, Straub, & Rai, 2007) initiated the idea of modelling Ragu-Nathan et al. (2008) measuring instrument as formative in a research seminar in 2011, where Straub was an opponent on an early draft of the present paper.