doi: 10.1111/isj.12068

The effects of technostress and switching stress on discontinued use of social networking services: a study of Facebook use

Christian Maier,* Sven Laumer, Christoph Weinert & Tim Weitzel

Department for Information Systems and Services, Otto-Friedrich University Bamberg, Bamberg, Germany, *e-mail: christian.maier@uni-bamberg.de, sven.laumer@uni-bamberg.de, christoph.weinert@uni-bamberg.de, tim.weitzel@uni-bamberg.de

Abstract. *Although much research has been performed on the adoption and usage phases of the information systems life cycle, the final phase, termination, has received little attention. This paper focuses on the development of discontinuous usage intentions, i.e. the behavioural intention in the termination phase, in the context of social networking services (SNSs), where it plays an especially crucial role. We argue that users stressed by using SNSs try to avoid the stress and develop discontinuous usage intentions, which we identify as a behavioural response to SNS-stress creators and SNS-exhaustion. Furthermore, as discontinuing the use of an SNS also takes effort and has costs, we theorize that switching-stress creators and switching-exhaustion reduce discontinuous usage intentions. We tested and validated these effects empirically in an experimental setting monitoring individuals who stopped using Facebook for a certain period and switched to alternatives. Our results show that SNS-stress creators and SNS-exhaustion cause discontinuous usage intentions, and switching-stress creators and switching-exhaustion reduce these intentions.*

Keywords: technostress, post-adoption research, hedonic and voluntary technology usage, switching behavior, discontinuance usage, social networking sites

INTRODUCTION

The question why people use a particular technology has been prevalent in information systems (IS) research since the technology acceptance model was developed in 1989 (Davis, 1989). Numerous research articles have examined the factors causing *intention to adopt* in order to better understand the initial adoption decision (e.g. Davis, 1989; for a review, see Williams *et al*., 2009) or *continuous usage intention* in order to better understand the continued usage of an IS (e.g. Bhattacherjee, 2001; for a review, see Lankton & McKnight, 2012 and Bhattacherjee & Lin, 2014). Research approaches focusing on one of these two individual usage decisions belong to the first two out of three phases of the life cycle of an IS (Furneaux & Wade, 2010; 2011). In

the first phase, *adoption*, individuals develop intentions to adopt and start using an IS (Davis, 1989), and in the second phase, *usage*, individuals develop intentions to use an IS continuously (Bhattacherjee, 2001). The life cycle concludes with the *termination* phase, in which users develop discontinuous usage intentions, stop using the IS (Turel, 2014) and potentially switch to alternatives (Xu *et al*., 2014) as a consequence of these intentions. Although numerous studies have focused on the first two phases of the life cycle of an IS, fewer studies have looked at the termination phase from a user's perspective by researching discontinuous usage intentions (Turel, 2014). This intention is the 'decision users make to quit the usage of a system and not go back to it' (Turel, 2014, p. 1), which is particularly relevant when users have free choice.

Therefore, it is not surprising that users' discontinuous usage intentions are recognized as a strategic issue, especially for technologies that are used voluntarily and in particular for social networking services (SNSs) (Xu *et al*., 2014). When users stop using an SNS, the provider loses its key asset because users are the basis of its financial profitability (Chiu & Huang, 2014). The discontinuous usage intention may be especially prevalent among SNS users who are stressed when using an SNS (Maier *et al*., 2012; 2014). These users should have a high motivation and the freedom to discontinue using the SNS because people try to avoid stressful situations by changing their behaviour (Beaudry & Pinsonneault, 2005). However, when users can freely choose to stop using an SNS or switch to an alternative, the actual behavioural response also takes effort and has costs, which can be perceived negatively by SNS users (Xu *et al*., 2014). Compared with prior research on discontinuous usage intentions focusing on the individual-based, behaviour-based, technology-based, task-based, environment-based and affective-based antecedents of discontinuous usage intentions (Parthasarathy & Bhattacherjee, 1998; Pollard, 2003; Furneaux & Wade, 2010; 2011; Sun, 2013; Maier *et al*., 2014; Turel, 2014; see Appendix A – Table 1 for an overview), stress associated with SNS use and the perceived effort and costs related to discontinued usage have received little attention to date. Several scholars have identified the relevance of stress and switching behaviour for SNSs (Chiu & Huang, 2014; Maier *et al*., 2012; 2014), revealing a gap in discontinuous usage intention research. Furthermore, Beaudry and Pinsonneault (2005) have proposed the general theoretical assumption that when users feel threatened by an IS, they engage in adaptation strategies like switching away from the IS. Turel (2014) has called for an analysis of discontinuous usage intention as an adaptation behaviour to avoid the dark side of an IS. In response, this study focuses on the impact of stress and the perceptions of the actual switch on discontinuous usage intentions in a voluntary usage context, asking two research questions:

First, the paper asks *whether discontinuous usage intention is a behavioural response of users who experience stress when they use an SNS*. The study follows well-established research approaches in the area of general technostress (Tarafdar *et al*., 2007; Ragu-Nathan *et al*., 2008), which distinguish among technostress creators that are technology-induced stimuli, events or demands (Ragu-Nathan *et al*., 2008), psychological reactions (Tarafdar *et al*., 2010) and behavioural responses (Tarafdar *et al*., 2010). Prior research has shown that technostress creators have an impact on psychological reactions (Tarafdar *et al*., 2010), such as techno-exhaustion and end-user satisfaction. In terms of behavioural responses, prior research has shown a direct influence of technostress creators on end-user performance (Tarafdar *et al*., 2010), continuous usage intention (Maier *et al*., 2012) and continuance

commitment (Ragu-Nathan *et al*., 2008). Only one study has focused on the impact of technostress creators on discontinuous usage intentions as a behavioural response (Maier *et al*., 2014), which underscores the scarcity of technostress research on the impact of technostress creators and techno-exhaustion on discontinuous usage intention, which is the first focus of this study.

Second, the paper asks *whether discontinuous usage intentions are diminished by the stress associated with switching away from an SNS*. We theorize that changing one's behaviour causes switching stress because it takes effort and has costs (Polites & Karahanna, 2012). When such switching-based stimuli, events or demands are perceived as negative by users, they are known as switching-stress creators. We theorize that switching-stress creators might impact both psychological reactions (switching-exhaustion) and behavioural responses (discontinuous usage intention) to the switch away from a technology. With regard to the termination phase of the life cycle of IS (Furneaux & Wade, 2010; 2011), this study contributes that discontinues usage intentions are modified (i.e. reduced) by the stress experienced when switching away from a technology. To date, little research has been carried out on the effect of switching-related stress, from a user's perspective, on discontinuous usage intentions, which is the second focus of this study.

To answer the two research questions, we develop a theoretical model that focuses on technostress creators and techno-exhaustion associated with using an SNS and switching-stress creators and switching-exhaustion associated with no longer using the SNS and potentially switching to alternatives, and their impact on SNS users' discontinuous usage intention and the corresponding discontinued use. To test the proposed model, an experimental setting is used that requires users to stop using a particular SNS (Facebook) but allows them to use alternatives, so they experience not only the stress associated with using the SNS, but also the stress associated with switching away from the SNS. The experiment investigates this genuine Facebook hiatus using five surveys.

The remainder of this paper is organized as follows. After reviewing the relevant literature, we hypothesize how technostress and switching-stress creators as well as SNS-exhaustion and switching-exhaustion influence discontinuous usage intention. Finally, we describe our experimental setting and discuss our results and the limitations and implications of our research.

THEORETICAL BACKGROUND

This section provides an overview of current research in the streams of IS discontinuance and technostress. It shows that research focused on IS discontinuance has overlooked the impact of technostress as well as the final switching process and that research focused on technostress has also overlooked discontinuance usage as a consequence of stressful IS usage.

IS discontinuance

There has been extensive research on IS continuance (Lankton & McKnight, 2012; Bhattacherjee & Lin, 2014); most of which has assumed that IS continuance and discontinuous

are the opposite extremes on the same continuum (e.g. Turel *et al*., 2013). Recently, although, scholars have begun focusing on IS discontinuance as a distinct phenomenon, concluding that IS discontinuance is not merely the opposite of IS continuance (Turel, 2014).

In the life cycle of an IS (Furneaux & Wade, 2010; 2011), the discontinuous usage intention is relevant in the final termination phase, following the adoption and usage phases (Figure 1). After having initially adopted an IS, a user either decides to continue to use the IS or to stop using the IS. In each phase, different theoretical approaches are necessary to explain why an individual uses a technology. In the adoption phase, the technology acceptance model (Davis, 1989) is one of the prominent models explaining the intention to adopt an IS. Several approaches using this model have revealed antecedents of the intention to adopt (see Williams *et al*., 2009 for a review). In the usage phase, the IS continuance model (Bhattacherjee, 2001) explains the continuous usage intention and several antecedents of the continuous usage intention have been identified (see Lankton & McKnight, 2012 and Bhattacherjee & Lin, 2014 for a review). The termination phase of the IS life cycle and the corresponding discontinuous usage intention, in contrast, have been largely overlooked (Turel, 2014) and are included in few research approaches.

Based on the multi-dimensional brain processing of positive and negative phenomena (Cacioppo & Berntson, 1994; Cacioppo *et al*., 1999), it has been shown that continuous and discontinuous usage decisions are driven by different factors (Parthasarathy & Bhattacherjee, 1998). Parthasarathy and Bhattacherjee (1998) and Pollard (2003) have shown that individuals continuing to use a technology perceive perceptions differently than individuals discontinuing the usage. Turel (2014) theorized that continuous and discontinuous usage intentions are driven by different perceptions. Appendix A – Table 1 provides an overview of research on perceptions influencing discontinuous usage intention, indicating that neither stress-related nor switching-related perceptions have been considered.

Furthermore, several switching theories and IS research approaches focusing on user switching behaviour have revealed that when a user switches from one IS to another, several

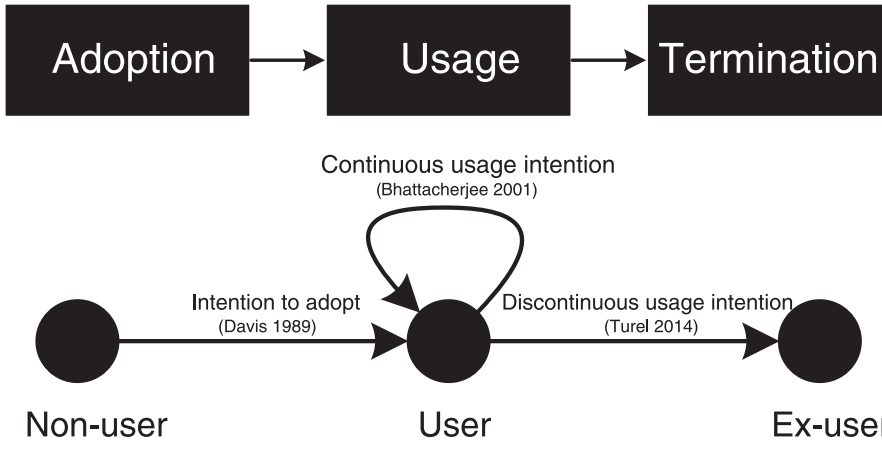


Figure 1. User transformation model.

factors influence the user's behaviour (Bhattacherjee & Park, 2013; Xu *et al*., 2014). Transition costs, sunk costs, security costs, setup costs and continuity costs have been identified as common switching costs (Polites & Karahanna, 2012; Bhattacherjee & Park, 2013; Xu *et al*., 2014). This is in line with other switching theories (Webb & Sheeran, 2006; Colgate *et al*., 2007) and user migration theories (Bhattacherjee & Park, 2013; Xu *et al*., 2014), which argue that the effort required to switch from one service to another is an important determinant of whether a particular service is used continuously or whether a user develops discontinuous usage behaviour (Jones *et al*., 2002; Burnham *et al*., 2003). Hence, in addition to the influence of the user's perception of the IS on her intention to switch away from the IS, perceptions associated with the switch itself are also important in understanding user behaviour in the termination phase of the IS life cycle.

In summary, IS discontinuance is especially relevant in situations considered problematic by users (Turel, 2014), such as when users are stressed by using a technology. In such a situation, users might intend to stop using a technology to avoid the stressful situation by changing their behaviour (Beaudry & Pinsonneault, 2005) and develop discontinuous usage intentions. The following section provides an overview of technostress research that supports the basic theoretical assumptions of our research model.

Technostress research

Recently, technostress has become the focus of considerable IS research (e.g. Tarafdar *et al*., 2007; 2010; Ragu-Nathan *et al*., 2008; Ayyagari *et al*., 2011 see Appendix A – Table 2 for contexts, antecedents and consequences in the literature: Maier, 2014). Technostress is generally defined as an IT user's experience of stress when using technologies (Ragu-Nathan *et al*., 2008). More specifically, users are stressed by technostressors, which are technology-induced stimuli, events or demands (Ragu-Nathan *et al*., 2008; Ayyagari *et al*., 2011). Such stressors that are associated with technostress are called technostress creators (Tarafdar *et al*., 2007), which cause reactions among individuals that are commonly called strain (Tarafdar *et al*., 2010; Ayyagari *et al*., 2011). On the one hand, an individual might react psychologically to technostress creators by feeling exhausted from using IT, which is called techno-exhaustion (Ayyagari *et al*., 2011). This is a specific form of psychological strain (Tarafdar *et al*., 2010). On the other hand, technostress creators might also cause behavioural responses, which are called behavioural strain (Tarafdar *et al*., 2010).

Appendix A – Table 2 provides an overview of research articles studying technostress. Particularly relevant for this research is the work of Tarafdar *et al*. (2007) discussing technostress creators while using work-related technologies and the work of Ayyagari *et al*. (2011) discussing psychological reactions to stressors in terms of techno-exhaustion. Similarly, Tarafdar *et al*. (2007; 2010; 2011) theorize and empirically validate that technostress creators decrease end-user satisfaction, which is one determinant for whether individuals use technologies continuously. Finally, Maier *et al*. (2012; 2014) confirm that the findings of Ayyagari *et al*. (2011) and Tarafdar *et al*. (2007; 2010; 2011) also apply when using SNSs in the private usage context and reveal SNS-stress creators as determinants for SNS-exhaustion and satisfaction. Beyond that, it has also been shown stress creators experienced while using SNSs cause

discontinuous usage intention (Maier *et al*., 2014). However, prior research has not yet investigated how multiple stress creators and exhaustion as a concrete psychological reaction to stress creators lead to discontinuous usage intention as a behavioural response.

General behavioural responses to a threatening IS are the focus of coping theories, which conceptualize behavioural responses as adaptation strategies defined as 'behavioral efforts exerted by the users to manage specific consequences' (Beaudry & Pinsonneault, 2005, p. 496). In particular, the coping model of user adaptation (CMUA, Beaudry & Pinsonneault, 2005) proposes that when users are threatened by an IS, they will engage in adaptation strategies to restore their emotional stability and to minimize the negative consequences. One such adaptation strategy is to totally withdraw from a threatening situation (Begley, 1998, Lazarus & Folkman, 1984), which is reflected by discontinuous usage intentions in an IS context (Turel, 2014). Hence, the research model described later is designed to help us investigate whether stress associated with using an SNS leads to a behavioural response such as discontinuous usage intention and whether the stress associated with engaging in an adaptation strategy such as switching away from a stressful SNS might reduce this effect.

RESEARCH MODEL: CONSTRUCTS AND HYPOTHESIS DEVELOPMENT

The research objective in this research is to investigate whether discontinuous usage intention is a behavioural response of users who perceive using an SNS as stressful and whether discontinuous usage intentions are diminished by the stress associated with switching away from an SNS. Our research model builds on the theoretical background that explains SNS users' discontinuous usage intention and the corresponding discontinuous usage behaviour. We assume that SNS-stress creators, as a particular instance of technostress creators, and SNS-exhaustion, as a particular instance of a psychological reaction, foster the development of discontinuous usage intention (the first research question), and that switching-stress creators and switching-exhaustion reduce the development of discontinuous usage intention (the second research question).

Figure 2 illustrates our research model. In the following, we describe the SNS-stress creators and SNS-exhaustion constructs and then hypothesize the relationships among these constructs and their impact on discontinuous usage intention (H1 to H3). Afterwards, we describe the switching-stress creators and switching-exhaustion constructs and develop hypotheses among them and their influence on discontinuous usage intention (H4 to H6). Finally, we hypothesize the relationship between discontinuous usage intention and discontinuous usage behaviour (H7). All constructs used in this article are defined and presented in Table 1.

SNS-stress creators

SNS-stress creators are stress-creating conditions associated with the usage of SNSs. Prior research identifies that stress-creating conditions include different conditions that users are confronted with while using SNSs (Maier *et al*., 2012; 2014), including five SNS-stress creators identified by Maier *et al*. (2012). One such characteristic is *complexity*, which is when users find

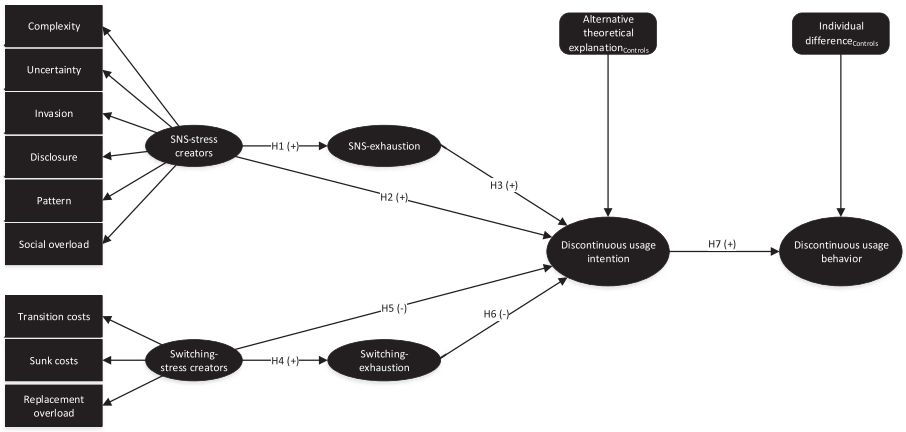


Figure 2. Research model (rectangles are dimensions; rounded rectangles are controls; ellipses are constructs).

SNSs difficult to use and are not able to handle the SNSs. *Uncertainty* arises because conditions or the SNS interface change periodically. *Invasion* reflects users' perception of being invaded by a ubiquitous technology as SNSs permeate modern daily life. *Disclosure* means that virtual friends disclose a wealth of information on SNSs (Tow *et al*., 2010), which can lead users willing to process all this information to experiencing information overload (Koroleva *et al*., 2010). *Pattern* reflects users' perception of being forced to adapt their behavioural patterns to the pattern of the SNS, such as when SNSs became one major channel through which individuals coordinate events (Khan & Jarvenpaa, 2010). Finally, *social overload* indicates that SNS users can perceive that they give too much social support to their virtual friends (Maier *et al*., 2014). This means that individuals think they have to respond to messages disclosed by virtual friends, such as 'Help me, I need an apartment in New York' or 'My girlfriend dumped me! What should I do now?!' This stress creator is also included in the research model because Maier *et al*. (2014), building on social support theory (e.g. Caplan, 1974), find that social overload is important for understanding SNS-stress-induced consequences in terms of SNS-exhaustion and discontinuous usage intention.

SNS-exhaustion and discontinuous usage intention

The construct SNS-exhaustion reflects an individual's psychological reaction to stress-creating conditions caused by using SNSs (Maier *et al*., 2014). Prior research indicates that it is caused by SNS-stress-creating conditions such as social overload (Maier *et al*., 2014). The construct and its definition are derived from more general exhaustion constructs used in IS stress research (e.g. Moore, 2000; Ayyagari *et al*., 2011).

The construct discontinuous usage intention describes an individual's intention to change his or her behaviour by no longer using a technology (Maier *et al*., 2014). Prior research indicates that discontinuous usage intention is inhibited by factors such as satisfaction and habit (Sun, 2013; Turel, 2014), or caused by perceptions such as guilt, self-efficacy to discontinue (Turel, 2014) and social overload (Maier *et al*., 2014).

Table 1. Definitions of central concepts

Construct	Definition	Reference
Complexity	Reflects a negative perception that the SNS is difficult to handle	Adapted from Tarafdar *et al*. 2007; Ragu-Nathan *et al*. 2008; Maier *et al*., 2012
Uncertainty	Reflects a negative perception that the SNS is constantly being changed and updated	Adapted from Tarafdar *et al*. 2007; Ragu-Nathan *et al*. 2008; Maier *et al*., 2012
Invasion	Reflects a negative perception that the SNS has an overly central role in and has invaded daily life	Adapted from Tarafdar *et al*. 2007; Ragu-Nathan *et al*. 2008; Maier *et al*., 2012
Pattern	Reflects a negative perception that SNS users have to adapt their behavioural patterns to the pattern of using the SNS	Adapted from Maier *et al*., 2012
Disclosure	Reflects a negative perception that too much information is disclosed on an SNS by oneself and one's virtual friends	Adapted from Maier *et al*., 2012
Social overload	Reflects a negative perception of SNS usage when users receive too many social support requests and feel they are giving too much social support to other individuals in their virtual social network	Adapted from Maier *et al*., 2014
Transition costs	Include the time and effort required to adapt to a new situation	Adapted from Polites & Karahanna, 2012
Sunk costs	Reflect an individual's reluctance to 'cut their losses' and a tendency to justify previous commitments to a course of action by making subsequent commitments	Adapted from Polites & Karahanna, 2012
Replacement overload	Reflects a negative perception when an individual has to use too many different (non-)technological alternatives to replace the functionalities of a certain technology	Conceptualized for this study
SNS-exhaustion	Reflects an individual's psychological reaction to stressors caused by using the SNS	Adapted from Maier *et al*., 2014
Switching-exhaustion	Reflects an individual's psychological reaction to switching-induced stressors	Conceptualized for this study
Discontinuous usage intention	Reflects an individual's intention to stop using an SNS	Adapted from Sun, 2013; Turel, 2014
Discontinuous usage behaviour	Reflects that an individual has changed his/her behaviour by not longer using an SNS	Adapted from Bhattacherjee and Lin, 2014

Relationships among SNS-stress creators, SNS-exhaustion and discontinuous usage intention

Technostress research identifies stress creators as an influencing factor for whether individuals are satisfied with using a technology (Tarafdar *et al*., 2010). Furthermore, the relationship

between stress creators and exhaustion is well-researched in the general stress literature (e.g. Moore, 2000; Ahuja *et al*., 2007; Podsakoff *et al*., 2007; Barley *et al*., 2011). As SNS-specific research also argues that SNS-stress creators are a cause of exhaustion (Maier *et al*., 2014), we assume the following:

H1*: The higher the SNS-stress creators, the higher the SNS-exhaustion.*

Research has revealed that users perform worse (Tarafdar *et al*., 2011) or are less innovative at work (Tarafdar *et al*. 2014) when they are perceiving stress creators. In the stream of SNS and discontinuous usage research, recent research discusses that the perception of a stress creator causes intentions to discontinue (Maier *et al*., 2014). The rationale for this is that individuals try to avoid stressful situations by changing their behaviour (Beaudry & Pinsonneault, 2005) that translates to stopping using the IS in this case (Turel, 2014), so users confronted with stress creators develop high discontinuous usage intentions. We therefore assume the following:

H2*: The higher the SNS-stress creators, the higher the discontinuous usage intention.*

Prior research argues that an individual who is exhausted from doing something develops the intention to change his or her behaviour (e.g. Podsakoff *et al*., 2007) and the intention to change something about the current situation (Lavee *et al*., 1987), which reflects high intentions to discontinue the stressful behaviour (Ajzen, 1985). Accordingly, as using a stressful IS is a problematic behaviour (Turel, 2014) that might lead individuals to stop using an IS (Beaudry & Pinsonneault, 2005), we argue that a user who is exhausted from using an SNS will develop intentions to discontinue SNS usage. Consequently, we hypothesize the following:

H3*: The higher the SNS-exhaustion, the higher the intention to discontinue using an SNS.*

Switching-stress creators

Switching-stress creators are stressors associated with switching from using one technology to others. Polites and Karahanna (2012) discuss the transition and sunk costs associated with switching from using one technology to another. *Transition costs* refer to the time and effort required by an individual to adapt to a new situation and learn to use alternatives. This includes the time and effort needed to identify technological and/or non-technological alternatives to a stressful SNS, as well as to experiment with and learn to use these alternatives appropriately. *Sunk costs* refer to a particular form of psychological commitment to continue to use an SNS, which deters individuals from switching to an alternative (Samuelson & Zeckhauser, 1988) because of the time and effort already invested in learning to use the SNS (Kim & Kankanhalli, 2009) and integrating it into their daily lives. This time and effort can appear to have been poorly invested if that SNS is no longer used (Polites & Karahanna, 2012). Moreover, individuals use several alternatives to replace typical SNS functionalities, like communicating, keeping

informed about friends' lives and having fun (Koroleva *et al*., 2011). While SNSs can be a single toolkit that provides all of these functionalities through one platform, individuals are likely to need one or more different alternatives to maintain these functionalities in the event of switching. As a consequence, we argue that individuals might consider the high number of different alternatives required to replace these functionalities as a switching-stress creator. This stress creator is named *replacement overload* in the following.

Switching-exhaustion

The construct switching-exhaustion reflects an individual's psychological reaction to switching-stressors. It is derived from more general exhaustion constructs used in IS stress research (e.g. Moore, 2000; Ayyagari *et al*., 2011) and adapted to the IS switching context (e.g. Kim & Kankanhalli, 2009; Polites & Karahanna, 2012) because literature in this stream indicates that switching from one technology to another causes reactions that are comparable with psychological strain, such as exhaustion (e.g. affective inertia, as described by Polites and Karahanna (2012), includes one item capturing stress while switching).

Relationships among switching-stress creators, switching-exhaustion and discontinuous usage intention

Prior research (Webb & Sheeran, 2006; Colgate *et al*., 2007) argues that the effort required to switch from one service to another is an important determinant of whether a particular service is used continuously (Jones *et al*., 2002; Burnham *et al*., 2003). Likewise, recent IS research has focused on users switching from one technology to an alternative when a new IS is implemented in an organization (e.g. Kim & Kankanhalli, 2009; Polites & Karahanna, 2012) or when users switch online services (Bhattacherjee & Park, 2013; Xu *et al*., 2014).

Changing one's behaviour causes a wide range of different consequences that are either perceived as positive or negative by the individual (Oreg *et al*., 2011). When switching from one behaviour to another is perceived as stressful, the individual reacts psychologically (Polites & Karahanna, 2012) by perceiving exhaustion. As the cause of this reaction is a switch from using a technology like SNS to using an alternative, we define this psychological reaction as switching-exhaustion. This psychological reaction is particularly strong when individuals are not willing or able to invest time and effort into switching to alternatives and when individuals have to break the status quo and habitual patterns (Polites & Karahanna, 2012). Hence, we assume the following:

H4*: The higher the switching-stress creators, the higher the switching-exhaustion.*

Research in the field of IS switching behaviour reveals that switching-induced costs and effort shackle users to the status quo (Polites & Karahanna, 2012). This means that even if individuals have intentions to discontinue using a technology (H2 and H3), the effort required to change behavioural patterns causes discontinuous usage intentions to diminish. The rationale for this is that people prefer to maintain the status quo (Kim & Kankanhalli, 2009). Consequently, we

assume that individuals perceiving high switching-stress creators develop low intentions to discontinue, so that it can be hypothesized as follows:

***H5**: The higher the switching-stress creators, the lower the discontinuous usage intention.*

Changing one's behaviour has a wide range of consequences, which are perceived as positive, neutral or negative by the individual (Oreg *et al*., 2011). When switching from one behaviour to another is perceived as stressful, it is likely to have behavioural consequences, as an individual intends to choose a behaviour that lowers switching-exhaustion (Lavee *et al*., 1987). Thus, the individual yearns to continuously use the SNS instead of switching to alternatives. We therefore propose the following:

***H6**: The higher the switching-exhaustion, the lower the intention to discontinue using an SNS.*

Intention-based discontinuous usage

To understand individual behaviour, prior IS research has drawn on intention-based theories and models (e.g. Davis *et al*., 1989; Bhattacherjee & Premkumar, 2004). These posit that individual intention is the driving force behind whether a certain behaviour is adopted, such that high intentions cause usage behaviours and low intentions do not. Perceiving a threat from using IT can thus result in attempts to exit a situation in order to minimize its negative consequences and restore personal emotional stability (Beaudry & Pinsonneault, 2005). However, in contrast to single IT events such as those focused on by Beaudry and Pinsonneault (2005), the threat in the case of stressful SNS usage is ongoing and builds awareness over time, which determines adaptation strategies like discontinuous usage intentions (Turel, 2014). Consequently, an individual who feels stressed when using an SNS aims to change something about the current situation to minimize inconvenient perceptions (Turel, 2014). This means that an individual constantly rethinks her usage behaviour and might decide to reduce usage intensity or even stop using an SNS. First, the behavioural response becomes visible in an increasing discontinuous usage intention (Ajzen, 1985). Gradually, such intentions are translated into a behaviour change as the user tries to minimize negative feelings and avoid stressful situations (Beaudry & Pinsonneault, 2005). Therefore, we assume the following:

***H7**: Individuals with high intentions to discontinue using an SNS stop using the SNS.*

Alternative theoretical explanations and individual differences as control variables

There has been a plethora of research focusing on discontinuous usage (e.g. Bhattacherjee & Premkumar, 2004; Bhattacherjee & Lin, 2014; Sun, 2013) and service switching (Colgate *et al*., 2007) focusing on the discontinuous usage of a service such as an SNS. To account for

\factors identified in these research streams, we also include control variables that enable or inhibit switching to alternatives. Consequently, we control for the influence of satisfaction (Bhattacherjee & Lin, 2014), perceived usefulness (Davis, 1989), perceived enjoyment (Turel & Serenko, 2012) and social influence (Eckhardt *et al*., 2009) on discontinuous usage intention. We also include individual differences in terms of age (Burton-Jones & Hubona, 2005), gender (Venkatesh & Morris, 2000), dispositional resistance to change (Maier *et al*. 2015), neuroticism and extraversion (Eckhardt *et al*., 2015) as control variables that may influence individual behaviour.

METHODOLOGY

An experimental setting

This research aims to show how discontinuous usage intentions are influenced by stress associated with using SNSs and switching to alternatives. In order to ensure that all research participants underwent the switching phase, we used an experimental approach, described later, which uses five surveys.

As Facebook is the most used and well-known SNS, and because research indicates that Facebook is a source and symbol of stress (Maier *et al*., 2012), we selected Facebook as the SNS for our experiment. All experiment participants were Facebook users and thus aware of its assets and drawbacks. Once the experiment began, participants were not allowed to use Facebook for two weeks but were free to switch to and use one or more alternatives. With the participants' permission, we ensured a true Facebook hiatus by changing participants' Facebook passwords for the duration of the experiment. To ensure the confidentiality of the accounts, each participant selected one of 100 random and secret twenty-digit sequences of letters and numbers visible and known only to an independent faculty member, who then changed participants' passwords confidentially. This faculty member had no access to participants' email addresses, so the faculty member, the authors and the participants were all unable to log in. We also configured participants' Facebook settings so they would not receive forwarded email messages. At the end of the experiment, each participant received a new password after we tested whether we could log in with this password to ensure it had not been reset and to ensure that nobody had used the platform during the experiment.

During these two weeks, some of the participants kept a diary to record their experiences of not using Facebook. We also interviewed some participants to identify which alternatives they used and which stressful stimuli they experienced when switching to and using alternatives. Finally, five surveys were conducted to capture SNS-stress creators, SNS-exhaustion, switching-stress creators, switching-exhaustion, discontinuous usage intention and behaviour at various points in the experiment. The first survey was conducted before the experiment to assess the perceptions caused by using SNS. This survey included SNS-stress creators, SNS-exhaustion and control variables. The second survey focused on the switching process and was completed by the participants on day one or two of the non-usage phase. This survey included switching-stress creators and switching-exhaustion. The third survey was completed at the end of the non-usage phase on day 13 or 14, when participants were aware of the advantages and drawbacks of (not) using SNS. This survey captured participants' discontinuous

usage intentions. Survey four focused on the behaviour of the participants by asking participants whether they were using Facebook or an alternative one week after the last day of the non-usage phase. An additional fifth survey was used to control for the resulting discontinuous usage behaviour after one month. Next to these variables, the individual difference variables were captured at different stages to ensure short surveys. This is possible because predispositions do not vary significantly over short periods (Ajzen, 2005). Eventually, Figure 3 illustrates the timeline used during our experiment, and Table 2 provides an overview of the variables measured in each survey.

To motivate individuals to take an active part in this experiment, we raffled lottery tickets to win a Google Nexus 7 tablet (Google Inc., Mountain View, CA, USA). Participants received one lottery ticket for writing a diary, one for participating in an interview and one for completing all five surveys, although completing the surveys was mandatory for all participants in the experiment.

Figure 3. Experimental procedure.

Table 2. The five surveys and the constructs

Survey 1	Survey 2	Survey 3	Survey 4	Survey 5
Age	Dispositional resistance to change	Number of alternatives to Facebook	Minutes spent on Facebook	Minutes spent on Facebook
Gender	Neuroticism	Number of new alternatives	Discontinuous usage behaviour	Discontinuous usage behaviour
Minutes spend on Facebook	Extraversion	Discontinuous usage intention		
Number of friends in SNS	Transition costs			
Satisfaction	Sunk costs			
Perceived usefulness	Replacement overload			
Perceived enjoyment	Switching-exhaustion			
Social influence				
Complexity				
Uncertainty				
Invasion				
Pattern				
Disclosure				
Social overload				
SNS-exhaustion				

Sample characteristics

We recruited participants using advertisements on notice boards at a university, by publishing advertisements on Facebook and by sending an email to registered participants of an experiment subject database. The university has about 12 000 students and has established a database of voluntary participants that can be used by experimental researchers as recruiting channel to announce upcoming experiments. This database includes approximately 800 individuals. A total of 82 individuals took part voluntarily in our experiment. Gender was almost equally distributed (48% female) and the participants' mean age was 27.7 years (range: 16–42). Almost half of the sample was students from various programmes including information systems, management, psychology and social science. Most of the participants have at least a high school degree. On average, participants had 280.5 virtual friends in the SNS. Before starting the hiatus, participants spent an average of 70.3 min per day on Facebook. These individuals use the SNS for different purposes. The demographic characteristics are summarized in Table 3.

During the experiment, participants used an average of five alternatives, including on average one that was new to them and that they had to learn to use. 66% of the participants thought these alternatives replaced the functionalities of SNS completely (Table 4).

One week after the two weeks of Facebook abstinence were over, usage time per day was 33.3 min and almost half of the participants used Facebook for less than 16 min, and every fifth participant spent between 16 and 30 min on Facebook. Notably, following the experiment, four participants decided to quit Facebook, another four participants reported not having used Facebook for a few days, and another four participants were unsure whether they would use Facebook continuously or use alternatives. Hence, while a majority of the participants returned to Facebook after the hiatus, almost 15% did not return at all.

Table 3. Sample characteristics

Gender	48% female, 52% male		Time spent on Facebook (in per cent, mean 70.3 min)	<15 min	15.5
Age (in per cent, mean 27.7)	<20	9.9		15–30 min	22.5
	20–29	70.4		31–45 min	16.9
	30–39	16.9		46–60 min	16.9
	>39	2.8		60–120 min	18.3
	<100	8.5		>120 min	9.9
Number of friends in target SNS (in per cent, mean 280.5)	100–199	28.2	Functionalities used frequently (in per cent)	Chatting or writing private messages	60.6
	200–299	25.4		Checking newsfeed	56.3
	300–399	15.5		Click like button	33.3
	400–499	11.3		Browsing friends' list of friends	11.3
				Posting messages	7.0
	>499	11.3		Searching for individuals	5.6

Table 4. Alternatives used or done more often while not using the SNS

Number of alternatives (in per cent, mean 5.0)	0-2	14.0	Activities while not using SNS (in per cent)	WhatsApp and iMessage	69.2	Skype	37.3
	3-5	43.7		SMS	64.7	Doing sports	32.8
	6-8	29.6		Email	57.4	Instant messenger (ICQ, Jabber and Teamspeak)	29.9
	9-10	12.7		Working or studying	56.7	Watching TV or DVD	22.4
Number of new alternatives (in per cent, mean 1.2)	0	57.7		Reading (magazines, newspaper and books)	52.2	Play board or video games	19.4
	1-3	32.4		Telephone	51.5	Listen to music or radio	13.4
	4-7	9.9		Going out or meet friends	38.8	*Note:* That no one switched to Google+ or other SNS	

RESEARCH RESULTS

In the following, we present our research results. We use the surveys to evaluate the entire research model empirically.

Empirical results

To validate the research model, we transferred it into a structural equation model (Chin, 1998a) using the partial least squares (PLS) method and SmartPLS 3.1.6 (Ringle *et al*., 2014). Although the data sample with 82 participants is small, it is enough to assess the model based on the rule of ten (Hair *et al*., 2011) and based on calculating proposed sample sizes with different fit indexes as it is also performed in prior IS research articles (e.g. Turel & Connelly, 2013; Turel *et al*., 2013; Khanin & Turel, 2014).[1] As survey-based data can be affected by common method bias, we next evaluate our data accordingly.

Common method bias

Self-reported data such as that gathered in our five surveys may be subject to common method bias (CMB) that inflates the correlations between the variables in the research model (Podsakoff *et al*., 2003). To minimize the influence of CMB, which is particularly problematic

[1]Following Kim (2005), the minimum sample size to achieve a given level of power depends on (a) the number of variables/degrees of freedom, (b) the relation among the variables, (c) the choice of fit index and (d) the value of the fit index. Using the fit index root mean square error of approximation (with $\varepsilon = 0.05$), the proposed sample size is $N_\varepsilon = 54.3$, and for using Steiger's gamma (with $\gamma = 0.95$), the proposed sample size is $N_\gamma = 78.4$. As the sample used in our study is larger, PLS is an appropriate technique for evaluating the research model with the given sample size.

for studies collecting data at a given point in time from one single survey with similar scales (Spector, 2006), we collected data at five different points during the experiment. We also used two different techniques to assess the impact of CMB. First, Harman's single factor test indicates whether the majority of the variance can be explained by one single factor. In our data, only 23.8% of the variance is explained by one factor. Second, although we acknowledge the critique of Chin *et al*. (2012) of the unmeasured latent method construct approach introduced by Liang *et al*. (2007), we performed this test because it might detect CMB influence. This means that a CMB factor was added to our research model and all remaining factors were transformed in single-item constructs (Williams *et al*., 2003). We then compared the ratio of R^2 with CMB to R^2 without CMB factor. In our case, the CMB factor explains an average delta of 0.005 and the average R^2 without CMB factor is 0.813, so that the resulting ratio is 1:163. Furthermore, we compared the path coefficients from the CMB factor and the original construct and revealed a ratio of 1:253 for path coefficients.

We broke down the overall research model into two separate parts consisting of models in which the dependent and the independent variable were collected in one survey to investigate whether CMB is a problematic issue, again using the Podsakoff *et al*. (2003) method. The first model includes SNS-stress creators as independent and SNS-exhaustion as dependent variable (R^2-ratio: 1:145; path coefficients-ratio: 1:262). The second model includes three switching-stress creators and switching-exhaustion (R^2-ratio: 1:175; path coefficients-ratio: 1:250).

Our results reveal that less than 10% of all path coefficients from the CMB factor to the single-item constructs are significant. This value is comparable to prior research articles using this kind of CMB analysis (Liang *et al*., 2007). We also controlled for whether the strength of relationship between the constructs in our original research model changed after entering the CMB variable, but no changes in the significance level were observed.

Summing up, CMB does not appear to be a substantial issue in this research.

Measurement model

Each variable (except dispositional resistance to change) was measured using reflective indicators. The multidimensional stress creator constructs were conceptualized as superordinate constructs (reflective first-order and reflective second-order construct; Polites *et al*., 2012) and evaluated as suggested by Wright *et al*. (2012). This means that we observed content validity, indicator validity, construct reliability and discriminant validity to validate the measurement model (Bagozzi, 1979).

We used existing measurement items whenever possible to ensure content validity by adapting items used in prior research to our research setting. We used the following items.

SNS-stress creators. To capture social overload ($\alpha = 0.90$), pattern ($\alpha = 0.85$), disclosure ($\alpha = 0.86$), uncertainty ($\alpha = 0.85$), complexity ($\alpha = 0.83$) and invasion ($\alpha = 0.86$), we drew on items used in general technostress research (Ragu-Nathan *et al*., 2008) as well as SNS-specific stress research (Maier *et al*., 2012; 2014). SNS-stress creators were modelled according to prior research (Maier *et al*., 2012) as a superordinate second order construct

(reflective first-order and reflective second-order construct; Polites *et al*., 2012) using social overload, pattern, disclosure, uncertainty, complexity and invasion as its dimensions. In this regard, we extended the five factor structure as proposed by Maier *et al*. (2012) by a sixth dimensions as suggested by Maier *et al*. (2014).

Switching-stress creators. The items of sunk costs ($\alpha = 0.93$) and transition costs ($\alpha = 0.88$) are based on Polites and Karahanna (2012) and were adapted to the context of SNS usage. Among others, we adapted the original items 'I have already invested a lot of time in learning to use my current method of collaborating / sharing files with teammates' to 'I have already invested a lot of time and effort into personalizing my profile in Facebook', as users had uploaded photos or specified personal interests to give their profile a personal touch. The stressor replacement overload ($\alpha = 0.94$) is newly developed. The process of developing these items is described in Appendix B. Switching-stress creators were modelled as a superordinate second order construct (reflective first-order and reflective second-order construct; Polites *et al*., 2012) using sunk costs, transition costs and replacement overload as its dimensions.

SNS-exhaustion and switching-exhaustion. We measured SNS-exhaustion ($\alpha = 0.92$) based on the items of Ayyagari *et al*. (2011), which had been used before in the SNS context by Maier *et al*. (2014). For switching-exhaustion ($\alpha = 0.94$), we worded the items similarly to Ayyagari *et al*. (2011) but adapted them to the contexts of switching and using alternatives. This means that the usage of a technology was not the cause of perceptions of exhaustion (as performed by Ayyagari *et al*., 2011) but rather the switching process from the SNS to other alternatives. Finally, survey items such as 'Switching from Facebook to one or more alternatives is a strain for me' were used in this research.

Discontinuous usage. To capture an SNS user's intention to discontinue, we used three items that have been used in the stream of discontinuous usage research (Maier *et al*., 2014; Turel, 2014; α=0.96). We also used four items to measure an individual's discontinuous usage behaviour ($\alpha = 0.94$). We followed the lead of Bhattacherjee (2001) and Bhattacherjee and Lin (2014) to capture users' discontinuous usage behaviour, and we used survey items such as 'I use one or more alternatives to Facebook' in this research.

Control variables. We measured the control variables perceived usefulness ($\alpha = 0.78$; Brown & Venkatesh, 2005), perceived enjoyment ($\alpha = 0.90$; Turel & Serenko, 2012), satisfaction ($\alpha = 0.87$; Bhattacherjee, 2001) and social influence ($\alpha = 0.91$; Brown & Venkatesh, 2005) with the help of measures used in prior articles. These items have also been used in the SNS context (e.g. Maier *et al*., 2012; Turel & Serenko, 2012). The personality traits extraversion ($\alpha = 0.83$) and neuroticism ($\alpha = 0.78$) were measured using two items, as proposed by Rammstedt and John (2007) and as practiced in previous IS research (e.g. Junglas *et al*., 2008). To control for dispositional resistance to change, we made use of the scale proposed by Oreg (2003) and used in IS research (Polites & Karahanna, 2012; Maier *et al*., 2013), which consists of four dimensions as a second-order aggregate construct: routine seeking ($\alpha = 0.86$), emotional reaction to change ($\alpha = 0.78$), short-term thinking ($\alpha = 0.80$) and cognitive rigidity ($\alpha = 0.90$).

The final items used in this research are summarized in Table 5.

Indicator reliability is used to determine the rate of variance of an indicator that comes from the latent variables. More than 50% of a latent variable's variance should be explained by the indicators and values should be greater than 0.707 (Carmines & Zeller, 2008). In our study, every loading exceeds the recommended threshold (Table 5).

Composite reliability (CR) and average variance extracted (AVE) are used to verify high quality at the construct level (Fornell & Larcker, 1981). To assess construct reliability, CR should be at least 0.7 and AVE at least 0.5. Table 6 shows that both criteria are fulfilled for all constructs.

Fourth, discriminant validity describes the extent to which items differ from one another (Campell & Fiske, 1959). Table 6 shows that the square root of AVE is greater than the corresponding construct correlation (Fornell & Larcker, 1981; Hulland, 1999). As the heterotrait-monotrait (HTMT) ratio of correlations criterion detects a lack of discriminant validity more reliably than the Fornell–Larcker criterion, it is also used to assess discriminant validity (Henseler *et al*., 2014). Using the absolute $HTMT_{0.85}$ criterion indicates that discriminant validity is not an issue in our research (the highest correlation between discontinuous usage intention and discontinuous usage behaviour: 0.833)

Based on the previous tests, we confirm that our constructs have convergent and discriminant validity.

The validation for the formative control variable dispositional resistance to change is included in Appendix C, Table 6.

Structural model

We evaluated the structural model by using the coefficient of determination and the significance level of each path coefficient (Chin, 1998b).[2] Based on the empirical data, our findings indicate that the SNS-stress creators explain 57.8% of the variance of SNS-exhaustion. Moreover, switching-stress creators explain 61.8% of the variance of switching-exhaustion. These two different kinds of stress creators and exhaustion as well as the control variables explain 70.7% of the variance of discontinuous usage intention. However, when excluding control variables, the stress creators and the exhaustion variables still explain 63.7% of the variance of discontinuous usage intention. This intention in turn explains 63.8% of the variance of discontinuous usage behaviour whereby the value increases by 3.5 percentage points when also controlling for individual differences.

The significance level of each path coefficient indicates that each hypothesized path is significant. This means that SNS-stress creators have a significant impact on SNS-exhaustion. In addition, switching-stress creators are significant influencing factors for switching-exhaustion and discontinuous usage intention. SNS-exhaustion and switching-exhaustion influence discontinuous usage intention significantly, which in turn influences discontinuous usage behaviour significantly (Figure 4).

[2]PLS algorithm is run with the path weighting scheme; the bias-corrected and accelerated bootstrap procedure is computed without compensating for any sign changes.

Table 5. Measures

Construct	Items	Loadings	Reference
Complexity	I need a long time to understand and use Facebook.	0.821	Maier *et al*., 2012
	I do not find enough time to upgrade my technology skills to use Facebook.	0.735	
	Younger people are better at using Facebook than I am.	0.702	
	I often find Facebook too complex to use.	0.913	
Uncertainty	There are always new terms and conditions on Facebook.	0.827	Maier *et al*., 2012
	Facebook apps are constantly being changed.	0.867	
	Overall, Facebook is constantly being changed.	0.918	
Invasion	I am in touch with my Facebook friends too much over Facebook, even during my vacation.	0.943	Maier *et al*., 2012
	I feel my personal life is being invaded by Facebook.	0.933	
Pattern	Through Facebook, I am forced to inform friends about news prompts.	0.895	Maier *et al*., 2012
	Through Facebook, I am forced to communicate with friends periodically.	0.905	
	I am forced to adapt my communication patterns to Facebook.	0.826	
Disclosure	I feel that my social status is under constant threat due to Facebook.	0.847	Maier *et al*., 2012
	I perceive pressure from my friends to check their news on Facebook regularly.	0.842	
	I do not share all of my news on Facebook so that I am better informed than my friends.	0.821	
	I think that my friends do not post all their news in Facebook because they want to be the best informed.	0.855	
Social overload	I take too much care of my friends' well being on Facebook.	0.865	Maier *et al*., 2014
	I deal with my friends' problems too much on Facebook.	0.938	
	My sense of being responsible for how much fun my friends have on Facebook is too strong.	0.918	
	I am too often caring for my friends on Facebook.	0.894	
	I pay too much attention to posts of my friends on Facebook.	0.866	
	I congratulate Facebook friends as a consequence of the birthday reminder, although I would not congratulate them in real life.	0.713	
SNS-exhaustion	I feel drained from activities that require me to use Facebook.	0.825	Ayyagari *et al*., 2011
	I feel tired from my Facebook activities.	0.859	
	Using Facebook is a strain for me.	0.870	
	My Facebook activities stress me out.	0.744	
Sunk costs	I have already invested a lot of time and effort to set up Facebook on my needs and preferences, so that I only see relevant information.	0.911	Polites & Karahanna, 2012
	I have already invested a lot of time and effort into personalizing my profile in Facebook.	0.950	
	I have already invested a lot of time and effort into conveying a positive image of myself via Facebook.	0.919	

Continues

Table 5. *Continued*

Construct	Items	Loadings	Reference
	I have already invested a lot of time and effort into cultivating friendships via Facebook.	0.846	
Transition costs	It takes a lot of time to maintain the level of information exchange with my social environment using alternatives to Facebook.	0.789	Polites & Karahanna, 2012
	It takes a lot of time to maintain the level of communication with my social environment using alternatives to Facebook.	0.915	
	Overall, it takes a lot of time to maintain the established level of socializing with my social environment.	0.825	
	Replacing Facebook by one or more alternatives is easy for me. (Reverse)	0.876	
Replacement overload	I have to use too many different alternatives in order to interact to the same degree with my social environment.	0.932	Self-developed: see Appendix B
	I have to use too many different alternatives in order to stay in touch with my social environment.	0.926	
	I have to use too many different alternatives in order to get information from my social environment.	0.902	
	I have to use too many different alternatives in order to provide information to my social environment.	0.913	
Switching-exhaustion	Switching from Facebook to one or more alternatives stresses me out.	0.924	Adapted from Ayyagari *et al*., 2011
	I feel tired by switching from Facebook to one or more alternatives.	0.903	
	Switching from Facebook to one or more alternatives is a strain for me.	0.941	
	I feel drained from activities involved in switching from using Facebook to one or more alternatives.	0.952	
Social influence	My social environment thinks that I should use Facebook.	0.829	Adapted from Brown & Venkatesh, 2005
	My social environment expects me to use Facebook.	0.923	
	People who are important to me think that I should use Facebook.	0.894	
	People who are important to me expect me to use Facebook.	0.910	
Perceived enjoyment	Using Facebook is enjoyable.	0.779	Turel & Serenko, 2012
	Using Facebook is pleasurable.	0.883	
	Using Facebook is fun.	0.921	
	Using Facebook is exciting.	0.763	
	Using Facebook is interesting.	0.898	
Perceived usefulness	Using Facebook is useful to stay in contact with friends.	0.773	Adapted from Brown & Venkatesh, 2005
	Using Facebook is useful to communicate with friends.	0.782	
	Overall, using Facebook is useful.	0.887	
Satisfaction	I am pleased with my use of Facebook	0.757	Adapted from Bhattacherjee, 2001
	I am content with my use of Facebook.	0.824	
	I am delighted with my use of Facebook.	0.870	

Continues

Table 5. *Continued*

Construct	Items	Loadings	Reference
	I am satisfied with my use of Facebook.	0.778	
	Overall, I have a positive opinion about Facebook.	0.827	
Discontinuous usage intention	I prefer using alternatives to Facebook.	0.978	Maier *et al*., 2014
	In the future, I prefer to use alternatives to Facebook.	0.968	
	I prefer to use alternatives instead of continuing to use Facebook.	0.966	
Dispositional resistance to change	I generally consider changes to be a negative thing.	0.883	Oreg, 2003
	I like to do the same old things rather than try new and different ones.	0.931	
	I'd rather be bored than surprised.	0.839	
	If I were to be informed that there's going to be a significant change regarding the way things are done at work, I would probably feel stressed.	0.764	
	When I am informed of a change of plans, I tense up a bit.	0.757	
	When things don't go according to plans, it stresses me out.	0.772	
	If my boss changed the criteria for evaluating employees, it would probably make me feel uncomfortable even if I thought I'd do just as well without having to do any extra work.	0.814	
	Changing plans seems like a real hassle to me.	0.740	
	Often, I feel a bit uncomfortable even about changes that may potentially improve my life.	0.817	
	When someone pressures me to change something, I tend to resist it even if I think the change may ultimately benefit me.	0.777	
	I sometimes find myself avoiding changes that I know will be good for me.	0.818	
	I often change my mind.	0.852	
	Once I've come to a conclusion, I'm not likely to change my mind.	0.947	
	I don't change my mind easily.	0.843	
	My views are very consistent over time.	0.865	
Neuroticism	I see myself as someone who is relaxed and handles stress well. (*reverse*)	0.977	Rammstedt & John, 2007
	I see myself as someone who gets nervous easily.	0.769	
Extraversion	I see myself as someone who is reserved. (*reverse*)	0.902	Rammstedt & John, 2007
	I see myself as someone who is outgoing and sociable.	0.942	
Discontinuous usage	I use one or more alternatives to Facebook.	0.918	Adapted from: Bhattacherjee 2001; Bhattacherjee & Lin, 2014
	I use the alternatives to Facebook that I used during the 2-week experiment.	0.880	
	I use Facebook over other alternatives. (*reverse*)	0.944	
	I use Facebook rather than one or more alternatives. (*reverse*)	0.938	

Table 6. AVE, CR, Fornell–Larcker criterium and bivariate correlations

	Construct	Mean	SD	AVE	CR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Complexity	2.22	1.26	0.64	0.87	0.797																								
2	Uncertainty	4.22	1.39	0.76	0.90	0.36	0.871																							
3	Invasion	3.95	1.61	0.88	0.94	-0.06	0.09	0.938																						
4	Disclosure	2.87	1.73	0.71	0.91	0.19	0.30	0.16	0.843																					
5	Pattern	3.32	1.68	0.77	0.91	0.13	0.09	0.24	0.35	0.877																				
6	Social overload	3.57	1.72	0.76	0.95	0.08	-0.24	0.20	0.50	0.38	0.869																			
7	SNS-exhaustion	3.44	1.60	0.68	0.90	0.19	0.38	0.08	0.54	0.30	0.32	0.826																		
8	Sunk costs	4.31	1.64	0.82	0.93	-0.09	-0.08	0.16	0.21	0.15	0.17	0.32	0.906																	
9	Transition costs	4.19	1.72	0.73	0.95	0.05	-0.30	0.17	0.23	0.17	0.16	0.35	0.51	0.854																
10	Replacement overload	3.79	1.51	0.84	0.96	-0.10	-0.34	0.17	0.21	0.16	0.22	0.38	0.40	0.34	0.918															
11	Switching-exhaustion	4.53	2.02	0.87	0.96	0.16	0.08	0.16	0.37	0.18	0.19	0.43	0.49	0.52	0.42	0.930														
12	Social influence	3.93	1.65	0.79	0.94	0.03	-0.15	0.19	0.43	0.37	0.31	0.26	0.31	0.33	0.27	0.22	0.890													
13	Perceived enjoyment	5.00	1.27	0.72	0.93	0.19	-0.30	0.19	0.32	0.25	0.29	0.22	0.33	0.24	0.19	0.23	0.37	0.851												
14	Perceived usefulness	5.61	1.22	0.67	0.86	0.17	0.03	0.17	0.17	0.14	0.19	0.05	0.29	0.27	0.13	0.24	0.22	0.44	0.815											
15	Satisfaction	4.75	1.32	0.66	0.91	0.03	-0.17	0.18	0.18	0.12	0.22	0.19	0.36	0.41	0.25	0.36	0.34	0.68	0.53	0.812										
16	Discontinuous usage intention	3.20	1.86	0.94	0.98	0.18	0.04	0.34	0.13	0.10	0.18	0.30	-0.46	-0.56	-0.44	-0.63	-0.26	-0.48	-0.39	-0.39	0.971									
17	Short term thinking	3.53	1.41	0.62	0.87	0.02	-0.07	-0.17	0.07	0.12	-0.03	0.01	-0.01	-0.03	-0.04	0.09	-0.06	-0.15	-0.02	-0.16	0.02	0.789								
18	Cognitive rigidity	4.74	1.62	0.77	0.93	-0.15	-0.03	-0.04	0.05	0.03	0.04	0.05	-0.13	-0.12	0.03	-0.08	-0.12	0.04	-0.11	0.06	0.06	0.14	0.877							
19	Emotional reaction	4.31	1.61	0.60	0.86	0.01	0.13	-0.05	-0.01	0.13	-0.05	-0.01	-0.13	-0.04	0.06	0.01	-0.18	-0.10	-0.08	-0.10	0.15	0.65	0.03	0.777						
20	Routine seeking	5.31	1.53	0.78	0.92	-0.08	-0.28	-0.21	0.23	0.31	0.44	0.30	0.14	0.13	0.19	0.33	0.00	0.18	0.03	0.19	-0.09	0.43	0.30	0.31	0.885					
21	Neuroticism	4.05	1.55	0.77	0.87	0.19	0.06	0.18	0.12	0.13	0.02	0.26	-0.06	0.10	-0.05	0.09	0.05	0.05	0.04	0.06	0.00	0.007	-0.152	0.07	-0.034	0.879				
22	Extraversion	4.94	1.54	0.85	0.92	0.01	0.03	0.13	0.03	0.03	0.02	-0.12	0.04	0.04	0.02	-0.05	-0.03	0.21	0.23	0.15	-0.06	-0.11	0.21	-0.03	-0.093	-0.21	0.922			
23	Gender	1.48	0.50	1.00	1.00	-0.04	-0.08	-0.12	0.04	0.04	0.18	-0.05	0.05	-0.11	-0.02	-0.03	0.17	0.06	-0.06	-0.01	0.01	-0.012	0.166	-0.10	0.154	-0.36	-0.10	*Single item construct*		
24	Age	27.7	4.93	1.00	1.00	0.14	0.17	0.08	0.03	0.07	0.00	-0.06	-0.06	0.04	-0.07	0.04	-0.03	-0.14	-0.05	-0.26	-0.08	0.036	-0.136	-0.03	0.041	-0.24	0.09	0.02	*Single item construct*	
25	Discontinuous usage behavior	3.94	1.96	0.85	0.96	0.12	0.05	0.29	0.30	0.24	0.28	0.27	-0.47	-0.66	-0.36	-0.72	-0.31	-0.34	-0.48	-0.37	0.75	-0.005	-0.186	-0.17	-0.123	-0.05	-0.15	0.00	-0.07	0.920

Shaded diagonal represents square root of the AVE

Focusing on alternative theoretical explanations and their significance level of their path coefficients, we can state that satisfaction, perceived usefulness and perceived enjoyment influence discontinuous usage intention significantly. Concerning the control variables, extraversion, neuroticism and dispositional resistance to change influence behaviour change significantly (Figure 4). Moreover, perceived enjoyment and usefulness have a significant impact on satisfaction (Table 7).

Strength of effect

To determine effect strength, we calculated f^2 values. As summarized in Table 8, the control variables (controls) have a medium effect on discontinuous usage intention. The switching-stress creators and switching-exhaustion have a strong effect and SNS-stress creators and SNS-exhaustion have a medium effect.

Post-hoc analysis: stability of user behaviour over time

To test whether discontinuous usage behaviour is stable after a longer period of time, survey five again captured discontinuous usage behaviour one month after the experiment had finished. Based on this data, we evaluated the research model again by replacing the discontinuous usage behaviour variable used in survey four by the one captured in survey five.

Our results show that the R^2 of discontinuous usage behaviour only rises by 0.6 percentage point to 67.9%. Moreover, we compared whether the path coefficients of discontinuous usage intention, age, gender, extraversion, neuroticism and dispositional resistance to change on discontinuous usage behaviour are different depending on

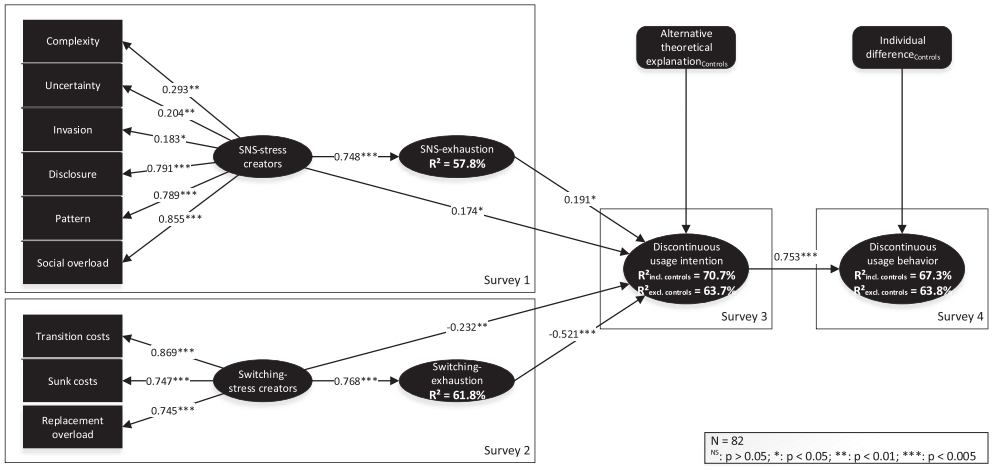


Figure 4. Research model validation using data from surveys one to four (rectangles are dimensions; ellipses are constructs).[3]

Table 7. The influence of control variables

Influence of … on discontinuous usage intention		Influence of … on discontinuous usage behaviour		Influence of … on satisfaction (R^2 = 67.5%)	
Satisfaction	−0.398***	Age	-0.009^{NS}	Perceived usefulness	0.254***
Perceived usefulness	−0.158**	Gender	-0.042^{NS}	Perceived enjoyment	0.662***
Perceived enjoyment	−0.476***	Dispositional resistance to change[a]	−0.166*		
Social influence	0.022^{NS}	Neuroticism	−0.089*		
		Extraversion	−0.166**		

[a]In alignment with Polites and Karahanna (2012) and based on the Jarvis *et al*. (2003) criteria, dispositional resistance to change is conceptualized as a second-order aggregate construct (reflective first-order and formative second-order construct).
^{NS}: $p > 0.05$; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.005$

whether data from survey four or five are used. The results of a parametric test suggested by Keil *et al*. (2000) and a non-parametric test suggested by Henseler *et al*. (2009) indicate that none of the relationships differ in terms of the strength of relationship when measuring participants' behaviour with data from survey five instead of survey four. In summary, we can conclude that the behaviour observed immediately after the experiment continued one month later.

[3]SNS-stress and switching-stress creators are conceptualized as superordinate constructs (reflective first-order and reflective second-order constructs; Polites *et al*. (2012)) and evaluated as suggested by Wright *et al*. (2012).

Table 8. Effect size (Cohen, 1988[a])

Independent variable	SNS-stress creators and SNS-exhaustion	Switching-stress creators and switching-exhaustion	Controls
Dependent variable		Discontinuous usage intention	
f^2	0.23	1.33	0.27
Interpretation	Medium effect	Strong effect	Medium effect

[a]$f^2 > 0.35$, strong effect; $f^2 > 0.15$, medium effect; $f^2 > 0.02$, weak effect (Cohen, 1988).

DISCUSSION AND IMPLICATIONS

This research aims to identify *whether discontinuous usage intention is a behavioural response of users who perceive using an SNS as stressful* and *whether discontinuous usage intentions are diminished by the stress associated with switching away from using SNS*. Our results reveal that SNS-stress creators and SNS-exhaustion are significant antecedents of discontinuous usage intention and that switching-stress creators and switching-exhaustion cause discontinuous usage intentions to diminish among users. The implications of these findings are discussed in the following and summarized in Table 9.

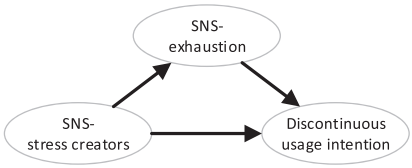
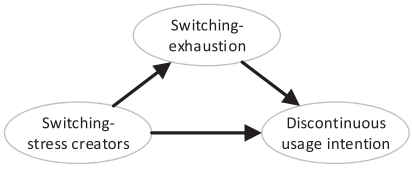
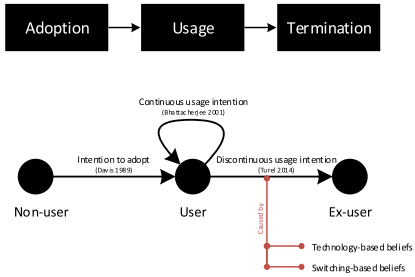
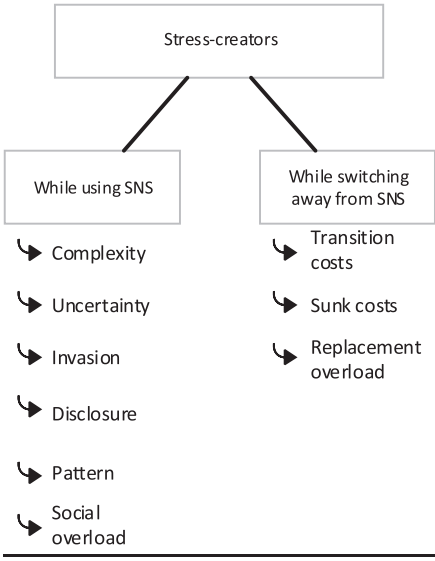
Discontinuous usage intention as behavioural response to SNS-stress creators and SNS-exhaustion

Prior research in the field of technostress has focused on identifying the antecedents of exhaustion (Ayyagari *et al*. 2011; Maier *et al*. 2014), but has left user reactions to exhaustion to future research (Ayyagari *et al*. 2011). The present research contributes to this stream of research by showing that the perception of exhaustion results in the development of discontinuous usage intentions, which are then subsequently translated into discontinuous usage. Consequently, we reveal that exhaustion causes behavioural responses, which leads individuals to stop using a technology. For prior research discussing IS use avoidance as one coping strategy (Beaudry and Pinsonneault 2005), we can additionally contribute that individuals avoid using SNSs when they perceive the usage of SNS as stressful.

As discussed in the section technostress research, prior research in this stream looked at the influence of stress creators on exhaustion, satisfaction and continuous usage intention as well as the influence of the stressor social overload on discontinuous usage intention (Tarafdar *et al*., 2010; 2011; Ayyagari *et al*., 2011; Maier *et al*., 2012; 2014). We contribute to this stream of research by discussing the influence of both SNS-stress creators and SNS-exhaustion on discontinuous usage intention, which is a unique behavioural response (Turel 2014).

Moreover, Turel (2014, p. 11) discusses that '[f]uture research can further examine IS discontinuance as an adaptation behavior … trying to cognitively minimize the perceived negative consequences'. In this respect, this research discusses discontinuous usage as a stress-induced adaptation strategy. This means that some users perceive stress creators while using SNSs and subsequently develop intentions to discontinue using SNSs in order to minimize these negative perceptions. Hence, we conclude that discontinuing to use IS might actually be an adaptation strategy for some users.

Table 9. Implications for research

	SNS-stress creators and SNS-exhaustion as sources of discontinuous usage intention • Revealing that SNS-stress creators as instances of technostress creators and SNS-exhaustion as an instance of techno-exhaustion cause users to develop discontinuous usage intentions.
	Switching-stress creators and switching-exhaustion diminish discontinuous usage intentions • Confirming that switching-stress creators and switching-exhaustion reduce discontinuous usage intentions. • Revealing switching-exhaustion as an additional psychological reaction to switching from using one IS to using one or several other ISs. • Identifying switching-stress creators and switching-exhaustion as predictors of discontinuous usage intention
	Switching as part of the termination phase of the full life cycle of IS • Identifying that the actual switching process is part of the termination phase of the life cycle of IS • Extends prior research by showing that next to individual-based, behaviour-based, technology-based, task-based, environment-based and affective-based perceptions, switching-based beliefs are relevant for whether an individual stops using an IS.
	Identification and conceptualization of stress creators when switching to alternatives • Transition costs, sunk costs and replacement overload as significant switching-stress creators • Proposing and validating a measurement model for replacement overload

Switching-stress creators and switching-exhaustion diminish discontinuous usage intention

The study extends current research on discontinuous usage intentions (Turel 2014). These studies (Appendix A – Table 1) reveal that discontinuous usage intentions are influenced by perceptions grounded in the individual, the behaviour, the technology, the task, the environment or the affective attitude. However, the switch from one IS to another is overlooked in this stream of research. We contribute perceptions about the switch in terms of switching-stress creators and switching-exhaustion as additional causes for whether an individual stops using a technology. Hence, switching-based perceptions should not be ignored, but rather should be included in models explaining discontinuous usage intentions.

Besides these general implications for research focusing on discontinuous usage intentions, we enter the general technostress discussion by arguing and showing empirically that individuals experience and are influenced by two different types of exhaustion contributing to discontinuous usage intention. A clear implication is that future research needs to consider exhaustion during the process of switching when alternatives are available. Consequently, we contribute to technostress research (Ayyagari *et al*., 2011) by identifying an additional exhaustion variable (beyond exhaustion caused by using a technology) that is important in contexts when switching is an option for users. While prior technostress research has mostly studied mandated technology usage in organizations in which no alternatives are available and switching is not an option for users (e.g. Ragu-Nathan *et al*., 2008; Tarafdar *et al*., 2010; Ayyagari *et al*., 2011), we extend technostress research by focusing on a different usage context and by providing that switching-stress creators and switching-exhaustion are relevant for this context. Furthermore, we contribute to research discussing exhaustion (Ayyagari *et al*., 2011; Maier *et al*., 2014) that even when *SNS-exhaustion* causes discontinuous usage intention significantly, *switching-exhaustion* determines the behavioural intention to an even higher extent. Hence, an exhaustion from IT usage, as studied by Ayyagari *et al*. (2011), can be offset by switching-exhaustion, which has a stronger effect on discontinuous usage intentions.

Moreover, the implications of our results that switching-stress creators and switching-exhaustion diminish discontinuous usage intention can be discussed in relation to the CMUA (Beaudry and Pinsonneault, 2005) as we have identified discontinuous usage as an adaptation strategy for some users. Our results indicate that individuals who are not stressed by the switching process showed lower discontinuous usage intentions and stopped using the SNS after the experiment. The CMUA assumes that when users are threatened by an IS, they engage in adaptations strategies and ultimately stop using an IS, which is also supported by our results. However, the diminishing effect of switching-stress creators and switching-exhaustion has not been considered by CMUA so far. Hence, our results indicate that when leaving a stressful situation like the usage of an SNS an individual can blunder into a new stressful situation like the switch away from the SNS, which may have an even stronger impact on adaptations strategies than the actual stress that triggered this strategy. This suggests that when investigating adaptation strategies like discontinuous usage intention, it is not sufficient to focus only on the cause of the perceived threat but rather also on the threats related to the adaptation strategy.

Switching as part of the termination phase in the life cycle of an IS

The study also extends research on the life cycle of an IS by focusing on the termination phase and by revealing stress associated with using a technology and stress associated with switching away from the technology as antecedents of the discontinuous usage intention. Research in this area has examined primarily the two other phases of the life cycle (e.g. Williams *et al*., 2009; Lankton & McKnight, 2012; Bhattacherjee & Lin, 2014) and overlooked the final termination phase (Turel, 2014). Studies focusing on this final phase (Appendix A – Table 1) reveal that perceptions grounded in the individual, the behaviour, the technology, the task, the environment or the affective attitude are important. The proposed models always try to explain why an individual wants to stop using an IS and consequently they focus mainly on perceptions related to the situation an individual wants to avoid. However, as our results indicate, not only the situation to be avoided, but also the actual switch away contributes to discontinuous usage intentions in this phase. This suggest that also the actual switch away from an IS is an important aspect of the termination phase, which should be included in models explaining this phase of the life cycle of an IS.

In relation to user migration theories, which has been the focus of recent IS research (Bhattacherjee & Park, 2013; Xu *et al*., 2014), these results might be extended one more step by future research. User migration theories suggest that when users intend to switch from one IS to another, they are pushed by negative perception of old IS, are moored by perceptions of the switching process and are pulled by factors of the new IS. Our result provide evidence that switching perceptions are important as mooring factors in the final terminate phase, but future research might focus on pull factors and their importance in the final termination phase and also on the overlap between the termination of an IS lifecycle and the beginning of a new one.

Identification and conceptualization of switching-stress creators: sunk costs, transition costs and replacement overload causing switching-exhaustion

According to our data, 61.8% of the variance in switching-exhaustion is explained by switching-stress creators consisting of transition costs, sunk costs and replacement overload. This supports the argument that the additional time and effort it takes to adapt to a new situation are perceived as stress creators (Polites & Karahanna, 2012). The same holds for the fact that an individual's time and effort in learning how to use an IS are lost when switching to alternatives, as the efforts invested cannot be transferred to the alternatives. Furthermore, replacement overload represents a stress creator as individuals perceive that they have to use too many different alternatives to replace the functionalities of the technology.

Recent research in the field of technological change has called for research examining the psychological and behavioural consequences of stress caused by technological changes (Morris & Venkatesh, 2010). We responded to this call and contribute by focusing on switching-stress creators as transition costs, sunk costs and replacement overload that cause adverse psychological perceptions in terms of switching-exhaustion. We conclude that these aspects are not only drivers of user resistance (Kim & Kankanhalli, 2009) and inertia (Polites & Karahanna, 2012) but also of perceptions of exhaustion and a concrete psychological

consequence of stressful stimuli associated with changing usage behaviour. Moreover, as suggested by Morris and Venkatesh (2010), stress experienced during techno-changes also influences an individual's behaviour. We find that switching-stress creators and switching-exhaustion have an effect on discontinuous usage intention. We recommend that future research consider the influence of switching-stress creators and switching-exhaustion when focusing on the process of switching from one technology to another. In our case, we provided evidence for the influence of switching-stress creators and switching-exhaustion in the context of voluntary IT usage, but this might also be important when switching from one technology to another in an organizational setting while implementing an enterprise system.

Implications for SNS providers

Discontinuous usage is a strategic issue for SNS providers, who have a vested interest in reducing such intentions on the part of their users (Xu *et al*., 2014). When users stop using their SNS, providers lose their key asset and their financial profitability is endangered (Chiu & Huang, 2014). Our results provide initial indications of how SNS providers might discourage discontinuous usage intentions. First of all, SNS providers need to implement measures ensuring that users do not perceive SNS-stress creators. Concerning stress creator complexity, providers should make their site easy to use and provide training on a wide range of features. In order to reduce insecurity, SNS providers could simplify their terms and conditions and stop updating and changing their interface regularly. In order to reduce the danger of invasion, providers might implement warning messages that pop up when a user is online all-day long. SNS providers might help prevent their users from perceiving disclosure and social overload by implementing filter mechanisms or a means to manage sub-social networks. An example of an SNS that has already implemented this functionality is Google+, which offers 'circles' to manage sub-social networks within one SNS. The perception of the stress creator pattern might be diminished by providing better messaging services to reduce the *urge* to check the SNS inbox regularly.

These mechanisms might help an SNS provider reduce the perception of stress and thereby retain existing users. Nonetheless, less frequent interface changes or fewer updates of terms and conditions might be negative when trying to attract new users looking for the most recent and modern platform. Consequently, SNS providers have to think about the trade-off between focusing on attracting new users (e.g. by implementing a new, innovative graphical user interface (GUI)) or retaining existing users (e.g. by reducing users' perception of stress creators, such as by continuing to use a well-established GUI). Hence, our results indicate that technostress-induced discontinuous usage intentions among existing users are an important and under-researched trade-off variable. As the relative importance of new vs. old users is probably dependent on the technology or platform diffusion stage, future research on diffusion stage-dependent (non-)usage drivers might offer even greater insights into the economics of SNS.

Furthermore, as our results indicate, the perception of switching-stress creators and the related exhaustion cause discontinuous usage intention to decrease. Consequently, SNS providers might try to motivate users to continue using the SNS instead of switching to

alternatives by increasing the perception of switching-stress creators and switching-exhaustion. This can be performed by focusing on the switching-stress creators in terms of transition costs, sunk costs and replacement overload. Examples of possible transition cost-related possibilities include emphasizing the time and effort needed to switch. One way to increase users' perception of sunk costs is by not allowing them to transfer the settings of one SNS to a competing SNS. In order to leverage the stress creator replacement, SNS providers could add additional functionalities to SNS, such as video-supported group conversations and contact management. The more functionality a platform offers, the more difficult it will be to replace the platform, so users will remain with the platform despite the stress associated with using the SNS.

Limitations and future research

As with all research, our findings are limited in several ways. First, the non-usage phase was limited in time, so some individuals may have opted out of switching and using alternatives to replace the functionalities of Facebook. It is possible that the limited experimental phase resulted in an underestimation of the influence of switching-exhaustion and alternative-exhaustion on discontinuous usage intention. Second, we focused on the voluntary use of Facebook (Turel, 2014), so findings may differ if mandatory technology usage is investigated (Venkatesh *et al*., 2003). Here, future research might repeat our study in organizational settings where IT usage is mandatory. For example, this might be performed during an enterprise's system implementation, which implies a switch from one technology to another. Applying our research approach in this area may lead to a better understanding of whether the exhaustion induced by the old technology, the switching process or the new alternative is the principle cause of resistance behaviour in an organizational context. Third, we are limited by the selection of participants as they were not connected to each other via Facebook. Results may differ if a closed group does not use SNS, because then no individual is the only one not using the SNS and hence there may be a lower perception of social isolation or fear of not being informed. Furthermore, we did not control for the position of the participants in a social network to determine whether participants are central member or boundary spanners in their virtual social network. The results might vary depending on an individual's position in her social network. Fourth, we were not able to compare the explanatory power of our approach with that of network economics in light of switching behaviour because we focused only on the dark side of SNSs and switching away from using the SNS, but such a comparison would also entail focusing on the positive side. Future studies might build on our results regarding the stress associated with using and switching away from an SNS and broaden the scope to include network economics in order to further illuminate switching behaviour. Fifth, as we did not control for interrelationships among the SNS and switching-stress creators or the SNS-exhaustion and the switching-exhaustion variables, future research might focus on this interplay to discover how they affect each other. Sixth, the generalizability is limited by the small sample size and might be influenced by the fact that approximately half of the participants were students (Compeau *et al*., 2012). However, according to research statistics,[4]

[4]e.g. see http://linkedinsiders.wordpress.com/2014/05/13/facebook-und-die-altersstruktur/

young individuals like students are a large member group of Facebook. Therefore, in line with Compeau *et al*. (2012), we explicitly identified our target population of respondents and hence focused on Facebook users.

CONCLUSION

This paper extends the existing body of IS research on IS discontinuance by identifying discontinuance usage behaviour as an adaptation strategy to SNS-stressors and SNS-exhaustion. It also provides evidence that the development of discontinuance usage intentions is reduced by stresses associated with the switch away from a stressful IS itself, showing that switching-stress creators and switching-exhaustion effect this behavioural response. These effects were evaluated in an experimental research approach that forced individuals to stop using Facebook and allowed them to switch to alternatives.

ACKNOWLEDGEMENT

We would like to thank Monideepa Tarafdar, Ashish Gupta, Ofir Turel, an anonymous associate editor, and the three anonymous reviewers for their excellent guidance during the review process. We also thank Steven Lux for his support in data collection.

REFERENCES

Ahuja, M. K., Chudoba, K. M., Kacmar, C. J., McKnight, H. D. & George, J. F. (2007) IT road warriors: balancing work-family conflict, job autonomy, and work overload to mitigate turnover intentions. *MIS Quarterly*, **31**, 1–17.

Ajzen, I. (1985) From intentions to actions: a theory of planned behavior. In: Action Control: From Cognition to Behavior. Kuhl, J. (ed.). Springer, Berlin.

Ajzen, I. (2005) Attitudes, Personality and Behavior, 2. ed. Open Univ. Press, Maidenhead.

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

Bagozzi, R. P. (1979) The role of measurement in theory construction and hypothesis testing: toward a holistic model. In: Conceptual and Theoretical Developments in Marketing. Ferrell, O. C., Brown, S. W., Lamb, C. W. (eds.), pp. 15–32. American Marketing Assoc., Chicago, Ill.

Barley, S., Meyerson, D. & Grodal, S. (2011) E-mail as a source and symbol of stress. *Organization Science*, **22**, 887–906.

Beaudry, A. & Pinsonneault, A. (2005) Understanding user responses to information technology: a coping model of user adaptation. *MIS Quarterly*, **29**, 493–524.

Begley, T. (1998) Coping strategies as predictors of employee distress and turnover after an organizational consolidation: a longitudinal analysis. *Journal of Occupational & Organizational Psychology*, **71**, 305–329.

Bhattacherjee, A. (2001) Understanding information systems continuance: an expectation-confirmation model. *MIS Quarterly*, **25**, 351–370.

Bhattacherjee, A. & Lin, C.-P. (2014) A unified model of IT continuance: three complementary perspectives and crossover effects. *European Journal of Information Systems*. doi: 10.1057/ejis.2013.36.

Bhattacherjee, A. & Park, S. C. (2013) Why end-users move to the cloud: a migration-theoretic analysis. *European Journal of Information Systems*, **23**, 357–372. doi: 10.1057/ejis.2013.1.

Bhattacherjee, A. & Premkumar, G. (2004) Understanding changes in belief and attitude toward information

technology usage: a theoretical model and longitudinal test. *MIS Quarterly*, **28**, 229–254.

Brown, S. A. & Venkatesh, V. (2005) Model of adoption of technology in households: a baseline model test and extension incorporating household life cycle. *MIS Quarterly*, **29**, 399–426.

Burnham, T. A., Frels, J. K. & Mahajan, V. (2003) Consumer switching costs: a typology, antecedents, and consequences. *Journal of the Academy of Marketing Science*, **31**, 109–126. doi: 10.1177/0092070302250897.

Burton-Jones, A. & Hubona, G. S. (2005) Individual differences and usage behavior. *ACM SIGMIS Database*, **36**, 58–77. doi: 10.1145/1066149.1066155.

Cacioppo, J. T. & Berntson, G. G. (1994) Relationship between attitudes and evaluative space: a critical review, with emphasis on the separability of positive and negative substrates. *Psychological Bulletin*, **115**, 401–423. doi: 10.1037/0033-2909.115.3.401.

Cacioppo, J. T., Gardner, W. L. & Berntson, G. G. (1999) The affect system has parallel and integrative processing components: form follows function. *Journal of Personality and Social Psychology*, **76**, 839–855. doi: 10.1037/0022-3514.76.5.839.

Campell, D. T. & Fiske, D. W. (1959) Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, **56**, 81–105.

Caplan, G. (1974) Support Systems and Community Mental Health: Lectures on Concept Development. Behavioral Publications, New York.

Carmines, E. G. & Zeller, R. A. (2008) Reliability and validity assessment, [Nachdr.]. Sage Publ., Newbury Park, Calif.

Chin, W., Thatcher, J. B. & Wright, R. T. (2012) Assessing common method bias: problems with the ULMC technique. *MIS Quarterly*, **36**, 1003–1019.

Chin, W. W. (1998a) Issues and opinion on structural equation modeling. *MIS Quarterly*, **22**.

Chin, W. W. (1998b) The partial least squares approach to structural equation modeling. In: Modern Methods for Business Research. Marcoulides, G. A. (ed.), pp. 295–336. Erlbaum, Mahwah N.J.

Chin, W. W. & Newsted, P. R. (2000) Structural equation modeling analysis with small samples using partial least squares. In: Statistical Strategies for Small Sample Research. Hoyle, R. H. (ed.), pp. 307–341. Sage Publ., Thousand Oaks, Calif.

Chiu, C.-M. & Huang, H.-Y. (2014) Examining the antecedents of user gratification and its effects on individuals' social network services usage: the moderating role of habit. *European Journal of Information Systems*. doi: 10.1057/ejis.2014.9.

Cohen, J. (1988) Statistical Power Analysis for the Behavioral Sciences, 2nd edn. L. Erlbaum Associates, Hillsdale, N.J.

Colgate, M., Tong, V. T.-U., Lee, C. K.-C. & Farley, J. U. (2007) Back from the brink: why customers stay. *Journal of Service Research*, **9**, 211–228. doi: 10.1177/1094670506295849.

Compeau, D., Marcolin, B., Kelley, H. & Higgins, C. (2012) Research commentary – generalizability of information systems research using student subjects – a reflection on our practices and recommendations for future research. *Information Systems Research*, **23**, 1093–1109.

Davis, F. D. (1989) Perceived usefulness, perceived ease of use and user acceptance of information technology. *MIS Quarterly*, **13**, 319–340.

Davis, F. D., Bagozzi, R. P. & Warshaw, P. R. (1989) User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, **35**, 982–1003.

Eckhardt, A., Laumer, S. & Weitzel, T. (2009) Who influences whom? Analyzing workplace referents' social influence on IT adoption and non-adoption. *Journal of Information Technology*, **24**, 11–24.

Eckhardt, A., Laumer, S., Maier, C., & Weitzel, T. (2015) The Effect of Personality on IT Personnel's Job-related Attitudes: Establishing a Dispositional Model of Turnover Intention Across IT Job Types Forthcoming. Journal of Information Technology (JIT)

Fornell, C. & Larcker, D. F. (1981) Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, **18**, 39–50.

Furneaux, B. & Wade, M. (2010) The end of the information system life: a model of IS discontinuance. *The DATABASE for Advances in Information Systems*, **41**, 45–69.

Furneaux, B. & Wade, M. (2011) An exploration of organizational level information systems discontinuance intentions. *MIS Quarterly*, **35**, 573–598.

Hair, J. F., Ringle, C. M. & Sarstedt, M. (2011) PLS-SEM: indeed a silver bullet. *The Journal of Marketing Theory and Practice*, **19**, 139–152. doi: 10.2753/MTP1069-6679190202.

Henseler, J., Ringle, C. M. & Sarstedt, M. (2014) A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*. doi: 10.1007/s11747-014-0403-8.

Henseler, J., Ringle, C. M. & Sinkovics R. R. (2009) The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, **20**, 277–319.

Hulland, J. S. (1999) Use of partial least squares (PLS) in strategic management research: a review of four recent studies. *Strategic Management Journal*, **20**, 195–204.

Jarvis, C. B., MacKenzie, S. B. & Podsakoff, P. M. (2003) A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of Consumer Research*, **30**, 199–218.

Jones, M. A., Mothersbaugh, D. L. & Beatty, S. E. (2002) Why customers stay: measuring the underlying dimensions of services switching costs and managing their differential strategic outcomes. *Journal of Business Research*, **55**, 441–450. doi: 10.1016/S0148-2963(00)00168-5.

Junglas, I. A., Johnson, N. & Spitzmüller, C. (2008) Personality traits and concern for privacy: an empirical study in the context of location-based services. *European Journal of Information Systems*, **17**, 387–402.

Keil, M., Tan, B. C. Y., Wei, K.-K., Saarinen, T., Tuunainen, V. & Wassenaar, A. (2000) A cross-cultural study on escalation of commitment behavior in software projects. *MIS Quarterly*, **24**, 299–325.

Khan, Z. & Jarvenpaa, S. L. (2010) Exploring temporal coordination of events with Facebook.com. *Journal of Information Technology*, **25**, 137–151.

Khanin, D. & Turel, O. (2014) Conflicts and regrets in the venture capitalist-entrepreneur relationship. *Journal of Small Business Management*, n/a. doi: 10.1111/jsbm.12114.

Kim, H.-W. & Kankanhalli, A. (2009) Investigating user resistance to information systems implementation: a status quo bias perspective. *MIS Quarterly*, **33**, 567–582.

Kim, K. H. (2005) The relation among fit indexes, power, and sample size in structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal*, **12**, 368–390. doi: 10.1207/s15328007sem1203_2.

Koroleva, K., Krasnova, H. & Günther, O. (2010) 'STOP SPAMMING ME! – exploring information overload on Facebook'. AMCIS 2010 Proceedings.

Koroleva, K., Krasnova, H., Veltri, N. & Günther, O. (2011) It's all about networking! – empirical investigation of social capital formation on social network sites. Proceedings of the international conference on information systems.

Lankton, N. K. & McKnight, H. D. (2012) Examining two expectation disconfirmation theory models: assimilation and asymmetry effects. *Journal of the Association for Information Systems*, **13**, 88–115.

Lavee, Y., McCubbin, H. I. & Olson, D. H. (1987) The effect of stressful life events and transitions on family functioning and well-being. *Journal of Marriage and Family*, **49**, 857–873.

Lazarus, R. S. & Folkman, S. (1984) Stress, Appraisal, and Coping. Springer Pub. Co., New York.

Liang, H., Saraf, N., Hu, Q. & Xue, Y. (2007) Assimilation of enterprise systems: the effect of institutional pressures and the mediating role of top management. *MIS Quarterly*, **31**, 59–87.

Maier, C. (2014) Technostress: Theoretical foundation and empirical evidence. opus. urn:nbn:de:bvb:473-opus4-256587.

Maier, C., Laumer, S., Eckhardt, A. & Weitzel, T. (2012) Online social networks as a source and symbol of stress: an empirical analysis. Proceedings of the 33rd International Conference on Information Systems (ICIS), Orlando (FL).

Maier, C., Laumer, S., Eckhardt, A. & Weitzel, T. (2013) Analyzing the impact of HRIS implementations on HR personnel's job satisfaction and turnover intention. *The Journal of Strategic Information Systems*, **22**, 193–207. doi: 10.1016/j.jsis.2012.09.001.

Maier, C., Laumer, S., Eckhardt, A. & Weitzel, T. (2014) Giving Too Much Social Support: Social Overload on Social Networking Sites. European Journal of Information Systems.

Maier, C., Laumer, S., Eckhardt, A., and Weitzel, T. (2015) Who really quits? A longitudinal analysis of voluntary turnover among IT personnel Forthcoming in: The DATA BASE for Advances in Information Systems

Majchrzak, A., Beath, C. M., Lim, R. A. & Chin, W. W. (2005) Managing client dialogues during information systems design to facilitate client learning. *MIS Quarterly*, **29**, 653–672.

Moore, J. E. (2000) One road to turnover. an examination of work exhaustion in technology professionals. *MIS Quarterly*, **24**, 141–168.

Morris, M. G. & Venkatesh, V. (2010) Job characteristics and job satisfaction: understanding the role of enterprise resource planning system implementation. *MIS Quarterly*, **34**, 143–161.

Oreg, S. (2003) Resistance to change: developing an individual differences measure. *Journal of Applied Psychology*, **88**, 680–693.

Oreg, S., Vakola, M. & Armenakis, A. (2011) Change recipients' reactions to organizational change: a 60-year review of quantitative studies. *The Journal of Applied Behavioral Science*, **47**, 461–524.

Parthasarathy, M. & Bhattacherjee, A. (1998) Understanding post-adoption behavior in the context of online services. *Information Systems Research*, **9**, 362–379.

Podsakoff, N. P., LePine, J. & Lepine, M. A. (2007) Differential challenge stressor–hindrance stressor relationships

with job attitudes, turnover intentions, turnover, and withdrawal behavior: a meta-analysis. *Journal of Applied Psychology*, **92**, 438–454.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y. & Podsakoff, N. P. (2003) Common method biases in behavioral research: a critical review and recommended remedies. *Journal of Applied Psychology*, **83**, 879–903.

Polites, G. L. & Karahanna, E. (2012) Shackled to the status quo: the inhibiting effects of incumbent system habit, switching costs, and inertia on new system acceptance. *MIS Quarterly*, **36**.

Polites, G. L., Roberts, N. & Thatcher, J. (2012) Conceptualizing models using multidimensional constructs: a review and guidelines for their use. *European Journal of Information Systems*, **21**, 22–48.

Pollard, C. (2003) Exploring continued and discontinued use of IT: a case study of OptionFinder, a group support system. *Group Decision and Negotiation*, **12**, 171–193.

Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S. & Qiang, T. (2008) The consequences of technostress for end users in organizations: conceptual development and empirical validation. *Information Systems Research*, **1**, 417–433.

Rammstedt, B. & John, O. P. (2007) Measuring personality in one minute or less: a 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, **41**, 203–212. doi: 10.1016/j.jrp.2006.02.001.

Ringle, C. M., Wende, S. & Becker, J.-M. (2014) SmartPLS3, Hamburg.

Samuelson, W. & Zeckhauser, R. (1988) Status quo bias in decision making. *Journal of Risk and Uncertainty*, **1**, 7–59. doi: 10.1007/bf00055564.

Spector, P. E. (2006) Method variance in organizational research: truth or urban legend? *Organizational Research Methods*, **9**, 221–232. doi: 10.1177/1094428105284955.

Sun, H. (2013) A longitudinal study of herd behavior in the adoption and continued use of technology. *MIS Quarterly*, **4** (37), 1013–1041.

Tarafdar, M., Tu, Q., Ragu-Nathan, B. S., & Ragu-Nathan, T. S. (2007) The impact of technostress on role stress and productivity, *Journal of Management Information Systems*. **24**,, 301-328.

Tarafdar, M., Pullins, E. B. & Ragu-Nathan, T. S. (2014) Technostress: negative effect on performance and possible mitigations. *Information Systems Journal*, n/a. doi: 10.1111/isj.12042.

Tarafdar, M., Tu, Q. & Ragu-Nathan, T. S. (2010) Impact of technostress on end-user satisfaction and performance. *Journal of Management Information Systems*, **27**, 303–334.

Tarafdar, M., Tu, Q., Ragu-Nathan, T. S. & Ragu-Nathan, B. S. (2011) Crossing to the dark side: examining creators, outcomes, and inhibitors of technostress. *Communications of the ACM*, **54**, 113–120.

Tow, W., Dell, P. & Venable, J. (2010) Understanding information disclosure behaviour in Australian Facebook users. *Journal of Information Technology*, **25**, 126–136.

Turel, O. (2014) Quitting the use of a habituated hedonic information system: a theoretical model and empirical examination of Facebook users. *European Journal of Information Systems*. doi: 10.1057/ejis.2014.19.

Turel, O. & Connelly, C. E. (2013) Too busy to help: antecedents and outcomes of interactional justice in web-based service encounters. *International Journal of Information Management*, **33**, 674–683. doi: 10.1016/j.ijinfomgt.2013.03.005.

Turel, O., Connelly, C. E. & Fisk, G. M. (2013) Service with an e-smile: employee authenticity and customer use of web-based support services. *Information & Management*, **50**, 98–104. doi: 10.1016/j.im.2013.02.004.

Turel, O. & Serenko, A. (2012) The benefits and dangers of enjoyment with social networking websites. *European Journal of Information Systems*, **21**, 512–528. doi: 10.1057/ejis.2012.1.

Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. D. (2003) User acceptance of information technology: toward a unified view. *MIS Quarterly*, **27**, 425–478.

Venkatesh, V. & Morris, M. G. (2000) Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, **24**, 115–139.

Webb, T. L. & Sheeran, P. (2006) Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin*, **132**, 249–268. doi: 10.1037/0033-2909.132.2.249.

Williams, L. J., Edwards, J. & Vandenberg, R. (2003) Recent advances in causal ,modeling methods for organizational and management research. *Journal of Management*, **29**, 903–936.

Williams, M. D., Dwivedi, Y. K., Lal, B. & Schwarz, A. (2009) Contemporary trends and issues in IT adoption and diffusion research. *Journal of Information Technology*, **24**, 1–10.

Wright, R. T., Campbell, D. E., Thatcher, J. B. & Roberts, N. (2012) Operationalizing multidimensional constructs

in structural equation modeling: recommendations for IS research. *Communications for the Association for Information Systems*, **30**, 367–412.

Xu, Y., Yang, Y., Cheng, Z. & Lim, J. (2014) Retaining and attracting users in social networking services: an empirical investigation of cyber migration. *The Journal of Strategic Information Systems*. doi: 10.1016/j.jsis.2014.03.002.

Biographies

Christian Maier is an assistant professor at the University of Bamberg, Germany. His research on IS usage, technostress, E-HRM, IT workforce, and enterprise content management has been published in several conference proceedings and scientific journals including *European Journal of IS, Information Systems Journal, Journal of Strategic IS, Journal of IT, DATA BASE for Advances in Information Systems, Business & Information Systems Engineering, Employee Relations*, and *Journal of Business Economics*. He is the winner of the ACM SIGMIS Magid Igbaria Outstanding Conference Paper of the Year 2011 Award.

Sven Laumer is an assistant professor at the University of Bamberg. He is interested in user acceptance, user resistance, and technostress in general and the support of information systems for HR tasks in organizations, virtual teams, the IT workforce, computer-supported cooperative work, and process-oriented enterprise content management in particular. His research has been published among others in *European Journal of Information Systems, Information Systems Journal, Journal of Strategic Information Systems, Journal of Information Technology, DATABASE for Advances in Information Systems, MIS Quarterly Executive, Information Systems Frontiers, and Business & Information Systems Engineering*. He is the winner of the ACM SIGMIS Magid Igbaria Outstanding Conference Paper of the Year 2011 Award and two best reviewer awards.

Christoph Weinert is a doctoral student at the University of Bamberg. He has graduated in Information Systems at the University of Bamberg. His research results about IT adoption and usage, technostress and coping, teleworking, and enterprise content management have been published in *Business & Information Systems Engineering* and proceedings of various conferences including ECIS, AMCIS, International Conference on Wirtschaftsinformatik, ACM SIGMIS, and Gmunden Retreat on NeuroIS.

Tim Weitzel is professor and chair of information systems and services at the University of Bamberg, Germany. His research on IT management, standardization, eHRM, and technostress has been published in *MIS Quarterly, Journal of MIS, European Journal of IS, Information Systems Journal, Journal of IT, Journal of Strategic IS, MIS Quarterly Executive*, and *Business & Information Systems Engineering*.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher's web site.