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Author(s): Pirkkalainen, Henri; Salo, Markus

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TWO DECADES OF THE DARK SIDE IN THE INFORMATION SYSTEMS BASKET: SUGGESTING FIVE AREAS FOR FUTURE RESEARCH

Research

Pirkkalainen, Henri, University of Jyväskylä, Jyväskylä, Finland / Tampere University of Technology, Tampere, Finland, henri.pirkkalainen[at]tut.fi

Salo, Markus, University of Jyväskylä, Jyväskylä, Finland, markus.salo[at]jyu.fi

Abstract

Despite its benefits, information technology (IT) use is associated with serious negative effects on individuals. For example, technostress and IT addiction can harm IT users' organizational performance and everyday well-being. Such dark side phenomena have become more evident since IT has transmuted into a major component of humans' job routines and private lives. However, since current information systems (IS) research on the dark side is in an early and fragmented stage, there is a need for a synthesis. To address this need, we conducted a literature review of 37 articles published in the IS basket journals between 1995 and 2015. We detected four key phenomena: technostress, information overload, IT addiction, and IT anxiety. Within the analysis of the articles, we paid special attention to the antecedents, consequences, and mitigation mechanisms of each phenomenon. Based on our findings, this article contributes to IS research by pointing out unmapped territories in the IS basket and suggesting five areas for future research: (1) Technostress mitigation mechanisms in everyday use of IT, (2) IT addiction in organizational use of IT, (3) Information overload in everyday use of IT, (4) IT anxiety in everyday use of IT, and (5) Personal IT actions as mitigation mechanisms.

Keywords: IT use, Dark side, Technostress, Information overload, IT addiction, IT anxiety.

1 Introduction

Although humans have witnessed numerous benefits and delights from the use of information technology (IT), IT use has also been found to cause negative effects with its dark side. The term “*dark side of IT use*” refers to a “*collection of ‘negative’ phenomena that are associated with the use of IT, and that have the potential to infringe the well-being of individuals, organisations and societies*” (Tarafdar et al., 2015a, p. 161). In the organizational/professional context, the dark side phenomena reduce the efficiency and productivity of employees and units. For example, an employee’s technostress can lead to poor job engagement or even burnout (Srivastava et al., 2015). More recently, researchers have noted serious negative phenomena that can also harm users of everyday/leisure IT, such as social networking sites, computer games, and online auctions. For example, users may become pathologically addicted to social networking sites and suffer from severe symptoms (Turel & Serenko, 2012).

Indeed, Tarafdar et al. (2015a) as well as D’Arcy et al. (2014) have described important dark side phenomena of IT use, such as technostress, information overload, and addiction. In this article, we specifically set our focus on unintended and unforeseen IT-use-related negative effects on individuals. These effects may or may not have further negative implications on organizational or societal levels. We acknowledge that the term “*dark side*” might also be suitable to describe phenomena such as misuse, IT-related crime, and other mischievous IT-related activities. However, for the purpose of this study, we exclude such activities in which the individual already holds a malicious intent.¹

While IT use is one of the most popular research streams in information systems (IS) and “*the most critical variable in the entire repertoire of empirical and behavioral studies pinpointed at the intersection of computing and human beings*” (Straub & Del Giudice, 2012, p. iii), researchers have mainly focused on the positive side of it. We consider it a serious concern that the dark side of IT use has drawn such relatively minor attention in the leading IS journals, even though the negative effects have become more evident since IT has been incorporated in numerous private and organizational activities. As the current state of dark side research is at an early and fragmented stage (D’Arcy et al., 2014; Tarafdar et al., 2013; Tarafdar et al., 2015a), there is a need for a synthesis of dark side research in the field of IS. Such an overview will make it possible to identify research gaps and suggest crucial directions for future research. Filling such gaps is important as it can enable IS researchers, managers, and users to reduce the consequences (e.g. burnout and harmed well-being) of the dark side phenomena.

Given the importance of the topic and the need for a synthesis, our aim is to present a literature review that illustrates the current state of dark side research within the leading IS journals. We chose to focus on the IS basket (Association for Information Systems, 2011) because its journals can be considered globally reputable outlets that present major contributions to the IS field. In the analysis of the 37 retrieved articles, we specifically examined three important components of each dark side phenomenon: antecedents, consequences, and mitigation mechanisms.

As a contribution to current knowledge, this study attempts to open avenues for future research by synthesizing dark side research and offering an outlook on previous studies. Importantly, based on our findings, we point out several research areas that have not been covered in the leading IS journals. We argue that research in these suggested areas is the responsibility of the leading IS journals because these areas involve crucially influential and universal issues that frequently occur in the real world (both in organizational/professional and everyday/leisure contexts). As a practical contribution, we attempt to generate a converging push toward IS research that minimizes the negative impacts of IT use. For example, one of our suggested yet previously uncovered research areas is the mitigation of technostress by personal (IT) actions: the identification and promotion of personal (IT) actions—through

¹ We apply this exclusion because the situations are different: an individual with malicious intent is already aware of the potential negative effects, while the same cannot be assumed for an individual without malicious intent. In sum, we believe that the unintended and unforeseen effects—as highlighted also by Ayyagari et al. (2011) and Tarafdar et al. (2015)—are frequent, unobvious yet harmful, and in need of attention.

which individual users are themselves able to reduce technostress—can lead to better organizational performance and physical well-being.

2 Literature Review: 20 Years of Research in the IS Basket

The aim of the literature review was to analyze the state of the art to provide future research directions on the dark side phenomena in IS research. The main guidelines of Webster and Watson (2002) for conducting a literature review were followed. While we do recognize that the dark side phenomena have also been studied in interdisciplinary settings, our research objective was to observe the major contributions in the IS research and, as emphasized by Webster and Watson (2002), the major contributions are likely to be in the leading journals of the field. For this purpose, we selected the widely accepted leading IS basket journals (Association for Information Systems, 2011) for the literature review, including MISQ, ISR, JMIS, JAIS, EJIS, ISJ, JIT, and JSIS.

As our literature review was focused on the negative effects of IT use on individuals, we did not define any keywords in order to allow previously unmentioned yet related phenomena to arise. Therefore, we chose to go through each issue of the IS basket journals published between 1995 and 2015. The selection of the two decades was made after an initial investigation of dark side phenomena in articles published between 2005 and 2015, some of which referred to prior IS basket articles published between 1995 and 2005. We excluded editorials from the review, as we were interested in research articles on the phenomena.

Two authors executed the literature search. The journals to be reviewed were divided among the two authors for the search, and an overlap of 5 years was agreed upon for two journals to confirm a similar review approach. First, we reviewed the title and the abstract of each article published between January 1995 and August 2015. In order to avoid missing any relevant articles, we included all articles that addressed a negative effect on an individual in general. A total of 106 articles from the eight journals were selected in this initial phase. Second, we refined the criteria further to only consider the negative effects of IT use; after we reviewed each of the 106 articles, 37 articles fit our scope and were included in the study. The other 69 articles were excluded for various reasons, such as a focus on job-related stress without discussion or research on the role of IT (Ahuja et al., 2007), mention of IT as a potential solution but not the cause of a negative effect for an individual (Yan et al., 2014), and use of IT as a channel to express negative perceptions caused by certain products (e.g., online reviews) instead of IT use being the cause (Yin et al., 2014).

When analyzing the 37 articles selected, we aimed to ensure appropriate coding and agreed on a coding structure and rules. First, we agreed which aspects we should pay attention to and take note of. The following were deemed crucial: (1) the type of phenomenon regarding the negative effect on an individual, (2) the context in which the phenomena were studied (e.g., the separation between organizational/professional and everyday/leisure use of IT emerged from the studies), (3) the method and approach for data collection, (4) the theories applied, (5) the antecedents and causes of the negative effect, (6) the consequences of the negative effect, and finally (7) the mitigation mechanisms. Second, we took extensive notes on each analyzed article in spreadsheet format and regularly discussed them to align our approaches. Finally, we compared our processes of coding the articles to ensure similar coding procedures and patterns.

3 Review Findings

Based on the reviewed articles, we detected four evident dark side phenomena: technostress, information overload, IT addiction, and IT anxiety. Figure 1 illustrates the occurrence of these phenomena in the IS basket between 1995 and 2015. According to our review, 34 of 37 articles fell into these four types of phenomena. The three exceptions were related to the burden of IT-enabled telework (Greenhill and Wilson, 2006), the burden of managers' computer-mediated control (Vieira da Cunha et al., 2015), and loneliness regarding use of social networking sites (Matook et al., 2015). To attain an ap-

appropriate overview of the reviewed studies (Table 1), the following detailed description of the review findings will concentrate on the four key phenomena. Related to Figure 1, various recent trends have potentially contributed to increasing research interest on the dark side phenomena (Tarafdar et al., 2015) and the increased use of IT has led to identification of negative effects with severe implications for individuals, organizations, and societies (Ayyagari et al., 2011; Turel et al., 2011).

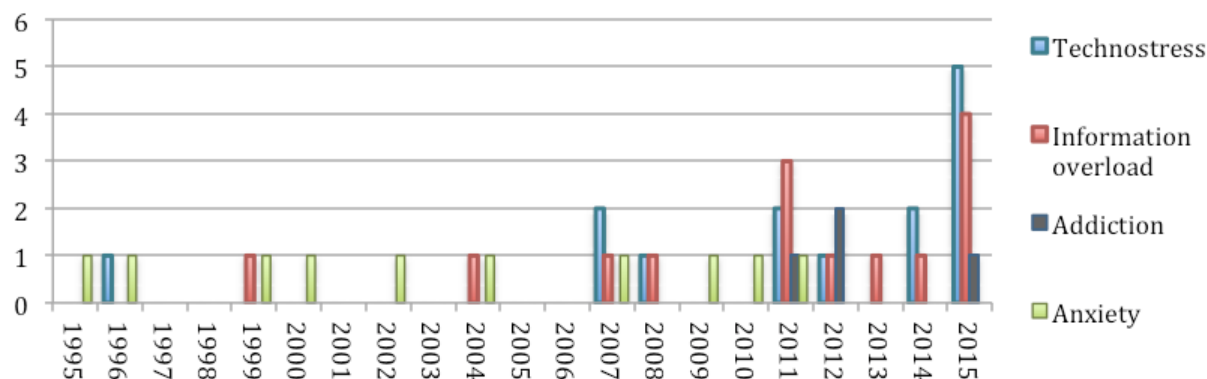


Figure 1. The occurrence of dark side -articles in the IS basket by year.

3.1 Technostress

The reviewed studies on technostress are largely based on the foundation set by clinical psychologist Craig Brod (1982), who coined the term and described technostress as the inability of an individual to cope or deal with new technology in a healthy manner, resulting in experienced stress. IS research has mainly applied the transaction perspective on stress (Lazarus, 1966), which views stress as a phenomenon that is captured by the relationship between the conditions that create stress, namely stressors, and the response of an individual to it, namely strain (Tarafdar et al., 2015b; Ayyagari et al., 2011).

Based on the literature review, technostress research in the IS basket has mainly focused on the self-reported and psychological measures of stress; only one article by Tams et al. (2014) also applied physiological measures to studying technostress. The study of Tams et al. (2014) focused on the comparison of the two types of methods and showed how both approaches are valid because they tap into differing aspects of technostress. The reviewed antecedents of technostress relate to various stressors caused either by technology, such as perception of the complexity and intrusiveness of IT (Tarafdar et al., 2007) or by the home/work environment, such as job insecurity and work-home conflict (Ayyagari et al., 2011).

Our review also illustrates the interrelation between technostress and other dark side phenomena. First, information overload is sometimes treated as an antecedent of technostress; Ayyagari et al. (2011) and Tarafdar et al. (2007) presented information/techno-overload as a key stressor. Second, IT interruptions² have also been observed to function as an episodic stressor (Galluch et al., 2015).

The reviewed studies that were conducted in an organizational context mostly focused on the consequences of technostress in terms of job performance and behavior at work. To this end, three of the reviewed articles (Tarafdar et al., 2015b; Ragu-Nathan et al., 2008; Tarafdar et al., 2011) proposed organizational support structures as mitigation mechanisms by reducing either the effect of the stressor (Tarafdar et al., 2015b; Tarafdar et al., 2011) or the perceived strain (Tarafdar et al., 2015b; Tarafdar

² Addas and Pinsonneault (2015) argued based on Baron (1986) that interruptions research in IS is strongly based on distraction conflict theory, which defines interruptions as unpredictable events or triggers that create an attentional conflict (e.g., external distraction) in attending to two (or more) mutually exclusive inputs. We addressed interruptions rather as triggers and events that might be the cause of a particular phenomenon (e.g., technostress and information overload), even though at times interruptions have been presented as a separate type of dark side phenomenon (D'Arcy et al., 2014).

Article	Phenomenon	Theoretical Base	Data / Method	Context	Antecedents	Consequences	Mitigations
Technostress							
Ayyagari et al., (2011)	Technostress	PE-fit model	Survey	Organizational / professional	Several stressors	Strain	-
D'arcy et al., (2014)	Technostress	Various	Survey	Organizational / professional	Ambiguous information security requirements and ISP violations	Security-related stress and ISP-violating behavior	Coping response to security-related stress leads to ISP violation intention
Galluch et al., (2015)	Technostress	Various	Experiment	Organizational / professional	Interruptions	Strain	Coping behaviors: Timing control to prevent, method- and resource-based control to alleviate
George (1996)	Technostress	Computer-based monitoring	Case studies	Organizational / professional	Computer-based monitoring	-	-
Koch et al., (2012)	Technostress (among negative emotions)	Boundary theory, theory of positive emotions	Case study	Organizational / professional	Use	-	-
Maier et al., (2015)	Technostress	Various	Experiment	Everyday / leisure	SNS stressors	SNS exhaustion, discontinuous usage intentions	Stop using SNSs, intentions to discontinue using SNSs
Moody & Galletta (2015)	Technostress	Various	Experiment	Everyday / leisure	Information sent	Stress	
Pawlowski et al., (2007)	Technostress	Social representations theory	Interviews	Organizational / professional	IT-, work/home- and task-related stressors	Job performance, leaving the job, well-being	-
Ragu-Nathan et al., (2008)	Technostress	Transaction theory of stress	Survey	Organizational / professional	Technostress creators	Organizational and continuance commitment	Technical support provision, literacy facilitation, involvement facilitation
Srivastava et al., (2015)	Technostress	Various	Survey	Organizational / professional	Technostress creators	Job burnout, job satisfaction	Personality traits
Tams et al., (2014)	Technostress	Various	Experiment	Everyday / leisure	Task-related stressors	Reduced performance	-
Tarafdar et al., (2007)	Technostress	Sociotechnical theory and role theory	Survey	Organizational / professional	Technostress creators	Productivity and role stress	-
Tarafdar et al., (2011)	Technostress	Various	Survey	Organizational / professional	Technostress creators	Satisfaction, utilization of ICT	Involvement facilitation, innovation support
Tarafdar et al., (2015)	Technostress	Transaction theory of stress	Survey	Organizational / professional	Technostress creators	IT-enabled performance and technology-enabled innovation	Building technology competence, self-efficacy, information systems literacy enhancement, and involvement in IS initiatives
Information Overload							
Addas & Pinsonneault (2015)	Information overload	Various	Log diaries and interviews	Organizational / professional	Interruptions	Performance	-
Aral et al., (2012)	Information overload	Various	Survey	Organizational / professional	Multitasking	Productivity	-
Cameron & Webster (2013)	Information overload	Various	Survey	Organizational / professional	Multitasking	Productivity	-

Cenfetelli & Schwarz (2011)	Information overload	Information systems success	Critical incidents + Field study	Everyday / leisure	-	Use intention	-
Grisé & Gallupe (1999)	Information overload	Integrative complexity theory	Experimental sessions	Organizational / professional	Idea organization, task domain, external control of task pace	-	-
Jones et al., (2004)	Information overload	Various	Field study	Everyday / leisure	-	Several IT use behaviors	-
IT Addiction							
Turel (2015)	Addiction	Social cognitive theory	Survey	Everyday / leisure	Satisfaction, age, habit	Self-efficacy, guilt, use discontinuance	-
Turel & Serenko (2012)	Addiction	Various	Survey	Everyday / leisure	Several IT use characteristics	-	-
Turel et al., (2011)	Addiction	TAM	Survey	Everyday / leisure	-	Several IT use characteristics	-
Xu et al., (2012)	Addiction	Various	Survey	Everyday / leisure	Several human needs	-	Several (attention switching, dissuasion, rationalization, parental monitoring, resource restriction, cost)
IT Anxiety							
Beaudry & Pinsonneault (2010)	IT anxiety	User adaptation and appraisal theories of emotions	Interviews and survey	Organizational / professional	Anger	Several IT use and other behaviors	Distancing and seeking social support
Brown et al., (2004)	IT anxiety	Various	Survey	Organizational / professional	Several IT and personality related factors	Attitude and IT use	-
Compeau & Higgins (1995)	IT anxiety	Various	Survey	Organizational / professional	Self-efficacy	IT use	-
Compeau et al., (1999)	IT anxiety	Social cognitive theory and model of computer self-efficacy	Survey	Organizational / professional	Self-efficacy	-	-
Elie-Dit-Cosaque et al., (2011)	IT anxiety	Lewin's field theory	Survey	Organizational / professional	Several various	Behavioral control over IT use	-
McElroy et al., (2007)	IT anxiety	Various	Survey	Organizational / professional	-	IT use	-
Niederman et al., (1996)	IT anxiety	-	Interviews	Organizational / professional	-	IT use (not explicit)	-
Pramatari & Theotokis (2009)	IT anxiety	Various	Scenario and survey	Everyday / leisure	-	Attitude towards IT	-
Thatcher & Perrewe (2002)	IT anxiety	Various	Survey	Organizational / professional	Trait anxiety, personal innovativeness	IT self-efficacy	-
Venkatesh (2000)	IT anxiety	TAM and behavioral decision theory	Survey	Organizational / professional	-	Several IT use characteristics	-
Other							
Greenhill & Wilson (2006)	Burden	Marxist approach	-	Organizational / professional	Telework	-	-
Matook et al., (2015)	Loneliness	Various	Survey	Everyday / leisure	Several personal and IT characteristics	-	-
Vieira da Cunha et al., (2015)	Burden	Computer mediated control	Ethnographic study	Organizational / professional	Managers' IT monitoring employees	Deception	-

Table 1. Summary of the reviewed studies.

et al., 2011; Ragu-Nathan et al., 2008). These organizational practices ranged from positive reinforcement and allocation of resources (Tarafdar et al., 2015b) to literacy facilitation (Ragu-Nathan et al., 2008). The personality traits as well as the coping behaviors of individuals have also been addressed as mitigation mechanisms. Both of these angles have mainly been seen to alleviate the effects of IT stressors and perceived strain. Maier et al. (2015) indicated in their study on everyday use of Facebook that individuals even create discontinuous usage intentions to alleviate perceived strain.

3.2 Information Overload

Information overload³ refers to an individual's state when *"too much information is provided beyond the user's needs resulting in perceptions of being overwhelmed"* (Cenfetelli & Schwarz, 2011, p. 815). In such a state, the user cannot process and take advantage of all the information, which may result in a breakdown (Jones et al., 2004; Rogers & Agarwala-Rogers, 1975). Depending on the context of the study, information overload can include specific dimensions. For example, in a study of online discussions, Jones et al. (2004) referred to prior literature to specify that information overload comprises conversational overload (an excessive amount of messages) and information entropy (unorganized form of the messages). Researchers have studied information overload in both organizational and leisure contexts. For example, Grisé and Gallupe (1999) separated information overload from mental workload and presented that it is anteceded by usage of organizational group support systems, while Jones et al. (2004) found that an overload of textual information affects everyday users' response behavior in online discussions.

There appear to be two approaches to studying information overload in the IS basket: one approach treats information overload more as an independent phenomenon, while the other treats it as an intertwined one, positioning overload among creators of technostress or treating it as a state caused by IT interruptions. Within the first approach, information overload is understood as an implication of IT use that has further consequences for future IT use behaviors. More precisely, Cenfetelli and Schwarz (2011) argued that information overload has only a negative effect on IT use without a positive opposite, and thus they categorize it as an inhibitor of IT use.

The latter approach linked information overload with technostress (by arguing that information overload is a stressor) or IT interruptions (by arguing that interruptions are antecedents of information overload). Galluch et al. (2015) discussed how interruptions create attentional conflict and might lead to information overload (Baron, 1986; Meyer and Kieras, 1997). To this end, information overload can also be caused by IT interruptions (Addas & Pinsonneault, 2015). Contrasted with the more detailed and specific view of studies centered on information overload, the technostress and interruptions approaches draw a more overarching picture in which information overload plays only one part. For example, Tarafdar et al. (2015) studied factors that inhibit technostress creators (including overload) and showed how organizational support structures can to some extent prevent the emergence of stressors.

3.3 IT Addiction

Within IS, several studies have built their definition of IT (or technology) addiction on drug addiction: with both IT and drugs, addiction is related to obsessive usage and related symptoms. Xu et al. (2012, p. 321) define IT addiction as *"a user's psychological state of maladaptive dependency on IT use that is manifested through the obsessive-compulsive pattern of IT-seeking and IT-use behaviors that take place at the expense of other important activities."* By combining prior definitions, Turel et al. (2011) presented that behavioral addiction symptoms may include IT-dominated thoughts and behaviors, negative emotions when not using IT, inability to control the use of IT, impairment of other regular activi-

³ In this article, we focus only on information overload that is caused by IT and/or information that is transmitted through IT. That being said, we also acknowledge that, outside of our focus, (1) the source of information causing the information overload may also be other than IT and (2) information overload can have interrelations with other types of overload, such as work overload and cognitive overload.

ties, decreased tolerance for thrills, and mood changes (Turel et al., 2011). Thus, IT addiction can have a wide variety of consequences to an individual's performance and well-being. These consequences can in turn spread further to the levels of organizations, families, communities, and even societies.

In the IS basket, researchers have studied empirically the antecedents, consequences, and prevention mechanisms of IT addiction. However, studies have examined addiction only in the context of everyday/leisure IT (e.g., online auctions, online games, and social networking services). In the operationalization of the addiction factor, researchers have applied statements about the symptoms of IT addiction (e.g., negative influences to one's psychological state, social life, work, study, eating habits, or sleep patterns⁴). All of the reviewed studies rely on self-reported data surveyed from users who either are or are not addicted to IT.

So far, one of the main contributions of addiction research in IS is the integration of addiction into one of the determinants of IT use (directly or via other factors). For example, Turel et al. (2011) showed that addiction positively influences perceived ease of use, usefulness, and enjoyment, which all further positively influence use intentions. Additionally, researchers have uncovered factors that constitute addiction (e.g., game-related needs for relationships, escapism, and mastery by Xu et al., 2012). The study by Xu et al. (2012) is the only one to address how addiction may be prevented in different ways (e.g., attention switching, rationalization, and parental monitoring).

In sum, the avenue for IT addiction research has been opened in the IS basket mainly through the contributions by one particular research group. The reviewed studies provide valuable first insights about the relationship between addiction and IT use. However, as Turel et al. (2011, p. 1055) describe, research on IT addiction is still *"in its embryonic stage."*

3.4 IT Anxiety

According to Elie-Dit-Cosaque et al. (2011, p. 209), *"there is consensus across scholarly disciplines that [IT anxiety] refers to an anxious state toward IT use"*. IT anxiety (or computer anxiety) refers to the individuals' *"feelings of apprehension or anxiety when using [IT]"* (Compeau et al., 1999, p. 148), while also accounting for the potential implications of IT use, such as fear of failures and realization of risks (Thatcher & Perrewé, 2002). For example, Venkatesh (2000) applied Brown et al. (1997) approach to measure anxiety with statements that highlight feelings of being scared, threatened, uncomfortable, nervous, and uneasy because of IT use.

The reviewed studies have examined merely the antecedents of IT anxiety and the influence of anxiety on IT adoption, use, and use-related attitudes. Researchers have done this by utilizing various theoretical approaches from both reference disciplines (e.g., psychology-related social cognitive theory and Lewin's field theory) and IS (e.g., TAM and UTAUT). A majority of the articles studied the topic by collecting survey data about users' (or potential users') self-reported perceptions. The study contexts included both organizational and everyday/leisure settings. For example, Venkatesh (2000) found that anxiety negatively affects perceived ease of use with organizational IT, while Pramatarari and Theotokis (2009) concluded that anxiety is a negative predictor of supermarket consumers' intentions to adopt product-related RFID services. To gain more specific insights, some researchers have differentiated between the more general computer anxiety and context-specific anxieties such as computer-mediated communication anxiety (e.g., Brown et al., 2004). Thus, there may be cases in which individuals are not anxious about general IT but instead fear a specific application of it.

With studies focusing on the initial adoption phase, researchers have not tended to investigate the antecedents of anxiety; anxiety has been treated more as a given, prevalent factor influencing IT use.

⁴ n.b. Additionally, although not often discussed, addiction can potentially involve a few positive sides (e.g., escaping life's other problems by obsessive usage of online games). However, such positive sides can be considered only minor when compared to its serious negative consequences to the life of the addict.

However, within the post-adoption phase, researchers have paid attention to the different sources of anxiety. The antecedents of anxiety include personal factors (e.g., personal innovativeness), IT-related factors (e.g., computer-mediated communication familiarity), and organizational factors (e.g., managerial support). Only one of the studies (Beaudry & Pinsonneault, 2010) positioned anxiety to affect mitigation-related behaviors (distancing and seeking for social support). Overall, anxiety has not often been the sole focus of the study but has served as an important negative determinant of IT adoption, use, or use-related attitudes.

4 Discussion and Contribution: Future Research Directions

This article contributes to existing knowledge by presenting a synthesis of the dark side research in the IS basket and providing specific directions for future research. To enable the identification of previously unexplored areas, we paid attention specifically to three essential components: the antecedents, consequences, and mitigation mechanisms of the phenomena. We organized those articles that had empirically studied one or more of these components in a single chart (Table 2), which enabled us to make critical observations about research gaps related to the four phenomena.

		Antecedents			Consequences			Mitigation mechanisms		
		IT related	Person-ality	External	IT use	Perfor-mance	Well-being	Personal IT ac-tions	Personal non-IT ac-tions	External mitiga-tion
Techno-stress	<i>Organizational / professional</i>	2,9,11,13,16,21,23,24,27,28,29		2,9,21	25,28	9,12,21,23,24,27,28,29	2,11,21,24	11 <i>RA5 ↓</i>	9	23,28,29
	<i>Everyday / leisure</i>	17,19,25			17	19,25	17,19	17 <i>RA1</i>		
Information overload	<i>Organizational / professional</i>	11,29		14		1,5,23,24,27,28,29	11,24	11		28,29
	<i>Everyday / leisure</i>	<i>RA3</i>			6,15			<i>RA3</i>		
IT addic-tion	<i>Organizational / professional</i>	<i>RA2</i>								
	<i>Everyday / leisure</i>	30,31,34	30,34	34	30,32		30		34	34
IT anxiety	<i>Organizational / professional</i>	4,7,8	3,4,10,26	10	3,4,7,10,20,26,33				3	3
	<i>Everyday / leisure</i>	<i>RA4</i>			18,22			<i>RA4</i>		

RA = Research Area; 1 = Aral et al., (2012), 2 = Ayyagari et al., (2011), 3 = Beaudry & Pinsonneault, 2010, 4 = Brown et al., (2004), 5 = Cameron & Webster (2013), 6 = Cenfetelli & Schwarz (2011), 7 = Compeau & Higgins (1995), 8 = Compeau et al., (1999), 9 = D’arcy et al., (2014), 10 = Elie-Dit-Cosaque et al., (2011), 11 = Galluch et al., (2015), 12 = George (1996), 13 = Greenhill & Wilson (2006), 14 = Grisé & Gallupe (1999), 15 = Jones et al., (2004), 16 = Koch et al., (2012), 17 = Maier et al., (2015), 18 = McElroy et al., (2007), 19 = Moody and Galletta (2015), 20 = Niederman et al., (1996), 21 = Pawlowski et al., (2007), 22 = Pramatarı & Theotokis (2009), 23 = Ragu-Nathan et al., (2008), 24 = Srivastava et al., (2015), 25 = Tams et al., (2014), 26 = Thatcher & Perrew (2002), 27 = Tarafdar et al., (2007), 28 = Tarafdar et al., (2011), 29 = Tarafdar et al., (2015b) 30 = Turel (2015), 31 = Turel & Serenko (2012), 32 = Turel et al., (2011), 33 = Venkatesh (2000), 34 = Xu et al., (2012)

Table 2. Chart demonstrating previously uncovered research areas in the IS basket.

Our chart is a concrete way to point out five areas that have not been studied in the IS basket. Although a few researchers have previously presented some general directions for future dark side research, we aim to contribute by pointing specific gaps and presenting literature-based evidence of what has been studied and what has not. We believe that the IS basket would benefit from studies covering these unexplored areas in the future, since each of the areas and their high significance and wicked consequences can be already universally witnessed in the real world. The five research areas and related argumentation about their importance are discussed as follows.

4.1 Research Area 1: Technostress Mitigation Mechanisms in Everyday Use of IT

As everyday/leisure use of IT is steadily increasing (Moody & Galletta, 2015), IS researchers have become aware of the negative effects of IT use that might manifest as perceived strain, leading to discontinued use of systems and switching behavior (Maier et al., 2015) as well as to changing attitudes online (Moody & Galletta, 2015). Such technostress that is experienced by IT users in daily settings has an impact not only on companies or service providers (e.g., Facebook, as discussed by Maier et al., 2015, or online retail sales, as discussed by Moody & Galletta, 2015) but on the well-being of individuals in general. The review findings indicated how only a few of the studies on technostress address mitigation mechanisms to alleviate the negative effects of IT-related stressors. The identified mechanisms relied on organizational support structures (Tarafdar et al., 2015b; Ragu-Nathan et al., 2008; Tarafdar et al., 2011;) as well as personality traits (Srivastava et al., 2015). Given the importance of the topic, the mechanisms that mitigate technostress need to be addressed by IS researchers in broader settings, even beyond the work environment.

The previously identified organizational mitigation mechanisms do not appear to be sufficiently applicable to reduce technostress derived from the everyday/leisure use of IT. With the professional use of IT, the organization and management are responsible for employees and take action to the extent that it is necessary to support them. When people use IT outside work, they do not have a similar support structure that is responsible for our actions (except partially for family and friends). The responsibility is mostly on the individuals themselves. Thus, researchers should uncover the wide variety of everyday mechanisms that individual users apply to reduce technostress (e.g., IT use-related time and notification management, venting, and escape/avoidance). This relates to a more specific research problem: How users could mitigate technostress by their own mechanisms (instead of external support)?

Identification (and further promotion) of such mechanisms could decrease the amount of technostress as well as its consequences, such as reduced physical well-being. Additionally, research on technostress mitigation in the everyday context could reveal new methods for dealing with the increasing demands from society and IT. In fact, the boundaries between private and professional life are constantly blurring (Ayyagari et al., 2011), as people use technological devices, apps, and systems throughout the day. IT use is not necessarily compulsory, but it is convenient, allowing humans to manage most of the errands, tasks, and social interactions related to both the home and work environments. These new mitigation mechanisms for dealing with IT not only impact individuals and their interpersonal relationships at home but are also transferable to the organizational context, thus influencing managerial and organizational strategies directly.

Previous findings on the influence of IT stressors on decreasing job performance and satisfaction (Ragu-Nathan et al., 2008; Tarafdar et al., 2011; Galluch et al., 2015) demonstrate the harsh reality technostress poses to individuals. IT use will not decrease over time, nor does the workplace settle down in a competitive market. The responsibility of individuals for their own well-being is as important as the responsibility of managers over their employees. This is why future research should take into account how individuals themselves can alleviate the perceived strain or even divert or prevent the emergence of some of the IT stressors. Some initial yet promising snippets about such mechanisms were presented by Galluch et al. (2015), who outlined types of coping behaviors that individuals adopt in choosing when to view e-mails and when to step away from IT. We urge researchers to study mitigation mechanisms further in the context of technostress to determine when such strategies can be most effective during everyday use of IT and when the last-resort option of stopping IT use is necessary.

4.2 Research Area 2: IT Addiction in Organizational Use of IT

IT addiction in the organizational/professional context is a completely unmapped territory in the IS basket. This research gap is intriguing, since it has been specifically stated that “*the IT artifact can enable and facilitate technology addiction in leisure as well as organizational contexts*” (Turel, Se-

renko & Giles, 2011, p. 1046). Indeed, it is common nowadays to witness addiction to organization-related IT: numerous employees compulsively check, read, and write emails during important work meetings, family time at home, and even leisure activities (n.b. not necessarily causing only negative consequences). Therefore, this important area calls for future research that would uncover the antecedents, consequences, and mitigation mechanisms of IT addiction in organizational contexts. Examples of more specific questions: How frequent IT addiction is at workplaces and how it could be cured?

Further on, we believe that there are certain differences between organizational and everyday contexts (in addition to some similarities). First, the antecedents of IT addiction can be different, as there are different responsibilities and pressures related to the use of organization-related IT. For example, responsibility to respond quickly to messages from managers, pressure to be available 24/7, and expectations to prepare for the next day's tasks may push employees towards all-day addiction to email and other communication technologies. Hence, we encourage researchers to explore such antecedents of addiction to organization-related IT by surveying or interviewing employees (particularly knowledge workers) who are addicted to email or other communication technologies.

Second, the consequences of IT addiction may also vary in the organizational context. According to a related study outside the IS basket, addiction to organizational IT can cause conflicts of IT/work/family and reduce organizational commitment through increased work overload (Turel et al., 2011). However, IT addiction is also assumed to have other consequences that have not yet been studied, such as non-optimal ways of handling tasks and non-optimal performance when an employee is addicted to one particular IT application and refuses to use a potentially better alternative.

Finally, researchers have yet to explore the mitigation mechanisms for IT addiction in organizational contexts. As studies dealing with addiction to everyday IT often involve prevention techniques such as self-rationalization, parental monitoring, and resource restrictions (Xu et al., 2012), they do not consider that in organizations part of the responsibility is held by managers and company policies. Many managers might even think that employees' IT or email addiction may actually benefit the company, while some organizations have implemented pro-employee restrictions of using email on weekends and vacations. However, there seems to be a lack of research about the potential benefits of IT addiction in organizations as well as the actual effects of related restrictions. Since IT addiction and work/life boundaries are still taboo topics in many organizations, further research on IT addiction and potential mitigation mechanisms in the organizational context could offer responses to these dilemmas.

4.3 Research Area 3: Information Overload in Everyday Use of IT (Antecedents and Mitigation Mechanisms)

Another critical research area in the everyday/leisure use of IT relates to information overload. The everyday context is intriguing to study because of a contradiction regarding information overload and the voluntary basis of IT use: even though individuals may already feel overwhelmed by information, they voluntarily tend to expose themselves more to increasing amounts of information and potential overload. In reality, many IT users have multiple types of channels constantly open through multiple services; for example, communication channels through group discussions (thematic, hobby-related, with family and friends) and private discussions, feeds, trackers, and games that are of interest to them or that they cherish. Even if they do not have control over their own actions and the extent to which they expose themselves to IT, they do feel the need to match the expectations of the ones close to them and are influenced by the societies and traditions around them. IT-enabled everyday communication is indeed demanding. In general, the social pressure to be available online 24/7 will not decrease but will most likely increase as more devices and people are connected to the Internet.

The antecedents of information overload in everyday use of IT need to be further addressed in the IS discipline. To do this, IS researchers could utilize related studies published outside the IS basket. For example, Bawden and Robinson (2009) argued the complexity of the antecedents, stating how various types of information that people are exposed to hit their weak spot because their senses together with

the knowledge and experiences they possess are ill-equipped to deal with it all. It is also safe to say that people's information needs increase outside the workplace. News travels at tremendous speed, and traditional media such as print newspapers, TV, and radio hardly keep up with the pace as any event of value is shared and distributed by individuals within their social networks and beyond. Processing information from a multitude of sources is challenging even for people who are highly competent in media literacy. People might even leave their mobile phones' notification settings to a default mode, constantly increasing the flood of information. Therefore, detailed investigations are required to identify these complex antecedents and especially to study how people can alleviate these negative effects without sacrificing the precious communication and information retrieval that is part of everyday life.

While information overload as a research topic dates back before IT and online environments were discussed, it has been argued that the solutions and coping strategies of non-IT-related information overload are not transferable to the issues people face because of modern IT (Bawden and Robinson, 2009; Shenk, 1997). Since information overload was seen to be studied in relation to technostress, we urge IS researchers to take this interrelation further into account and study various mitigation strategies and approaches. Thus, one of the key research questions is: What type of mitigation mechanisms not only serve as treatments to information overload but also enable prevention of such without the loss of information and interpersonal relations that individuals often cherish?

4.4 Research Area 4: IT Anxiety in Everyday Use of IT (Antecedents and Mitigation Mechanisms)

Within the IS basket, researchers have yet to study two aspects of IT anxiety in everyday/leisure use of IT. First, the antecedents of IT anxiety in everyday use of IT have remained unknown. Researchers should at least confirm whether the same factors that influence organizational IT anxiety (e.g., self-efficacy and personal innovativeness) are also important determinants in the everyday use context. Yet, as an even more fruitful agenda, we encourage scholars to explore various previously uncovered leisure-related issues that may antecede IT anxiety. For example, these factors could potentially include fears of getting addicted to IT and harming one's own attention span.

Second, there is a lack of research related to the mitigation mechanisms for reducing anxiety on the level of everyday/leisure IT. Although we did not find any studies addressing this gap in the IS basket, there are some studies outside the basket suggesting that IT-related anxiety can be reduced by training and support (e.g., Thatcher et al., 2007; Zhao et al., 2008). External training and support can indeed prevent IT anxiety in circumstances where personal (or digital) assistance is easily available, but we argue that traditional training approaches are limited in certain ways. First, we believe that IT anxiety is not a major problem for everyday use of IT regarding such individuals who are already highly willing to train themselves. Second, the traditional notion of training is not always conceivable with modern everyday IT, such as ubiquitous software and applications. Third, there are other potential ways to mitigate IT anxiety besides external training (e.g., step-by-step persuasion, self-reward strategies, and personal expectation management). Therefore, more research is needed to uncover the specific question: What kind of alternative ways there are to alleviate the effects of IT anxiety? For example, as many elders experience anxiety for new IT software and applications, IT providers could persuade elders with easy-to-use trials of "senior versions" of their software and applications that would highlight the key features step by step in as simplistic a manner as possible. In sum, we encourage researchers to look for further mechanisms beyond the traditional training (e.g., utilizing psychology literature on anxiety and fear reduction) and study them empirically in the everyday use of IT.

4.5 Research Area 5: Personal IT Actions as Mitigation Mechanisms

Finally, the actions individuals themselves take to prevent or alleviate the negative effects of IT use constitute an unexplored area of research. The responsibility of an individual over his or her own IT-

related actions was mentioned for the previously presented future research areas in relation to everyday settings. This research gap is insufficiently addressed for all of the witnessed phenomena, leading to an essential research problem: How users could mitigate the unintended negative effects of IT use by their own actions?

Only two articles have addressed the IT-related actions that individuals take as mitigation mechanisms. Coping behaviors to mitigate the effects of stressors that increased strain were addressed by Galluch et al. (2015) in a professional context. Maier et al. (2015) evidenced how individuals create discontinuous usage intentions to avoid exhaustion on Facebook or even stop using the system in everyday settings. These studies were the only ones that considered the IT actions of individuals and opened a research strand that invited multiple topics and research approaches in both the professional and everyday use of IT.

Future research on personal IT actions as mitigation mechanisms should study the preferences and practices of individuals in greater detail, as the way people handle usage time, organizational IT and personal devices, tools, and gadgets differ drastically from person to person. Such research should further reveal the types of personal IT actions that range from device to software and application management, clarifying which actions can contribute to improved organizational performance and everyday well-being in general. For example, researchers have yet to study the effects of currently popular mitigation mechanisms such as usage time trackers as self-awareness tools, notification management routines, and intentional vacation breaks from IT.

Field studies that rely on qualitative and quantitative self-reported data will be required, as will dedicated experiments that support unraveling both the psychological and organizational implications by the inclusion of the selected mitigation mechanisms. Future research should especially focus on the extent to which personal IT actions can prevent the emergence of negative effects in varying professional and everyday settings. Also, we encourage curriculum planners and educators to ensure that such mitigation mechanisms and other dark side topics are included in the IS curriculum.

5 Concluding Remarks

In this article, we presented a literature review regarding the dark side of IT use, specifically targeted at the negative effects of IT use on individuals. By examining 37 articles published in the IS basket between 1995 and 2015, we found four key dark side phenomena: technostress, information overload, IT addiction, and IT anxiety. We particularly analyzed the articles to draw conclusions about the three important components of the phenomena: antecedents, consequences, and mitigation mechanisms. This enabled us to identify research gaps in the IS basket and present five essential areas as directions for future IS research.

There are certain limitations regarding our study. First, we recognize that the IS domain is not solely represented by the IS basket journals, and some major contributions are appearing outside these aforementioned journals. However, we do argue that the IS basket journals still give a rather representative overview of the key topics that are discussed within the IS community. Second, we also recognize that the dark side is not only a problem of the IS discipline. For example, the related research in psychology, medicine, and sociology could inform the IS research further. In fact, we believe that interdisciplinary research will be required to understand and tackle these wicked phenomena better. Third, in this article, we accounted only for negative effects associated to IT use on an individual who has no malicious intent. Thus, it is the responsibility of the reader to understand that our study and findings are limited to that particular focus. Finally, we concentrated mainly on the four key phenomena that emerged from our review. However, our review revealed that there are some phenomena that are not necessarily related to these four types: for example, one of the articles presented that IT use can result in loneliness (Matook et al., 2015). Thus, it should be kept in mind that there may be other dark side phenomena in addition to the four types, even ones *“that have not yet been actuated”* (Tarafdar et al., 2015a, p. 163).

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