Smartphone Use and Technostress: Hindrances to Users' Humanistic and Instrumental Goals

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Abstract

Information technology (IT) has become integral to many people's daily lives as smartphones have been widely diffused in our society. As a result, exploring the various consequences of their use has become crucial. Over the past 15 years, technostress (i.e., stress caused by IT use) has gained increased scholarly attention. However, previous studies have been limited in identifying smartphone users' specific humanistic and instrumental goals in relation to their experiences of technostress. By applying a qualitative research approach and collecting and analyzing data from 30 semi-structured interviews, we contribute to research by exploring smartphone-related technostress that creates hindrances to users' humanistic and instrumental goals. We identify six humanistic goals (personal interests, meaningful life, being yourself, relaxation and recovery, sleep, and social relationships) and four instrumental goals (studying, work, mundane tasks, and personal information management), and uncover the hindrances smartphone-related technostress creates to them. We discuss the different goals that comprise smaller sub-goals, approaching goals from a hierarchical perspective. In addition, we contribute to research by exploring smartphone use, technostress, and conflicting goals. Our practical implications are multifold, highlighting the benefits for users and service providers.

Keywords

Technostress, smartphone use, humanistic goals, instrumental goals, conflicts

1. Introduction

Humans have long harnessed information technology (IT) to increase productivity and efficiency. However, IT can also overwhelm users, overshadowing its benefits and highlighting problems due to the stress caused by its use (i.e., technostress) [1, 2, 3]. This phenomenon not only adversely affects organizations by reducing productivity [1, 4, 5] but also impacts individuals, potentially harming their well-being [6, 7] and overall quality of life [8]. Furthermore, IT has blurred the boundaries between work and leisure, causing conflicts due to work demands that interfere with individuals' personal lives [e.g., 9, 10]. Although IT use can yield many advantages, the adverse outcomes can be substantial. Notably, technostress can hinder reaching goals and objectives [3]. In this study, we define *goals* as internal representations of desired states that encompass a broad spectrum, ranging from basic physiological benchmarks to complex cognitive visions of aspirations and accomplishments, such as achieving career success [11, p. 338]. Goals are vital since they can be seen as "essential components of a person's experience of his or her life as meaningful and as contributing to the process by which people construe their lives as meaningful or worthwhile" [12, p. 107]. Consequently, we aim to uncover how technostress creates hindrances to smartphone users' goals.

When discussing IT use, it is crucial to consider both humanistic and instrumental goals and outcomes as central components of the socio-technical nature of the information systems (IS) discipline [13]. Organizations often employ IT to achieve instrumental goals, such as increased productivity, while humanistic goals, such as well-being, have received less attention. This could

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lead to a number of problems, technostress among them [13]. Therefore, Sarker et al. [13] have called for more synergized research and practice efforts to explore both humanistic and instrumental goals and outcomes in IS. Although they focus on the organizational perspective, this issue extends to individuals' personal use of IT (i.e., use not primarily linked to working or studying). Numerous studies have emphasized the hedonic-oriented nature of IT use as a central domain in IS research [e.g., 14, 15]. Considering the negative aspects of such IT use, it has been shown that technostress is remarkably prevalent even when use is voluntary and intended for leisure [16]. The ramifications of technostress are extensive, as illustrated by cases where an individual's academic performance is detrimentally influenced by the technostress associated with browsing social media [17]. While humanistic and instrumental goals have been briefly addressed in the organizational context of technostress from the perspective of presenteeism [18], the intricate dynamics of these goals, personal smartphone use, and technostress have received limited scrutiny. In our research approach and context, we therefore considered the users, the IT artifacts, and their interactions, thereby emphasizing the socio-technical nature of IS [13].

Scholars have advocated for more thorough and expansive investigations into technostress that consider diverse contexts and perspectives [3]. Previous studies have been limited in delineating specific humanistic and instrumental goals of smartphone users that technostress can hinder. Given that smartphones are ubiquitous devices present in various everyday situations that rapidly deliver vast amounts of information, gaining insights into the multifaceted consequences of such IT interactions is imperative. The consequences of smartphone use can be unintended, often manifesting as indirect hindrances to users' goals not initially associated with smartphone engagement. Thus, our emphasis was on the unintended effects of smartphone use on users' goals, rather than on the underlying motivations behind the use. From this perspective, we investigated individuals' goals, smartphone use, and technostress to answer the following research question: **How can smartphone-related technostress create hindrances to users' humanistic and instrumental goals?**

To answer this question, we collected and analyzed interview data from 30 smartphone users who had experienced technostress. We contribute to research in two key ways. First, we discuss humanistic and instrumental goals in relation to technostress in the smartphone use context. We problematize and offer solutions for stress and individuals' goals by exploring how stress and unachieved goals are associated [19], for example, when an individual is unable to live a meaningful life (e.g., to be happy and live life to the fullest) due to distraction, invasion, or overdependence caused by smartphone use. Second, we add to the discussion regarding the synergy and conflicts between humanistic and instrumental goals in IS. While we observed instances of synergy between users' different goals and smartphone use, their goals were often in conflict, causing issues. By exploring this, we also contribute to the existing research on work–life balance and technostress.

The remainder of this article is structured as follows. First, we provide an overview of the theoretical background of our study. We then describe the methods employed in our empirical research. After that, we present our findings. Finally, we discuss our research contributions and the practical implications of our study, acknowledge potential limitations, and suggest areas for future research.

2. Theoretical background

2.1. Stress and IT use

Stress is a complex phenomenon that humans encounter for various reasons, and its manifestations vary from person to person. Thus, stress is a subjective and dynamic transaction between individuals and the environment, and it occurs when individuals appraise the environment's demands as overwhelming [20, 21]. This study primarily focused on negative stress and excludes positive stress (known as "eustress") [22]. In particular, we focused on

technostress (i.e., stress arising from the use of IT) [3, 23]. Studies have shown that this phenomenon causes issues for individuals and organizations alike. Technostress forms through stressors, which are the creators of stress that form through the interplay between individuals and their environment (e.g., information overload). These stressors lead to strains, which are reactions to stress (e.g., feelings of exhaustion) [24, 25]. A misfit between an individual's resources and the technological environment is central to the technostress process [24], which aligns with the transactional approach [21]. This perspective highlights that neither the individual nor the IT environment singularly induces technostress; their interaction is key [3]. Stressors causing negative consequences and outcomes have been called hindrance-stressors [26]. Although we refer to hindrances throughout the paper, we do not refer solely to hindrance-stressors. Rather, we reflect the all-encompassing hindering impact of the technostress process on individuals' goals.

The concept and definition of technostress emerged in the 1980s [27, 28], while research proliferated in the 2000s and 2010s [e.g., 1, 2, 3, 23, 24, 29, 30]. The first wave of studies focused predominantly on organizations, exploring issues such as the loss of productivity and job dissatisfaction caused by technostress [1, 2]. Over the past decade, technostress research has undergone a significant shift, expanding beyond organizational boundaries to encompass voluntary and leisure-oriented IT use. Such research has been led by studies focusing on social media [31, 32, 33, 34, 35]. Moreover, many studies have focused on mobile devices, particularly smartphones [36, 37, 38]. In personal IT use, many adverse outcomes of technostress have been identified, including problems with concentration, sleep [34], and social relations [34, 39]. The consequences of IT use often cross the boundaries of personal and professional lives, causing conflicts between leisure time and work obligations [9, 10], as well as academic pursuits [17, 40]. The pervasiveness of IT across various dimensions of life has introduced new avenues for individuals to encounter stress-inducing situations. Consequently, technostress has emerged as a significant phenomenon within our technology-driven world.

2.2. Humanistic and instrumental goals and technostress

Aiming for and achieving goals is an inherent part of human behavior [41]. Goals are intimately linked to the fundamental human traits of seeking and having meaning in life [12]. Generally, overarching categories of goals comprise smaller interconnected goals [11], meaning that goals can be viewed hierarchically [42]. Exemplary broader goal categories include humanistic and instrumental goals [13]. In organizational contexts, for instance, humanistic goals include aspirations for greater well-being, job satisfaction, and the pursuit of equality while instrumental goals are tied to things such as heightened productivity, efficiency, and profitability [13, 43]. On an individual level, humanistic goals can be striving for happiness, positive self-assessment, and a sense of belonging [11]. Conversely, instrumental goals manifest various forms, including career progression, academic accomplishments, effective life management, or, more generally, the achievement of something significant [44].

In psychology discipline, it has been suggested that individuals' goals and well-being are connected [45]. Focusing on the interplay between goals and stress, distress may interfere with goals due to compromised self-regulatory behavior [19]. Approaching goals from a hierarchical perspective, research has shown that even daily minor stressors may harm individuals' smaller (e.g., meeting a work deadline) and more substantial (e.g., experiencing happiness) goals [46]. Furthermore, such goals can interrelate, meaning that the achievement of minor goals can be pivotal for attaining larger overarching goals [47]. Consequently, even small instrumental goals can influence the attainment of greater humanistic goals, highlighting the need for synergy. Individual goal hierarchies and personal beliefs fundamentally shape how specific situations are evaluated. If an interaction with the environment threatens something of value to the individual (i.e., their goals), this may contribute to stress [48]. Thus, not reaching goals can be stressful [49]. As Folkman [50, p. 9] summarizes, "Stressful situations are often stressful precisely because they threaten or harm valued goals." This further highlights the complexities surrounding goal attainment and stressful experiences.

Thus, users' goals are pivotal in shaping their appraisal of various technostressors [51]. While research has indicated a link between technostress and both humanistic and instrumental goals, there remains a gap in identifying specific humanistic and instrumental goals impacted by personal smartphone use and technostress. Within the organizational context, studies have demonstrated how IT-induced presenteeism can contribute to conflicts between humanistic and instrumental outcomes [18]. In addition, technology giants (e.g., Google) exploit our information to manipulate our behavior, thereby threatening both our privacy (instrumental goal) and our freedom (humanistic goal) [52]. Privacy concerns have been associated with technostress [53, 54], underscoring their potential impact on individuals' goals. While researchers have extensively studied how IT can facilitate various organizational goals, such as heightened productivity [55, 56], IT-enabled productivity is not always actualized. This can happen, for example, due to technostress [1, 4, 5]. Drawing on the ideas of Sarker et al. [13], we explored how individuals – like organizations – have humanistic and instrumental goals that IT use impacts. Although IT can be leveraged to reach goals, we explored how technostress interferes with users' goals.

3. Research methods

We employed qualitative research methods to address our research question because they are particularly suitable for studying "people's wider perceptions or everyday behavior" [57, p. 7]. Thus, such methods are fitting for examining individuals' everyday interactions with IT (in our study, smartphones). Our approach involved conducting semi-structured interviews to gain rich data [58].

3.1. Data collection

To identify participants, we employed purposeful sampling, which involved selecting individuals based on predefined criteria (active smartphone users who had experienced technostress), coupled with snowballing, which entailed asking participants to recommend suitable candidates [59]. Participants were sought using the personal connections of the authors, and from email lists, social media, and blogs. We conducted 30 semi-structured interviews in two rounds to collect data: 10 interviews (nine face-to-face, one remote) in 2019 and 20 (all remote) in 2021. All the interviews were conducted by the first author, with durations spanning from 34 to 77 minutes (average 54 minutes). Of the participants, 19 were women, and 11 were men. Their ages ranged from 22 to 41 years (with an average age of 27 years). They represented diverse professional backgrounds, such as university student, project coordination, career advising, and massage therapy. All the participants were native Finnish speakers residing in Finland. Their daily smartphone usage ranged from 1 to 9 hours (with an average of 5 hours), engaging with various applications, including Instagram, TikTok, and WhatsApp.

Being aware of the drawbacks of interviews as a data collection method, such as the potential for interviewers to inadvertently impose their worldviews on participants, we took steps to mitigate these challenges. Employing mirroring, wherein participants' own words are used to formulate follow-up questions [58], helped us gain more profound insights into the participants' experiences, as told in their own words. For instance, if the participants mentioned stress, we asked them to elaborate on their experiences. The role of the interviewer is to listen attentively and guide discussions to enhance the understanding of the participants' experiences [60]. Our interviewer (the first author) adopted an empathetic stance, encouraging the participants to express their thoughts openly. We followed a predefined interview framework based on two central themes: general smartphone use and the negative or stressful outcomes attributed to smartphone use. As the interviews progressed, we iteratively refined our framework to better accommodate our research objectives, as the participants' responses illuminated areas that warranted more in-depth exploration. In terms of smartphone use, the participants were asked the following questions (among others): *What kind of content do you browse on your smartphone? What do you gain by browsing said content?* Regarding technostress from smartphone use, the

participants were asked the following questions (among others): *What kind of smartphone use has caused adverse consequences for you? How did you realize that smartphone use was burdening you?* While the interviews did not explicitly target the participants' goals, these were clearly discernible in the answers, as they provided concrete narratives about their smartphone use and the ensuing outcomes. After 30 interviews, we determined that an adequate saturation point had been achieved and continued with the analysis.

3.2. Data analysis

The analysis phase began with transcription of the interviews, which partially overlapped with the data collection. During this phase, we started familiarizing ourselves with the data. We continued by reading the data and making notes about observations of interest to our research objectives. While the primary responsibility for the data analysis rested with the first author, collaborative discussions involving the co-authors were conducted, particularly regarding the intricate interplay between the users' goals and technostress. After the transcriptions, we began to code the data following different guidelines [61, 62, 63], using the NVivo software. Although we did not conduct grounded theory research per se, we partially followed the method's guidelines, which has been common in IS research [64]. The method's techniques can be helpful and appropriate, even when pure grounded theory research is not done [60]. For example, we employed open coding and constant comparisons during our analysis [61].

We initiated the analysis with open coding, systematically labeling instances in which the participants described technostress experiences. For instance, the sentence "*I have also realized that in many situations it [the smartphone] interrupts my thinking*" was labeled "interruption." Subsequently, we sought patterns in the data using inductive reasoning [62]. This phase unveiled a deeper understanding of the stressful situations encountered by our participants, enabling us to observe the interfering impact of technostress on their different goals. For example, the participants explained how smartphone use disturbed their performance of household chores, leading to delays that eventually contributed to disturbances in their sleep schedules.

We explored this further by reviewing all the stressful experiences coded in the initial round from this perspective to "turn those patterns into meaningful categories and themes" [59, p. 463]. As a result, 10 main goal categories were identified as closely linked to technostress via the phenomenon's hindering effect on them. These goals were systematically categorized as either humanistic or instrumental, within which sub-goals were discerned (see Table 1 and Table 2, respectively). For example, the act of completing chores was classified as a sub-goal within the broader instrumental goal of "mundane tasks." Thus, we categorized the goals by interpreting our data and seeking meanings in the participants' words [59]. Continuing with our inductive approach, we proceeded to further explore the connections between the identified and categorized goals and the occurrences of technostress [62]. By doing this, we were able to identify situations in which the users' different goals could be in conflict due to their technostress experiences. For example, not using a smartphone during certain situations could increase studying efficiency (instrumental goal) by reducing distractions while simultaneously harming social relations (humanistic goal) due to the individual being unable to follow personal online discussions in real time. While our analysis was fundamentally data-driven, we drew insights from the existing literature to help us understand our observations regarding different technostress experiences. In essence, we used the prior literature to interpret our data [62]. This also helped us integrate and position our findings with existing research. Throughout the analysis phase, we consistently employed constant comparisons to observe similarities and differences between the participants and their experiences [61]. In the results, we report "central" situations and events discussed by the participants, meaning that multiple participants mentioned them. Thus, we used triangulation to confirm our findings [62].

4. Results

In this section, we showcase how we observed individuals' technostress experiences creating hindrances to their humanistic and instrumental goals. We also discuss conflicts between different goals, smartphone use, and technostress.

4.1. Technostress and humanistic goals

Humanistic goals refer to aspirations that prioritize things such as well-being, quality of life, and individuals' values. However, it is worth noting that the concept of well-being is complex and intertwined with more specific goals, such as engaging in activities that individuals find enjoyable that are often connected to their personal interests. As a result, we did not focus solely on well-being as an isolated goal; instead, we perceived it as embodied in the various humanistic goals we observed. In Table 1, we present the humanistic goals our participants had pursued that had been hindered by the technostress they experienced in smartphone use.

Table 1
Technostress and humanistic goals

Humanistic goals (and sub-goals)	Technostress example
Personal interests – (having time, motivation, and concentration for hobbies; engaging with online content of interest)	Smartphone use can take away time or motivation from hobbies or distract the time dedicated to them, which can be stressful and hinder goals relating to personal interests.
Meaningful life – (being happy; living life to the fullest; avoiding time-wasting)	Smartphone use for activities considered unproductive or unnecessary can be stressful and conflict with one's aspirations and desires, hindering living a meaningful life.
Being yourself – (identity; self-image; self-acceptance; personal values; freedom)	Smartphone use to browse social media and view other people's pictures can trigger dysfunctional comparison behavior, leading to negative thoughts about one's self-image, which can be stressful and hinder being oneself.
Relaxation and recovery – (having time and concentration for relaxation and recovery; ensuring that downtime is relaxing and recovering)	Smartphone use for relaxation and recovery can paradoxically result in stress due to the overwhelming amount of information encountered, hindering relaxation and recovery.
Sleep – (sleeping enough; sleeping well)	Smartphone use before going to sleep can negatively affect sleep duration and quality, which can be stressful and hinder one's targeted sleep patterns.
Social relationships – (maintaining relationships; having time for relationships; focusing during social situations)	Smartphone use while spending time with friends, a partner, or family can be stressful for all parties due to conflicts and disturbed concentration caused by smartphone use, hindering social relationships.

Well-being, reflected in the goals outlined in Table 1, was often in the background of the observed technostress experiences. This is logical, given that stress inherently tends to interfere with well-being. Many participants stated that interruptions, overload, and feelings of overdependence prompted by smartphone use routinely disrupted activities such as reading, knitting, exercising, watching TV, or spending time outdoors. This often resulted in not engaging in activities they used to enjoy, consequently hindering the goals associated with personal interests. Multiple interviewees mentioned this in relation to reading books:

> *Yeah, I used to read [books], but now I really don't read. […] I know that in the long run, for me, it would enhance my well-being if I could immerse myself [in reading]. It would be wonderful. I love reading. But it is so much easier to take the smartphone and check new information there; reading a book takes more effort. Personally, it makes me really sad.* (Participant 6)

As mentioned, on average, the participants spent five hours per day using their smartphones. Interestingly, a prevalent sentiment expressed in the interviews was a distinct lack of appreciation for the time spent browsing smartphones. Many participants noted that their smartphone use and the ensuing outcomes frequently diverged from their desired experiences. In such narratives, the influence of technostress hindering the pursuit of meaningful lives was evident. In many instances, such behavior was described as a waste of time:

> *When I realize that I have been browsing something that is not… It is not life; I just browse some unnecessary content that is not even important, and then I experience anxiety about wasting my life on this. Like, I should be doing completely different things.* (Participant 27)

From a different perspective, browsing social media, such as Instagram, on smartphones emerged as a hindrance to some participants' goals centered on the notion of "being yourself." This indicates that the issues extend beyond mere time spent browsing; the ramifications of technostress are much more complex. Issues with "being yourself" could arise even when trying to reason with oneself that nothing is as perfect as shown on social media. As one participant said:

> *Yeah, you realize that it's "polished" content, but depending on your own feelings, you sometimes can't remind yourself of that. You rather easily think, "Well, everyone else is doing better than I am."* (Participant 2)

Interestingly, we observed similar thoughts associated with creating content. When one contributes to the unrealistically beautiful world of social media, it can eventually be problematic. As one participant explained:

> *It was, in a way, seeking attention or something. Then I woke up to it. […] I was like, damn, I too am a down-to-earth person, and it is unnecessary for me to put this kind of polished content on IG [Instagram].* (Participant 20)

When offering justifications for their smartphone use, some participants shared their view that they perceived it as a way to relax. Interestingly, a majority expressed the view that smartphone use often failed to yield such effects, despite the intention to find relaxation. For some, this was dependent on the application used:

> *When I really got into Twitter, I was experiencing anxiety because of the topics I followed. The amount of content was increasing, and I couldn't handle it anymore. […] I use Instagram specifically for fun and relaxation. On Twitter, you have to have your brains and intelligence with you; it isn't just for fun. […] It suits me better to look at pictures of coffee cups from different cafés on IG [Instagram] than the politically active conversations on Twitter.* (Participant 3)

Furthermore, most participants acknowledged their habit of browsing smartphones while in bed just before sleeping. Their reports varied regarding whether this was considered stressful, but the negative consequences were evident for most. For instance, many felt that smartphone use had reduced their sleep quality or kept them up too late. When discussing smartphone use and sleep, one participant said:

> *[It has affected my sleep] very much. Especially when I used TikTok, all the songs were playing in my head; it was horrible. When I went to sleep, the dance videos and songs kept playing in my head, and I felt really restless all the time.* (Participant 30)

Beyond individual consequences, most participants highlighted instances of stress stemming from smartphone use in the context of social relationships. Notably, nearly half of the participants discussed smartphone use in relation to their romantic partnerships. For many, either their own smartphone use or that of their partners had caused issues, manifesting as stressful events that hindered their relationships:

> *We might sit on the couch [with my partner] and not talk to each other; we just browse our phones. Both [of us] are doing something unnecessary. We do communicate, yeah, but sometimes you feel like… [laughs]. Why are we doing this with the person we have decided to spend our lives with? Why don't we come up with some nice things to do together, such as playing board games, going out for a walk, or something else?* (Participant 11)

4.2. Technostress and instrumental goals

Instrumental goals refer to aspirations that prioritize individuals' development, growth, success, and survival. In Table 2, we present the instrumental goals our participants had pursued that had been affected by the technostress they experienced in smartphone use.

Table 2
Technostress and instrumental goals

Instrumental goals (and sub-goals)	Technostress example
Studying – (having time, motivation, and concentration for studying; completing study assignments on time; doing well in studies; studying efficiently; graduating)	Smartphone use can cause interruptions and disturbances in concentration while studying, for example, due to constant notifications and messages, which can be stressful and hinder progressing schoolwork.
Work – (having motivation and concentration for work; being a good employee; behaving appropriately with customers; being efficient at work)	Smartphone use at work can lead to interruptions and disturbances in concentration, for example, due to constant notifications and messages, which can hinder work, and trigger contemplation about one's own role and responsibilities as an employee.
Mundane tasks – (doing chores; cleaning; shopping; maintaining personal hygiene; completing such tasks efficiently)	Smartphone use can contribute to one avoiding completing (uncomfortable) chores by browsing, increasing frustration and annoyance with one's behavior, causing stress and hindering mundane tasks.

Personal information management – (managing information security; getting high-quality information; getting important information on time)	Smartphone use to seek information online can lead to anxiety due to low-quality, irrelevant, distracting, or untimely information. In addition, worrying about one's personal information and, for example, the associated privacy issues can be stressful and hinder personal information management.

Goals associated with studying, work-related tasks, and the broader endeavor of being efficient and productive consistently emerged as targets hindered due to technostress experiences. For instance, a prevalent observation was that the participants, many of whom were students, highlighted the distracting effect of smartphone use when engaging in academic work, such as writing a thesis and doing coursework. These could be viewed as smaller instrumental goals contributing to broader goals, such as graduating. One participant explained smartphone use in relation to doing schoolwork, as follows:

> *It takes time away from schoolwork. Well, especially, I don't know, but I guess that remote studying also has had an impact on it. For example, I have one course at the moment [April] overdue, with a deadline that was in March. So, really, if I didn't have this phone, I would have definitely completed the course already. And I would probably have made progress in other areas, too. So, with schoolwork, it definitely takes a lot of time [away].* (Participant 27)

Furthermore, many participants were employed and recalled instances in which smartphone-induced technostress interfered with their work-related goals. Typically, especially in the era of increased remote work and meetings, people browsed their smartphones during work, which negatively affected their concentration. Nevertheless, it is important to recognize that smartphone use might only be a part of the problem, as one interviewee contemplated:

> *I have realized at work that I sometimes feel like, "Damn, I would like to be able to focus better." And then I think about what the reason is. Is it about the work not being interesting, or is it the phone? Why am I unable to immerse myself in the work? It might be the sum of many different things.* (Participant 19)

Additionally, we observed that technostress had the potential to hinder mundane tasks, including household chores such as cleaning, and tasks associated with personal hygiene such as washing up. Such issues often emerged when participants procrastinated by engaging in smartphone browsing, which could hinder additional goals. As one participant explained, delaying nightly routines by browsing their smartphone could disrupt their sleep schedule. This also illustrates the interconnectedness (and thus possible conflicts or synergy) of humanistic and instrumental goals:

> *At around 7 in the evening, you are like, "Okay, today I will go to sleep early. I can't stay awake anymore." But then, at 11, you realize that, "Well, I've been just scrolling through my phone for the past two hours." I might be really tired, but I know I should change my clothes, go to the bathroom, and wash my face before I can go to sleep. But when I don't have the energy to do those things, I just lie there and scroll through the phone.* (Participant 21)

The abundance of information delivered through smartphones emerged as a significant stressor for participants due to difficulties in receiving and processing relevant, timely, or high-quality information without being overwhelmed. Some highlighted different news sources and their varying credibility. However, this was predominantly discussed in relation to messaging with others: if one wishes to follow a discussion in real time, this can actually be stressful due to

overload or invasion, ultimately hindering individuals' goals tied to managing information. As one participant explained:

> *It is [the smartphone] roaring all the time. It is like I sometimes experience real anxiety and think like, "Argh, I can't read all these." Then I just, you know, press [the messages away] and think that maybe someone will let me know later if I don't have time to read them.* (Participant 10)

Finally, some participants discussed privacy issues in smartphone use as something that could cause stress, hindering their goals related to personal information management. For instance, they emphasized that the volume of data that some services collect is a problem:

> *It obviously worries me how much, in reality, data are collected [about users] and how they are utilized. [The services] also listen to you, and in a way, you can't know or realize how much data there are and how sneakily they are used. That makes me a bit worried.* (Participant 18)

4.3. Technostress and conflicting goals

Our data and analysis revealed a recurring pattern wherein users' different goals frequently conflicted due to smartphone-related activities and the ensuing technostress. Notably, when different goals were in conflict, attempts to manage stressors, such as minimizing distractions, occasionally contributed to the emergence of other stressors—like information overload. This dynamic meant that the participants sometimes navigated situations in which they believed they could enhance their well-being by distancing themselves from their smartphones, thereby prioritizing personal interests. However, upon picking up their smartphone again, they were met with an overload of information that increased their stress levels, highlighting conflicting goals and technostress:

> *Sometimes, I have weekends during which I don't use my phone like at all, and then you have the burden of, I actually get really stressed if I haven't checked [Instagram] in two days. […] [Do you feel stressed about all the new content?] Yes, yes. Since you haven't had the time to check it, like, "Okay, a few pictures, good." And then there is, like, 130 pictures, and then you feel stressed.* (Participant 10)

Thus, conflicting goals could cause new issues requiring goal prioritization from users. To illustrate this, some participants said that they reduced their screen time to manage the hindrances they experienced due to interruptions. Unfortunately, this adjustment inadvertently took a toll on their social relationships, causing them to miss out on meaningful or engaging conversations. As one participant explained:

> *[Elaborating on life changes and reduced smartphone use] I enrolled in [a new school], so I have many other things to do than browse the phone all the time here. […] In a way, this is [better], or you feel like you have more truly relaxing activities. […] But on the other hand, you don't have as much time to talk with your siblings [via smartphone due to living in different places], as you don't see them as much in your everyday life.* (Participant 12)

As previously mentioned, for some, smartphones serve as a means of relaxation, particularly during the evenings. Despite some seeing value in the relaxing effect of smartphone use, it is noteworthy that, even in these instances, smartphone engagement could have adverse effects on their sleep patterns. However, the perceived value derived from this relaxation, despite its repercussions on sleep, remained significant for these individuals:

I have never tried, for example, going to sleep in such a way that I have a phone-free period before starting to sleep. I am aware that there is research that shows… that it worsens sleep quality and thus is not a good thing. But I have felt that when I use TikTok [before going to sleep], I get my mind off work stuff and such for a while. (Participant 14)

Shifting our attention to instrumental goals, some participants who integrated their personal smartphones into their professional endeavors found themselves confronted with conflicts between goals, underscoring the intricacies of work–life balance. While our primary focus was on the personal use of these devices, it became evident that, for a subset of participants, the demarcation between specific work- or study-related activities and personal use was exceedingly blurred. This was particularly true for the participants who harnessed social media to promote their expertise. In such cases, difficulties in balancing work and personal life and conflicting humanistic and instrumental goals were strikingly evident:

And I've thought about, like, could I altogether remove certain applications from my phone? But then I think it's difficult because I have to have them at work, and my accounts are linked there. That's a challenge: how to manage that. I've wondered if it could be pretty liberating to stop using them altogether. But yeah, it's still something that feels like a difficult thought. (Participant 15)

Thus, it is difficult to avoid the hindrances posed by technostress across various life goals due to the dynamic interplay between these goals and the device itself. Similar patterns associated with study-related goals and personal interests were discerned, further underscoring conflicting humanistic and instrumental goals.

An intriguing insight emerged when a participant recalled an extended period (spanning months) during which they abstained from social media. Surprisingly, despite this prolonged hiatus, they found it relatively effortless to catch up with the latest developments upon their return. This exemplifies the subjective aspect of potentially stressful situations: what is perceived as stress-inducing and goal-hindering for some may not hold true for others, accentuating the distinctly personal nature of stress and its alignment with individual goals. Everyone has their own challenges, and sometimes people must choose which battles to fight due to conflicting goals. As we have demonstrated, achieving balance with one's use is difficult due to the pervasive nature of smartphones:

I feel like it is about me sharing my attention with the smartphone, which doesn't really bring me any joy. It only seems like it does. Yeah, the smartphone is a real devil. I can't say anything else [laughs]. (Participant 6)

5. Discussion

First, we discuss the research contributions of our article. The practical contributions of our study are then outlined. Finally, we acknowledge the limitations of our research and offer suggestions for future research.

5.1. Research contributions

We have contributed to the research in two main ways. First, we examined technostress in the context of personal smartphone use by applying the lens of humanistic and instrumental goals associated with IT use, which are both central in the IS domain [13]. While extant research has briefly explored these goals and technostress within organizations from a presenteeism perspective [18], and there have been investigations into goals and technostress centered around IT use in hospital settings [51], our research has expanded on this by focusing on a wider range of technostress experiences in a different use context from the user perspective. Although IT, especially in organizations, is used to gain, for example, increased efficiency and productivity [55,

56], it can lead to unintended negative consequences. We have expanded on the unintended negative consequences of IT use by demonstrating how individuals' everyday life smartphone-related technostress experiences, such as interruptions and the associated concentration issues, can interfere with, for example, goals associated with users' personal interests or personal information. Thus, we problematized the interplay of technostress and individuals' goals by discussing how technostress is associated with unmet goals [19]. As goals are composed of smaller components [11], our contribution has involved identifying sub-goals for humanistic goals, such as living a meaningful life (e.g., being happy), and instrumental goals, such as mundane tasks (e.g., doing chores efficiently). We have unraveled the consequences of technostress on such sub-goals, thereby acknowledging the hierarchical nature of goals [42]. Given that even minor stressors can undermine the achievement of significant goals [46, 47], our study's findings add to the existing literature by delineating humanistic and instrumental goals, including their sub-goals and the resulting hindrances brought about by technostress. As the inability to attain goals can generate stress [49], experiencing technostress could initiate a detrimental cycle that creates hindrances to goal attainment and increases stress. An illustration of this is the scenario in which individuals find it challenging to engage in personal interests (e.g., reading or exercising) due to their overdependence on smartphone use. This accentuates the complex interaction between IT use, technostress, and users' goals. By presenting goals in a hierarchical manner and outlining the associated technostress-related hindrances, our research has brought technostress investigation closer to users' concrete, situation-specific experiences and their ensuing consequences. Thus, we have expanded on studies focusing on general strains (such as exhaustion and fatigue) as adverse outcomes of technostress. In addition, although issues such as concentration have been identified as negative outcomes of technostress [34], we extended this by delineating and categorizing further how such issues can concretely affect users' lives (e.g., by hindering engaging in personal interests).

Second, we have answered the call to explore the synergy between humanistic and instrumental goals in IT use [13]. Although our focus was on individuals rather than organizations, the significance of this synergy remains relevant and crucial. Our data analysis revealed more instances of conflict than of synergy, aligning with findings from the organizational context [13]. Notably, instrumental goals related to work and academic pursuits often collided with humanistic goals like fostering social relationships and seeking relaxation and recovery. This tension is often linked to work–life balance, which operates bidirectionally: IT use for work can hinder personal domains [e.g., 9, 10], and likewise, IT engagement for non-professional endeavors can interfere with work tasks [65]. Our observations highlighted instances in which individuals took temporary breaks from smartphones or social media to prioritize instrumental goals related to studying, inadvertently leading to challenges in maintaining social connections that largely depend on smartphone interactions. While reducing smartphone use might improve studying efficiency, it can concurrently trigger feelings of unhappiness due to decreased real-time interactions with friends. Hence, reducing technostress often comes with a cost, and numerous factors contribute to the complexities of such mitigation [16]. Moreover, it has been mentioned that conflicting strivings can be stressful [66], a phenomenon we could see in our study, although broad generalizations cannot be made from qualitative studies such as this. Overall, the presence of conflicting goals necessitates individuals to make prioritizations that involve weighing the positive and negative impacts of smartphone use. This requires reflection from individuals. What is truly important? Even though reaching for specific goals can act as a trigger that pushes users towards positive change associated with smartphone-related technostress, the changes can negatively affect other goals and lead to additional stress. Overall, our study adds to the discussion on both the social and technical aspects of IT use and the associated humanistic and instrumental goals and outcomes [13].

5.2. Practical implications

Our exploration of technostress interfering with users' goals provides valuable insights for smartphone users seeking to optimize their experiences. Instead of succumbing to conflicts,

individuals can work towards achieving synergy in their smartphone usage, aiming for balance between various goals and the associated smartphone interactions through thoughtful prioritization. Many participants in our study noted the profound impact of reflecting on their smartphone habits and acknowledging the negative outcomes. We encourage smartphone users to engage in such thinking. Furthermore, our findings shed light on the common phenomenon in which individuals contemplate making changes but struggle with implementation. Our findings offer concrete situations in which technostress arises, which could assist users in recognizing moments when such stress occurs and potentially guide their responses.

Moreover, our research underscores the role of service providers in alleviating smartphone-related technostress. Our results could inform the design of tools aimed at reducing technostress, such as content modification and filtration features, and better monitoring and use restriction mechanisms. Initial reports of such features have recently emerged. In China, users under 14 years old cannot use Douyin (a TikTok equivalent) for more than 40 minutes a day or from 10 PM to 6 AM [67]. Such initiatives are crucial for preventing scenarios in which "IT might facilitate the development of a dehumanized and dystopian society" [13, p. 696]. Additionally, the participants in our study expressed the benefit of open dialogue about these issues. Workplaces, educational institutions, and healthcare practitioners can provide platforms for individuals to share their thoughts and challenges related to smartphone use. Service providers can leverage our insights to better understand how smartphone usage affects users' goals and offer meaningful support to address these concerns effectively.

5.3. Limitations and future research

Our study has several limitations. First, the foundational concept for this research emerged from research within organizational settings (i.e., IT used for achieving humanistic and instrumental goals) [13]. While we have demonstrated that such concepts can be relevant in the domain of personal IT use, such an expansion into new contexts inherently introduces potential limitations. We have maintained transparency regarding our exploratory research approach to mitigate this concern. Second, the concept of goals poses some limitations, since defining individuals' goals might be ambiguous. Additionally, the intricate interplay between users' diverse humanistic and instrumental goals, interconnected through synergies and conflicts, could pose challenges to unambiguous categorization. Nonetheless, we aimed to be rigorous in analyzing our data, employing techniques such as triangulation to support our arguments. Third, our reliance on self-reported data meant that the participants had to recall past experiences associated with smartphone use. Consequently, memory bias may have been present, influencing the accuracy of their recollections. Although we took measures to address this limitation, such as allowing participants adequate time for reflection before responding, the inherent nature of self-reporting introduces the possibility of inaccuracies. Fourth, our second phase of data collection coincided with the outbreak of COVID-19, a period that substantially altered our daily lives. This circumstance could have influenced the participants' responses, as some noted changes in their smartphone use due to the pandemic. We aimed to alleviate this limitation by openly addressing the impact of COVID-19 and engaging with the participants to differentiate issues potentially influenced by pandemic-related effects.

We also identified possibilities for future research on the topic. First, as studies in psychology have mentioned how individuals can use coping strategies (e.g., mental disengagement) to manage stressors that interfere with goal attainment [68], future research could build on this by exploring, for example, different barriers obstructing technostress mitigation [16], thereby offering insights to facilitate the development of services that empower individuals to achieve their goals instead of hindering them. Second, an intriguing direction for future research could be to investigate how distinct situational factors (e.g., life changes) might enable or hinder technostress experiences that obstruct individuals' different goals. Understanding these dynamics could provide valuable insights into the contextual nuances of technostress and its interplay with goal pursuit. Third, traditional IT implementation has been primarily guided by instrumental goals, even within systems designed to fulfill humanistic goals, such as welfare

platforms [69]. Further research, possibly employing design science methodologies, is needed to study and develop IT artifacts that not only facilitate the attainment of both humanistic and instrumental goals but also ensure that their utilization does not hinder either objective. Fourth, while our observations predominantly revolved around content consumption, opportunities exist for future research exploring the intersection of technostress, individuals' goals, and the act of generating digital content. This extension could provide a more comprehensive understanding of how technostress interacts with various facets of individuals' goals.

6. Conclusion

While IT engenders numerous positive outcomes, it is essential to acknowledge its potential to induce stress, commonly referred to as technostress. This stress can manifest at various levels and has implications that merit comprehensive exploration. Despite the widespread recognition of the challenges tied to IT use, the understanding of these issues remains somewhat limited. In this paper, we have explored how technostress arising from smartphone use can hinder users' humanistic goals (such as living a meaningful life) and instrumental goals (such as studying). Furthermore, our analysis delved into the intricate interplay of goals, often leading to conflicts that complicate the management of technostress. Our contribution to the literature stems from our exploration of the connections between technostress and specific humanistic and instrumental goals.

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