Privacy and availability needs regarding user preferences for Smart Availability Assistant – towards a digitally enabled work life balance

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Abstract: The use of communication technologies (CTs) enables blurring the traditional boundaries between work and private life. Many employers are worried about this situation and addressed those issues with different technological and organizational approaches. The goal of our research is to introduce improved enterprise availability management by developing an employee-friendly technological solution that actually reflects the variety of employees' availability needs. Due to the overall aim of broadening and bridging research on an availability management, results of a quantitative study (N=821) insights into the management of individuals' availability and key requirements regarding the development of a Smart Availability Assistant. In general, it became apparent that to appropriately design this kind of smart assistant we must not only recognize the heterogeneity of peoples' availability preferences but also identify and meet employees' privacy expectations by use of a Smart Availability Assistant.

Keywords: availability management, smart assistant, information privacy, privacy concerns

1 Introduction

Over the last twenty years, the presence and usage of information and communication technologies (ICTs) changed from selective to ubiquitous, transforming both private and professional environments. It became imperative for most individuals to permanently engage with these technologies to accomplish work tasks efficiently [AGP11]. A constant connection to work enabled by modern communication technologies allows employees to stay connected with their job anywhere and anytime (Diaz et al. 2012). In fact, the results of surveys among employees are disturbing: 64% of knowledge workers in Germany indicated to be available for their boss, collogues or clients even during holidays [Bi18]. Moreover, 40% of European employees commonly get work-related requests outside their regular working hours [AN13].

The emerging and pervasive proliferation of ICTs in the workplace has led to extensive research, especially in the fields of information systems (IS) and organizational behavior (OB). Scholars indicate both positive and damaging outcomes of ICT-enabled availability [BO07], [Sc17]. On one hand, ICT usage elicits flexibility and autonomy due to increased control and possibilities to work beyond the traditional boundaries of the workplace and workday [Di12]. Previously prevalent confines of the traditional office space or work time in fact disappear. Therefore, employees' ability to appropriately manage work-life demands [To06] as well as work satisfaction and productivity are positively affected [MC06]. On the other hand, researchers regularly underline also

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harmful effects of ICT usage, mostly regarding emotional and mental capacities of employees [BMG11], [SPK19]. Extensive organizational ICT interaction is found to be a driver for increased stress levels, in IS literature referred to as technostress [AGP11], [TTR17], and partially for decreased work productivity due to technology overload [KL10], which can cause even health issues like burnout [Ba11], [Ra08], [DB12]. Moreover, enhanced flexibility and autonomy of the individual are accompanied by increased expectations from managers and colleagues to be almost constantly available for work due to an "always on" culture, which has evolved in many organizations over the last years [Sc17]. Keeping up with these expectations may result in greater workloads and encroachment on family and private time [To06].

Employee problems become company problems. Over the last few years, labor and union representatives as well as politicians started to address the ICT-enabled constant availability and its potential detrimental outcomes for workers. Several businesses are taking the initiative in this regard by integrating either resolute technological approaches or tightened availability policies. For instance, automobile manufacturers pioneer limited availability, e.g. automatically blocking incoming e-mails and messages after the employee's regular working hours (from 6.15 pm until 7.00 am) by switching off the e-mail servers [Ha11] or by deleting all incoming e-mails while employees are on holiday [Da14]. Similarly, political awareness about employees' availability problem is increasing. Under pressure from trade unions, France has introduced a labor law, that is supposed to guarantee employees the "right to disconnect" from work-related e-mails and calls [TG16].

Basically, all these solutions can restrict the usage of smartphones and computers by blocking calls, messages, and e-mail notifications only for a specified period of time. However, the effectiveness of these solutions to improve work-life balance varies across segments of employees, because they do not map the complexity of the individuals' availability preferences [Sc17]. It becomes clear, that a more sophisticated availability management is needed. In this context, we aim at the development of a Smart Availability Assistant (SAA), that will reflect the complexity and variety of peoples' availability needs. Despite potential benefits, smart assistants in form of a mobile app raise several security and privacy challenges for consumers. Mobile apps often transmit a large amount of personal data in real time, rendering strong potential for privacy intrusion [FT09]. In the case of a data breach an adversary could access users' detailed SAA usage history and potentially additional information about the employees' lifestyle, availability behavioral patterns, location, personal identity, and daily behavior [CL18], [Do18]. Recent headlines have highlighted this potential risk by reporting cases, where vendors and app developers are indeed collecting personal data through users' smartphones and transmitting them to other entities [Xu12]. These practices of data access and transmission employed by operating systems have aggravated privacy concerns among users. Accordingly, Bélanger and Crossler [BC11] stated that "one area of future research that seems likely to gain importance is the balancing of information privacy concerns with the advantages of location-based services". For this reason, in this paper we present the results of a quantitative study of users' preferences for a Smart

Availability Assistant through the lens of privacy challenges and employees' privacy concerns. Through a user study with 821 participants we point out important desires, demands and influencing factors for acceptance and use of this technological solution tool.

2 Research and Theoretical Background

2.1 Research Background

Considering the paradoxical character of ICT [JL05], we assure that, while mobile communication technologies can cause, that the work-private boundary regularly becomes blurred and unclear, they should also be used as a tool for managing the work-non-work boundary [KHS09], [GG07]. In fact, a number of papers emphasize the agency of ICTs' use in managing work-family boundaries. For example, Golden and Geisler's [GG07] research on ICTs' usage among knowledge workers in the USA provides few detailed insights into how these employees could use them in different ways to support the particular styles of work-private boundary they preferred. Moreover, a field study among 31 professional workers from Germany, which use a special application Availability-Monitor, indicates, that assistance systems may contribute to an improvement of users' work-life balance and a reduced exhaustion and stress level [Sc17]. The goal of our research is to introduce an enterprise availability assistant that actually reflects the complexity and variety of the individuals' availability preferences. According to the underlying concept (see Fig. 1), the assistant analyses incoming communication requests in order to delay or block undesired e-mails, phone calls, and text messages for a specified time period in a smart way. The decision whether to block, delay or let trough the delivery of calls and messages will be based on the analysis of its content and further information about the individuals' availability preferences, like the users' current life domain, location data and time as well as from the type of contact and its defined priority [LR17].
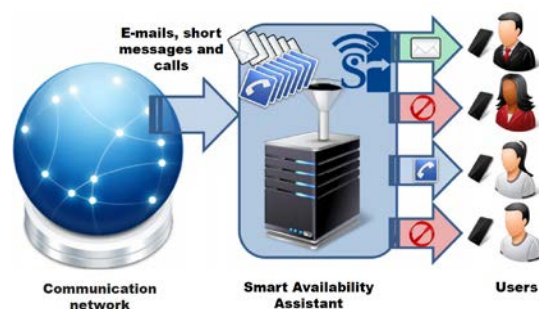

Fig. 1: General overview of system functionality [LR17]

Indeed, previous studies have provided valuable initial insights about the use of ICT for cross-border communication and availability management. They have not, to the authors' best knowledge, investigated the cross-border communication, availability needs and employees' privacy concerns regarding the use of an availability app. To address this research gap, we asked the following research question: How do employees from different fields manage their cross-border communication, what are their availability needs, how can digital assistants support them in order to fully harmonize their actual availability and what are their privacy preferences regarding the SAA?

2.2   Theoretical Background

We define the objectives of the solution by analyzing the data gained from a qualitative study [SR18] and drawing on the boundary theory [Ni96], [AKF00], [KL12] as our main theoretical framework. The boundary theory defines how humans create boundaries considering their diverse life domains. In this regard, research suggests that employees can be grouped into five dominant work-life boundary management styles (separators, family firsters, cyclers, work firsters and integrators) and that the life contexts and values of each individual lead to different desired levels of availability and thus to different boundary management styles [Ko16]. Separators tend to mainly keep work and private lives separated in defined blocks of time and to strongly focus on each performed role with few interruptions from the other. In contrary, integrators constantly blend or merge work and private lives due to a high degree of cross-role interruptions, e.g. voluntarily checking work-related e-mails at home while also responding to personal calls or text messages throughout the workday. Cyclers are neither of the previous pure styles. In fact, cyclers practice a more fluctuating style in which they switch back and forth between cycles of high work-life integration and periods of complete separation. These situations are often caused by habitual peak work times such as deadlines for construction works for builders or emergencies for medical staff. However, in times of higher work-life integration, cyclers focus more on private contacts they did not have sufficient time for during peak work periods. Lastly, work firsters and private life firsters have dominant role identities, that are prioritized. They respond to interruptions asymmetrically, i.e. in one direction but not the other. Whether work or private life is prioritized depends on the person's preferences [Cl00], [Ko16].

In this study we adopt the Technology Acceptance Model (TAM) and its extensions inform the current study's exploration of the factors that affect SAA adoption. According to the original model [Da89], users' attitudes toward technology use determine their behavioral intentions, which directly influence the individuals' final use or rejection of the technology. In TAM, attitudes toward technology use are influenced by two personal beliefs: perceived ease of use and perceived usefulness. However, TAM falls short in recognizing how external contextual factors inform technology acceptance [Ba07]. In response, the Unified Theory of Acceptance and Use of Technology (UTAUT) [Ve03] suggests that three key constructs drive behavioral intentions to use the technology: performance expectancy (the perceived usefulness of the system), effort

expectancy (the perceived ease of use), and social influence (to what degree an individual perceives, that important others believe he or she should use the system) [Li19]. Consequently, this research provides an opportunity to apply and extend technology acceptance frameworks by investigating privacy as determinant of availability management's acceptance and use.

3 Research Method

The data for this study was collected using a cross-sectional survey design with a sample of knowledge workers. Knowledge workers are employees whose main capital is knowledge [Re11]. As mobile technology use represents a central part of their work [WBB08], we consider knowledge workers as a particularly relevant sample. The completion of the survey took 25 minutes on average.

3.1 Participants

The questionnaire was opened for almost 1,600 times and yielded a response rate of 54%. In total, a great number of 864 surveys were completed. However, data cleansing excluded some answers of participants, who unrealistically completed the survey e.g. in less than 10 minutes, which leads to the final sample of N=821. The invitations for participation were sent using traditional digital communication like e-mail and some messaging applications: WhatsApp, Messenger, Skype. Also public posts on social media platforms spread the questionnaire as widely as possible. The sample consisted of participants, who are employed in 30 different countries, but mainly in Germany (85%), Poland (4%), Romania (2%), the USA (2%) and Italy (1%). The average age of the respondents was 34,6 years (SD = 12 years) with a quite equal division of participants on gender – 49.6% women (N=408) and 50.4% men (N=413). Participants work for employers of different sizes and diverse industry sectors (e.g., information technology, consulting and finance), which creates a broad perspective regarding stakeholders' preferences towards the SAA. In their current position, 31% of participants exhibit leadership responsibility. The weekly work time according to employment contract was between 31 and 40 hours (61%). Because we wish to include only persons with a certain degree of current work experience, the pool of participants is limited to employed knowledge workers with at least 20 working hours per week [SSH 19].

3.2 Questionnaire Design

The survey contains of 87 questions divided into 4 thematic blocks. The first part collects demographic data, the second part deals with the participant's current employment, the third part covers the research questions about availability behaviors and preferences and the fourth part comprises the user's preferences towards the use, design and development of a SAA.

4   Results Findings

Due to the privacy focus of this paper, we will only shortly describe the general findings of the study, whereas concentrate in detail on the privacy challenges.

According to the employment contract, most participants (61%) work from 31 to 40 hours per week. In comparison, the actual work time appears to be longer, more than 50% of participants work in average more than according to their employment contract.

In addition, the participants were asked about their attitudes towards and experiences with work-related matters in their spare time; opinions are divided. On the one hand, 30.8% of the participants advocate the constant availability for work even though three-fourths of them feel stressed about it. On the other hand, 39.6% of the participants generally do not want to be available for work-related matters in their spare time.

The attitudes towards the separation and integration of work and private life vary among individuals. Most of the participant desire either a complete separation (37.3%) or an interactive integration (35.7%) of work and private life. However, the desired states of availability often differ from the actual states. For instance, every fifth participant (19.7%) currently has work-related interruptions in their private life, whereas only 3.8% of participants really desire it. Overall, the mismatch between actual and desired availability (calculated by comparing the participant's indicated actual availability with his or her desired availability) is substantial: Every second participant (50.3%) does not achieve his or her desired level of availability in actual practice. Moreover, half of the participants (50.2%) actually do not have any clear arrangement, that clarifies one's availability. In terms of work-related e-mails and text messages, behaviors are somewhat heterogeneous. Half of the participants (46.7%) check and read incoming e-mails in their spare time where even four-fifths of those participants (79.4%) usually reply. In the end, of those participants, that also reply to work-related messages, the vast majority of the participants (87.3%) is doing so, because otherwise they would not be able to successfully manage their workload.

The results above demonstrate a need for availability management. Analyzing the participants' preferences towards potential functions of a SAA, the introduction of certain default modes was mainly supported. In detail, most participants considered the following settings to be useful: The user can only be contacted in an emergency (76.9%), the user can only be contacted by a specific group of people or topic of issue (73.9%), the user can only be contacted by text message (71.2%), the user is not available at all (62.3%) or the user can only be contacted via phone call (49.1%).

Moreover, most participants (73.4%) consider it useful to be able to rate the decisions of the assistant so that it can learn from these evaluations and deduce enhanced future decisions. In contrast, only a narrow majority of the participants (54.1%) want the SAA to interpret the content of a message automatically in order to assess its urgency.

Regarding reliability of the SAA, we asked three questions to recognize how the SAA

should decides regarding the availability management: "Based on my settings, the availability assistant should be able...". Most participants (60.8%) consider it useful or very useful "to make suggestions for a change of the availability setting" (M=4.91; SD=1.82). Considerably fewer participants (44.2%) rated it as useful "…to change the availability setting independently and to be informed by message" (M=4.09; SD=2.11). The less desired option (21.5%) was "…to change the availability setting independently without my information", (M=2.77; SD=2.04). The respondents are selected from a seven-point Linkert scale from 1 (not useful at all) to 7 (very useful).

In case a message gets delayed or a phone call gets blocked, participants predominantly consider it useful that the assistant gives a feedback to the sender. To understand which information users want to reveal, we asked three questions: "The availability assistant should be able to inform the sender of a delayed message or a rejected call about...". Most participants (87.1%) would like to inform the sender about "...when I can be reached again" (M=6.08; SD=1.39). The option "…how I can be reached alternatively" (M=4.08; SD=2.04) were less desired (61.3%), same as "…why I cannot be reached at the moment" (M=4.70; SD=2.12) (59.8%). Our respondents chose along a seven-point Linkert scale from 1 (not useful at all) to 7 (very useful). Interestingly, in this context, most participants do not differentiate between the specific groups of senders: The notification about the user's unavailability is considered useful similarly for the employer or supervisor (76%), colleagues (67.4%), and customers (70.7%).

Regarding the person, which defines the settings for a SAA, our participants showed high desire for self-determination. We asked "In your opinion, who should define the default settings for the availability assistant - for example, when and for whom you are available as a user? (Multiple answers are selectable)". Clearly, the most of our participants chose "I as a user myself" (78.8%), the second most desirable option was "I and the team I work with" (43.0%), 18.51% respondents responded "My employer/superior" and only 8.89% would like the SAA settings to be defined by "The employee council".

We observed the same trend in regard to the question "Who do you think should be able to review the settings that your personal availability assistant contains? (Multiple answers are selectable)". 91.35% chose the answer "I as a user myself", 25.58% responded "The system administrator", 25.46% replied "The (team) colleagues", 25.09% selected "The employer / supervisor", 14.06% answered "The head of department", and only 8.89% would like, that "The workers council" reviews the SAA's settings.

Moreover, the responders clearly desire an availability arrangement within the usage of a SAA. To the question "In your opinion, how should the use of an availability assistant be regulated with your employer", the majority (70.77%) answered "Through a works agreement". The option "Through a company practice" was less desired (23.63%).

The tendency for a self-determination and participant's wish for independent control and privacy of the personal availability settings were also showed through answers to the question "Where should the settings, your personal availability assistant contains, be

saved?". 72.59% of the participants chose the option "On the device".

To sum up, the usage of a software to regulate availability is considered useful or very useful by most participants (55.9%), while, in contrast, few participants (21.1%) consider it not useful. When asked how likely it is for the participant to personally use such a software, the tendencies are somewhat evenly distributed. A great number of participants indicated a high likelihood (36%) or a moderate likelihood (27.5%), while 36.5% of our participants show a low likelihood to use the SAA. For the 300 respondents, who said, that they would not use SAA, we asked them to select factors that may have played a role in their decision. The factors most often cited by these respondents reflected concerns about utility and privacy. They included: "In my professional context there is no need for availability management" (61.0%), "I believe that better availability management cannot be achieved by using a software" (31.0%), "I have privacy/security concerns about these features" (17.67%). In addition, participants provided open-ended responses to the question, "What is the main reason you don't use a SAA?" The vast majority of responses reflected classical constructs in TAM and UTAUT with many revealing low performance expectancy (i.e. low perceived usefulness) associated with SAA usage. For example, "I can regulate my availability well without software", "In my spare time I have a choice not to log into my e-mails or turn off the phone". A second cluster of responses suggested a high effort expectancy (i.e. "Availability software still has too many open questions for me", "One app more, no thanks". Finally, social influence played a role for participants' decision not to use a SAA with one respondent noting "It is all about the culture and behaviors".

5   Discussion and Conclusion

The future of work has become one of the trendiest buzzwords in today's business world. Politicians, employers and workers alike need to find answers to the coming challenges of combining automation with human work, enhancing the physical world with capabilities offered by digital technologies, and finding the most effective balance between work and private life as well as individual availability management. In this context, the present study adds to the current academic knowledge and provides valuable insights into the successful management of individuals' availability as well as preferences regarding availability applications through the lens of privacy challenges and employees' privacy concerns.

The quantitative study we conducted shows very clear, that the potential users have high desire for self-determination regarding the arrangement of SAA' settings. Nearly unanimously our participants opted that only the user self should determine the settings of the SAA and only the user self should have an access into the personal settings. Moreover, in the extension of boundary theory [Ko16] our study results provide valuable insights into how employees abstract their individual boundary style and translate it into tangible availability preferences. The results clearly show, that there is no fixed model

regarding the attitudes towards the separation and integration of work and private life. Moreover, the preferences are changing within the life domain and time. Consequently, lack of flexibility and self-determination seem to be a principal reason why existing approaches, like blocking or deleting automatically incoming e-mails and messages after the employee's regular working hours [Ha11], [Da14] do not meet facets of employees' availability needs. Moreover, the findings of the study reveal, that the potential users would like to have a right to inspect the SAA's decision regarding the availability management. Although, the majority of the participants declare, that SAA should be able to learn from user's availability behaviors, only around 21% would allow the SAA to change the availability setting independently. Interestingly, there is also a clear tendency which information should be reveals in the feedback to a sender in case a message gets delayed. Participants predominantly consider it useful that the assistant informs the sender when the user can be reached again (87.1%). The information "how instead" and "why" the user is not available are much less desired.

On the one hand, the quantitative study we conducted shows an alarming reality that every second knowledge worker does not achieve the individually desired availability, precisely 50.3% of the participants do not achieve the desired level of availability in the actual workplace. Moreover, in the extension of boundary theory [Ko16], [KHS09] our study results provide valuable insights into how employees abstract their individual boundary style and translate it into availability preferences. The results clearly show, that there is no fixed model regarding the attitudes towards the separation and integration of work and private life. Most of the participant desire either a complete separation 37.3% or an interactive integration 35.7% of work and private life. Individuals vary in their availability preferences regarding their life domain, context and contact, meaning that the work and private life boundary is shaped through an individual's day-to-day decisions, needs and obligations.

On the other hand, the results indicate, that the technological solution, which allows differentiated adaptive management has the potential to contribute to individuals' well-being. Practice indicates, that actual employers do not respond adequately to the diverse needs of their employees, since present solutions concentrate only on regulating the extent of availability. In this context, there is a need for a technological solution, that will reflect the diversity and complexity of peoples' availability preferences. Under those circumstances, the SAA shows great potential in successfully managing and regulating individual availability, as it supports users' flexibility and autonomy. Specifically, the majority of study participants 55.9% validate the underlying concept of the SAA by perceiving it as useful and declaring to eventually use it. Furthermore, our analysis demonstrates that this kind of assistant will support particularly employees with a mismatch between their actual and preferred boundary style, leadership responsibilities, from large companies and/or those who receive work-related calls during their spare time. Differently, the results indicate, that older employees are less likely to adopt this technological solution. It shows the need for more information and awareness regarding smart availability management, as well as training concepts for employees.

Potential limitations of this study relate to the study participants as well as the form of our questionnaire. First and foremost, the sample profile might not result in entirely universal conclusions, i.e. the study only considered knowledge workers in an organizational context. However, availability issues affect individuals from all backgrounds as well as the scope of a SAA could go far beyond such specific context. By the same token, most participants of the study live and work in Germany 85% (697) thus complicating international comparisons. Moreover, as is the case with most work–life and organizational behavior research, our study relies on cross-sectional, self-report data and is thus subject to common method variance [PM03]. In designing this study, we followed recommendations described by Conway and Lance [CL10] to reduce the likelihood of common method variance biasing results. Finally, the depth of the study's research questions resulted in an extensive and exhausting questionnaire: On average, it took the participant 20 to 30 minutes to complete it. Therefore, it is conceivable, that with increasing processing time particularly the final questions have received less attention, so that in the end, the results might be slightly distorted.

Given these points, forthcoming research is also invited to extend our study. So far, the usage and preferences regarding SAA have been discussed only on a theoretical level. However, it would be useful to understand and closely measure what effects can actually be observed in practice using SAA, i.e. how much of the potential benefit can be realized and to what extent the technical solution can help to solve availability issues. Moreover, future researchers should take a more inductive approach to identify consumers' privacy expectations. Understanding the factors that drive mutually beneficial and sustainable privacy norms is also important for service providers to best meet the privacy expectations of users and maintain the social contract proven essential for continued adoption of such devices. For this purpose, we suggest a long-term study that could evaluate an availability assistant, that effectively supports employees in managing their availability in line with their individual availability and privacy preferences.

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