Digital service consumption, blessing or curse? Exploring the effect of persuasive design features on mindfulness and consumer well-being

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Abstract

Whether digital services simplify and enhance the user experience or manipulate it is discussed controversially. Contributing to the debate, this study links the concept of mindfulness to digital service consumption. It explores whether supporting services based on persuasive design features impact consumers' mindfulness and whether consumers' mindfulness affects psychological outcomes. The findings of the event contingent diary research with 100 digital service experiences provide no conclusive evidence. On the one hand, persuasive design features are not found to impact consumers' mindfulness. On the other hand, consumer mindfulness in the digital service process is negatively related to stress and positively related to satisfaction and well-being. The implications suggest joint efforts between socially responsible companies and stakeholders from public and non-profit organizations to clearly communicate the aim of digital services and ensure mindful cognitive information processing.

Keywords: *digital services, service design, mindfulness, psychological outcome*
Track: *Social responsibility and ethics*

1. Introduction

Digital services are pervasive, transforming the way consumers shop, book hotels, choose transportation, obtain information, or manage their work life balance. Enabled by technological advancements such as artificial intelligence, machine learning, big data analysis or the internet of things, the range and availability of digital services is growing at a fast pace. The end-user consequences arising from the omnipresence of digital services are the subject of debates in various fields, ranging from service research, human-computer interaction, persuasive system design to consumer behaviour. The thematic foci are rather different. On the one hand, in the service research field which leans upon specific knowledge from human-computer interaction studies, a business modelling perspective prevails. Guided by the implicit principle of "more is better", the emphasis is on designing service processes and systems that enhance the user experience by optimising its usefulness, i.e. the benefits the consumer can reap from the usage. Outcome variables applied to measure the effectiveness of digital service design range from customer effort, user engagement, convenience to loyalty or spend (Leimeister et al. 2014). On the other hand, there is growing concern regarding the risks of ubiquitous user engagement in digital service processes, particularly but not exclusively in the field of consumer behaviour and specialised subdisciplines such as persuasive system design (Wansink 2015; Andres, Borriello and Fogarty 2007). They refer to the potential negative impacts of behaviour that is more and more guided by algorithms. Early warning signals of long-term risks suggest that these go beyond the business context but have far-reaching negative consequences for the society as a whole. Among the specific sectors mentioned frequently are e.g. public health (due to addictive behaviour) or education (due to the inability to distinguish between trustful and trustworthy content and a lack of self-control especially among young people). Not surprisingly, restrictions, warnings and education about the negative consequences of digital service usage are called for by its critics (Oesterle, 2014). The crucial point in the debate can be unravelled by taking an ethical stance. Concerns about user engagement in digital service processes are particularly justified, if computer-mediated persuasion takes place without the user being aware of it (Atkinson 2006). This notion of conscious versus unconscious information processing and decision making is the hallmark of mindfulness. On the most essential level, mindfulness is the ability to see the happenings of one's inner and outer world (Kabat-Zinn, 2003). With such clear awareness of and attention to what is actually happening, mindful behaviour is seen as the polar opposite of reflexive or impulsive action (Brown & Ryan 2003). People who are mindful are more aware of their thought processes, more deliberate in the choices they make and less susceptible to persuasive

influences. Regarding the effects of mindfulness, empirical studies confirm positive influences of mindfulness on a variety of factors ranging from well-being, health, creativity to cognitive performance (Creswell, 2017). Against this background, we aim to contribute to the controversial debate about digital services by linking the concept of mindfulness to digital service consumption and explore its effects. Specifically, our aim is to investigate the following two research questions: Firstly, whether supporting digital service design features have an impact on consumers' mindfulness in the service process. Secondly, whether consumers' mindfulness in the digital service process effects the psychological outcomes stress, well-being and satisfaction. To the best of our knowledge, no study exists which investigates consumer interaction in digital service processes from a mindfulness perspective. The contribution of this research is threefold: we inform the debate about digital services by providing insights on the mental processes related to the use of digital service design features. In addition, we shed light on the psychological effects of mindful- versus mindlessness in digital service contexts. This in turn, this research may contribute to the question, to what extent digital service design should be accompanied by ethical considerations.

2. Literature review and research propositions

2.1 The research context

In the service research literature, digital services as our research context have been conceptualised as services in the electronic mediated environment (EME) and defined as "*services being facilitated by IT where the consumer interacts with a user interface including web site, mobile phone or tablets to gain a consumption experience and desired benefits*" (Dai & Salam, 2010, p. 2). The process underlying digital services is IT-based self-service. Hence, the user experience is typically personalized, context adaptive and real-time (Leimeister, Österle, & Alter, 2014). Although the core service offering remains unchanged, compared with non-digital equivalents, digital processes are more prone to exerting influence on the user due to the accompanying support services. These are based on commonly used features designed to steer the user throughout the self-service process. They enable a predictable and intentional influence on the end-user's cognitive state and behaviour. Among the most widespread design features applied in supportive digital services are reduction, social comparison and tailoring (Oinas-Kukkonen & Harjuma, 2009). Reduction refers to systems designed to reduce the effort that users expend with regard to the task performance (e.g.

endless-scroll). Social comparison offers means for gathering together people who have the same goal and make them feel norms (e.g. recently viewed). Furthermore, tailoring refers to means that bring the user closer to his or her own behavior and builds on familiarity (e.g. personalized push notifications). Our research focuses on digital support services infused with these persuasive design principles.

2.2 Impact of digital service design on consumer mindfulness

In current service research, design is conceptualised in a neutral way as a proposed course of action for changing an existing situation into a preferred one (Patrício, Gustafsson, & Fisk, 2017). In other words, the designer in his designs attempts to ensure a fit between content and form in such a manner that the user may change his cognitive stance and/or course of action (Andrew, Borriello & Fogarty, 2007). From a normative perspective, the targets of supporting digital service designs as such are discussed. Whereas economic considerations justify designs aiming for increased user engagement or spend, consumer behaviourists refer to the social responsibility concerns related to overconsumption and potentially unhealthy lifestyle choices (Kohler et al. 2011). From a persuasive system design perspective that is adopted in our paper, the focus is on digital design features' ability to trigger either unconscious or voluntary change, regardless of the targeted attitude or behavioural changes (Oinas-Kukkonen & Harjumaa, 2009). Whereas the former is commonly referred to as manipulation, the latter is described as persuasion, although it is acknowledged that the boundaries between the two may be blurred. Whether supporting digital services increase or decrease the likelihood of conscious and hence mindful usage has not been answered consistently. For example, Lowe et al. (2015) take a positive stance, arguing that supporting digital services leverage the technology's ability to provide more relevant, more accessible and more supportive information. This in turn, leads to choices regarding the information format as well as the messages sent that increase the users' ability to track the long-term consequences of their decisions and, subsequently, may also positively affect conscious decision making. Similarly, conceptualizations of online service convenience explicitly include the users' sense of control over the utilization and conversion of their time and effort in achieving their goals (Dai and Salam, 2014). Furthermore, the literature emphasizes the notion of the consumer as a proactive co-creator in the IT-enabled self-services, who is actively steering the course of action in a way that the value created and extracted is maximized. The co-creation perspective treats consumers not only as "users" but also as "producers" of the digital service experience (Brown and Martin, 2015). In sharp contrast, critical voices emphasize that although the

technology and systems as such may be neutral, by designing them, the form and content of the messages conveyed become vehicles of manipulation. Interestingly, easy access, convenient usage and personalized content as the main advantages of supportive digital services are simultaneously seen as risk drivers for mindful usage (Wansink, 2015). They enable companies to exploit the bias and psychological processes of automatized behaviour, conditioning and familiarity effects, which are known to impair conscious information processing (Rosenberg, 2004). Supporting empirical studies show for example that Smartphone overconsumption results in cognitive deficits (Hartanto & Yang, 2016) and digital music consumption may cause compulsive use (Shapira et al., 2003). We can capture both lines of reasoning from the literature in the following two opposing propositions:

P 1a: Using supporting digital services has a positive impact on consumer mindfulness in the service process

P 1b: Using supporting digital services has a negative impact on consumer mindfulness in the service process.

2.3 Psychological effects of consumer mindfulness in the digital service process

Over the past three decades, mindfulness has been the subject of extensive research not primarily within business but in medicine, psychology and education (see for an overview Creswell, 2017). In our study, we use the conceptualisation of mindfulness as a naturally occurring characteristic which may be sharpened or dulled by factors such as design qualities (Sternberg 2000). Mindfulness as a form of conscious mental processing allows humans to operate efficiently and to consciously regulate their thoughts and behaviour (Hülsheger et al. 2013). This in turn, makes consumers less vulnerable to manipulation and false sources of satisfaction. It can also show in the form of economic well-being, which emerges from self-control and reflective, fiscally prudent ways of consumption (Brown & Ryan, 2003). Furthermore, selected scholarly contributions have argued that mindful consumers are more likely to consider the ecological facets of consumption when taking decisions (Sheth, Sethia, & Srinivas, 2011). Supporting empirical studies confirm positive effects of mindfulness on stress (Creswell, 2017), well-being (Brown & Ryan, 2003) and on satisfaction (Lowe, Fraser & Souza-Monteiro, 2015). Although to date, no empirical studies have confirmed the effects of mindfulness specifically for digital service processes, we adopt the causal reasoning as well as empirical insights from other contexts in the following three propositions:

P2a: The consumer's mindfulness throughout the digital services process has a negative influence on his / her perceived stress.

P2b: The consumer's mindfulness throughout the digital services process has a positive influence on his / her well-being.

P2c: The consumer's mindfulness throughout the digital services process has a positive influence on his / her overall satisfaction with the service experience.

3. Methodology

To explore these propositions, an initial empirical study based on a diary approach was conducted. Diaries involve the recording and analysis of events and experiences over time and in real-life context (Wiseman, Conteh, & Matovu, 2005). Data was collected using event contingent experience sampling, in which participants complete self-reports after a designated event (i.e. using a digital service). The choice of this approach is justified by its following characteristics (Wiseman, Conteh, & Matovu, 2005): Firstly, event contingent diary studies enable a more profound understanding of the covariation in stimulus conditions (supporting design services) and responses of human behaviour (mindful usage). Secondly, they allow for an investigation in real-life settings, supporting ecological validity. This is particularly important when studying the concept of mindfulness, which is proposed to be especially vulnerable to observation biased. Thirdly, diary-based data collection impedes memory bias which is common to global self-reports (retrospective recall, autobiographical memory).

3.1 Procedures

Participants were asked to report their experiences with digital services over the course of eight days using an online questionnaire designed for this cause. In line with event contingent experience sampling, they were requested to record each experience right after using a digital service. The briefing of participants included the following information: (1) A description of the study's definition of digital services and supporting services based on examples; (2) Instructions on events to be reported using three prescribed digital service categories selected for the study; (3) Instructions on the time and effort needed to participate in the study. Participants were reminded to fill out the questionnaire four times during the time period of the data collection. The data was received in anonymized form and cannot be tracked back to the participants. Data collection took place in May 2019.

3.2 Sample

27 subjects were recruited to participate in the study. Participants were volunteers between 21–65 years of age, 20 of them were female, 11 had obtained a Bachelors- or Masters-Degree. With these 27 participants, the sample contained 100 individual experiences with digital services. These experiences were further clustered into three categories: (1) communication and networking service experiences such as using Instagram, Facebook or LinkedIn (51%); (2) information service experiences such as online newspapers, blogs or forums (33%) and; (3) shopping and booking experiences using apps such as Zalando or Booking.com (16 %).

3.3 Measures

For each experience, participants indicated which app they had used and noted their usage of nine distinct supporting services (Oinas-Kukkonen & Harjuma, 2009; see Table 1).

Table 1: Frequencies of Support Services Availability (out of 100 Experiences) and their Usage

Support Service	**available**	**not used by**	**in %**	**used by**	**in %**
Endless scroll	56	12	21%	44	79%
Recently viewed	87	58	67%	29	33%
Pull-to-refresh	77	20	26%	57	74%
Auto play	48	15	31%	33	69%
Receiving rewards	55	49	89%	6	11%
Receiving likes	64	38	59%	26	41%
Game-streaks	18	17	94%	1	6%
Notifications	97	55	57%	42	43%
Reviews	96	70	73%	26	27%

Participants' mindful usage of the digital service was measured using a scale consisting of four items out of the German version of the Mindful Attention Awareness Scale (MAAS) (Michalak, Heidenreich, Ströhle & Nachtigall, 2008). Questions regarding participants' overall satisfaction were adopted from Bodet (2008), stress-experience was adopted from the German version of the Perceived Stress Scale (Klein, 2016) and positive affect was adopted from the German version of the "Positive and Negative Affect Schedule" (PANAS) (Krohne et al., 1996). Additionally, participants indicated their general mindfulness (trait mindfulness), based on the German mindfulness Scale (Michalak et al., 2008). This scale contained seven items and served as a control for general mindfulness. Mindfulness as well as psychological outcome measures all used a 7-point Likert-scale ("not agreeing at all" – "totally agree").

4. Findings

4.1 Descriptives

Mindfulness during the digital service process resulted in a mean of 4.57 (Standard deviation (SD) = 1.55; Cronbach α = 0.776). The participants were overall satisfied with the experience (M=5.4; SD = 1.36; Cronbach α = 0.90). Levels of well-being were high (M=5.7; SD = 1.25) while stress levels were low (M=2.13; SD = 1.23; Cronbach α = 0.84) throughout the digital service processes. The trait-mindfulness resulted in a mean of 4.73 (SD = 1.25; Cronbach α = 0.87). Trait-mindfulness did not correlate significantly with mindfulness during the digital service process (r = -.09).

4.2 Investigating the propositions

In order to investigate propositions 1a and b we conducted nine separate t-tests measuring the impact of the usage of all nine supporting services on users' mindfulness in the service process. The analysis included only the subset of digital service experiences that contained the respective supporting services (i.e. if endless scroll wasn't available the experience was excluded from analysis). With one exception, the data provides neither support nor contradicts Proposition 1a or Proposition 1b. In general, consumers that used the support services were not significantly more mindful than consumers that indicated they had used the service. The exception is endless scroll: Here we find support for Proposition 1a. Consumers using the support service indicated significantly higher levels of mindfulness in the digital service process (M = 4.8, SD = 1.5; t (df = 11) = 2.5, p > .05) compared to consumers that didn't use endless scroll (M = 3.6; SD = 1.2; (n = 44)).

In order to investigate propositions 2a, 2b and 2c, correlations between mindfulness throughout the digital service process and the according psychological outcomes were calculated. Because of the missing normal distribution for the according variables we used non-parametric correlations (Spearman's Rho) to investigate the relationship between, stress, well-being and satisfaction with the service experience. In line with Proposition 2a, we find a negative correlation between mindfulness and perceived stress (-.341, p = .001). In accordance with Proposition 2b and 2c, the analysis reveals a positive correlation between mindfulness during the digital service process and well-being (.210, p = .003) as well as overall satisfaction (.210; p = .038).

5. Discussion, limitation and implications

Our study has been designed to contribute to the novel field of research on psychological effects of digital service usage that is about to emerge. While the findings confirm the importance of consciousness and focused attention for a positive outcome of digital service

consumption, they do not provide evidence for the manipulative effect of persuasive design principles. Such a middle ground position may pave the way for constructive co-development efforts among both, supporter and critics of digital services. For companies with business interests in future digital service growth, social responsibility appears to be linked to designs which support the consumer ease of use without jeopardising his or her awareness. In the literature, guidelines have been proposed about the clarity with which both the aim of the design principles applied should be communicated as well as the effort that needs to be placed onto monitoring the extent to which the services succeed in achieving this aim (Torning & Oinas-Kukkonen 2008). Moreover, suggestions to go beyond short-term outcomes such as app usage or user spend and move towards more comprehensive variables such as value-in-use should be adopted (Ranjan and Read 2016). Value-in-use takes a longer-term perspective and includes service-usage implied personal transformation. It is best monitored through longitudinal research designs such as panel studies. This would also be in line with the proposed avenue for service research designed to strengthen the managerial as well as societal impact and examine the role of technology-driven services for well-being (Patrício, Gustafsson, & Fisk, 2017. p. 4). A further avenue could be joint initiatives between socially responsive businesses and stakeholders from public and non-profit organisations to increase service user mindfulness through trainings (Zhu, Hedman & Li, 2017). Ranging from books to podcasts and indeed apps with practical exercises for improving mindful digital service consumption, such initiatives could potentially leverage the advantages of digital services while limiting its risks.

Similar to other preliminary research, this study is accompanied by several limitations. While, the real-life experience setting had the advantage ecological validity, this design didn't permit neither for a control of the actual experience as a whole nor for the supporting services. For example, a concrete extraction of the technological context concerning e.g. the interaction (clicking, navigating) versus the presentation layer or the content of the app was not possible. Hence, our research included a great variety of digital services that resulted in broad range of individual experiences. Further investigations with experimental designs are called for that enable a fuller control of the experiences with support services and permit a more precise measure of the respective causal relationships between design features and mindfulness.

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