Social Networking Site Use Resumption: A Model of Return Migration

Authors

Christian Maier*, University of Bamberg, christian.maier@uni-bamberg.de

Sven Laumer, Friedrich-Alexander Universität Erlangen-Nürnberg, sven.laumer@fau.de

Jason Bennett Thatcher, Temple University, jason.thatcher@temple.edu

Heshan Sun, Price College of Business, University of Oklahoma, sunh@ou.edu

Christoph Weinert, University of Bamberg, christoph.weinert@uni-bamberg.de

Tim Weitzel, University of Bamberg, tim.weitzel@uni-bamberg.de

* corresponding author

Abstract

This research explains why individuals resume using social networking sites (SNSs) after quitting using them. Drawing on return migration theory, we developed a theory-driven model of SNS resumption, which includes two novel antecedents of SNS resumption behavior: non-use-related dissatisfaction and use-related satisfaction. We also hypothesize that dispositional resistance to change moderates the impact of non-use-related dissatisfaction and use-related satisfaction on resumption. We used a mixed-method approach to refine and evaluate the research model. Study 1 uses the critical incident method to identify SNS specific antecedents of non-use-related satisfaction and use-related satisfaction, allowing us to refine the research model. Study 2 uses structural equation modelling to evaluate our research model using two three-wave surveys: one with recent ex-users who recently decided to stop using and to delete their profile on Facebook and one with long-standing ex-users who had stopped using and deleted their profile on Facebook a long time ago. We found support for most relationships in our model: non-use-related dissatisfaction and use-related satisfaction drive resumption intentions and dispositional resistance moderates these relationships. Furthermore, we found that the time elapsed since users discontinued Facebook moderated these relationships such that the effect of non-use-related dissatisfaction on resumption intention is stronger for recent ex-users and the one of use-related satisfaction stronger for long-standing ex-users. Our findings advance understanding of resumption, an understudied behavior of the IT lifecycle and IT use and acceptance research.

Keywords: Resumption, Mixed-Method Studies, Three-wave Empirical Study, Social Network Sites, Facebook, IT Lifecycle, Post-Adoption

Introduction

Social networking sites (SNSs) constitute a social technology that engage users by offering a simple technological frame to enable satisfying individuals' social needs (Tarafdar et al. 2020). While the SNS continue to draw users, there are hints that all is not well for all in the SNS domain. Indeed, recent history is replete with SNSs that failed financially or failed to grow. For example, Friendster, one of the earliest SNS, reported 115 million users in 2011, only to quietly shut its doors to users in 2015. MySpace, which was "*once the king of the Internet"* (TechCrunch 2011), has been eclipsed by Facebook. Even popular SNSs are encountering declining numbers of users. For example, Facebook, the largest and most globally dispersed SNS, has experienced declining activity among registered users in its most lucrative markets (Keach 2018), recently losing more than 2.8 million U.S. users under 25. Analysts predict continued decline in the future (Wagner and Molla 2018). Similarly, LinkedIn suffers from low use rates, with only 50% of 500 million registered users active on the platform monthly (Aslam 2018). Since SNS business models depend on active users, such declining use creates concerns about the long-term viability of specific SNSs and leads to potential losses in shareholder value (Shaban 2018).

A plausible explanation for the declining number of users is that individuals migrate across SNSs. Evidence abounds that young users migrate across SNSs (eMarketer 2018). For example, young Facebook users flocked to Instagram, Snapchat and TikTok, resulting in Facebook acquiring Instagram, offering to purchase Snapchat, and adding new functionality to the platform that better satisfies individuals' social needs (Bary 2017). Explanations for such movement include new platforms offering a more robust community that meet individuals' social needs or offering a richer set of technological features (Maier, Laumer, Eckhardt, Weitzel 2015; Morrison and Gomez 2014).

While explanations for migration to new SNSs exist, academic literature offers scant insight into why some SNS users *migrate back* to a previously used SNS platform, i.e., resumption of SNS use. The extant studies have investigated why users join an SNS (Hu et al. 2011), continue using it (e.g, due to perceptions of switching costs, (Carter et al. 2014)), and discontinue using it (Maier, Laumer, Eckhardt, Weitzel 2015). Prior research generally considers discontinuation as an end state of the user-SNS relationship. However, evidence suggests that even when some SNS users delete their

accounts, they may later return by re-registering and resume using that SNS (Harmon 2015; Morrison and Gomez 2014). Nostalgia for the abandoned virtual community is a plausible explanation for such resumption of SNS use by ex-users (Gómez 1998). An ex-user may miss social connections found on the previously used SNS platform or want to regain access to ideas and thoughts expressed by community members (Emami 2017). Such returning SNS users are particularly desirable to platforms (Frier 2018), because they possess intimate knowledge of the platform, strengthen existing social networks on the platform, and affirm to existing users the value of participating on the platform vis-à-vis a newer rival platform. Therefore, this research aims to understand the following research question:

What factors drive ex-users to resume use of an SNS platform that they previously used and discontinued?

To approach this question, this research develops a model of SNS resumption that integrates the characteristics of social technologies and personality traits that guide SNS resumption. The model is based on return migration theory, which was originally developed to explain how social embeddedness in a city in which one previously lived draws individuals to go back to that city (Gmelch 1980; King 2015; Zhao 2002). Return migration theory suggests that push, pull, and mooring factors encourage the movement of people across communities, and thus offers a tool that can be used to glean insight into why ex-users return to an SNS. We view SNS platforms as neighborhoods similar to physical locations in which social ties and amenities can draw departed community members back to familiar neighborhoods. Specifically, we seek to explain how user resumption of an SNS is driven by social and technological factors tied to prior SNS use as well as to current use experience (e.g., rival platforms) and demonstrate how these elements shape individual SNS resumption. Return migration theory helps us explain how satisfaction with past SNS experience and dissatisfaction with no longer using the SNS leads to resumption of SNS use. We draw upon information systems literature (Hong et al. 2014; Te'eni 2017) and that of related disciplines (Johns 2006) to contextualize return migration theory to the SNS context.

This research contributes to the literature in several ways. First, it illuminates and extends our current understanding of the lifecycle of SNS use by integrating resumption as a distinct postadoption behavior (Maier 2020; Maier, Laumer, Weinert, Weitzel 2015). The existing SNS literature has

studied adoption, continued use, and discontinuance of SNS platforms. Resumption behavior, however, has received little, if any, attention. Our research addresses this gap by explicitly studying SNS resumption behavior. Second, our research systematically develops a new model of SNS resumption based on return migration theory through analyses that reveal that non-use-related dissatisfaction (a push factor) and use-related satisfaction (a pull factor) shape resumption intentions. This research also illustrates how dispositional resistance to change, a mooring factor, exerts an influence on resumption indirectly, through moderating the impact of non-use-related dissatisfaction and use-related satisfaction on SNS resumption. Third, we contextualize our model to the SNS context and specify that communication underload, information underload, replacement overload, social isolation, and boredom shape non-use-related dissatisfaction. Fourth, we provide evidence of the generalizability and boundary conditions of this model through results that demonstrate consistency across samples of recent and long-standing ex-users. These contributions strengthen the understanding of how individuals use IS and offer new directions for future research.

Theoretical Background and Model Development

In this section, we develop a contextualized model of SNS resumption, drawing upon return migration theory (Gmelch 1980; King 2015; Zhao 2002). Our application of return migration theory suggests that physical re-migration to a location in which one previously lived is analogical to resuming use of an SNS. In both situations, individuals have specific and actual knowledge about the abandoned location, be it a geographical location or a virtual SNS location. Such knowledge, together with the status quo, helps shape return migration decisions.

Return migration theory

Return migration theory is an adaption of migration theory. The original *migration theory* was developed to explain why people move across geographical locations. Lee (1966) effectively summarized the central tenets of migration theory: individuals migrate when they are attracted by a new location (pull factors) and/or repelled by a current location (push factors) but not constrained by intervening obstacles (mooring factors). Migration typically refers to long-term or permanent physical relocation (Lee 1966) and has been used to explain several phenomena in the general migration context (Stimson and Minnery 1998). Later, migration theory has been generalized to explain different

phenomena, for example, consumer switching behavior generally (Nimako and Winneba 2013) and between brands (Ghasrodashti 2018); traveler switching behavior in the airline (Jung et al. 2017) and hotel industry (Lehto et al. 2015); consumer switching in multichannel services (Chiu et al. 2011) and banking (Gerrard and Cunningham 2004); and employee commitment to employers (Fu 2011) and job switching intentions (Haldorai et al. 2019).

In the IS context, migration theory has been used to explain end users moving to the cloud (Bhattacherjee and Park 2013; Wu et al. 2017), switching between online games (Hou et al. 2011) or browsers (Yu et al. 2017), switching in the mobile shopping context (Lai et al. 2012), switching between blogs (Zhang et al. 2012) or instant messaging platforms (Sun et al. 2017), and switching between SNSs, e.g., from Facebook to Instagram (Chang et al. 2014; Xu et al. 2014). Consistent with migration theory, IS findings on SNS migration indicate that users migrate when dissatisfied with their current SNS and attracted by an alternative (Hwang et al. 2018; Xu et al. 2014). As in the geographical migration context, switching costs might limit SNS switching (Chang et al. 2014).

The original migration theory was later adapted to study return migration. The adapted *return migration theory* extends migration theory and explains how pull, push, and mooring factors influence people's return decisions (Gmelch 1980; King 2015; Zhao 2002). Table 1 summarizes the differences between the original migration theory and return migration theory. Where the original migration theory emphasizes people's migration from the original location to a new location, return migration focuses on a person's returning to the origin location, where he or she previously lived, from the current location. In the context of return migration, pull factors attract individuals to return to their origin locations; push factors drive individuals to leave their current locations; mooring factors constrain return migration. Specifically, research posits that satisfaction with the origin location (a pull factor) and dissatisfaction with the current location (a push factor) influence return migration (Jong and Fawcett 1981; Speare et al. 1982). Moreover, personality traits constitute mooring factors that influence return migration decisions (Jokela 2009; Tabor et al. 2015).

Table 1. Return migration theory as an adaptation of migration theory

Characteristics	Migration Theory	Return Migration Theory

Explanation	Why an individual moves to a place s/he has not lived before.	Why an individual moves back to a place s/he has lived before.
Temporality	*Current* experience and expectations for the *future.*	Satisfaction from the *past*, dissatisfaction with the *current* location, and expectation for the *future* in the old location all play a role.
Locations relevant for the decision	... the current location … the unknown target location	... the current location … the target location, which s/he knows as s/he has lived there before
Actual knowledge	… about the current location s/he is living	… about the current location s/he is living … about the target location, as s/he had lived before.
Expectations	… about the target location	… about the returning location.

Temporality also constitutes an important factor in return migration, with pull factors (e.g. satisfaction with the originating location) being grounded in the past and push factors (e.g. dissatisfaction with the current location) being grounded in the present (Dustmann and Weiss 2007; Lee 1966; Zhao 2002). Hence, both satisfaction with the past and dissatisfaction with the present are assessed simultaneously when individuals consider return migration.

Return migration theory has been used to explain why people move back to origin locations, which can take the form, for example, of immigrants returning to their country of origin, individuals moving back to a hometown, or individuals moving from a city back to a rural area (Cieslik 2011; Lu et al. 2009).

Return Migration in SNS Contexts

Similar to migration theory, which is useful to explain the virtual migration from one virtual neighborhood to another (Xu et al. 2014), we argue that return migration theory is useful for explaining virtual return migration, i.e., when individuals return to virtual social neighborhoods in which they previously 'lived' (see Table 2). Applying return migration theory allows for the consideration of not only past experience with an SNS but also current experience with no longer using the SNS. It also underscores the importance of considering mooring factors, e.g., dispositional resistance to change, when seeking to understand why users form the intention to resume SNS use.

Table 2. Summarizing pull, push, mooring factors		
Type of factors	**Original understanding based on Lee (1966)**	**Definition in the context of SNS resumption**
Push factor	Negative factors at the current location that encourage people to migrate back to the origin destination.	Negative factors related to the situation of no longer using the SNS with its possibilities to socialize with others that drive ex-users to resume using it.
Pull factor	Positive factors at the origin destination that attract people to migrate back to it.	Positive factors related to the previously used SNS such as the perception about the technological and social characteristics of the SNS, which convince ex-users to resume using it.
Mooring factor	"Intervening obstacles" constraining the migration.	Intervening obstacles that constrain ex-users' resumption of the SNS use.

To contextualize return migration theory, we followed Hong et al.'s (2014) recommended guidelines and start with the general return migration theory, refine it to fit the SNS context, identify and model SNS specific beliefs (Ajzen and Fishbein 1980), examine interplays between those perceptions and beliefs, and examine alternative models (see Table 3). By doing so, we developed a contextualized model that depicts the socio-technological experience of SNS resumption, which includes push and/or pull factors closely tied to the specific technological and social elements of SNSs.

Table 3: Research Approach to Contextualize Return Migration Theory to SNS Resumption	
First guideline ("Grounded in a General Theory")	A general theory, return migration theory (Gmelch 1980; King 2015; Zhao 2002), guides our research. It explains why individuals who had left their home country decide to migrate back home again from an individual perspective. In short, research indicates that migration is often temporary and that previous investments and social ties increase return intentions. We adapt return migration theory to the socio-technical context of SNS use. This provides us with the possibility of studying why an ex-user of the SNS Facebook resumes using the SNS. **We define SNS resumption as an individual's behavior to start using an SNS again after having voluntarily and consciously decided to discontinue its use previously.** The conscious decision is, for example, reflected in closing and deleting one's Facebook account. This distinguishes resumption behavior from temporal discontinuation, e.g., when a user stops using Facebook for a period of time without the idea of permanently leaving Facebook.
Second guideline ("Contextualizing and Refining a General Theory")	In line with research using migration theory in IS research (Bhattacherjee and Lin 2014), we argue that resumption behavior—in contrast to return migration—requires less effort in the SNS context. While returning users need to become reacquainted with the SNS platform, refamiliarize themselves with the platform's rules and norms, and catch up with the new features and interfaces, we do not consider switching costs or efforts to be a significant burden and, as such, do not account for them in our research model. Moreover, we adapt general return migration theory in the SNS context. Specifically, we theorize factors pushing ex-users away from the non-use status, factors pulling ex-users to resume use, and mooring factors restricting SNS resumption. As resumption behavior implies that ex-users have bonds with using and no longer using the SNS, respectively, we consider

	non-use-related dissatisfaction and use-related satisfaction to be major push and pull factors influencing SNS resumption.
Third guideline ("Thorough Evaluation of the Context to Identify Context-Specific Factors")	We conducted a qualitative study (Study 1) with 41 ex-users to understand SNS-specific beliefs that form non-use-related dissatisfaction and use-related satisfaction. This step is required, as previous research has not identified beliefs influencing non-use-related dissatisfaction.
Fourth guideline ("Modeling Context-Specific Factors")	We propose direct effects of the identified SNS-related beliefs on non-use-related dissatisfaction and use-related satisfaction, which both influence SNS resumption intention. We performed a quantitative analysis (Study 2) consisting of two samples. For each sample, we set up a longitudinal study with three surveys each to understand how the identified beliefs, pull, push, and mooring factors, influence resumption intention and behavior. In all, 299 individuals—distinct from the 41 participants in Study 1—participated in Study 2 in two different samples (recent ex-users: 118; long-standing ex-users: 181).
Fifth guideline ("Examination of the Interplay Between Technology Artifact and Other Factors")	We acknowledge that mooring factors are among others personality traits (e.g., dispositional resistance to change), which have a moderating role on how non-use-related dissatisfaction versus use-related satisfaction translated into SNS resumption. Beyond this, we also propose that there are different relative influences of non-use-related dissatisfaction versus use-related satisfaction on SNS resumption for recent and long-standing ex-users. Recent ex-users are individuals who recently discontinued using Facebook, while long-standing ex-users are individuals who stopped using Facebook over six months prior to data collection.
Sixth guideline ("Examination of Alternative Context-Specific Models")	We include control variables germane to SNS resumption and conduct mediation analysis to explore how different, context-specific models shape SNS resumption.

When contextualized to SNSs, return migration focuses attention on why SNS users go back to a familiar virtual neighborhood. We define SNS resumption behavior as an individual's behavior to start using an SNS again after having voluntarily and consciously decided to discontinue its use previously. Studying SNS resumption enables explaining why an ex-user, who previously discontinued using an SNS platform, might choose to resume use of the SNS. It is worth noting that to be an ex-user, an individual must consciously *decide* to no longer use an SNS platform, e.g., by deleting his/her account. This nuance distinguishes an ex-user from occasional users (i.e., those who may rarely use an SNS but still psychologically consider themselves to be users). From the perspective of a specific SNS, such as Facebook, this implies that there are two different types of ex-users: quitters and switchers. Quitters refers to individuals who have a Facebook account, then decide to delete their accounts without using an alternative SNS. Second, it might also be that individuals delete their accounts and switch to using an alternative SNS such as Instagram. We consider that resumption behavior is possible for both types of ex-users in case that they, later, resume using Facebook.

SNS resumption is analogous to returning to a physical location, in that both require a person to reverse a previous migration decision. In both cases, individuals are likely to have bonds (e.g., social connections) and prior experience with the previous situation (e.g. experience with a location or a SNS platform). In the case of return migration, an individual leaves a location and explores an alternative location or locations before migrating back to the original location. Analogously, concerning SNS resumption, an individual discontinues use of an SNS and may have explored alternative SNSs or other ways of interacting with others before resuming use of the original SNS.

Resumption: A New Type of SNS Behavior

SNS resumption behavior is distinct from well-studied adoption, continuance, and discontinuance patterns in two important ways. First, resumption research focuses on ex-users, whereas adoption research focuses on non-users (or potential users), explaining why individuals who have never used a system are willing to begin using it. Adoption research examines adopters' expectations about the outcomes of SNS use based on little or no direct knowledge of the consequences of use (Hu et al. 2011; Lampe et al. 2013). For example, research demonstrates that adopters' perceptions about using SNSs differ from non-adopters' expectations about SNS use in terms of hedonic outcomes, utilitarian outcomes, subjective norms, perceived ease of use, and fear of IT (Maier et al. 2011). In contrast, resumption focuses on ex-users, who are not using the system but have previous experience using the system, such that their resumption decisions are not only based on expectations, as in the case of adopters, but also on experiences and direct knowledge of the consequences of use derived from prior use behavior.

Second, SNS use and discontinuation research focuses on why existing users continue or discontinue using a SNS. On the one hand, SNS usage research has studied why users continue use of a SNS. For example, research has shown that user satisfaction shapes continuance intentions with using a SNS (Basak and Calisir 2015; Hu and Kettinger 2008), which in turn is influenced by users' perceived usefulness and enjoyment of using it (Gerow et al. 2017; Maier et al. 2012a). On the other hand, SNS discontinuation research studies the implications of behavior change (i.e., becoming an ex-user). However, unlike adoption research, it assumes that users base their decisions on present knowledge regarding the future challenges and benefits of abandoning a technology (Maier 2020).

While existing discontinuation research has studied *quitters* and *switchers*, our study focuses on *returners*.

The above discussion implies a need for developing a new theoretical perspective to distinguish resumption vis-à-vis other use behaviors. Unlike the prior research on SNS adoption, continuance and discontinuation, research on resumption behavior focuses on ex-users and requires understanding of how ex-users integrate both knowledge of past use and assessments of future benefits to make resumption decisions. Therefore, the resumption context references a different set of knowledge and expectations than are held by other types of users, such as non-users or actual users. Moreover, temporality can further distinguish among ex-users: *recent ex-users* who recently discontinued the use of an SNS and *long-standing ex-users* who have discontinued using an SNS for a relatively longer time (e.g., six months ago). While recent ex-users tend to be more acutely aware of the implications of non-use (e.g., missing friends, information feeds, and so on), long-standing ex-users may be more focused on memories of their SNS use experience.

One could argue that switching theories, which are part of discontinuation research, could explain resumption, as they account for a behavioral change—for example, changing from using Facebook to using Instagram. However, while switching theories focus on user comparisons between the 'old' technology (e.g., Facebook) versus the 'new' one (e.g., Instagram) (Polites and Karahanna 2012), resumption is about 'switching back' to a technology, with which a user already has prior experience (e.g., Facebook) .

In summary, resumption behavior represents a new type of system use behavior because it is performed by ex-users who are aware of the consequences of resumption, based on their prior experience with using a technology (e.g., SNS) as well as current experience with not using the technology (SNS) or using alternative technologies. Return migration theory, with its focus on push, pull, and mooring factors associated with previous and current situations, is well-suited to explaining this interplay between prior and current beliefs about technological factors that shape resumption.

Research Model and Hypotheses about SNS Resumption

Our research model of SNS resumption (see Figure 1) draws on return migration theory to predict SNS resumption intention and behavior. Specific hypotheses are discussed below.

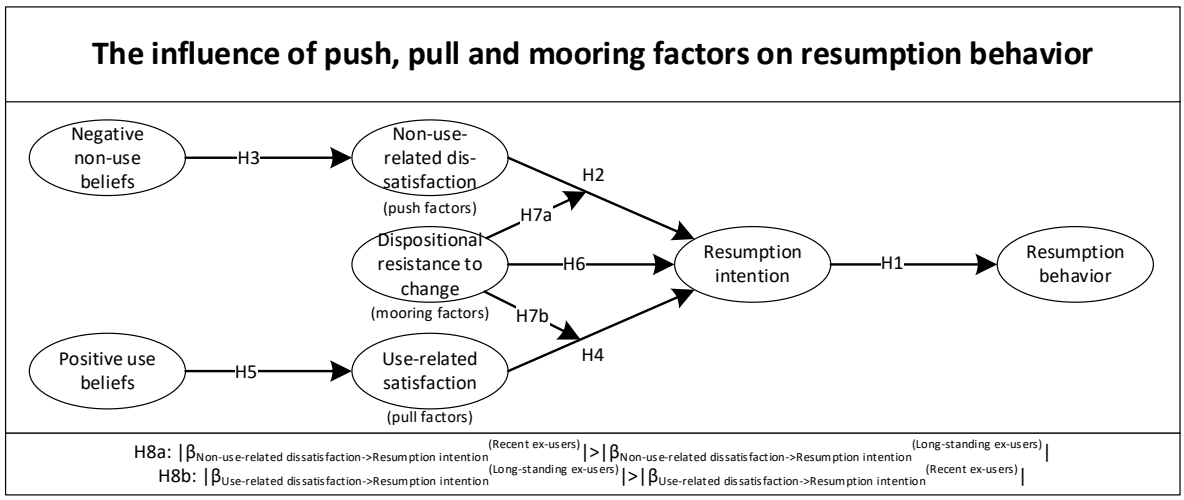

Figure 1: Research Model of SNS Resumption

We define SNS resumption intention as an ex-user's conscious behavioral intention to use an SNS again after having discontinued using it. Social psychology-based IS research (e.g., Bhattacherjee and Lin 2014; Venkatesh et al. 2003) and SNS research (Maier, Laumer, Weinert, Weitzel 2015) suggest that rationally formed behavioral intention influences behavior. This logic has been well studied in many IT contexts and should hold true for return SNS migration contexts. Hence, we propose that ex-users will resume using an SNS when they have intentions towards resuming use:

H1: An ex-user's intention to resume using an SNS positively influences his or her resumption behavior.

Given return migration theory implies that ex-users' intentions to resume SNS use will be driven by push, pull, and mooring factors, our research model contextualizes push, pull, and mooring factors in the SNS context.

Push factors. In return migration theory, push factors are defined as the factors that repel individuals, thus driving them to leave the current location. In the SNS context, push factors are defined as the negative, adverse factors about the non-use situation that push individuals away from the non-use of the SNS back toward resuming SNS use. We argue that the non-use-related

dissatisfaction, defined as an ex-user's affective response reflecting his or her overall negative evaluation of not currently using a specific SNS, is a push factor. Prior research has shown the significant effects of dissatisfaction on behavioral change (Maier, Laumer, Weinert, Weitzel 2015). Individuals usually avoid negative experiences and will make proactive behavioral changes to avoid negative experiences (Stein et al. 2015). For example, an ex-user of Facebook may become dissatisfied with not using it because it is difficult to maintain all social relationships when no longer using Facebook. As a result, he/she may form an intention to return to Facebook. Similarly, a Facebook ex-user who switched to Instagram, may become dissatisfied after realizing that many of his/her friends do not use Instagram, and such dissatisfaction may cause him or her to develop resumption intention. Thus, the presence of non-use-related dissatisfaction will motivate ex-users of an SNS to consider resumption, thereby avoiding or diminishing negative effects associated with not using this particular SNS. Thus, we hypothesize:

H2: An ex-user's non-use-related dissatisfaction positively influences his/her resumption intention.

We argue that non-use-related dissatisfaction is grounded in non-use-related user beliefs. Research has suggested that dissatisfaction is often a result of individuals' negative beliefs (Tarafdar et al. 2010). For example, it is argued that when individuals appraise an IT event as a threat and perceive a lack of control over potential consequences, dissatisfaction is a possible negative emotion that may arise (Beaudry and Pinsonneault 2005). In the technostress context, it has been shown that technostressors lead to low end-user satisfaction (Tarafdar et al. 2010). This suggests that ex-users' negative beliefs about not using an SNS will likely lead to non-use dissatisfaction. For example, if ex-users feel isolated or bored because of the absence of an SNS in their lives, they will be more likely to feel dissatisfied with the current state of not using the SNS. Thus, we hypothesize:

H3: An ex-user's negative beliefs about not using an SNS positively influences his or her non-use-related dissatisfaction.

Pull factors. In return migration theory, pull factors are factors that motivate people to re-migrate to their origin location. In the SNS context, pull factors refer to positive factors about using an

SNS that bring individuals back to use of the SNS. These positive factors stem from individuals' satisfaction associated with prior SNS use (Maier et al. 2012b). We define this use-related satisfaction as an ex-user's present affective response reflecting his or her overall positive evaluation of past use of the SNS, based on the general definition of satisfaction (Oliver and Westbrook 1982). Research has indicated that such distal recollections of satisfaction associated with outcomes of previous behavior can be stored in a person's long-term memory and can be retrieved later to shape recalled use satisfaction and predict future behavior (Collopy 1996). These distal evaluations are relevant to individuals' resumption intentions, because they can be retrieved from an individual's long-term memory (Myers 2004; Thompson and Kim 1996) even when the SNS is no longer used. The positive relationship between satisfaction and behavioral intention has been well established in the IS literature (Wixom and Todd 2005). Hence, we hypothesize that ex-users will more likely resume using an SNS when the level of use-related satisfaction is high. In contrast, ex-users who evaluate the prior use of a SNS as less satisfactory are less likely to develop an intention to resume using it. Thus, we hypothesize:

H4: An ex-user's use-related satisfaction positively influences his or her resumption intention.

Prior IS research has investigated how various user beliefs such as information quality, system quality (Wixom and Todd 2005), disconfirmation of previous expectations, and perceived usefulness can lead to satisfaction. In SNS research, research suggests that positive beliefs lead to satisfaction (e.g., Maier et al. 2012a; Xu et al. 2014). Among others, it has also been shown that user's perceived usefulness (Maier et al. 2012a) or perceived enjoyment (Turel and Serenko 2012) influence user satisfaction with a SNS. Hence, in the context of resumption, we hypothesize:

H5: An ex-user's positive beliefs about having used an SNS positively influence his or her use-related satisfaction.

Mooring factors. Mooring factors represent intervening factors that are difficult to change and that hinder or facilitate behavioral change (e.g., Bansal et al. 2005; Lee 1966; Moon 1995). Return migration theory suggests that intervening factors may moderate the effects of push and pull factors on return migration intention or behavior. More specifically, personality traits, which are constant

patterns of thoughts, feelings, and behavior across diverse situations, often operate as mooring factors (McCrae and Costa 2006). For example, personality traits have been shown to be a mooring factor that influences migration or return migration behavior (Jokela 2009; Tabor et al. 2015). Also, research has demonstrated that personality-related mooring factors such as low variety seeking (Jung et al. 2017) and risk tolerance (Ojiaku et al. 2018) influence switching behavior.

We believe that in an SNS migration context, mooring factors can moderate how push and pull factors influence individuals' resumption of SNS use. Sun et al. (2017) have shown that in the context of migration in a virtual context, inertia operates as mooring factor that influence the effect of push and pull factors in shaping virtual migration behavior. In a similar vein, IS research has widely examined personality traits (Thatcher et al. 2018; Thatcher and Perrewé 2002) and has shown that personality traits influence IS-related behavior (Eckhardt et al. 2016; Maier et al. 2019) or moderate the influence of beliefs on behavior (Devaraj et al. 2008). As such, personality traits can behave as intervening obstacles that hinder or facilitate IS use.

Our research focuses on *dispositional resistance to change* as a mooring factor, which is defined as a person's general inclination to resist change of any kind (Oreg 2003). Dispositional resistance to change has been described in recent research as inhibiting behavioral change in general (Hon et al. 2014; Oreg 2006) and IT use in particular (Laumer et al. 2015; Polites and Karahanna 2012). In the SNS context, research has found that dispositional resistance to change moderates the formation of SNS-specific beliefs and behaviors over time (Maier et al. 2012b). Dispositional resistance to change influences the belief update of perceived usefulness and perceived ease of use such that users with high dispositional resistance to change tend to have more stable beliefs over time. Moreover, dispositional resistance to change shapes how beliefs are developed by confirming one's own behavior (Maier et al. 2012b).

We argue that dispositional resistance to change directly influences SNS resumption intentions. It has been shown that individuals with high dispositional resistance to change are less likely to adopt new SNSs or change their SNS usage behavior (Maier, Laumer, Weinert, Weitzel 2015), reflecting their preference for avoiding changes in general. Similarly, we argue that ex-users with high resistance to change tend to exhibit lower intentions to resume SNS use because this would

imply switching from the current status (not using an SNS) to a new status (resume using the SNS). Individuals with a high dispositional resistance to change seem to manifest more consistency regarding their decisions (Oreg 2003), which, in the context of this study, would indicate that ex-users with a high dispositional resistance to change are likely to stick with their previous decision to not using the SNS. Thus, we hypothesize:

H6: An ex-user's dispositional resistance to change negatively influences his or her resumption intention.

We further argue that dispositional resistance to change, which is specifically relevant for change-related contexts (Laumer et al. 2015; Oreg 2006), will also moderate the influence of push and pull factors on SNS resumption intentions. Personality traits are intervening factors that can positively or negatively moderate how beliefs influence behavioral intentions (Devaraj et al. 2008; Maier et al. 2012b). Return migration theory generally argues that personality trait-based mooring factors moderate the positive relationship between push and pull factors and behavioral intentions (e.g., King 2015).

We argue that dispositional resistance to change moderates the effects of non-use-related dissatisfaction as well as use-related satisfaction on resumption intentions. First, we argue that each ex-user has a different threshold of non-use-related dissatisfaction: the ex-user considers resumption only if the level of dissatisfaction is above that threshold. An ex-user's dispositional resistance to change determines the threshold above which non-use-related dissatisfaction translates into resumption intention. Ex-users with high dispositional resistance to change have a higher threshold (Maier et al. 2012b; Oreg 2003) that must be reached before non-use-related dissatisfaction impacts resumption intentions. That is, a person with high dispositional resistance to change has to be sufficiently dissatisfied to change his or her behavior and migrate back to a previously used SNS. Similarly, an individual's dispositional resistance to change also determines the threshold of use-related satisfaction that must be reached before use-related satisfaction translates into resumption considerations. That is, a person with high dispositional resistance to change needs a higher level of satisfaction with past use of a SNS as the motivation to migrate back to that SNS. When a person has a low level of dispositional resistance to change, he/she is open to change and accordingly is more likely

to migrate back to a SNS, even if his/her motivation from past use, reflected as use-related satisfaction, is not that strong. Together, we hypothesize:

H7: Ex-users' dispositional resistance to change negatively moderates the influence of **(a)** non-use-related dissatisfaction, and **(b)** use-related satisfaction on resumption intentions, such that the influence is weaker when dispositional resistance to change is higher.

Recent vs Long-Standing Ex-users. Return migration research suggests that time (i.e., duration of absence) is an important factor impacting individual decisions to return to a place of origin (König 2000). Similarly, time (e.g., length of a customer-merchant relationship) has also been shown to be relevant for resumption behavior in other contexts (Zhang et al. 2014). Therefore, we believe the above hypotheses about pull, push, and mooring factors may bear different implications for users who discontinued use of a SNS for a long time versus those who did recently. For the context of SNS use, we define duration of absence as the time between discontinuance (i.e., when a person quits using an SNS) and resumption (i.e., when the person resumes using the SNS).

Defining duration of absence helps us distinguish two types of ex-users: recent ex-users (who discontinued using the SNS recently) and long-standing ex-users (who discontinued using the SNS a long time ago). Recent ex-users are more likely to resume previous behavioral use patterns when their habits are still strongly in place (Polites and Karahanna 2012, 2013). Recent ex-users consider prior SNS use to be a familiar and ingrained behavioral use pattern. Even for highly motivated users, breaking this pattern is challenging (Maier, Laumer, Weinert, Weitzel 2015; Polites and Karahanna 2013). When a recent ex-user is confronted with negative aspects of non-use (e.g., feel socially isolated), he or she is more likely to fall back into the old behavioral patterns that are still familiar and ingrained (Polites and Karahanna 2013), i.e., resuming use of the SNS. In contrast, long-standing ex-users have already broken the familiar and ingrained behavior patterns of SNS use and thus are less likely to revert back to using the SNS. Therefore, recent ex-users are more vulnerable than long-standing non-users to push factors (non-use-related dissatisfaction) that motivate resumed use of an SNS. We therefore hypothesize:

H8a: The influence of non-use-related dissatisfaction on resumption intentions is stronger for recent ex-users than for long-standing ex-users.

We argue that use-related satisfaction more strongly influences long-standing ex-users than recent ex-users. For ex-users, nostalgia can be an important factor (Gómez 1998). When no longer part of a virtual community, individuals may begin to selectively shape prior experience such that positive experiences (e.g., feeling connected) outweigh the negative ones (e.g., communication overload). In line with nostalgia research (Wildschut et al. 2006), in the SNS context, while negative experiences may motivate departure from the virtual community, long-standing ex-users may, over time, begin to focus primarily on recollections of positive memory about the discontinued SNS. In contrast, for recent ex-users, the negative experiences that led them to discontinue use of the SNS are fresh and nostalgia is weak. As such, we argue that use-related satisfaction likely exerts a stronger effect on long-standing ex-users than on recent ex-user. We therefore hypothesize:

H8b: The influence of use-related satisfaction on resumption intentions is stronger for long-standing ex-users than for recent ex-users.

A Mixed-Method Approach

We employed a mixed-method, two-study design. Because previous research in IS use does not directly map to our current research question, mixed-methods studies have been determined to be useful (Venkatesh et al. 2013). We followed the epistemological approach of pragmatism, which places the greatest importance on the research question and on selecting the most suitable research method, allowing us to combine different methods and paradigms—i.e., *induction*, in line with our qualitative study and *deduction*, in line with our quantitative study using two samples. Our design strategy can be characterized as sequential, mixed-method, multistrand, and less-dominated qualitative followed by dominant quantitative investigation. By doing so, we were able to elaborate a theory that offers a rich understanding of SNS resumption behavior. We summarize our studies and analysis in Figure 2.

Previous research has suggested that to study a new behavioral pattern it is necessary to first identify relevant salient beliefs (Ajzen and Fishbein 1980). Therefore, Study 1 uses qualitative

methods to identify specific user beliefs that are associated with use-related satisfaction and non-use-related dissatisfaction. The refined research model is then evaluated in Study 2, which employs quantitative methods to analyze data collected from recent ex-users and long-standing ex-users. By drawing two samples, we were able to evaluate the effect of temporality on our model. Using an illustrated mixed-method approach, we were then able to corroborate and triangulate research findings to gain a more complete understanding of resumption and its antecedents.

It is worth noting that in this research we chose a six-month threshold to distinguish recent ex-users and long-standing ex-users: those who quitted a SNS platform within six months are considered recent ex-users; those who quitted a SNS platform more than six months ago are considered long-standing ex-users. The rationale is that in behavioral IS research, it is typical to use intervals of one to six months in longitudinal studies, indicating that people are more likely to update their beliefs within six months.[1]

[1] While consistent with the literature Venkatesh et al. (2003); Kim and Malhotra (2005); Sun (2013), we recognize that using a six-month threshold to distinguish recent versus long-standing users is somewhat arbitrary. We are not aware of a theoretically or empirically derived threshold for determining when to call ex-users recent or long-standing, so we adhered to best practices found in the IS literature.

Study 1: Qualitative study	Study 2: Quantitative study (with two samples)	
	…. with recent ex-users	…. with long-standing ex-users
Purpose ▪ Identify salient beliefs **Approach** ▪ Critical incident technique ▪ 41 interviews (23 recent ex-users; 18 long-standing ex-users) ▪ Dialog with recent and long-standing ex-users **Result** ▪ Inventory of salient beliefs causing satisfaction with use and dissatisfaction with non-use that bring users back to using the system ▪ Individuals think about IS resumption after discontinuation	**Purpose** ▪ Evaluate the research model with recent ex-users **Approach** ▪ Longitudinal research design with 3 waves of surveys ▪ 118 recent ex-users ▪ PLS analysis (valid measurement and structural model) **Result** ▪ Identification of factors causing resumption	**Purpose** ▪ Evaluate the research model with long-standing ex-users **Approach** ▪ Longitudinal research design with 3 waves of surveys ▪ 181 long-standing ex-users ▪ PLS analysis (valid measurement and structural model) **Result** ▪ Identification of factors causing resumption

Figure 2: Mixed-method research approach

Study 1: Qualitative Study

Study 1 aimed to identify context-specific user beliefs, a strategy that Ajzen and Fishbein (1980) recommend when studying new phenomena. We interviewed 18 long-standing and 23 recent ex-users. We contacted users through an established Facebook panel to locate ex-users who used Facebook but then had stopped using it. The 41 ex-users were almost equally divided between men and women and had an average age of 30.2 years. We followed the critical incident technique (Flanagan 1954) and used a qualitative data coding procedure (Miles et al. 2013; Myers 2009). More details about study design, sampling strategy, sample characteristics, and methodology are described in detail in Appendix A.

Results

We found that 38 of the 41 ex-users of Facebook reported having thoughts about resuming Facebook use. Representative user statements include:

> "*Although I was really sure that quitting Facebook was a good decision, I am quite unsure whether it would be better to go back to using it. Now that I am not using it at the moment, I view lots of things differently than before [while I was using it].*"

"This new viewpoint [of not using Facebook] makes Facebook more attractive than before, so I could imagine using it again; but I have to think about this more carefully over the next few days, weeks, and months."

"You never know whether not using Facebook is the right decision. I have to conclude that taking this step towards non-use was probably the right one despite some challenges, but you never know."

"I agonize over whether it might better to resume using it."

Furthermore, our interviews revealed five major negative beliefs ex-users had about non-use of Facebook: communication underload, information underload, replacement overload, social isolation, and boredom (see Table 4). More detailed quotes describing these non-use beliefs can be found in Appendix A (Table Appendix-1).

Table 4: Non-use beliefs identified using qualitative analyses (see Appendix A, Table Appendix-1 for exemplary quotes)

Non-use belief	Definition	# of mentions by 23 recent ex-users	# of mentions by 18 long-standing ex-users
Communication underload	A negative perception of being involved in fewer than desired interactions, as a result of no longer using an SNS.	19	11
Information underload	A negative perception of receiving less information than desired, as a result of no longer using an SNS.	20	13
Replacement overload	A negative perception of having to use too many different (non)technological alternatives to replace the functionalities of the discontinued SNS.	15	3
Social isolation	A negative perception of having fewer social contacts and feeling not well-embedded in the social network, as a result of no longer using an SNS.	16	9
Boredom	A negative perception of having nothing to do and not knowing what to do with oneself, as a result of no longer using an SNS.	11	6

Communication underload: Participants reported that discontinuing Facebook use contributed to diminishing communication quantity and quality in two ways. First, participants reported that discontinuing Facebook reduced the number of conversation partners. Second, participants reported an overall reduced quantity of communication due to the loss of the communication channel facilitated by Facebook. These effects were particularly significant for weak social ties such as acquaintances, neighbors, former work colleagues, friends and contacts made while traveling or working abroad.

Although not in frequent contact with these individuals, participants reported that they missed having an easy way to maintain contact. While most participants reported difficulty maintaining contact with weak ties, many also reported that without Facebook they also experienced less communication with strong ties.

Information underload: Participants reported that no longer using Facebook reduced their access to information. Facebook offers users the opportunity to give and receive information from one's social environment (Maier, Laumer, Eckhardt, Weitzel 2015). No longer using Facebook makes it difficult to gather information concerning both strong and weak ties. In our study, the participants felt less informed about their social network and in general, i.e. about current events. This was especially relevant for participants who had used Facebook to engage with special interest groups.

Replacement overload: Participants complained that there was no single adequate substitute for Facebook. They reported that alternative communication channels such as SMS or WhatsApp and other SNSs such as Instagram were less sufficient for their needs because they were only useful for communicating with certain members of their previous Facebook network. Participants also complained that alternatives are generally more complicated to use and do not provide the same functionalities. In short, participants reported that Facebook alternatives they tried did not have comparable advantages in terms ease of use and features, requiring them to feel replacement overload, because they had to use several alternatives (e.g. SMS, WhatsApp, e-mail, Instagram) to maintain contact with their social network, which required more effort (Maier, Laumer, Weinert, Weitzel 2015).

Social isolation: Participants reported that no longer using Facebook caused them to feel socially isolated. For example, participants reported difficulties maintaining contact with many of their Facebook friends and difficulty maintaining contact with new people they met in real life. Participants also reported feeling like friends forgot them after they quit Facebook.

Boredom: Participants reported that prior to quitting Facebook, they were unaware of the amount of time they spent on Facebook, and also complained that they missed using Facebook to coordinate group events and other leisure activities. After leaving Facebook, participants reported higher levels of boredom and noted that they sometimes felt an uncomfortable sense of not knowing what to do. While

Facebook resulted in more free time, participants felt unsure about how to fill these new gaps in their day and experienced greater boredom.

Summary: Study 1 findings suggest that discontinuing SNS, particularly, Facebook, use resulted in five negative non-use beliefs capable of impacting levels of non-use-related dissatisfaction. Hence, we refine H3 with these five non-use beliefs:

> **H3:** (a) Communication underload, (b) information underload, (c) social isolation, (d) boredom, and (e) replacement overload due to no longer using an SNS positively influences non-use-related dissatisfaction.

Similarly, our qualitative study confirmed the relevance of two positive beliefs about previous SNS use, perceived usefulness of prior SNS use and perceived enjoyment of prior SNS use, consistent with previous research. These findings are summarized and defined in Table 5 and explained in more detail below[2].

Table 5: Use beliefs identified using qualitative analyses (see Appendix A, Table Appendix-1 for detailed quotes)

Use belief	Definition	# of mentions by 23 recent ex-users	# of mentions by 18 long-standing ex-users
Perceived usefulness of prior SNS use	The belief that using an SNS would be useful.	19	11
Perceived enjoyment of prior SNS use.	The belief that using Facebook would be fun.	20	13

Perceived usefulness of prior SNS use: Facebook ex-users reported usefulness as a driver of satisfaction with using Facebook. Participants perceived Facebook as useful for staying in contact with others and communicating with both strong and weak ties. Since numerous IS studies have shown that perceived usefulness predicts adoption and postadoption use of many technologies (Karahanna et al. 1999; Venkatesh 2000) including Facebook use (Maier, Laumer, Weinert, Weitzel 2015), we were not

[2] It is worth noting that perceived ease of use, which is defined as the degree to which using a system is perceived to be free of effort, is not examined in this research because research suggests that perceived ease of use becomes less salient after the adoption stage, as users gain more experience using the system Venkatesh (2000). In contrast, as experience grows, perceived usefulness and perceived enjoyment become more salient Agarwal and Karahanna (2000); van der Heijden (2004).

surprised to find that perceived usefulness of prior SNS use was a salient user belief among our participants.

Perceived enjoyment of prior SNS use: In line with previous research indicating that perceived enjoyment is a positive feature of Facebook use (Turel and Serenko 2012), we were not surprised to find that our participants also confirmed the importance of perceived enjoyment of prior SNS use: participants specifically mentioned that playing virtual online games and using applications was a fun and positive feature of the Facebook user experience that contributed to user satisfaction.

Summary: Study 2 findings confirm that perceived usefulness of prior SNS use and perceived enjoyment of prior SNS use were relevant to ex-users' satisfaction with Facebook use. Hence, we refine H5 with these two use-related beliefs:

> **H5**: An ex-user's (a) perceived usefulness of prior SNS use and (b) perceived enjoyment of prior SNS use of an SNS positively influences his/her use-related satisfaction.

A Refined Research Model of SNS Resumption

Based on the theoretical arguments developed above and the specific beliefs identified through the qualitative study, we refine our research model by integrating the five negative beliefs related to non-use and two positive beliefs related to the use of the SNS Facebook, as depicted in Figure 3. This research model provides the basis for our quantitative study, as will be discussed next.

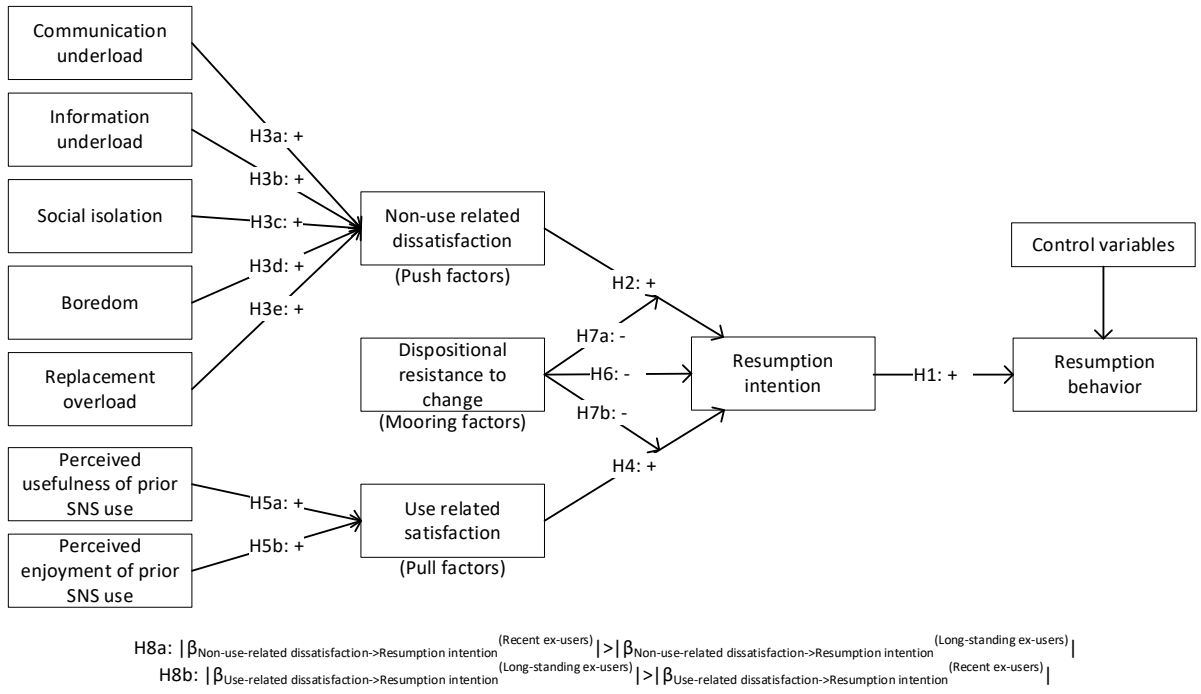

Figure 3: Refined Research Model of SNS Resumption

Study 2: Quantitative Study with two Samples

To test our research model, we conducted surveys focusing on Facebook, because it is the largest and most widely used SNS. Appendix B describes the study design and strategy for each sample. We conducted two empirical studies each focusing on a specific sample. In the first sample we focus on recent ex-users and in the second sample we focus on long-standing ex-users. Both are longitudinal and consist of three waves of data collections. Sample characteristics are provided in Table 6.

Table 6: Sample characteristics of the 118 recent ex-users (Sample 1) and 181 long-standing ex-users (Sample 2)

		Sample 1: Recent ex-users	**Sample 2: Long-standing ex-users**
Gender		50% female, 50% male	44% female, 56% male
Age (in percent, mean 30.2 | 33.4)	**<20**	21.1	1.8
	20-29	42.7	36.8
	30-39	23.2	43.3
	>39	15	18.1
Number of friends in Facebook (in percent, mean 301 | 227)	**<100**	7.1	31.9
	100-199	19.7	19.8
	200-299	30.7	14.5
	300-399	16.8	15.7

	400-499	18.6	4.1
	>499	7.1	14
Time spent on Facebook (in percent, mean 39.9 min | 55.8 min)	**<15min**	24.8	22.1
	15-30min	27.4	34.9
	31-45min	22.1	14
	46-60min	12.4	5.8
	60-120min	6.2	15.1
	>120min	7.1	8.1
Functionalities used frequently (in percent)	**Chatting/writing private messages**	78.1	73.5
	Checking newsfeed	77.2	79.4
	Clicking like-button	54.2	49.2
	Browsing friends' lists of friends	24.7	22.1
	Posting messages	14.6	19.6
	Searching for individuals	8.9	9.8
Note: Data were collected in the first survey			

Measures

All measures used in our quantitative study can be found in Appendix B (Table Appendix-6). As much as possible, we adapted previously validated measures. For each of the five items, we measured *non-use-related dissatisfaction* and *use-related satisfaction*, which have both been used in general contexts (Bhattacherjee and Lin 2014) as well as SNS-specific research (Maier, Laumer, Eckhardt, Weitzel 2015). For non-use-related dissatisfaction, we adapted the items by adding the term "not" before "using Facebook" in each item to draw focus to the non-use period: for example, "I am very satisfied with using Facebook" versus "I am very dissatisfied with not using Facebook."

To measure perceived enjoyment of prior SNS use and perceived usefulness of prior SNS use, we refer to previous research that measures both beliefs in the context of using the SNS Facebook (Maier, Laumer, Weinert, Weitzel 2015; Turel and Serenko 2012). To measure *replacement overload*, we used four items validated in prior research (Maier, Laumer, Weinert, Weitzel 2015), such as "I have to use too many different alternatives in order to stay in touch with my social environment." and "I have to use too many different alternatives in order to get information from my social environment." For *dispositional resistance to change*, we used measures from Oreg's (2003) research. We conceptualized it as a second-order construct, including four dimensions of routine seeking, emotional reaction, short-term thinking, and cognitive rigidity.

We self-developed measures of *social isolation*, *communication underload*, *information underload*, and *boredom*. The instrument development process is described in Appendix B. To measure resumption intention, we started with prior related research focusing on related intentional and behavioral variables (Venkatesh et al. 2012) and adapted the items to the context of resumption. This resulted in three items we used to measure resumption intention, including "In the future, I intend to use Facebook again." In line with previous research focusing on behavioral variables, we measure resumption behavior using a Yes / No item: "I am using Facebook again." [3]

We included control variables used in other research on IT acceptance or SNS. Specifically, we included control variables such as age, gender, number of Facebook friends, time spent on Facebook per day before discontinuance, discontinuance motivation, social embeddedness, and duration of absence (in the long-standing ex-user sample only). For the sample of recent ex-users, we also included habit (Bhattacherjee and Lin 2014). Discontinuance motivation acknowledges that an ex-user's decision to stop using an SNS can be two-dimensional: individuals might either be attracted by an alternative SNS or they may just decide to stop using the SNS. Therefore, we ask: "Please specify whether you started using an alternative after you deleted your Facebook account." Social embeddedness reflects how many good friends were Facebook friends. We measured it using one item: "How many of your prior Facebook-friends were real friends (as a percentage)." Duration of absence (focused on long-standing ex-users) reflects a self-assessment about how long it had been since an individual stopped using Facebook. To measure this, we asked: "Please specify how long ago you deleted your Facebook account."

Data Analysis

In line with previous research (Tarafdar et al. 2020), we used tools including CB-SEM to develop new measures and then turned to the use of the partial least squares (PLS) method using SmartPLS 3.2.4 (Ringle et al. 2014) to evaluate the research model. We used PLS, because it is particularly suitable for investigating new theoretical relationships, e.g., resumption and its antecedents, due to its high statistical power (Sarstedt and Mooi 2019).

[3] We also collected data for resumption behavior with a 7-point Likert scale. Results are comparable in a way that significant relationships remain significant. Only the R^2 values differ slightly.

To ensure our sample size met power requirements for detecting significant relationships, we followed Kim's (2005) suggestion and calculated power based on a) number of variables / degrees of freedom, b) the relationship among the variables, c) choice of fit index, and d) the value of the fit index and proposes a range of different fit indexes. Focusing on the more restrictive sample with more variables (the sample focusing on long-standing ex-users) and using Steiger's gamma (with γ=0.95; α=0.05; *Power* = 0.90), the proposed sample size is 110.8, while using RMSEA (α=0.05; *Power* = 0.90) reveals a minimum proposed sample size of 39.6 for the proposed research model. Both samples (sample 1: 116 recent ex-users, sample 2: 181 long-standing ex-users) exceeded these requirements.

Measurement model

Since each construct and the first-order constructs of dispositional resistance to change are measured by reflective indicators, we evaluated the content validity, indicator reliability, construct reliability, and discriminant validity of the measurement model (Bagozzi 1979). We evaluated the second-order construct consistent with guidelines offered by Wright et al. (2012). We also assessed the extent of common method bias (CMB) using four different tests and conclude that CMB should not be an issue for our results (see Appendix B). We also tested the differences in the responses between early and late respondents by comparing the demographics for the first 33% and the last 33% of responses. The t-test we used revealed no significant differences ($p>0.05$), suggesting that early-late response bias is likely not an issue.

Indicator reliability. The indicator reliability shows the degree to which the variance of an indicator originates in the latent variables. To explain 50% of the variance of a latent variable on the basis of the indicators, the loading must be at least 0.707 (Carmines and Zeller 2008). This was fulfilled for all indicators in both samples. Moreover, based on a bootstrap analysis using 5,000 samples, we found the loadings to be highly significant (Appendix B, Table Appendix-6).

Construct reliability. To determine the quality at the construct level, we used composite reliability (CR) and average variance extracted (AVE) (Fornell and Larcker 1981). AVE should be higher than 0.5 and CR higher than 0.7; as shown in Appendix B (Table Appendix-7 and Table Appendix-8), both criteria were met for both samples.

Discriminant validity. Discriminant validity describes the extent to which specific measurement items differ from others (Campell and Fiske 1959). Therefore, the square root of AVE is included in Appendix B (Table Appendix-7 and Table Appendix-8) on the diagonal of the bivariate correlations. As these square root values are greater than the corresponding construct correlations (Fornell and Larcker 1981; Hulland 1999), we can state with confidence that this requirement was fulfilled in both samples. As the heterotrait-monotrait (HTMT) ratio of correlations criterion detects a lack of discriminant validity more reliably than the Fornell-Larcker criterion, it is used to assess discriminant validity (Henseler et al. 2014). Using the absolute $HTMT_{0.85}$ criterion indicates that discriminant validity was not an issue in our research, meaning that the measurement model is valid in both samples.

We also tested for multicollinearity. We used the variance inflation factor (VIF) as an indicator, which revealed that in both samples the VIF value was lower than the recommended maximum VIF value of 5 (Rogerson 2001); the highest value between social isolation and non-use-related dissatisfaction (the sample focusing on recent ex-users) was 2.948.

Structural model

We use the coefficient of determination (R^2), the significance levels of each path coefficient, the effect size, the moderation effects, and the standardized root mean square residual (SRMR) to evaluate the structural model. Figure 4 indicates that our model explained 47.0% (recent ex-users) / 67.7% (long-standing ex-users) of the variance of an individual's resumption intention, which in turn explained 47.4% / 50.4% of actual resumption behavior. Moreover, the salient beliefs about non-use explained 59.2% / 59.4% of non-use-related dissatisfaction. Interestingly, the salient beliefs (perceived usefulness of prior SNS use and perceived enjoyment of prior SNS use) about use explained 18.3% of the variance in recent ex-users' use-related satisfaction and 60.0% of the variance in long-standing ex-users'.

Concerning the path coefficients and whether these are significant, we found the results to be comparable in samples of both recent and long-standing ex-users. Specifically, resumption intention is a good predictor of resumption behavior for both recent (H1: $\beta = 0.52$, $p < 0.005$) and long-standing ($\beta = 0.58$, $p < 0.005$) ex-users. Furthermore, our results reveal that use-related satisfaction (H4: $\beta = 0.34$,

$p < 0.005$ [recent ex-users]; $\beta = 0.61$, $p < 0.005$ [long-standing ex-users]) and non-use-related dissatisfaction (H2: $\beta = 0.39$, $p < 0.005$ [recent ex-users]; $\beta = 0.28$, $p < 0.005$ [long-standing ex-users]) significantly influence resumption intentions.

Dispositional resistance to change, the mooring factor, does not significantly influence resumption intention directly (H6: $\beta = 0.05$, $p > 0.05$ [recent ex-users]; $\beta = -0.02$, $p > 0.05$ [long-standing ex-users]). However, it moderates the impact of how non-use-related dissatisfaction (H7b: $\beta = -0.30$, $p < 0.005$ [recent ex-users]; $\beta = -0.14$, $p < 0.05$ [long-standing ex-users]) and use-related satisfaction (H7a: $\beta = -0.15$, $p < 0.05$ [recent ex-users]; $\beta = -0.16$, $p < 0.05$ [long-standing ex-users]) impact resumption intentions.

Concerning the identified salient beliefs, our results confirmed that communication underload (H3a: $\beta = 0.29$, $p < 0.005$ [recent ex-users]; $\beta = 0.24$, $p < 0.01$ [long-standing ex-users]), information underload (H3b: $\beta = 0.23$, $p < 0.01$ [recent ex-users]; $\beta = 0.23$, $p < 0.005$ [long-standing ex-users]), social isolation (H3c: $\beta = 0.19$, $p < 0.01$ [recent ex-users]; $\beta = 0.24$, $p < 0.01$ [long-standing ex-users]) and boredom (H3d: $\beta = 0.13$, $p < 0.05$ [recent ex-users]; $\beta = 0.13$, $p < 0.05$ [long-standing ex-users]) have significant effects on non-use-related dissatisfaction. However, replacement overload has no significant impact on non-use-related dissatisfaction (H3e: $\beta = 0.05$, $p > 0.05$ [recent ex-users]; $\beta = 0.05$, $p > 0.05$ [long-standing ex-users]). Our results also suggest that perceived usefulness of prior SNS use (H5a: $\beta = 0.13$, $p < 0.05$ [recent ex-users]; $\beta = 0.25$, $p < 0.01$ [long-standing ex-users]) and perceived enjoyment of prior SNS use (H5b: $\beta = 0.35$, $p < 0.005$ [recent ex-users]; $\beta = 0.60$, $p < 0.005$ [long-standing ex-users]) significantly influence use-related satisfaction.

Concerning the control variables, our results reveal that habit is the only control variable collected in the sample of recent ex-users that significantly influences resumption behavior (see Appendix B Table Appendix-9).

To test the temporal effects hypothesized in H8, we used the approach suggested by Dibbern and Chin (2005) and Chin and Dibbern (2006) to compare path coefficients between recent and long-standing ex-users. Our results reveal significant differences regarding the influence of non-use-related dissatisfaction on resumption intention (stronger for recent ex-users; $d = 0.11$, $p < 0.05$) and for the

influence of use-related satisfaction on resumption intentions (stronger for long-standing ex-users; d = 0.27, $p < 0.05$). Similar results can be seen when using the Partial Least Squares Multi-Group Analysis (PLS-MGA) for both relationships ($p < 0.05$), so that we find support for H8a and H8b.

In line with developing a single-context model (Hong et al. 2014), we include mediation analysis to study whether and how the identified user beliefs influence SNS resumption. Results indicate that each belief—except for replacement overload ($p > 0.10$ in both samples)—has an indirect effect on resumption behavior ($p < 0.05$ for all effects in both samples).

Finally, Henseler et al. (2014) proposed using the SRMR, which is defined as the difference between the observed and the predicted correlation, as an absolute measure of fit. Based on the value of 0.078 [recent ex-users] and 0.071 [long-standing ex-users], we conclude that a good fit was achieved.

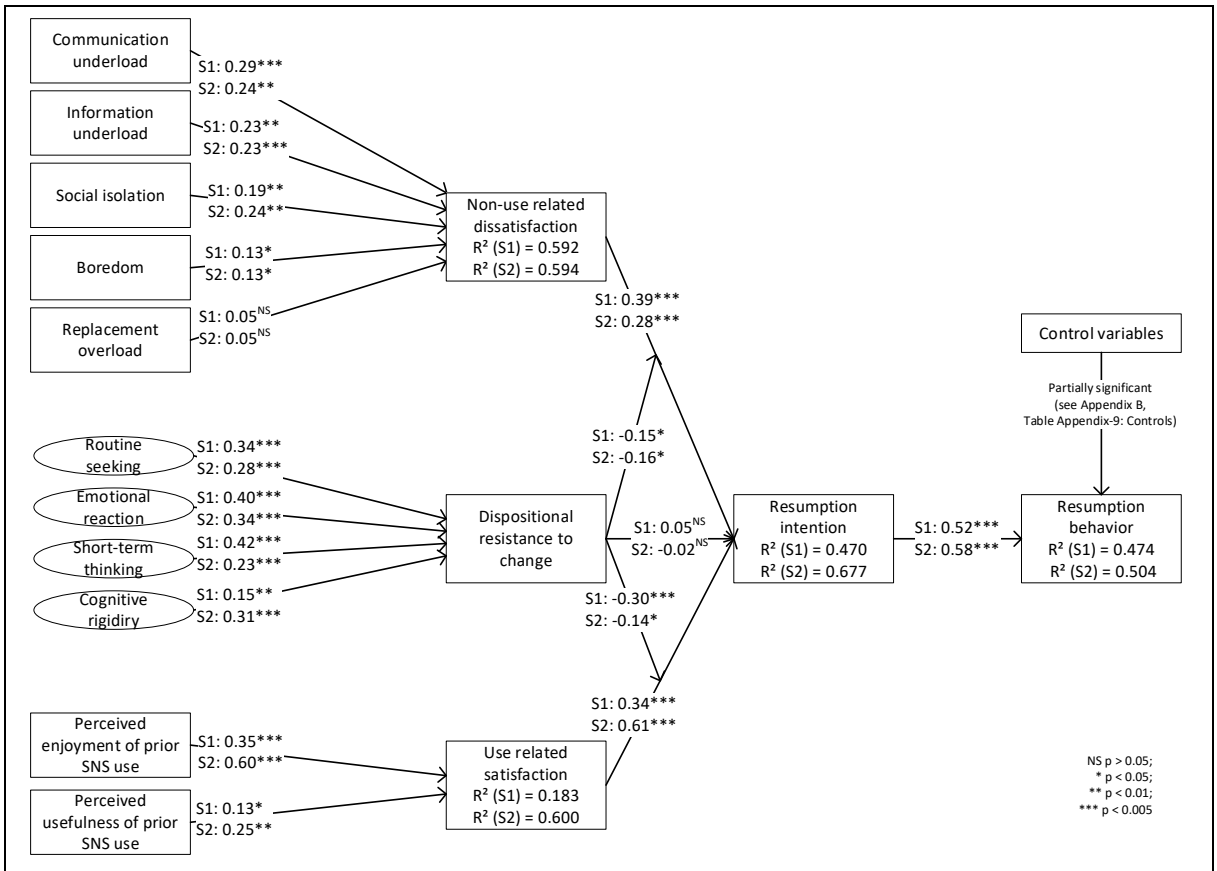

Figure 4: Hypothesis Test Results

Note: Two samples are denoted with S1 for the sample of recent ex-users and S2 for the sample of long-standing ex-users. Constructs measured at three different points in time (Appendix B, Figures Appendix-1, Appendix-2). Rectangles are constructs; ellipses are dimensions.

Post hoc analysis

Using a revised structural model, we then investigated the relationship between non-use-related dissatisfaction and use-related satisfaction. We included an additional path in the model to assess whether non-use-related dissatisfaction experienced during non-use of the SNS might cause distorted perceptions of use-related satisfaction among ex-users. Findings indicate a significant positive relationship (recent ex-users: 0.38, $p < 0.005$; long-standing ex-users: (0.40, $p < 0.005$) between non-use-related dissatisfaction and use-related satisfaction. It is noteworthy that other relationships did not significantly change in this analysis.

Furthermore, since our main analysis reveals differences for recent ex-users and long-standing ex-users, we further analyzed the relative importance[4] of non-use-related dissatisfaction and use-related satisfaction separately for each of the two different groups of ex-users. To do so, we estimated configurational invariance and compositional invariance (see Appendix B: Measurement invariance). We used the path comparison method proposed by Cohen et al. (2003), which has been applied in previous research (Maier et al. 2019), together with Dibbern and Chin's (2005) and Chin and Dibbern's (2006) techniques. First, when focusing on recent ex-users, the results suggest that there is no difference in the influence of non-use-related dissatisfaction or use-related satisfaction on resumption intentions ($p > 0.05$ per Cohen test). Second, when focusing on long-standing ex-users, we found that use-related satisfaction had a stronger effect on resumption intentions than did non-use-related dissatisfaction for long-standing ex-users ($p < 0.01$ per Cohen test).

Meta-inferences

Before discussing results, we draw meta-inferences between the qualitative findings of Study 1 and those of Study 2 (Venkatesh et al. 2013). While applying the epistemological perspective of pragmatism, we selected combined reasoning approaches, e.g., induction (in line with our qualitative study) and deduction (in line with our quantitative study). We used inductive reasoning to derive our qualitative inferences about salient beliefs shaping non-use-related dissatisfaction and use-related satisfaction. Then, we used deductive reasoning to deduce the inferences of our quantitative study

[4] To clarify, for H8, we test whether paths included in our research model are different between recent vs. long-standing ex-users. In that post-hoc analysis testing the relative influence, we focus on both samples (recent and long-standing ex-user) separately and thereby study whether non-use related satisfaction has a stronger/weaker effect on resumption intention than use related satisfaction in each sample.

regarding the impact of identified beliefs on the resumption behavior of long-standing and recent ex-users. In both studies, we aimed to minimize threats such as biases during the data collection, inadequate data transformation, and failure to address validity issues by using established analysis and validity criteria, thus ensuring the high quality of our meta-inferences. With that, and with using the mixture of generalizability modes, we were able to triangulate the inferences of both studies to deduce meta-inferences.

We observed high convergence between the two studies: Study 1 identified salient beliefs, which, with the exception of replacement overload, were confirmed in Study 2 as significant antecedents relevant for non-use-related dissatisfaction and use-related satisfaction. Furthermore, we drew on Study 1 to generate complementary insights from Study 2. First, we observed that the identified beliefs and the two types of dis/satisfaction (i.e., non-use-related dissatisfaction and use-related satisfaction) have an impact on resumption intention and behavior. Second, we found evidence that the findings are valid for recent as well as long-standing ex-users, even though the two types of dis/satisfaction guide resumption intention in different ways. Finally, our quantitative analysis also demonstrates that personality traits in terms of dispositional resistance to change influence whether non-use-related dissatisfaction and use-related satisfaction translate into resumption intentions. In sum, the developmental approach of using both a quantitative and a qualitative study (Venkatesh et al. 2013) made it possible to develop and validate a research model of SNS resumption and we found that the conjunction of these two studies added value beyond that of each study. Using quantitative samples, which provided strong statistical evidence concerning the strength of relationships, bolstered our qualitative research—through using both data types we were able to offer a more complete explanation of individual's resumption behaviors. Beyond the convergence and complementary findings generated by our two studies, we ensured high-quality meta-inferences in terms of design quality (by adhering to established guidelines for quality and rigor in both studies), explanatory quality (by ensuring integrative efficacy), and legitimations (by using established analysis) (Mattke et al. 2020).

Discussion

While previous research has shown that SNSs with a large user base are challenged by users discontinuing (Maier, Laumer, Weinert, Weitzel 2015) or switching to other SNSs (Chang et al. 2014; Xu et al. 2014), our research focuses on SNS resumption behavior, an understudied behavior that can increase the user base of SNSs. Since resumption is a distinct and understudied phenomenon, we started with a single-context model of SNS resumption (Hong et al. 2014), which was further refined and tested using a mixed-method approach. Our analyses suggest that resumption is relevant to the SNS use context. Our results suggest that SNS resumption is influenced by non-use-related dissatisfaction as well as use-related satisfaction, which are, in turn, influenced by SNS-specific ex-user beliefs. The impact of non-use-related dissatisfaction and use-related satisfaction on SNS resumption is moderated by the ex-user's dispositional resistance to change. We conducted two empirical studies, which consistently confirmed most of our hypotheses.

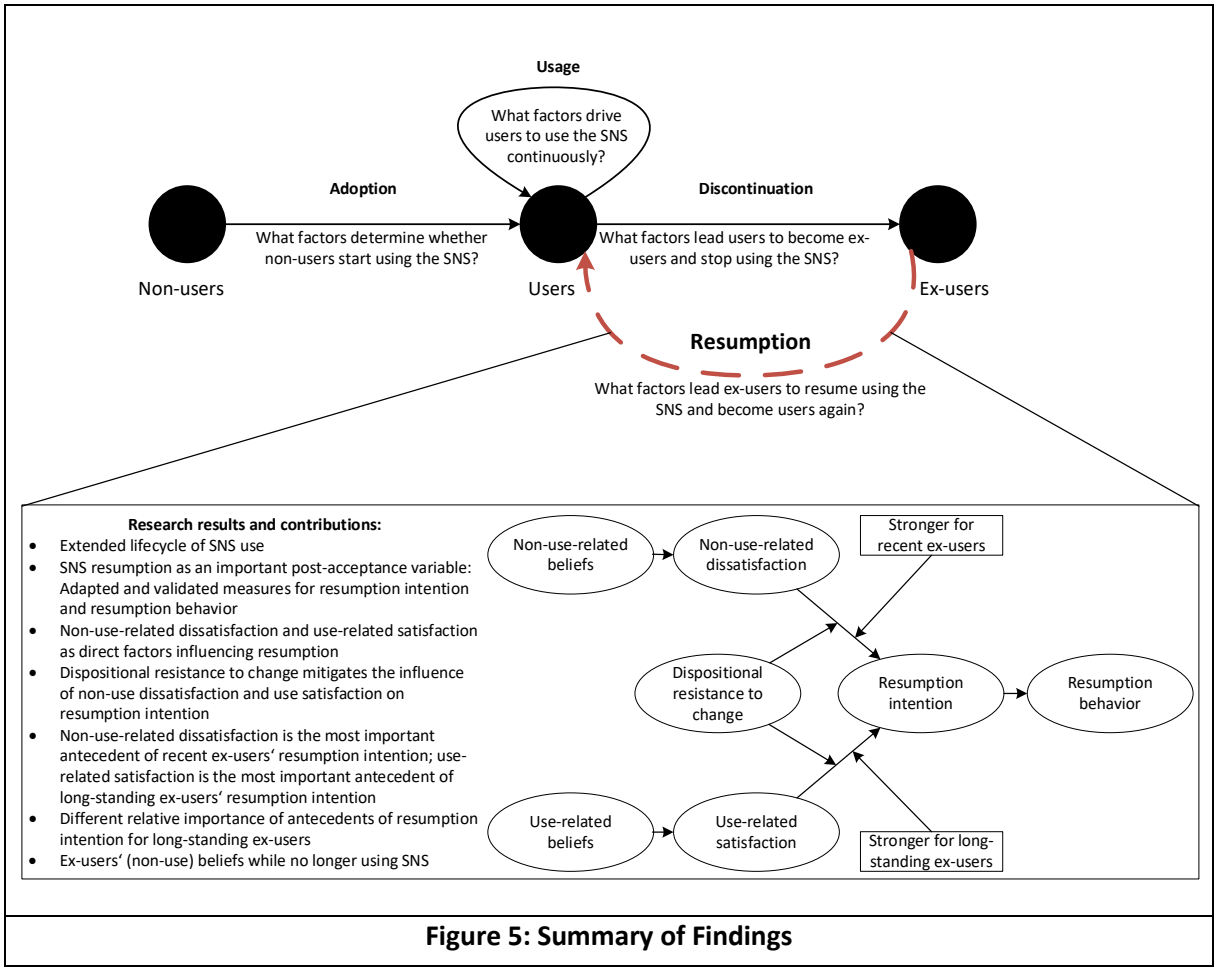

Figure 5: Summary of Findings

Contributions and Research Implications

As such, our research contributes to existing IS research by systematically developing and testing a new type of system use behavior, namely, SNS resumption. Distinct from the existing concepts of adoption, use, and discontinuation of SNS, SNS resumption constitutes a novel perspective for understanding why users renew SNS participation. Figure 5 illustrates the differences between resumption and related concepts.

First, we systematically conceptualized a new construct, SNS resumption, which is highly relevant to practice. We further distinguished SNS resumption from the established SNS behavioral patterns of adoption, continuous usage, and discontinuation (Maier 2020) and also identified beliefs relevant to SNS resumption. As recommended by research on new perspectives on IT acceptance (Straub and Burton-Jones 2007; Venkatesh et al. 2007), our work provides a framework, novel constructs, and a mixed-method view of SNS resumption, which serve to illuminate this understudied behavioral pattern.

Second, we systematically developed a contextualized model of SNS resumption based on return migration theory and conducted empirical studies to further refine and test the model. While some existing research has used migration theory to explain why individuals' expectations lead them to switch to a new, unfamiliar SNS (Chang et al. 2014; Xu et al. 2014), our contextualized return migration theory specifically explains how prior use experience shapes user decisions to resume use of a social technology such as an SNS. Our operationalization of the SNS resumption model demonstrates that dissatisfaction derived from not using an SNS (as a push factor) and satisfaction derived from using the SNS (as a pull factor) jointly drive ex-users to resume use of the SNS. We found that the impact of non-use-related dissatisfaction and use-related satisfaction on SNS resumption are moderated by ex-users' dispositional resistance to change (a mooring factor). So we contribute with three mechanisms that can be generalized to other contexts of resumption behavior.

Third, we further contextualized return migration theory by specifying the beliefs related to SNS resumption through our qualitative study (Hong et al. 2014; Te'eni 2017). We found five context-specific user beliefs that are related to non-use-related dissatisfaction in the SNS use context: *social isolation*, *communication underload*, *information underload*, *replacement overload,* and *boredom*. In doing so, we extend prior work that focuses on negative beliefs that lead SNS users (i.e. Maier,

Laumer, Eckhardt, Weitzel 2015) to consider switching or quitting the SNS (Maier, Laumer, Weinert, Weitzel 2015) by demonstrating that discontinuing SNS use can also create negative beliefs and dissatisfaction associated with no longer using the technology. We also self-developed new measures for these new beliefs.

Fourth, our work provides evidence that understanding why and how SNS users interact with SNS platforms requires examining both social and technological factors. Our studies underscored that ex-users' "push beliefs" about resumption generally result from social elements, while ex-users' "pull beliefs" tend to be caused by technological elements. Taken in the context of ex-users' particular levels of "dispositional resistance", a mooring factor, we observed that resumption behavior is grounded in relationships between social factors, technological factors, and personality traits.

Fifth, this research suggests that we need to further investigate temporality and technology use. We found that the main relationships in the research model were dependent on the length of time that had elapsed since an individual discontinued using the SNS. Specifically, we compared recent ex-users and long-standing ex-users and found that recent and long-standing ex-users differ in terms of how dissatisfaction or satisfaction relate to resumption intention. Recent ex-users based their resumption intentions more substantially on non-use-related dissatisfaction. In contrast, for long-standing ex-users, resumption intentions were more strongly influenced by use-related satisfaction. This differentiation between ex-user types could be particularly interesting for SNS researchers and providers seeking to understand how to craft "win back" strategies for ex-users. For example, it would be interesting to examine whether different win-back strategies could be designed to appeal to different types of ex-SNS users and whether, for example, recent versus long-standing ex-users would respond differently to financial or social incentives. Therefore, while experience of use has been studied extensively in the IS research, considering "experience of non-use" may also be valuable.

Limitations

This research has limitations. First, we were unable to access data about the average age, educational level, or sex of our sample of ex-users. However, to mitigate this concern, we included several control variables in our analysis. Second, our *post hoc* analysis suggests that non-use-related dissatisfaction and use-related satisfaction are related to each other. Even though return migration

theory does not theoretically suggest that there are interrelations between push and pull factors, future research might theoretically and empirically examine their relationship to understand how these influence each other. Fifth, this study focuses on one SNS: Facebook. Even though our theoretical framework suggests that satisfaction and dissatisfaction are general influencing factors, they might be influenced by different use- and non-use-related beliefs on other SNSs (e.g., Snapchat, Instagram, TikTok).

Future Research

This research opens up many possibilities for future research on resumption behavior (summarized in Figure 6). First, while this research is focused only on those who resume their use of SNS, there is a need for work that compares ex-users who resume use and those who do not resume use of an SNS in terms of specific personality traits, experiences (while using and no longer using the SNS), and specific features of the SNS. Such research can reveal profiles of individuals (Maier, Mattke et al. 2020; Pflügner et al. 2020) who are likely to resume using a social technology like an SNS. Further, such research might inspire thinking regarding the specific features of an SNS that are likely to impede use resumption. Such insights could help guide organizations craft strategies and feature sets that could convince more ex-users to resume using their SNS platforms.

Second, this research focused on Facebook. We constrained our work to one platform, so that we could glean richer insight into how use context shapes resumption behavior (Hong et al. 2014; Te'eni 2017). Consequently, Facebook represents a boundary condition for our model. We identify specific negative beliefs related to not using an SNS and salient positive beliefs related to SNS use that are contextualized to Facebook. Future work is needed on resumption of using other SNS platforms and even more, other types of information systems. For example, future research might investigate whether resumption is also relevant for utilitarian systems (Gerow et al. 2017), such as the file hosting service Dropbox, and whether it is influenced by additional factors (Xu et al. 2017) like costs, service level agreements, or technological issues. This would help understand how resumption behavior is different or similar across various technological contexts.

Third, while this research employs an individual-level perspective, our work hints that group-level factors may influence resumption. Recent research underscores the need for examining strong

group-level effects. For example, individuals imitate each other (Sun 2013), implying that future research on herding behavior might shed light on SNS resumption behavior. Related to that, other group-level contextual factors, e.g., network externalities, might influence resumption behavior. For example, future research can investigate how design elements that facilitate group-level synchronous and asynchronous communication adapted by Facebook (e.g. implementing the Facebook timeline, Facebook messenger) —which can be powered by network utilities (e.g., the system is more useful when more people use it)— influence ex-users' resumption related beliefs.

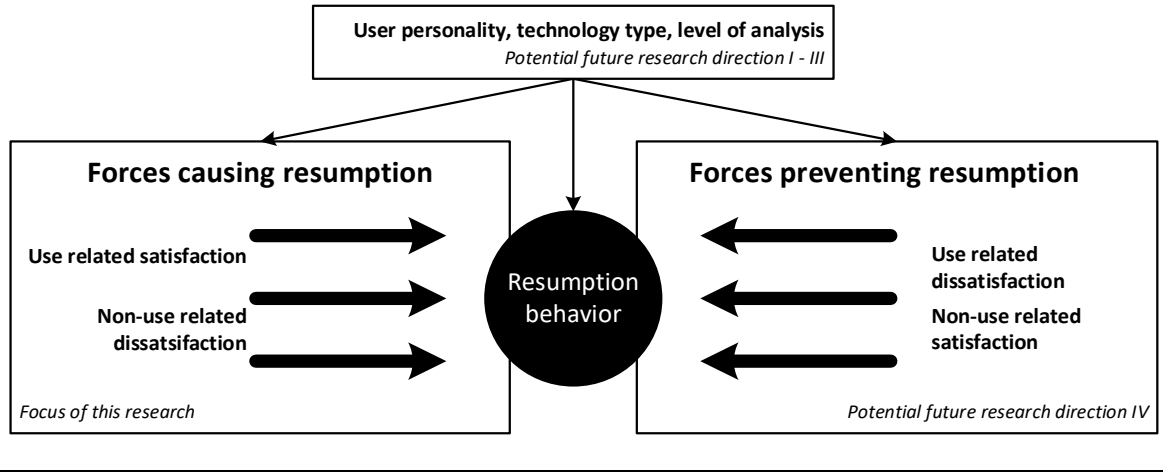

Figure 6: Potential future research directions

Fourth, while this research focused on dissatisfaction and satisfaction as push and pull factors, future work should examine other negative use beliefs and positive non-use beliefs that prevent resumption. So, future research might focus on other negative use beliefs (e.g., stress- or privacy-related beliefs while prior usage) and positive non-use beliefs (e.g., relative advantage of non-use compared to use), as this might also explain why ex-users do not resume using the SNS.

Further, we suspect that resumption and non-resumption may be distinct theoretical phenomena and thus require different theoretical foundations. Our work sheds light on only one set of behavior, namely why ex-users resume use. Future work should direct attention to understanding why ex-users do not resume use. It might also be interesting to understand how satisfaction/dissatisfaction

(in terms of either use or non-use) might influence decisions to continue not using, or even derogate an SNS that they have abandoned.

Practical implications

Our results are relevant to SNS providers seeking to craft strategies to draw ex-users back to an SNS and suggest that SNS providers direct attention to levers that shape resumption behavior: use-related satisfaction and non-use-related dissatisfaction, along with associated beliefs. For example, SNS providers could craft strategies that remind ex-users of the social or technological benefits they are missing through non-use. Such strategies can focus on triggering feelings of information underload, underscoring the impact of unanswered interaction on communication underload, reminding ex-users of missed social connections, and reminding them of feelings of community that combat social isolation.

If closing an account does not involve deleting contact information, SNS providers could, for example, craft messages that integrate past use information to trigger resumption. For example, if SNS providers have permission to contact users, they could use ex-users' e-mail addresses and even their mobile telephone numbers to directly send e-mails, SMSs, or WhatsApp messages with headlines such as "You missed 400 friends' updates this week," and provide detailed information about certain updates in the ex-users circle of SNS friends, for example "John married Amy last week." Such messages may create negative non-use beliefs that are strong enough to cause ex-users to consider resuming use of the SNS.

If SNS providers lack permission, they could send targeted messages on channels frequented by groups that share ex-users' demographics, such as blogs, news sources, and media content. For example, Facebook recently implemented a broad campaign to underscore the value of privacy updates across media channels. Facebook also recently integrated feature sets that appeal to younger users such as stories, more multimedia content, and more effective content management. Such broad strategies can tap into ex-users' reasons for discontinuing use (e.g., functionality) or motivate resuming SNS use (e.g., missing information/content), which may help SNS platforms attract previous users.

Moreover, our findings underscore the importance of setting realistic benchmarks for SNS resumption strategies, e.g., they will not be equally effective for all users. The moderating influence of dispositional resistance to change reveals that SNS providers' resumption strategies will most likely attract individuals with low dispositional resistance to change. SNS providers can thus only partially influence whether ex-users become users again, as resumption is to some degree grounded in individuals' personalities.

Conclusion

This research introduces the concept of resumption behavior to IS research and develops a contextual model of SNS resumption. Based on return migration theory, we explain how use-related satisfaction and non-use-related dissatisfaction shape resumption intention. Using a qualitative approach, we identify user beliefs driving use-related satisfaction and non-use related dissatisfaction. Using a quantitative survey approach, we demonstrate that positive and negative beliefs shape use-related satisfaction and non-use-related dissatisfaction and show that dispositional resistance to change moderates how these factors relate to resumption intention. Our results reveal that while recent and long-standing ex-users base their resumption decisions on the same factors, they weigh these factors differently. The research model, as well as associated findings and measurement instruments, provide a tool for future research studying the important topic of resumption use behavior.

Short Author Bios

Christian Maier is an Assistant Professor at the University of Bamberg, Germany. Dr. Maier's research interests include the IS use lifecycle, especially the adoption, usage, and discontinuous usage of digital technologies in the private (e.g., bitcoin, social networking sites) and organizational (e.g., enterprise content management, human resources technologies) use contexts, viewed through various theoretical lenses, such as IS use stress, coping, and resistance. His research has been published, among others, in the *Journal of the Association for Information Systems*, *European Journal of Information Systems*, *Information Systems Journal*, *Journal of Strategic Information Systems* and *Journal of Information Technology*. He is Senior Editor at *Internet Research* and was awarded the *Schmalenbach* prize for young researchers in 2015, the prestigious Early Career Awards by the *AIS* in 2019, and the *ACM SIGMIS* in 2020. In his free time, Dr. Maier enjoys cycling and eating out with family and friends.

Sven Laumer is the Schöller endowed Professor and Chair of Information Systems at the School of Business, Economics and Society at Friedrich-Alexander Universität Erlangen-Nürnberg and Deputy Director of the Dr. Theo und Friedl Schöller Research Center. His research focuses on digital work and life and in particular on the individual use and overload of digital technologies, technostress, the digital workforce (digital human resources management, digital change management) and digital business models and e-services. His research has been published among others in ISJ, EJIS, JSIS, JIT, Database, and MISQ Executive.

Jason Thatcher holds the Milton F. Stauffer Professorship in the Department of Management Information Systems at Temple University's Fox School of Business and Management. Dr. Thatcher studies strategic, human resources, and cybersecurity issues related to the effective application of information technologies in organizations. His work appears in *MIS Quarterly*, *Journal of the Association for Information Systems*, *Information Systems Research*, *Journal of Applied Psychology*, and other refereed outlets. He has served as president of the Association for Information Systems and senior editor at *MIS Quarterly*. He is presently a Senior Editor at the *Journal of the Association for Information Systems*. In his free time, Dr. Thatcher walks his malty-poo, eats dim sum, and watches anime with his daughter.

Dr. Heshan Sun a Professor in the Management Information Systems Division at the Price College of Business, University of Oklahoma. His research interests include human-computer interaction, post-adoptive system use, trust and e-commerce, and business analytics. His research has been published (or will appear) in journals such as the *MIS Quarterly* (4 papers), *Journal of the Association for Information Systems* (5 papers), *Decision Support Systems (2 papers)*, *Internal Journal of Human-Computer Studies*, and *Journal of the American Society for Information Science and Technology* (2 papers), among others. He was recognized by the Top-100 Rankings of Researchers list that is based on the six prestigious information systems journals. He has also been recognized in a bibliometric study as one of the top HCI researchers worldwide. He served as an associate editor of *MIS Quarterly* (2014-2017). He also has served or is still serving on the editorial board of several other journals. He won the prestigious Reviewer of the Year (2011) Award from *MIS Quarterly*. His research has been supported by various grant agencies (e.g., NSF).

Christoph Weinert is an assistant professor at the University of Bamberg. His research results about IT adoption and usage, technostress and coping, teleworking, and enterprise content management have been published in Information Systems Journal, SIGMIS Database, Journal of Business Economics , Business & Information Systems Engineering and proceedings of various conferences including ICIS, ECIS, HICSS, AMCIS, International Conference on Wirtschaftsinformatik, ACM SIGMIS, and Gmunden Retreat on NeuroIS.

Dr. Tim Weitzel is Full Professor and Chair of Information Systems and Services at the University of Bamberg in Germany and Director of the Centre of Human Resource Information Systems (CHRIS). His current interests are in IT management, technostress, AI in HR and healthcare, and the future of work. Tim's research has been published in journals including MIS Quarterly, Journal of the AIS, Journal of MIS, and GQ and has been cited over 6.000 times.

REFERENCES

AGARWAL R and KARAHANNA E (2000) Time flies when you're having fun: Cognitive Absorption and beliefs about information technology usage. *MIS Quarterly* **24(4)**, 665–694.

AJZEN I and FISHBEIN M (1980). *Understanding attitudes and predicting social behavior.* Prentice-Hall, Englewood Cliffs, N.J.

ASLAM S (2018) Linkedin by the Numbers: Stats, Demographics & Fun Facts. https://www.omnicoreagency.com/linkedin-statistics/.

BAGOZZI RP (1979) The Role of Measurement in Theory Construction and Hypothesis Testing: Toward a Holistic Model. In *Conceptual and theoretical developments in marketing* (FERRELL OC, BROWN SW and LAMB CW, Eds), pp. 15–32, American Marketing Assoc., Chicago, Ill.

BANSAL HS, TAYLOR SF and JAMES YS (2005) "Migrating" to New Service Providers: Toward a Unifying Framework of Consumers' Switching Behaviors. *Journal of the Academy of Marketing Science* **33(1)**, 96–115, doi: 10.1177/0092070304267928.

BARY E (2017) As Facebook repels young users, can Instagram and Snapchat capitalize? https://www.marketwatch.com/story/as-facebook-repels-young-users-can-instagram-and-snapchat-capitalize-2018-02-12.

BASAK E and CALISIR F (2015) An empirical study on factors affecting continuance intention of using Facebook. *Computers in Human Behavior* **48**, 181–189, doi: 10.1016/j.chb.2015.01.055.

BEAUDRY A and PINSONNEAULT A (2005) Understanding user responses to information technology: a coping model of user adaptation. *MIS Quarterly* **29(3)**, 493–524.

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

BHATTACHERJEE A and PARK SC (2013) Why end-users move to the cloud: a migration-theoretic analysis. *European Journal of Information Systems* **23(3)**, 357–372, doi: 10.1057/ejis.2013.1.

CAMPELL DT and FISKE DW (1959) Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin* **56(2)**, 81–105.

CARMINES EG and ZELLER RA (2008). *Reliability and validity assessment.* Sage Publ., Newbury Park, Calif.

CARTER M, WRIGHT R, THATCHER JB and KLEIN R (2014) Understanding online customers' ties to merchants. The moderating influence of trust on the relationship between switching costs and e-loyalty. *European Journal of Information Systems* **23(2)**, 185–204, doi: 10.1057/ejis.2012.55.

CHANG I-C, LIU C-C and CHEN K (2014) The push, pull and mooring effects in virtual migration for social networking sites. *Information Systems Journal* **24(4)**, 323–346, doi: 10.1111/isj.12030.

CHIN WW and DIBBERN J (2006) A permutation based procedure for multi-group PLS analysis results of tests of differences on simulated data and cross-cultural analysis of the sourcing of information system services between Germany and the USA. *Modelización con estructuras de covarianzas en ciencias sociales: temas esenciales, avanzados y aportaciones especiales***(Netbiblo)**, 501–517.

CHIU H-C, HSIEH Y-C, ROAN J, TSENG K-J and HSIEH J-K (2011) The challenge for multichannel services: Cross-channel free-riding behavior. *Electronic Commerce Research and Applications* **10(2)**, 268–277, doi: 10.1016/j.elerap.2010.07.002.

CIESLIK A (2011) Where Do You Prefer to Work? How the Work Environment Influences Return Migration Decisions from the United Kingdom to Poland. *Journal of Ethnic and Migration Studies* **37(9)**, 1367–1383, doi: 10.1080/1369183X.2011.623613.

COHEN J, COHEN P, WEST SG and AIKEN LS (2003). *Applied multiple regression-correlation analysis for the behavioral sciences.* Lawrence Erlbaum Associates, Mahwah.

COLLOPY F (1996) Biases in Retrospective Self-Reports of Time Use: An Empirical Study of Computer Users. *Management Science* **42(5)**, 758–767, doi: 10.1287/mnsc.42.5.758.

DEVARAJ S, EASLEY RF and CRANT JM (2008) How Does Personality Matter? Relating the Five-Factor Model to Technology Acceptance and Use. *Information Systems Research* **19(1)**, 93–105.

DIBBERN J and CHIN WW (2005). *Multi-group comparison: Testing a PLS model on the sourcing of application software services across Germany and the USA using a permutation based algorithm.* Schäffer-Poeschel, Stuttgart.

DUSTMANN C and WEISS Y (2007) Return Migration. Theory and Empirical Evidence from the UK. *British Journal of Industrial Relations* **45(2)**, 236–256, doi: 10.1111/j.1467-8543.2007.00613.x.

ECKHARDT A, LAUMER S, MAIER C and WEITZEL T (2016) The effect of personality on IT personnel's job-related attitudes. Establishing a dispositional model of turnover intention across IT job types. *Journal of Information Technology* **31(1)**, 48–66, doi: 10.1057/jit.2014.27.

EMAMI S (2017) Returning to Social Media and How I Can't Explain Why I Did It. https://medium.com/@semami/returning-to-social-media-and-how-i-cant-explain-why-i-did-it-258c3caaa029.

EMARKETER (2018) Facebook Losing Younger Users. But not all are migrating to Instagram. https://www.emarketer.com/content/facebook-losing-younger-users-at-even-faster-pace.

FLANAGAN JC (1954) The Critical Incident Technique. *Psychological Bulletin* **51(4)**, 327–359.

FORNELL C and LARCKER DF (1981) Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research* **18(1)**, 39–50.

FRIER S (2018) Facebook Really Wants You to Come Back. https://www.bloomberg.com/news/features/2018-01-31/facebook-really-wants-you-to-come-back.

FU J-R (2011) Understanding career commitment of IT professionals: Perspectives of push–pull–mooring framework and investment model. *International Journal of Information Management* **31(3)**, 279–293, doi: 10.1016/j.ijinfomgt.2010.08.008.

GEROW JE, AYYAGARI R, THATCHER JB and ROTH PL (2017) Can we have fun @ work? The role of intrinsic motivation for utilitarian systems. *European Journal of Information Systems* **22(3)**, 360–380, doi: 10.1057/ejis.2012.25.

GERRARD P and CUNNINGHAM JB (2004) Consumer switching behavior in the Asian banking market. *Journal of Services Marketing* **18(3)**, 215–223, doi: 10.1108/08876040410536512.

GHASRODASHTI EK (2018) Explaining brand switching behavior using pull–push–mooring theory and the theory of reasoned action. *Journal of Brand Management* **25(4)**, 293–304, doi: 10.1057/s41262-017-0080-2.

GMELCH G (1980) Return migration. *Annual review of anthropology* **9**, 135–234, doi: 10.1146/annurev.an.09.100180.001031.

GÓMEZ R (1998) The nostalgia of virtual community. *Information Technology & People* **11(3)**, 217–234, doi: 10.1108/09593849810228020.

HALDORAI K, KIM WG, PILLAI SG, PARK T and BALASUBRAMANIAN K (2019) Factors affecting hotel employees' attrition and turnover: Application of pull-push-mooring framework. *International Journal of Hospitality Management* **83**, 46–55, doi: 10.1016/j.ijhm.2019.04.003.

HARMON ME (2015) Computing as Context: Experiences of Dis/Connection Beyond the Moment of Non/Use. Doctoral dissertation.

HENSELER J, RINGLE CM and SARSTEDT M (2014) A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science,* doi: 10.1007/s11747-014-0403-8.

HON AHY, BLOOM M and CRANT JM (2014) Overcoming Resistance to Change and Enhancing Creative Performance. *Journal of Management* **40(3)**, 919–941, doi: 10.1177/0149206311415418.

HONG W, CHAN FKY, THONG JYL, CHASALOW LC and DHILLON G (2014) A Framework and Guidelines for Context-Specific Theorizing in Information Systems Research. *Information Systems Research* **25(1)**, 111–136, doi: 10.1287/isre.2013.0501.

HOU ACY, CHERN C-C, CHEN H-G and CHEN Y-C (2011) 'Migrating to a new virtual world': Exploring MMORPG switching through human migration theory. *Computers in Human Behavior* **27(5)**, 1892–1903, doi: 10.1016/j.chb.2011.04.013.

HU T and KETTINGER WJ (2008) Why people continue to use social networking services: Developing a comprehensive model. *Proceedings of the 29th International Conference on Information Systems*.

HU T, POSTON RS and KETTINGER WJ (2011) Nonadopters of Online Social Network Services: Is It Easy to Have Fun Yet? *Communications of the Association for Information Systems* **29(Article 25)**.

HULLAND JS (1999) Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal* **20(2)**, 195–204.

HWANG HS, SHIM JW and PARK SB (2018) Why we migrate in the virtual world: factors affecting switching intentions in SNS. *Information, Communication & Society* **3(3)**, 1–11, doi: 10.1080/1369118X.2018.1477970.

JOHNS G (2006) The essential impact of context on organizational behavior. *Academy of Management Review* **31(2)**, 386–408.

JOKELA M (2009) Personality predicts migration within and between U.S. states. *Journal of Research in Personality* **43(1)**, 79–83, doi: 10.1016/j.jrp.2008.09.005.

JONG GF de and FAWCETT JT (1981) Motivations for migration: an assessment and a value-expectancy research model. In *Migration decision making: multidisciplinary approaches to microlevel studies in developed and developing countries* (JONG GF de and GARDNER RW, Eds), pp. 13–58, Pergamon, New York.

JUNG J, HAN H and OH M (2017) Travelers' switching behavior in the airline industry from the perspective of the push-pull-mooring framework. *Tourism Management* **59**, 139–153, doi: 10.1016/j.tourman.2016.07.018.

KARAHANNA E, STRAUB DW and CHERVANY NL (1999) Information Technology Adoption Across Time: A Cross-sectional Comparison of Pre-adoption and Post-adoption Beliefs. *MIS Quarterly* **23(2)**, 183–213.

KEACH S (2018) Facebook LOSES users for the first time ever, but Mark Zuckerberg doesn't care. https://www.thesun.co.uk/tech/5474575/facebook-loses-users-mark-zuckerberg-latest/.

KIM KH (2005) The Relation Among Fit Indexes, Power, and Sample Size in Structural Equation Modeling. *Structural Equation Modeling: A Multidisciplinary Journal* **12(3)**, 368–390, doi: 10.1207/s15328007sem1203_2.

KIM SS and MALHOTRA NK (2005) A Longitudinal Model of Continued IS Use: An Integrative View of Four Mechanisms Underlying Postadoption Phenomena. *Management Science* **51(5)**, 741–755.

KING R (2015). *Return Migration and Regional Economic Problems (Routledge Library Editions.* Taylor and Francis, Hoboken.

KÖNIG GG (2000) Return migration: Theory and evidence from returning migrants to Western Mexico.

LAI JY, DEBBARMA S and ULHAS KR (2012) An empirical study of consumer switching behaviour towards mobile shopping: a Push-Pull-Mooring model. *International Journal of Mobile Communications* **10(4)**, 386, doi: 10.1504/IJMC.2012.048137.

LAMPE C, VITAK J and ELLISON N (2013) Users and nonusers: interactions between levels of adoption and social capital. *Proceedings of the 2013 conference on CSCW*, 809–820.

LAUMER S, MAIER C, ECKHARDT A and WEITZEL T (2015) User personality and resistance to mandatory information systems in organizations: a theoretical model and empirical test of dispositional resistance to change. *Journal of Information Technology,* doi: 10.1057/jit.2015.17.

LEE ES (1966) A Theory of Migration. *Demography* **3(1)**, 47, doi: 10.2307/2060063.

LEHTO XY, PARK O-J and GORDON SE (2015) Migrating to New Hotels: A Comparison of Antecedents of Business and Leisure Travelers' Hotel Switching Intentions. *Journal of Quality Assurance in Hospitality & Tourism* **16(3)**, 235–258, doi: 10.1080/1528008X.2014.925787.

LU Y, ZONG L and SCHISSEL B (2009) To Stay or Return: Migration Intentions of Students from People's Republic of China in Saskatchewan, Canada. *Journal of international migration and integration* **10(3)**, 283–310, doi: 10.1007/s12134-009-0103-2.

MAIER C (2020) Overcoming pathological IT use: How and why IT addicts terminate their use of games and social media. *International Journal of Information Management* **51,** doi: 10.1016/j.ijinfomgt.2019.102053.

MAIER C, LAUMER S and ECKHARDT A (2011) Dispositional Resistance to Change and Social Network Site Adopters' and Non-Adopters' Attitudinal Beliefs - An Empirical Analysis. *Proceedings of the 19th European Conference on Information Systems*.

MAIER C, LAUMER S, ECKHARDT A and WEITZEL T (2012a) Online Social Networks as a Source and Symbol of Stress: An Empirical Analysis. *Proceedings of the 33rd International Conference on Information Systems (ICIS), Orlando (FL)*.

MAIER C, LAUMER S, ECKHARDT A and WEITZEL T (2012b) Using User Personality to explain the Intention-Behavior Gap and Changes in Beliefs: A Longitudinal Analysis. *Proceedings of the 33rd International Conference on Information Systems (ICIS), Orlando (FL)*.

MAIER C, LAUMER S, ECKHARDT A and WEITZEL T (2015) Giving too much social support. Social overload on social networking sites. *European Journal of Information Systems* **24(5)**, 447–464, doi: 10.1057/ejis.2014.3.

MAIER C, LAUMER S, WEINERT C and WEITZEL T (2015) The effects of technostress and switching stress on discontinued use of social networking services: a study of Facebook use. *Information Systems Journal* **25(3)**, 275–308, doi: 10.1111/isj.12068.

MAIER C, LAUMER S, WIRTH J and WEITZEL T (2019) Technostress and the Hierarchical Levels of Personality: A Two-wave Study with Multiple Data Samples. *European Journal of Information Systems,* doi: 10.1080/0960085X.2019.1614739.

MAIER C, MATTKE J, PFLÜGNER K and WEITZEL T (2020) Smartphone use while driving: A fuzzy-set qualitative comparative analysis of personality profiles influencing frequent high-risk smartphone use while driving in Germany. *International Journal of Information Management* **55**, 102207, doi: 10.1016/j.ijinfomgt.2020.102207.

MATTKE J, MAIER C, REIS L and WEITZEL T (2020) Bitcoin investment: a mixed methods study of investment motivations. *European Journal of Information Systems*, 1–25, doi: 10.1080/0960085X.2020.1787109.

MCCRAE RR and COSTA PT (2006). *Personality in adulthood. A five-factor theory perspective.* Guilford Press, New York NY.

MILES MB, HUBERMAN AM and SALDAÑA J (2013). *Qualitative data analysis. A methods sourcebook*.

MOON B (1995) Paradigms in migration research. Exploring 'moorings' as a schema. *Progress in Human Geography* **19(4)**, 504–524, doi: 10.1177/030913259501900404.

MORRISON SL and GOMEZ R (2014) Pushback: Expressions of resistance to the "everytime" of constant online connectivity. *First Monday* **19(8)**.

MYERS DG (2004). *Psychology.* Worth Publishers, New York.

MYERS MD (2009). *Qualitative research in business and management.* Sage, Los Angeles.

NIMAKO SG and WINNEBA K (2013) Consumer Switching Behaviour: A Theoretical Review and Research agenda. *Research Journal of Social Science and Management* **2(3)**, 74–85.

OJIAKU OC, NKAMNEBE AD and NWAIZUGBO IC (2018) Determinants of entrepreneurial intentions among young graduates: perspectives of push-pull-mooring model. *Journal of Global Entrepreneurship Research* **8(1)**, 179, doi: 10.1186/s40497-018-0109-3.

OLIVER RL and WESTBROOK RA (1982) The Factor Structure of Satisfaction and Related Postpurchase Behavior. In *New Findings on Consumer Satisfaction and Complaining* (DAY RL and HUNG HK, Eds), Indiana University, Bloomington, IN.

OREG S (2003) Resistance to Change: Developing an Individual Differences Measure. *Journal of Applied Psychology* **88(4)**, 680–693.

OREG S (2006) Personality, context, and resistance to organizational change. *European Journal of Work and Organizational Psychology* **15(1)**, 73–101, doi: 10.1080/13594320500451247.

PFLÜGNER K, MAIER C, MATTKE J and WEITZEL T (2020) Personality Profiles that put Users at Risk of Perceiving Technostress: A Qualitative Comparative Analysis with the Big Five Personality Traits. *Business & Information Systems Engineering*.

POLITES GL and KARAHANNA E (2012) Shackled to the status quo: The inhibiting effects of incumbent system habit, switching costs, and inertia on new system acceptance. *MIS Quarterly* **36(1)**.

POLITES GL and KARAHANNA E (2013) The embeddedness of IS habits in organizational and individual level routines: Development and disruptions. *MIS Quarterly* **37(1)**, 221–246.

RINGLE CM, WENDE S and BECKER J-M (2014). *SmartPLS3,* Hamburg.

ROGERSON P (2001). *Statistical methods for geography.* Sage Publications, London, Thousand Oaks, Calif.

SHABAN H (2018) Shareholder sues Facebook after stock plunges. https://www.washingtonpost.com/technology/2018/07/30/shareholder-sues-facebook-after-stock-plunges/?utm_term=.fad1a0d5b893.

SPEARE A, KOBRIN F and KINGKADE W (1982) The Influence of Socioeconomic Bonds and Satisfaction on Interstate Migration. *Social Forces* **61(2)**, 551–574, doi: 10.1093/sf/61.2.551.

STEIN M-K, NEWELL S, WAGNER EL and GALLIERS RD (2015) Coping with information technology: Mixed emotions, vacillation and non-conforming use patterns. *MIS Quarterly* **39(2)**, 367–392.

STIMSON RJ and MINNERY J (1998) Why People Move to the 'Sun-belt': A Case Study of Long-distance Migration to the Gold Coast, Australia. *Urban Studies* **35(2)**, 193–214, doi: 10.1080/0042098984943.

STRAUB DW and BURTON-JONES A (2007) Veni, Vidi, Vici: Breaking the TAM Logjam. *Journal of the Association for Information Systems* **8(4)**, 223–229.

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

SUN Y, LIU D, CHEN S, WU X, SHEN X-L and ZHANG X (2017) Understanding users' switching behavior of mobile instant messaging applications: An empirical study from the perspective of push-pull-mooring framework. *Computers in Human Behavior* **75**, 727–738, doi: 10.1016/j.chb.2017.06.014.

TABOR AS, MILFONT TL and WARD C (2015) The Migrant Personality Revisited: Individual Differences and International Mobility Intentions. *New Zealand Journal of Psychology* **44(2)**, 89–95.

TARAFDAR M, MAIER C, LAUMER S and WEITZEL T (2020) Explaining the link between technostress and technology addiction for social networking sites: A study of distraction as a coping behavior. *Information Systems Journal* **30(1)**, 96–124, doi: 10.1111/isj.12253.

TARAFDAR M, TU Q and RAGU-NATHAN TS (2010) Impact of Technostress on End-User Satisfaction and Performance. *Journal of Management Information Systems* **27(3)**, 303–334.

TECHCRUNCH (2011) Amazingly,MySpace's decline is accelerating. http://techcrunch.com/2011/03/23/amazingly-myspacesdecline-, accessed 25 June 2014.

TE'ENI D (2017) Current issue and future submissions, contextualized. *European Journal of Information Systems* **24(4)**, 361–363, doi: 10.1057/ejis.2015.8.

THATCHER JB and PERREWÉ PL (2002) An empirical examination of individual traits as antecedents to computer anxiety and computer self-efficacy. *MIS Quarterly* **26(4)**, 381–396.

THATCHER JB, WRIGHT RT, ZAGENCZYK TJ and KLEIN R (2018) Mindfulness in Information Technology Use: Definitions, Distinctions, and a New Measure. *MIS Quarterly* **42(3)**, 831–847, doi: 10.25300/MISQ/2018/11881.

THOMPSON RF and KIM JJ (1996) Memory systems in the brain and localization of a memory. *Proceedings of the National Academy of Sciences of the United States of America* **93(24)**, 13438–13444.

TUREL O and SERENKO A (2012) The benefits and dangers of enjoyment with social networking websites. *European Journal of Information Systems* **21(5)**, 512–528, doi: 10.1057/ejis.2012.1.

VAN DER HEIJDEN H (2004) User Acceptance of Hedonic Information Systems. *MIS Quarterly* **28(4)**, 695–704.

VENKATESH V (2000) Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. *Information Systems Research* **11(4)**, 342–365.

VENKATESH V, BROWN SA and BALA H (2013) Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. *MIS Quarterly* **37(1)**, 21–54.

VENKATESH V, DAVIS FD and MORRIS MG (2007) Dead Or Alive? The Development, Trajectory And Future Of Technology Adoption Research. *Journal of the Association for Information Systems* **8(4)**, 268–286.

VENKATESH V, MORRIS MG, DAVIS GB and DAVIS FD (2003) User Acceptance of Information Technology: Toward a unified view. *MIS Quarterly* **27(3)**, 425–478.

VENKATESH V, THONG JYL and XU X (2012) Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly* **36(1)**, 157–178.

WAGNER K and MOLLA R (2018) Facebook lost around 2.8 million U.S. users under 25 last year. 2018 won't be much better. https://www.recode.net/2018/2/12/16998750/facebooks-teen-users-decline-instagram-snap-emarketer.

WILDSCHUT T, SEDIKIDES C, ARNDT J and ROUTLEDGE C (2006) Nostalgia: content, triggers, functions. *Journal of Personality and Social Psychology* **91(5)**, 975–993, doi: 10.1037/0022-3514.91.5.975.

WIXOM BH and TODD PA (2005) A Theoretical Integration of User Satisfaction and Technology Acceptance. *Information Systems Research* **16(1)**, 85–102.

WRIGHT RT, CAMPBELL DE, THATCHER JB and ROBERTS N (2012) Operationalizing Multidimensional Constructs in Structural Equation Modeling: Recommendations for IS Research. *Communications for the Association for Information Systems* **30(23)**, 367–412.

WU K, VASSILEVA J and ZHAO Y (2017) Understanding users' intention to switch personal cloud storage services: Evidence from the Chinese market. *Computers in Human Behavior* **68**, 300–314, doi: 10.1016/j.chb.2016.11.039.

XU X, THONG JYL and TAM KY (2017) Winning Back Technology Disadopters. Testing a Technology Readoption Model in the Context of Mobile Internet Services. *Journal of Management Information Systems* **34(1)**, 102–140, doi: 10.1080/07421222.2017.1297172.

XU Y, YANG Y, CHENG Z and LIM J (2014) Retaining and attracting users in social networking services: An empirical investigation of cyber migration. *The Journal of Strategic Information Systems,* doi: 10.1016/j.jsis.2014.03.002.

YU C-S, CHANTATUB W and MENDI B (2017) Factors for user intention to switch browsers: a cross-national survey. *International Journal of Electronic Commerce Studies* **8(2)**, 108–133, doi: 10.7903/ijecs.1522.

ZHANG H, LU Y, GUPTA S, ZHAO L, CHEN A and HUANG H (2014) Understanding the antecedents of customer loyalty in the Chinese mobile service industry: a push-pull-mooring framework. *International Journal of Mobile Communications* **12(6)**, 551, doi: 10.1504/IJMC.2014.064901.

ZHANG KZK, CHEUNG CMK and LEE MKO (2012) Online service switching behavior: The case of blog service providers. *Journal of Electronic Commerce Research* **13(3)**, 184–197.

ZHAO Y (2002) Causes and Consequences of Return Migration. Recent Evidence from China. *Journal of Comparative Economics* **30(2)**, 376–394, doi: 10.1006/jcec.2002.1781.