

JYU DISSERTATIONS 12

Tiina Koskelainen

Toward a Stage Theory of Adaptive Social Media Use

Explaining Change in Facebook Use



UNIVERSITY OF JYVÄSKYLÄ
FACULTY OF INFORMATION
TECHNOLOGY

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**Toward a Stage Theory of
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Explaining Change in Facebook Use**

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ABSTRACT

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Existing research on information technology (IT) use has shown that post-adoptive technology use is not a stable but a dynamic phenomenon in which users apply various adaptation behaviors. Users reshape the technology (IT adaptation), adjust their work routines (task adaptation), and change their own behavior (user adaptation) according to the changes induced by IT. Today, people use increasingly social media and other IT for personal purposes. Facebook (FB) is a good example of personal IT that people voluntarily use for years and has become an integral part of people's everyday lives. Despite extensive research on IT use and IT/user adaptation, we know little about the dynamics of post-adoptive use behavior, especially in volitional use contexts – that is, contexts in which the end user is the one who decides whether, how, and how much to use IT. The overall objective of this doctoral dissertation is to understand changes in individuals' post-adoptive behaviors and the underlying mechanisms by focusing on user adaptation in the context of FB use. Uncovering the dynamics of individual-level adaptation behaviors is important because FB use is a highly social phenomenon and thus provides new insights into IT use. To further examine the dynamics of IT post-adoption, I conducted a pre-study and a longitudinal diary study on FB use. Informed by the hermeneutic phenomenological research approach, I was able to discover individuals' experiences of their FB use and user adaptation over time. Utilizing self-regulation theory as a sensitizing device during iterative data analysis enabled identifying the underlying mechanisms of user adaptation. Furthermore, a stage theory approach provided richer understanding of the process of user adaptation. This dissertation contributes to both theory and practice. First, the main theoretical contribution constitutes the introduction of a stage theory of user adaptation. This proposed theory extends our knowledge by illustrating and explaining FB users' adaptive behaviors and the underlying reasons for these changes. Second, the practical implications consist of important, novel insights into user adaptation processes for system designers, developers, and individual users.

Keywords: user adaptation, post-adoption, IT use, stage theory, self-regulation

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1 INTRODUCTION

Research on individual-level system use concern what the user does, what the user thinks, and what the user feels (Burton-jones & Gallivan, 2007). Prior information systems (IS) research has focused on three core phases of a typical IS life cycle, namely adoption, usage, and termination (Furneaux & Wade, 2010, 2011; Maier, Laumer, Weinert, & Weitzel, 2015). Adoption-oriented research focuses on identifying the key factors that may predict acceptance of a new technology upon introduction, whereas usage and termination-oriented research focuses on individuals' post-adoptive information technology (IT) behaviors (i.e., IT continuance and discontinuance).

After adoption, users not only interact with IT but also engage in various adaptation behaviors. User adaptation refers to the cognitive and behavioral efforts performed by users to cope with significant IT events (Beaudry & Pinsonneault, 2005). User adaptation occurs as users modify their work routines, change their own behavior, or reshape the technology itself (i.e., IT adaptation) to better fit their needs or to achieve desired outcomes (Barki, Titah, & Boffo, 2007; Beaudry & Pinsonneault, 2005; Fadel, 2012; Majchrzak, Rice, Malhotra, King, & Ba, 2000; Nevo, Nevo, & Pinsonneault, 2016; Sun, 2012; Sun & Zhang, 2006). To date, research on user adaptation has focused on IT-related changes at work from technological, organizational, and individual perspectives.

Despite extensive research on IT use and user adaptation, there is a need for a more comprehensive understanding of system use (Benbasat & Barki, 2007; Burton-Jones & Straub, 2006; Elie-Dit-Cosaque & Straub, 2011). While prior studies provide important insights describing adaptive behaviors that users apply to respond IT-induced changes in organizations, they have paid limited attention to mechanisms driving user adaptation over time.

In related fields (e.g., development psychology and health psychology) behavioral change is a dynamic process aimed at being understood through the development of stage theories (e.g., Prochaska, DiClemente, & Norcross, 1992; Schwarzer, 2008a; Weinstein, Lyon, Sandman, & Cuite, 1998). Thus, stage theorists focus on process characteristics by proposing a number of qualitative stages and by identifying the factors that move people from one stage to another

(Schwarzer, 2008a; Velicer & Prochaska, 2008; Weinstein et al., 1998). Consequently, the stage approach offers a means to illustrate behavioral change and use of various user adaptation strategies after IT adoption (i.e., how change unfolds over time).

Due to the fast development of the Internet and information communication technologies, research interest has gradually started to shift from IT use at work to online consumer behavior and social media use. Studies have shown that the determinants of online and offline IT use differ (e.g., Gefen, 2003; Lin & Bhattacharjee, 2010; Venkatesh, Thong, & Xu, 2012). Today, people have a growing dependence on pervasive and intrusive technological artifacts. In addition to work-related and other mandatory technology use, people increasingly use varied personal IT, such as digital devices, software, applications, Internet services, games, and social media, on a daily basis. Examples of popular personal IT are social media platforms, such as social networking sites (e.g., Facebook and LinkedIn), microblogging (e.g., Twitter), blogging, photo sharing (e.g., Instagram and Snapchat), video sharing (e.g., YouTube), and crowdsourcing. Use of personal IT is based on users' voluntary behavior. Thus, in contrast to mandatory IT use in working environment, usage of volitional systems requires users' active engagement, and volitional contributions depend upon users' personal norms and values (Malhotra & Galletta, 2003). In addition to the antecedents of use, the motivational factors of use (i.e., intrinsic and extrinsic motivation) may vary during IT post-adoption in the contexts of personal IT use (Soliman & Tuunainen, 2015).

While prior research deepens our knowledge on users' adaptive behaviors in organizations, we cannot apply it directly to personal IT use contexts. Hence, we argue that the reasons for behavioral change as well as the use behavior itself vary a lot among different types of systems. Furthermore, we believe that by studying post-adoptive use behavior through the lens of behavioral change theories will provide us new insights and fresh perspective on IT use.

This study focuses on the use of social network sites (SNS). The main function of SNS is to enable social interactions with family and friends. The most popular social networks have many accounts and strong user engagement. Today, SNS are incorporated into almost all activities of daily life (Carter & Grover, 2015; Lin & Lu, 2011; Maier, Laumer, Eckhardt, & Weitzel, 2015; Turel & Serenko, 2012). Due to the popularity of Facebook (FB), most SNS studies have targeted FB use. Previous FB studies have shown that FB use is primarily motivated by the need to belong and the need for self-presentation (Nadkarni & Hofmann, 2012). Furthermore, the literature on post-adoptive SNS use has focused mostly on the drivers on (dis)continuance and the negative consequences of SNS use (Lu & Gallupe, 2016). However, due to the complex nature of SNS use, existing studies on the determinants of post-adoptive SNS behaviors have produced inconsistent results (Lu & Gallupe, 2016).

With a constant presence in people's lives, SNS have strong social impacts. For some users, feelings of constant accessibility and connectivity, social overload, and bad habits are some negative aspects that have emerged in recent

discussions. Consequently, individuals' self-determination has an important role in the context of SNS use, and obviously, this may lead to problems for persons who have low levels of self-control. Recent academic and societal dialogue on personal IT use has drawn attention to people's obsessive use of the Internet and dependence on smartphones, social media, and online games (Turel, 2015; Xu, Turel, & Yuan, 2012). News articles discuss problematic FB use as behavioral addiction (Lewis, 2017; Mallow, 2016), although so far, there are no medical grounds for recognizing it as addiction (Demetrovics & Griffiths, 2012; Griffiths, 2012, 2013). Furthermore, former Google and FB employees are disconnecting themselves from the Internet due to growing concerns that constant IT use is limiting people's ability to focus (Lewis, 2017).

Despite the popularity of social media use and related consequences, there is a lack of research focusing on social media post-adoption behaviors. Therefore, the goal of this doctoral dissertation is to illustrate the changing nature of individuals' post-adoptive SNS behaviors by conducting a qualitative, longitudinal study of FB use.

1.1 Research objectives

The research objectives of this doctoral dissertation are twofold: first, to demonstrate the changing nature of post-adoptive behaviors in the context of social media use; and second, to explain the mechanisms driving user adaptation. This study focuses on FB use and, in particular, user adaptation. The aim is to understand what user adaptation means in the context of FB use by focusing on users' experiences.

User acceptance and use of new technology is one of the most mature research areas in the IS literature. Most previous research has focused on the determinants of technology acceptance and use (e.g., Davis, Bagozzi, & Warshaw, 1989; Venkatesh, Davis, & Morris, 2003). Since the early 2000s, there has been increasing interest in IT continuance and individuals' post-adoptive behaviors (e.g., Bhattacharjee, 2001; Jasperson, Carter, & Zmud, 2005; Kim and Malhotra, 2005; Limayem, Hirt, & Cheung, 2007). Gradually, the research focus has moved from the determinants of technology use to a more comprehensive view on IT artifact and changes in use over time (e.g., Beaudry & Pinsonneault, 2005; Orlikowski, 2000; Ortiz de Guinea & Webster, 2013; Sun, 2012).

User adaptation, that is, changes caused by new IT in organizational settings, has been studied since the early 1990s. While early studies on user adaptation focused on understanding the organizational consequences of implementing IT (e.g., DeSanctis & Poole, 1994; Orlikowski, 1996; Orlikowski & Robey, 1991), recent research has concentrated more on adjustments made by users, such as how users manipulate IT and revise system use to achieve their targeted outcomes (Bagayogo, Lapointe, & Bassellier, 2014; Majchrzak et al., 2000; Sun, 2012; Sun & Zhang, 2006) and manage various IT events by coping (Beaudry & Pinsonneault, 2005). An adaptation process occurs among the technology, task,

and user. Despite diverse definitions of user adaptation (e.g., adjustment, appropriation, reinvention, and IT adaptation), prior studies have focused on users' responses to changes and disruptions caused by IT in organizational settings (Kashefi, Abbott, & Ayoung, 2015; Nevo et al., 2016). Thus, the existing literature view users as *"reactive actors who respond to external triggers such as discrepancies between a new IT and existing structures, routines, habits, or goals"* (Nevo et al., 2016, p. 159).

Over the past decade, there has been increased research interest in social media use, especially in SNS use. Due to FB's popularity, most of the existing literature has focused on FB use. According to a literature review by Berger, Klier, Klier, and Probst (2014), research on SNS use has mostly considered the personal and social reasons for adoption and use of such networks. Furthermore, existing research has shown that FB use may become habitual over time (Thadani, 2013; Thadani & Cheung, 2011; Turel, 2014; Vishwanath, 2014). According to these studies, individuals' social network size, frequency of FB use, and deficient self-regulation significantly predict habitual FB use. For some users, habitual FB use may turn into bad habits and lead to FB addiction (Turel, 2015; Turel & Serenko, 2012) or result in other negative effects, such as social overload and stress (Maier, Laumer, Eckhardt, & Weitzel, 2012; Maier, Laumer, Eckhardt, et al., 2015).

In addition to desired outcomes and financial goals, organizational structures, practices, values, and norms regulate individuals' IT usage at work. In contrast, personal IT use is mostly voluntary in nature, so adults are responsible for controlling their own IT use. Obviously, this may cause problems for persons who have low levels of self-control. The pervasive nature of personal IT, such as SNS, can result in excessive use and various negative consequences related to family, personal, and professional life (Zheng & Lee, 2016).

Research on self-regulation has shown that people's behavior is guided by personal and social standards and self-regulative mechanisms (Bandura, 2001; Baumeister & Vohs, 2007). Regulation means change, and with self-control, people can adapt their behavior to bring it into line with standards and support the pursuit of long-term goals (Baumeister & Vohs, 2007). Personal IT use is based on users' self-determination and volitional behavior (Malhotra & Galletta, 2003), so the role of self-regulation needs to be highlighted to understand the reasons for user adaptation.

Previous IT use research has deepened our understanding of IT use and user adaptation several ways. However, most research on user adaptation has focused on changes in organizational IT use and paid limited attention to user adaptation in personal IT use contexts. Due to pervasive, multipurpose technologies, IT use is embedded in daily life, influencing not only on people's behaviors but also their identities (Carter & Grover, 2015). Recent research on IT use, therefore, has called for a more comprehensive understanding of individuals' usage behaviors (Benbasat & Barki, 2007; Burton-Jones & Straub, 2006; Carter & Grover, 2015; Elie-Dit-Cosaque & Straub, 2011; S. J. Hong & Tam, 2006; Yoo, 2010).

FB is an excellent example of a mixed system in the sense that it enables both utilitarian and hedonic use. Furthermore, FB is a system that is embedded

in people's everyday actions and intertwined in their identities and social environments. To understand FB users' usage behavior and the reasons for user adaptation during post-adoptive FB use, we need to take a closer look at different FB use patterns. In the context of FB use, we need to understand not only the causes of the problems (negative stimuli) but also the opportunities (positive stimuli) that bring about changes to FB use. To understand why users change/adapt their use behavior as they do, we need to find out reasons for their actions.

1.2 Scope of the dissertation

Despite the popularity of FB and other social media, limited attention has been paid to changes in individuals' post-adoptive behaviors and the underlying mechanisms. The thesis is aimed at providing an empirically grounded understanding of user adaptation processes in the social media use context by applying a stage theory approach. The study focuses on individuals' post-adoptive FB use. According to the objectives and scope of the study, the following research questions are formulated:

RQ1: What kind of post-adoptive use patterns do FB users have?

RQ2: How and why do people adjust their post-adoptive use behaviors?

To answer these research questions, I conducted a qualitative study of FB use. The use of hermeneutic phenomenology as a research approach helped reveal individuals' experiences of their FB use and user adaptation over time. Using self-regulation theory as a theoretical lens, the study results provide an understanding and deep insights into the processes of user adaptation in the context of FB use. Furthermore, a stage theory approach enables us to illustrate and explain the underlying mechanisms of user adaptation.

As the main result, the study proposes a stage theory of user adaptation describing a variety of FB use patterns and adaptation strategies users apply after adoption. The stage theory approach enables us to illustrate and explain the complex nature of user adaptation and its underlying mechanisms.

This dissertation comprises seven main sections structured as follows. Section 2 presents a review of the related literature. After reviewing research on IT use in general, we turn to individual-level IT use in more detail: first, we look into the phases of IT use life cycle, then research on habitual IT use and user adaptation, and finally research on SNS use. Section 3 presents the theoretical foundations of the study. First, we go through research on self-regulation and then, discuss the stage theories of behavioral change. The next section describes the research approach and perspectives of the study as well as data collection and data analysis techniques and procedures used. Section 5 presents the empirical findings and proposes a stage theory of user adaptation. Finally, Section 6

discusses the results, theoretical and practical implications, limitations, and future research topics, while Section 7 provides the conclusions.

2 RESEARCH ON INFORMATION TECHNOLOGY USE

2.1 Antecedents of system usage

The two main concepts in IT use are an IT artifact and a user (Riemer & Johnston, 2014). According to Benbasat and Zmud (2003, p. 186), an IT artifact is “*the application of IT to enable or support some task(s) embedded within a structure(s) that itself is embedded within a context(s).*” IT artifacts thus are more than the software or hardware and include the task, structure, and context. Furthermore, IT artifacts can be defined based on their scope (i.e., what comprises the IT) and role (i.e., how the IT is used) in the organization (Orlikowski, 2000). The core purpose of all IS is “*to help people understand the states of some real-world systems that are relevant to them*” (Burton-Jones & Grange, 2013, p. 636). Relevant states might be, for example, the state of the organization’s business processes represented by the enterprise resource planning system and the state of one’s social network represented by FB.

Orlikowski and Iacono (2001) reviewed the conceptualizations of IT in IS research. They described the assumptions of IT in five broad categories: the tool, proxy, ensemble, computational, and nominal views. First, the *tool view* treats IT as an engineered artifact expected to do what its designers intend it to do. As such, IT is seen a separate, predefined, unchanging thing humans control. Second, the *proxy view* assumes that the critical aspects of IT can be captured through a set of surrogate measures, such as individual perceptions and money spent. Third, the *ensemble view* focuses on the dynamic interactions between users and technology during IT construction, implementation, and use in organizations and the deployment of IT in society. Fourth, the *computational view* concentrates on the computational power of IT. Finally, in the *nominal view*, the role of IT artifacts is absent as the conceptual and analytical emphasis focused on a range of topics of broad interest to the IS field. System usage is a major area of interest

in IS research (Benbasat & Barki, 2007; DeLone & McLean, 1992, 2003; Venkatesh, Davis, & Morris, 2007) and has been studied in four research domains: IS success, IS acceptance, IS implementation, and IS for decision-making. Recently, researchers have measured usage by various means to identify different variables explaining usage variances, characteristics affecting user decision making and/or effective system use, and variables determining how IT benefits individuals and organizations in various contexts (Burton-Jones & Straub, 2006). Much of IS research has been concerned with the ongoing relations among IT, individuals, and organizations (Orlikowski & Baroudi, 1991). These areas of interest include various topics concerned with the social processes related to the creation, introduction, and use of IT.

The antecedents of system usage have been studied widely in various research domains for nearly four decades, but the construct still needs theoretical grounding (Burton-Jones & Straub, 2006). Due to the multidimensional nature of system use, the construct cannot have a single, generally accepted conceptualization; its dimensions and relevant measures of system use vary across contexts. This has led to mixed results and a lack of consensus on the conceptualization and measurement of system use (Burton-Jones & Straub, 2006). Most researchers treat system usage *“as a black box, with relatively ‘lean’ measures of use frequency and distant antecedents that are not theoretically connected to usage behaviors”* (Elie-Dit-Cosaque & Straub, 2011, p. 589).

2.1.1 Types of information technology

The assumption that system type influences user acceptance of IT is widely accepted in the IS literature. Early studies focused on the determinants of IT use in workplace settings, emphasizing the effectiveness and productivity of system use (e.g., Davis, 1989). Gradually, with the widespread adoption of IT outside organizational contexts, scholars started to pay more attention to personal and/or leisure IT use (e.g., Van der Heijden, 2004).

From the perspectives of the system's use purpose and the user's motivation to accept and use the system, prior research has broadly classified IS as either utilitarian or hedonic (Agarwal & Karahanna, 2000; Gerow, Ayyagari, Thatcher, & Roth, 2013; Van der Heijden, 2004; Wu & Lu, 2013). Utilitarian systems provide external value (based on extrinsic motivation) to the user with the primary objective of productive use, whereas hedonic systems provide internal value (based on intrinsic motivation) to the user with the primary objective of fun.

Today, however, IT is not solely used to accomplish organizational goals or to exploit easy-to-use interfaces but also to enable leisure and social interaction with business partners and friends (Junglas, Goel, Abraham, & Ives, 2013). In addition to purely utilitarian and hedonic systems, recent research has suggested that there is a third type of system: a mixed system combining features from the two other system types (Gerow et al., 2013; Hong, Thong, & Tam, 2006; Lin & Bhattacharjee, 2010; Wu & Lu, 2013). These mixed or dual-purpose systems, such as SNS, are integrated into daily life and provide both extrinsic (e.g., usefulness)

and intrinsic (e.g., enjoyment) values for the user (Gerow et al., 2013). Furthermore, mixed applications have an intimate relationship with the user and are independent of the user's location and time of access (Hong & Tam, 2006). Such systems are commonly used to share personal updates and keep in touch with friends and family but can also be used to accomplish work- and study-related tasks and communication. In addition to the potential for the system to have both extrinsic and intrinsic motivational drivers, the role of the motivational drivers may change during IT use, so initial use is driven by different motivational factors than continued use (Soliman & Tuunainen, 2015).

Today, there is no simple division between utilitarian/mandatory and hedonic/voluntary IT use. At work, some IT use may be mandatory (e.g., the use of certain software for certain tasks) or voluntary (e.g., the freedom to choose which service to use). In the personal or leisure IT use context, IT use is voluntary as people can choose whether to use certain IT (e.g., social media services). However, in some cases, voluntary use of certain IT is mandatory; if we think of, for example, e-banking systems, one has to use this system to manage one's finances.

2.1.2 Individual-level information technology use

Previous literature on IT adoption and use has made notable contributions to the IS literature by explaining user behavior and discovering the predictors of IT use. Innovation adoption studies (e.g., Rogers, 1995) have been concerned with the perceived characteristics of innovations, whereas research on technology acceptance and use (e.g., Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh et al., 2012) has focused more on the variables affecting individuals' behavioral intention and actual IT use.

IT and individuals are a key research area in IS, focusing primarily on the psychological aspects of human-computer interaction (Sidorova, Evangelopoulos, Valacich, & Ramakrishnan, 2008). Burton-Jones and Straub (2006, p. 231) defined individual-level system usage as "*an individual user's employment of one or more features of a system to perform a task.*" This definition describes three elements of system use: the competences and motivations of the user, the nature of the system, and the characteristics of the task.

Barki et al. (2007) expanded the concept of individual-level system use so that it concerns not only technology interaction behaviors but also task-technology adaptation and individual adaptation behaviors. According to Barki et al. (2007), technology interaction deals with all actions aimed at accomplishing a task, whereas task-technology adaptation includes all IT adjusting behaviors, including IT, task, and organizational reinvention. Furthermore, users may adapt their own behaviors, for example, through learning. In sum, research on individual-level IT use concerns what the user does (i.e., behavior), what the user thinks (i.e., cognition), and what the user feels (i.e., affect) (Burton-Jones & Gallivan, 2007).

Figure 1 presents a conceptual framework of prior research on individual-level IT use. In the following sections, we will first review shortly the three core

phases of IT use, namely adoption, usage, and termination. Then we will focus more in detail on individuals' post-adoptive use behaviors (i.e., the phases of usage and termination) including habitual IT use and user adaptation.

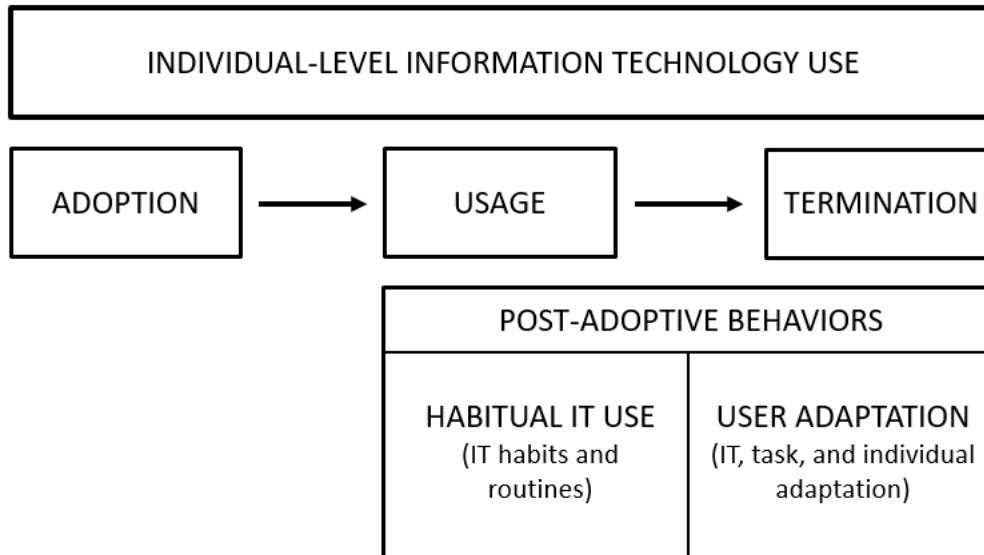


FIGURE 1 Conceptual framework of individual-level IT use

2.2 Phases of information technology use

IT adoption and use is one of the most mature research streams in the IS field. Since the late 1980s, numerous research articles have examined why people use certain IT or not. Interestingly, three successive streams of research reflect three core phases in a typical IT life cycle: the adoption, usage, and termination phases (Furneaux & Wade, 2010, 2011; Maier, Laumer, Weinert, et al., 2015).

2.2.1 Adoption phase

In the adoption phase, one key underlying assumption is that users are introduced to a new IT artifact with which they have very little (or no) prior experience. Consequently, there is a probability that the IT might not be adopted at all. Adoption-oriented research, therefore, has focused on identifying the key factors that may predict acceptance of a new technology upon introduction. One theory arguably laid the foundation for much of the work in this research area: the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975) and its extended version, the theory of planned behavior (TPB) (Ajzen, 1991). The technology acceptance model (TAM) (Davis, 1989) was undoubtedly the first widely known instantiation of the TRA addressing individual technology acceptance (intentions) in the workplace. TAM has repeatedly shown that IT's perceived usefulness and perceived ease of use are the most salient beliefs predicting end users' intentions

to accept the technology (e.g., Davis, Bagozzi, & Warshaw, 1989; Gefen, Karahanna, & Straub, 2003; King & He, 2006; Lee, Kozar, & Larsen, 2003; Venkatesh, 2000).

TAM has spawned a number of models and extensions, usually integrating new independent, moderating and/or mediating variables to best explain the variance in intentions. The work leading to the development of the unified theory of acceptance and use of technology (UTAUT) by Venkatesh et al. (2003) is perhaps one of the most comprehensive efforts in this regard. Building on eight prominent models of acceptance determinants (including TRA, TPB, diffusion of innovations theory, and TAM), UTAUT posits that performance expectancy, effort expectancy, and social influence predict actual use behavior through intentions, while facilitating conditions directly predict actual behavior without mediation.

2.2.2 Usage phase

At the turn of the millennium, research interest shifted from IT adoption to individuals' actual use of IT after initial adoption (i.e., IT continuance/post-adoption) as studies showed that successful IT adoption does not automatically lead to continued use (e.g., Jasperson et al., 2005; Kim & Malhotra, 2005). A simple but critical difference between the IT adoption and post-adoption stages boils down to the difference between expectations and experience. Specifically, while the adoption research stream has investigated the impact of expectations on users' intentions and subsequent decisions whether to accept or reject a technology, the post-adoption research stream has investigated how actual experience with IT reinforces its continued use over extended periods of time, well beyond the point at which an adoption decision had been made (Bhattacharjee, 2001; Bhattacharjee & Barfar, 2011; Jasperson et al., 2005; Karahanna, Straub, & Chervany, 1999).

Research on IT use has shown that the antecedents of IT adoption differ from the antecedents of actual use (Bhattacharjee, 2001; Jasperson et al., 2005; Karahanna et al., 1999). Continued IT use involves more complex characteristics than initial use (Jasperson et al., 2005; Kim & Malhotra, 2005). Moreover, the determinants of continued use, such as perceived usefulness and attitude beliefs, change as users update their evaluations of a system use over time (Bhattacharjee & Premkumar, 2004; Kim & Malhotra, 2005). IT continuance thus is not a single decision but a series of decisions to continue using IT (Limayem et al., 2007).

Notably, research on IS continuance behavior has relied on two main approaches. The first views continuance as an extension of acceptance behavior (e.g., Kim & Malhotra, 2005), whereas the second argues that inconsistencies between users' expectations and the actual outcomes of IS determine future use (Bhattacharjee, 2001). According to Bhattacharjee's (2001) IT continuance model, an individual's IS continuance intentions are based on two factors: experience of prior IS use (i.e., satisfaction) and their outcome expectations.

Although the terms *post-adoption* and *IT continuance* are used interchangeably (Karahanna et al., 1999), continuance is only one part of post-

adoptive behaviors. In addition to IT continuance, post-adoptive behaviors include IT adaptation, IT resistance, and switching between IT alternatives (Bhattacharjee & Barfar, 2011). Individuals' post-adoptive behavior is defined as

the myriad feature adoption decisions, feature use behaviors, and feature extension behaviors made by an individual user after an IT application has been installed, made accessible to the user, and applied by the user in accomplishing his/her work activities. (Jasperson et al., 2005, p. 531)

Post-adoptive behavior includes not only feature use and feature extension behaviors (Bagayogo et al., 2014; Jasperson et al., 2005) but also various learning and exploration activities (Barki et al., 2007; Burton-Jones & Straub, 2006; Saeed & Abdinnour, 2013; Stein, Newell, Wagner, & Galliers, 2015). Furthermore, recent studies have shown that habits affect IS continuance (Kim & Malhotra, 2005; Limayem & Hirt, 2003; Limayem et al., 2007; Ortiz de Guinea & Markus, 2009; Pahnla, Siponen, & Zheng, 2011; Venkatesh et al., 2012), and over time, post-adoptive behaviors become habitual (Jasperson et al., 2005).

2.2.3 Termination phase

The third and most recent research stream focuses on the termination stage of the IS lifecycle. Although research on IS discontinuance may be traced to the early 1990s (see Cooper, 1991), serious considerations of the topic only recently gained momentum. In the early period of IS discontinuance research in the 2000s, studies suggested that the key drivers of discontinuance intentions are the opposite of IS continuance drivers (i.e., low levels of perceived usefulness and satisfaction) (Bhattacharjee, 2001). However, there were early signs that discontinuance may be a more complex phenomenon than generally portrayed (Pollard, 2003) and that understanding discontinued use requires understanding the use context and the role of rival technologies (Spiller, Vlasic, & Yetton, 2007). Furthermore, recent research has shown that situational factors, such as unsatisfactory deliveries and incorrect orders in online grocery shopping, affect discontinuance (Hand, Dall'Olmo Riley, Harris, Singh, & Rettie, 2009).

Most notably, research at the individual level of analysis has focused on factors either driving discontinuance intentions (e.g., Bhattacharjee, Limayem, & Cheung, 2012; Polites & Karahanna, 2012; York & Turcotte, 2015) or coping with the negative consequences of excessive technology use (Soror, Hammer, Steelman, Davis, & Limayem, 2015; Turel, 2014). Interestingly, FB as a use context has received the most attention in this research stream, probably due to its ubiquitous nature (Cho, 2015; Maier, Laumer, Eckhardt, et al., 2015; Maier, Laumer, Weinert, et al., 2015; Turel, 2014). Turel (2014) found that guilt and discontinuance self-efficacy are the key drivers of FB discontinuance, whereas habit and satisfaction act as inhibitors of discontinuance intentions. Furthermore, recent research has shown that in the context of FB use, the nature of discontinuance might be either temporary or permanent (Cho, 2015; York & Turcotte, 2015).

2.3 Habitual information technology use

Traditionally, IT use has been viewed as reasoned and conscious behavior. However, recent research indicate that after adoption both conscious and automatic information processing mechanisms regulate IT use (e.g., Limayem & Hirt, 2003; Ortiz de Guinea & Markus, 2009; Ray & Seo, 2013). When IT use is habitual, users repeat well-learned action sequences in an automatic manner (Ortiz de Guinea & Markus, 2009).

2.3.1 Habitual behavior and habit formation

People have numerous habits, ranging from simple actions to complex behavior that develops over the lifetime. Previous research on habits has been conducted mostly in the fields of social psychology and psychology, which primarily treat habit as a routine or mechanical reaction to stimuli (Ouellette & Wood, 1998; Verplanken & Aarts, 1999; Wood & Neal, 2007). Existing literature studies habits from two different perspectives. The first perspective, known as the behavioristic view, posits that habitual behavior is guided by automatic cognitive processes rather than decision processes. Repetition of certain behavior is the basis of the behavioristic view (Aarts & Dijksterhuis, 2000; Verplanken & Aarts, 1999). Consequently, habit strength traditionally has been measured by the frequency of behavior (Ajzen, 2002; Sheeran et al., 2005). Moreover, stable features of the environment provide constant support for performance (Wood, Quinn, & Kashy, 2002). Stable contexts may vary to some extent but do not disturb the implementation and execution of practiced responses (Ouellette & Wood, 1998; Verplanken & Aarts, 1999). Although there is still an ongoing debate over how habits should be conceptualized, there is consensus that they are acquired through incremental strengthening of the association between a situation and an action (Lally, Jaarsveld, Potts, & Wardle, 2010).

The second perspective, known as the cognitive-motivational view, emphasizes the role of goals in habit development (Aarts & Dijksterhuis, 2000; Verplanken, 2006; Verplanken & Aarts, 1999; Verplanken & Orbell, 2003). According to this view, situational context cues are associated with a certain goal, and activation of that goal results in performance of a behavior. Thus, habits are mental associations between the goal and the resulting action. A number of researchers have emphasized that conscious control, particularly goal orientation, influences habitual behavior (Ajzen, 2002; Ortiz de Guinea & Markus, 2009; Verplanken & Orbell, 2003). In addition, the context (place, time, and situation) in which the behavior is performed plays a crucial role in the establishment of habits (Danner, Aarts, & de Vries, 2008). In sum, the behavioristic view on habit sees a direct link between the situation and the behavior, whereas the cognitive-motivational view points out that goal activation mediates the relationship between the situation and the behavior (Sheeran et al., 2005).

Research on habitual media use (e.g., Internet use) has combined the behavioristic and the cognitive-motivational views of habit. In the field of

communication research, LaRose (2010, p., 194; see also Larose & Eastin, 2004; Larose, Lin, & Eastin, 2003) defined media habits as “*a form of automaticity in media consumption that develops as people repeat media consumption behavior in stable circumstances.*” In the case of media habits, habit formation has two phases: habit acquisition and habit activation (LaRose, 2010). In the habit acquisition phase, a certain media consumption behavior is first determined by consciously formed intentions to obtain desired outcomes and then repeated in stable circumstances. Subsequently, in the habit activation phase, the habit may be activated through mental associations in situations similar to that in which it was formed. There is no longer a need for a stable situation because both external cues (i.e., context, time, location, and preceding events) and internal cues (i.e., goals, moods, and related thoughts) can activate the habitual response (LaRose, 2010).

2.3.2 Information technology habits

A common premise underlying previous technology acceptance and use studies is that individuals' IT use is based on conscious intentions and rational decision making (Davis, 1989; Venkatesh et al., 2003). However, previous studies have demonstrated that after initial use, individuals' usage behavior may become partly automatized or habitual (Bhattacharjee & Barfar, 2011; Jasperson et al., 2005; Kim & Malhotra, 2005; Limayem & Hirt, 2003; Polites & Karahanna, 2013). Users' pre-acceptance attitudes are based on cognitive beliefs, such as perceived usefulness and perceived ease of use, formed via second-hand information from others. In contrast, intentions to continue using IT are based both on users' rational evaluations and satisfactory experience with the IT and on non-rational inputs, such as attitudes, feelings, and awareness of satisfaction (Bhattacharjee, 2001; Ortiz de Guinea & Markus, 2009). Habitual IT use thus is less guided by conscious planning and is instead triggered by specific environmental cues in an automatic manner (Bhattacharjee & Barfar, 2011). In this sense, continued IT use is driven by conscious intentions, but well-learned action sequences are frequently repeated over time in stable contexts, so continued IT use may be habitual (Ortiz de Guinea & Markus, 2009). Consequently, both conscious and automatic information processing mechanisms regulate IT continuance (Limayem & Hirt, 2003; Ray & Seo, 2013).

Over the past decade, IS scholars have been increasingly interested in the role of habit in technology use (Bhattacharjee & Barfar, 2011; Kim, Malhotra, & Narasimhan, 2005; Limayem et al., 2007; Ortiz de Guinea & Markus, 2009; Pahnla et al., 2011; Polites & Karahanna, 2012, 2013; Venkatesh et al., 2012). Previous studies have shown that the impact of habit appears in various forms: it influences behavioral intention, modifies the relationship between behavioral intention and actual IT use, and directly affects actual IT use (Ortiz de Guinea & Markus, 2009).

In the organizational context, IT habits are more or less goal directed as employees use IT for task completion (Polites & Karahanna, 2012, 2013). Limayem et al. (2007, p. 709) defined the concept of IT habit in the context of continued IT use as “*the extent to which people tend to perform behaviors (use IS)*

automatically because of learning.” Repeated performance builds a mental script through which situational cues can automatically activate the learned actions, leading to technology use (Kim, 2009; Kim & Malhotra, 2005).

There are four antecedents to habit formation in the context of continued IT use: frequent repetition of the behavior, satisfactory experiences, relatively stable contexts, and the comprehensiveness of usage (Limayem et al., 2007). IT habits can be divided into general and specific habits based on the comprehensiveness of technology use (Limayem et al., 2007). General IT habits describe use of the same technology for many different purposes or tasks, whereas specific IT habits illustrate use of the system for only one or relatively few tasks.

As discussed, habits have various features. Generally, there is a consensus that habits are frequently practiced, goal-directed, automatic behaviors in stable contexts (e.g., Aarts & Dijksterhuis, 2000; Ouellette & Wood, 1998; Verplanken & Aarts, 1999; Wood & Neal, 2007). Recent research on IT habits has demonstrated that contextual variables (i.e., temporal, physical, and social contexts, task sequences, and mood) have important roles in work-related IT habit formation (Polites & Karahanna, 2013). In addition to contextual factors, studies have emphasized the roles of satisfaction, motivation, learning, and self-regulation in habit formation. These studies have shown that satisfaction with the outcomes of a certain behavior increases the motivation to repeat that behavior (Jager, 2003; Lally & Gardner, 2013; Limayem et al., 2007; Liu, Cheung, & Lee, 2011). Moreover, both intrinsic motivation and extrinsic rewards may affect habit formation (Lally & Gardner, 2013). The role of learning in the context of habitual IT use means that habitual behavior is based on previously learned sequences of actions (Limayem et al., 2007). Recently, the role of deficient self-control in media use, such as automatically checking e-mail without considering whether it interferes with more important tasks, has attracted more attention, especially in the context of Internet use (LaRose, 2010; Larose & Eastin, 2004).

In addition to the repetition of learned behavioral sequences, the tasks for which people use IT and the technology itself may be important triggers of habitual IT use (Ortiz de Guinea & Markus, 2009). Polites and Karahanna (2013, p. 226) discussed habitual IT choice while describing behaviors performed in an automatic manner, such as *“the behavioral act of clicking on an icon to open a particular application on one’s smart phone.”* Habitual choices and habitual IT use gradually become part of everyday routines. Usually, IT habits are harmless, but sometimes, habitual IT use may impede IT adaptation (e.g., result inertia) in work contexts (Polites & Karahanna, 2012, 2013). Furthermore, in the SNS use context, habitual IT use may lead to excessive or problematic use causing negative outcomes, such as IT addiction, social overload, and technostress (Maier, Laumer, Eckhardt, et al., 2015; Maier, Laumer, Weinert, et al., 2015). The possible negative outcomes of SNS use (e.g., FB use) are discussed more in detail in Section 2.5.2.

2.4 The process of user adaptation

Research on user adaptation has illustrated the dynamics of IT use and related changes. Existing research has provided evidence of the changing nature of post-adoptive IT use: user adaptation is not a single decision occurring at one point of time, as IT adoption is, but a dynamic, interactive process that develops and changes over time (Bruque, Moyano, & Eisenberg, 2008). The introduction of a new system affects the work environment in various ways and triggers complex user responses (Beaudry & Pinsonneault, 2005). Most prior research on user adaptation has focused on IT-related changes in organizational contexts from three perspectives: technological (e.g., feature use), organizational (e.g., tasks and structures), and individual (e.g., user behavior) (see a list of previous research on user adaptation in Appendix I). Users not only interact with IT but also engage in various adaptation behaviors as they become familiar with the technology and gain competence. After adoption, individuals adjust the existing IT (i.e., technology interaction), tasks (i.e., task-technology adaptation), and their own use behavior (i.e., individual adaptation) according to the various changes in organizational settings (Barki et al., 2007). Recent research, for example, has shown how users adjust and reshape IT to meet organizational goals (Bagayogo et al., 2014; Benlian, 2015; Liang, Peng, Xue, Guo, & Wang, 2015; Majchrzak et al., 2000; Nevo et al., 2016; Sun, 2012) and change or revise their post-adoptive usage (Barki et al., 2007; Beaudry & Pinsonneault, 2005, 2010; Bhattacharjee, Davis, Connolly, & Hikmet, 2017; Bruque et al., 2008; Fadel, 2012; Stein et al., 2015).

There is much ambiguity in the concepts used to describe IT-related adaptation behaviors. Scholars have used various terms and concepts, such as appropriation (DeSanctis & Scott, 1994), technologies structuring (Majchrzak et al., 2000), user adaptation (Beaudry & Pinsonneault, 2005), modification (Desouza, Awazu, & Ramaprasad, 2007), individual adaptation (Bruque et al., 2008), enhanced use (Bagayogo et al., 2014), feature use (Benlian, 2015), system exploration (Liang et al., 2015), and IT reinvention (Nevo et al., 2016). While these studies have been provided an understanding of the process of user adaptation, the existing research is fragmented, resulting in confusion in this area of research (Beaudry & Pinsonneault, 2005).

Although the existing literature has deepened understanding of individuals' technology use and related adaptation behaviors, studies have produced contradictory results regarding the nature of adaptation process: some authors have treated it as continuous (e.g., Leonard-Barton, 1988), whereas others have seen it as discontinuous (Lassila & Brancheau, 1999; Tyre & Orlikowski, 1994). However, recent research has proposed a consensus view arguing that the nature of adaptation process is related to the field setting (i.e., context), and thus, the adaptation process is "*responsive to changes in structural malleability, whenever that may occur*" (Majchrzak et al., 2000, p. 573).

The rest of the section provides detailed information about research on user adaptation and related behaviors. First, we take a closer look at IT use patterns

and the IT events acting as change triggers. We then review the perspectives on user adaptation.

2.4.1 Patterns of information technology use

Individuals' post-adoptive IT use behavior contains different patterns of activities – IT use patterns – describing the interactions between the user, system, and task (Burton-jones & Gallivan, 2007). An IT use pattern may describe, for example, what features of the system are used or not used (i.e., system centered), for what subtasks certain features are used (i.e., task centered), and what level of absorption the user displays while using the system (i.e., user centered). Furthermore, use patterns may contain elements of non-use, such as using only some features or ignoring a technology (Stein et al., 2015).

IT use patterns are dynamic in nature, so they vary over time (Burton-Jones & Gallivan, 2007). In addition to gradual changes, the intensity of IT use varies over time as periods of routine use alternate with brief periods of intensive change (Lassila & Brancheau, 1999; Ortiz de Guinea & Webster, 2013; Tyre & Orlikowski, 1994). To better understand the nature of individuals' post-adoptive IT usage, scholars have started to pay more attention to IT users' distinct use patterns and changes in them. For example, a recent study by Ortiz de Guinea and Webster (2013) showed that use patterns appear and disappear due to expected and unexpected IT events after adoption. The authors defined a dynamic IT use pattern as *“a group of emotions, cognitions, and behaviors that occur together, and whose values change together in response to events in the user's environment”* (Ortiz de Guinea & Webster, 2013, p. 1167). Various environmental changes thus alter people's emotions (i.e., affect and psychological arousal), cognitions (computer- and non-computer-related thoughts), and behaviors (i.e., adaptive and exploitive behaviors), leading to changes in IT use.

2.4.2 Change triggers

Routinized IT use may be disturbed by unusual or disruptive events that trigger the adaptation process (Beaudry & Pinsonneault, 2005; Lassila & Brancheau, 1999; Ortiz de Guinea & Webster, 2013; Sun, 2012; Tyre & Orlikowski, 1994). The process of IT adaptation starts when an IT event activates a need for change. An IT event refers to *“something or some event to which a person reacts or responds”* (Stein et al., 2015, p. 371). The existing literature on IT adaptation has demonstrated that a variety of stimuli initiate change after adoption. External triggers, such as a new or changed work task, resource constraints, and managers' demands, can force users to adjust or revise system use to achieve the desired outcomes (Desouza et al., 2007; Sun, 2012; Sun & Zhang, 2006). Furthermore, internal triggers, such as individual learning, gained IT competence, and changed goals, may lead to modification or extension of the technology features (Barki et al., 2007; Desouza et al., 2007).

Post-adoptive IT use includes both automatic (i.e., habitual use) and adjusting (i.e., user adaptation) use patterns. During expected IT events, users

engage in automatic use patterns, whereas discrepant IT events trigger adjusting use patterns (Ortiz de Guinea & Webster, 2013). Accordingly, expected IT events are ordinary and positive in nature, whereas unexpected IT events include both positive discovery events and negative discrepant events (Ortiz de Guinea & Webster, 2013; Tyre & Orlikowski, 1994). Consequently, different triggering IT events have different impacts on IT use patterns. During expected IT events, IT use fulfills user expectations, and users engage in automatic IT use patterns. Thus, no adaptation is required. Unlike expected IT events, discovery and discrepant IT events trigger adjusting IT use patterns. Discovery IT events refer to the finding of a new IT functionality (Tyre & Orlikowski, 1994), while discrepant IT events are perceived as threatening and trigger negative emotions (Ortiz de Guinea & Webster, 2013).

The role of the user in the process of user adaptation can be that of either a reactive actor, who responds to external triggers and adapts IT to existing organizational goals, or a proactive actor, who purposefully adjusts system use to achieve new goals. A recent study distinguished between IT adaptation and IT reinvention, noting that IT adaptation is a reactive behavior (i.e., past and present oriented) during which users adjust IT *“to existing goals to address present needs or past practices,”* whereas IT reinvention refers to a proactive behavior in which users are *“changing an implemented IT and/or its use to pursue new goals”* (Nevo et al., 2016, p. 159).

2.4.3 Perspectives of user adaptation

In the 1990s, studies on user adaptation applied the structuration perspective and highlighted the changing nature of IT use in organizations (DeSanctis & Scott, 1994; Lassila & Brancheau, 1999; Leonard-Barton, 1988; Tyre & Orlikowski, 1994). The structuration perspective on IT use posits that implementation of IT in organizations is a process of mutual adaptation, including IT reinvention and simultaneous organizational adaptation. Early studies focused mostly on the technological and organizational perspectives on user adaptation (i.e., IT adaptation), but since the 2000s, research interest has shifted toward the individual perspective highlighting user responses.

2.4.3.1 Technological and organizational perspectives

Much of the previous research on user adaptation has focused on understanding how employees' system feature use changes during IT continuance (i.e., technological perspective) and how implementation of new IT in organizations causes changes in work (i.e., organizational perspective). Employees have to adjust to the new conditions by modifying their work routines and learning to use a new system. In the early stages after IT adoption, users extend their feature use as they become familiar with the technology, whereas in later stages, they establish stable norms and routines for using the system (Benlian, 2015).

Individuals modify and enhance their IT use, for example, by using new features and feature extensions (Benlian, 2015; Desouza et al., 2007; Sun, 2012), changing implemented IT and/or its use (Nevo et al., 2016), and using

technology for additional tasks (Bagayogo et al., 2014). Moreover, the nature of adaptation may be either exploitive (i.e., incremental improvements) or exploratory adaptation possibly leading to unexpected or dramatic consequences (Schmitz, Teng, & Webb, 2016).

Some researchers have applied a stage or process approach to illustrate changes in feature use after IT adoption. For example, in a study on self-service IT use, Saeed and Abdinnour (2013) examined differences among user perceptions in various post-adoption stages. They identified three post-adoption IT usage stages that characterize specific patterns of self-service IT use: routinization, infusion, and extension (Saeed & Abdinnour, 2013). In the routinization stage, IT use is part of the users' normal activity, and they have developed standard IT routines. In the infusion stage, the users can effectively integrate IT into their work, while in the extension stage, they explore new uses of IT. The study results demonstrated that several factors (i.e., usefulness, user-initiated learning, ease of use, satisfaction, and voluntariness of use) differentiated users at the different stages of IT use (Saeed & Abdinnour, 2013).

Furthermore, Desouza, Awazu, and Ramaprasad (2007) applied a process approach to illustrate how individuals modify IT in five stages (i.e., operability, flexibility, adaptability, exaptability, and agility). The process model for user modifications demonstrates the maturity level as technology use changes over time and across stages as the user gains experience and expertise while using the system. Desouza et al. (2007) highlighted the individual's role as an active and innovative IT user. The study showed that some technology users are experts and others regular users (Desouza et al., 2007). To achieve organization-wide effective IT use, expert users must share their knowledge with regular users, and the results accordingly highlighted the role of social interactions in organizational IT adaptation (Desouza et al., 2007). Individuals use and modify IT not in isolation but in interactions with other individuals, groups, and the organization (Desouza et al., 2007), making the role of social and information networks important during the process of IT adaptation (Bruque et al., 2008).

The structuration perspective on IT use draws on Giddens' structuration theory and posits that technology has built-in structures, which users appropriate while using the technology (e.g., Barley, 1986; DeSanctis & Scott, 1994; Orlikowski, 1992). Studies following the structuration perspective describe the relationship between technology and organizational change as new systems cause changes not only to work tasks but also organizational processes and structures (e.g., Lassila & Brancheau, 1999; Orlikowski, 1992, 2000). Changes in the system, task, and user lead to redefinition of the IT and its context, resulting in changes in work practices (Lassila & Brancheau, 1999) and the facilities, norms, and interpretive schemes used in the organization (Orlikowski, 2000; Van de Ven, 1986).

Structuration theory has been widely used in the IS field (Jones & Karster, 2008). For example, Orlikowski (1992) introduced the term *duality of technology*, describing how the interactions between people and technology are ongoing and how technology is simultaneously shaped by users and shapes individuals'

usage behavior. Later, Orlikowski (2000) proposed the technologies-in-practice perspective focusing on emergent structures and interactions among users, technologies, and social action. According to Orlikowski (2000), organizations react to technological changes in three distinct ways: inertia (IT is used within existing practices), application (IT is used to reshape existing practices), and change (IT is used to substantially alter the existing practices). The study highlights users' active role in changing their IT use:

A practice lens assumes that people are purposive, knowledgeable, adaptive, and inventive agents who engage with technology in a multiplicity of ways to accomplish various and dynamic ends. (Orlikowski, 2000, p. 423)

2.4.3.2 Coping perspective

Recently, research from the individual perspective of user adaptation has gained increased interest among IS scholars. Modification of technological features is no longer the key area of interest, but instead, studies have focused on understanding users' emotions, appraisal processes, and coping efforts related to the user adaptation. The existing literature has shown that users rely on various coping strategies to respond IT-induced changes and overcome stressful IT events after adoption. User adaptation thus involves cognitive, affective, and behavioral coping mechanisms (e.g., Beaudry & Pinsonneault, 2005, 2010; Kane & Labianca, 2011; Maruping & Magni, 2015; Wu, Guo, Choi, & Ting-Ting, 2017). Behavioral adaptation refers to users' behavioral responses to an IT event (Wu et al., 2017). Through cognitive adaptation, users are able to motivate themselves to solve problems with system use and focus on positive outcomes (Maruping & Magni, 2015), whereas affective adaptation enables users to restore emotional stability after IT-induced changes (Beaudry & Pinsonneault, 2005).

From this perspective user adaptation is defined as *"the cognitive and behavioral efforts exerted by users to manage specific consequences associated with a significant IT event that occurs in their work environment"* (Beaudry & Pinsonneault, 2005, p. 496). According this definition, new or modified IT (i.e., an IT event) causes demands or challenges for users, who must apply various coping mechanisms to manage the current situation. Beaudry and Pinsonneault (2005) applied the coping theory perspective (Folkman & Lazarus, 1985; Lazarus & Folkman, 1987, 2012) to understand user adaptation behaviors and developed the coping model of user adaptation (CMUA). According to this model, user adaptation is triggered by a significant IT event. During the primary appraisal, users evaluate the relevance of the event as an opportunity or a threat. Next, during secondary appraisal, users assess their control over IT, work, and the self, as well as the available adaptation options.

After the appraisal process, users deal with the situation by either altering the problematic issue itself (i.e., problem-focused coping) or changing their perceptions on the situation (i.e., emotion-focused coping) (Folkman & Lazarus, 1985; Lazarus & Folkman, 2012). Emotion-focused coping includes actions such as minimizing the consequences of a threat, escaping and denying the situation, venting anger, and seeking support, whereas problem-focused coping entails, for

example, changing the environment (e.g., resources, barriers, and processes) and altering oneself (e.g., developing new behavioral standards and learning new skills and ways of doing things) (Beaudry & Pinsonneault, 2005).

According to the CMUA, the appraisal processes result in four distinct adaptation strategies: benefits maximizing, benefits satisficing, disturbance handling, and self-preservation (Beaudry & Pinsonneault, 2005). Positive appraisal of an IT event results in either a benefit-maximizing (high control) or a benefit-satisficing (low control) adaptation strategy. The outcomes of benefit maximizing are increased individual efficiency and effectiveness, whereas benefit satisficing results in limited effects on individual efficiency and effectiveness. Negative appraisal of an IT event (i.e., appraised as a threat) results either in a disturbance-handling strategy (high control) or a self-preservation strategy (low control). The outcomes of disturbance handling might be restoration of emotional stability, minimization of the negative consequences of an IT event, and increased individual efficiency and effectiveness. Self-preservation strategies result in either restoration of emotional stability or minimization of the perceived negative consequences. However, if users appraise the IT event as too demanding or overwhelming, they may emotionally disengage from the situation and exit it. Finally, reinforcement and reversal loops illustrate the possible reappraisal of the situation (from adaptation strategies to appraisal) and feedback loop (from outcomes to appraisal) (Beaudry & Pinsonneault, 2005). The coping perspective on user adaptation has gained increased interest among IS scholars since publication of the CMUA. Researchers have used coping theory or the CMUA as the theoretical framework for work on user responses to challenging or disturbing IT events (Beaudry & Pinsonneault, 2010; Bhattacharjee et al., 2017; Fadel, 2012; Stein et al., 2015; Wisniewski, Xu, & Chen, 2014).

Recently, the role of emotions in IT use has gained increased interest among IS scholars. Along with behavioral reactions, emotions have a central role in user responses (Beaudry & Pinsonneault, 2010; Bhattacharjee et al., 2017; Ortiz de Guinea & Webster, 2013; Stein et al., 2015). Studies have shown how the emotions felt by users in the early stages of IT introduction affect their subsequent use of the technology (Beaudry & Pinsonneault, 2010), how different characteristics of an IT event elicit either mixed or a single class of emotions (Stein et al., 2015), and how perceived negative emotions (e.g., guilt) influence IT discontinuance intentions in the hedonic use context (Turel, 2016). Beaudry and Pinsonneault (2010) have classified four types of emotions based on the appraisal processes: loss (e.g., anger, frustration, disappointment, and annoyance), deterrence (e.g., anxiety, distress, and fear), challenge (e.g., excitement, hope, flow, and playfulness) and achievement (e.g., enjoyment, satisfaction, and pleasure). These are appraised differently and lead to different adaptation behaviors.

The emotion process involves two kinds of cognitive activity: information and appraisal. According to Lazarus and Folkman (1987, p. 145), "*information concerns what we know or think we know about the world,*" whereas "*appraisal concerns the implications of that information for one's personal well-being.*" A specific IT event

elicits different emotions in different people. It, therefore, is important to note that it is not the IT event per se that triggers emotions but the evaluative assessment of the event by an individual (Lazarus & Folkman, 1987). Furthermore, people may respond to an IT event with conflicting emotions, such as a mix of satisfaction (achievement) and frustration (loss), due to a various cues of the stimulus event (Stein et al., 2015). Hence, the type of affective responses (i.e., uniform or mixed) results in either exclusive adaptation strategies or combinations of both negative and positive adaptation strategies (i.e., a vacillation strategy) (Stein et al., 2015).

2.5 Users as social actors

Internet-enabled systems have changed the nature and purpose of IT use. Today, individuals are social actors who increasingly use pervasive and multipurpose technologies (Hong & Tam, 2006; Yoo, 2010). Individuals do not use IT in isolation but jointly with others and thus, social interactions play an important role in IT use (Venkatesh & Brown, 2001).

2.5.1 A broader view of information technology use

Despite the widely recognized body of knowledge on individual IT use, the user-centric perspective provides relatively few details about the contexts that shape IT use (Lamb & Kling, 2003). Context plays a significant role in IT use because normally, individuals do not act in isolation but jointly with others (Bagozzi, 2007). Lamb and Kling (2003) recognized the role of IT in social interactions and called for a broader social-actor perspective on IT use. According to prior research, social influences play an important role in IT adoption decisions, especially in non-work settings (Venkatesh & Brown, 2001).

Today, people are social actors whose everyday actions are infused with IT use not only at work but also during personal time due to pervasive, multipurpose technologies (Hong & Tam, 2006). People increasingly use many kinds of everyday artifacts with embedded computing capabilities (e.g., smartphones, sport technologies, and cars with navigation systems). Computers and computing thus are part of people's everyday lives and experiences (Yoo, 2010). The ubiquity of IT in our lives blurs the boundary between space and time as we can use digital devices at any time and everywhere (Carter & Grover, 2015; Hong & Tam, 2006; Yoo, 2010). Further, pervasive systems are embedded in daily life, so IT has impacts on not only individuals' behaviors but also their identities. The intertwinement of IT and social structures with individual identity (i.e., IT identity) is an emerging view on the modern IT user that helps more comprehensively understand human behavior and individual thinking (Carter & Grover, 2015).

Although ubiquitous technologies enable positive outcomes, there are also negative effects. In addition to the norm of continual connectivity and

accessibility, shared cultural expectations may create pressure for some to participate, contribute, and be part of communities (Carter & Grover, 2015; Mazmanian, Orlikowski, & Yates, 2013). Recent research on the autonomy paradox illustrates how new communication practices and use of mobile digital devices restrict people's autonomy by being connected at all hours but, at the same time, increase people's sense of professional competence (Mazmanian, Orlikowski, and Yates, 2013).

According to Lee (1999), understanding the complex phenomena of IT use, including interactions among users, technologies, and social settings, constitutes the value of IS research. Today, technologies are increasingly socially construed (Orlikowski, 1992, 2000) as users create new interpretations and social practices that redefine both individual needs and IT structures. Consequently, there is a need for a new perspective understanding IT use because the context and drivers of mixed systems differ from system use in organizations (Hong & Tam, 2006).

2.5.2 Research on social network sites use

The past two decades have witnessed the rapid growth of SNS, such as FB and LinkedIn. SNS enable users to create public profiles and build relationships with other users. Users can not only communicate with each other but also share photos, reveal personal information, comment on and like updates, follow topics of interest, and join groups.

A widely recognized definition by Boyd and Ellison (2008) describes SNS as web-based services through which people can construct public or semi-public profiles and express and make visible their social networks (i.e., a list of friends using the same system). The visibility of profiles varies by the service. Users can adjust their privacy settings and choose whether they want their profiles to be public or visible only to their lists of friends. The nature of SNS has changed considerably in recent years, and Kane, Labianca, and Borgatti (2014) have provided an updated definition of online social media networks highlighting four core features shared by many social media technologies: digital profiles, search and privacy, relational ties, and network transparency:

Social media networks possesses four essential features, such that users (1) have a unique user profile that is constructed by the user, by members of their network, and by the platform; (2) access digital content through, and protect it from, various search mechanisms provided by the platform; (3) can articulate a list of other users with whom they share a relational connection; and (4) view and traverse their connections and those made by others on the platform. (Kane et al., 2014, p. 279)

In the IS field, SNS research comprises five major research areas: SNS characteristics, SNS user behavior, SNS privacy, SNS design, and SNS in organizations and society (Berger et al., 2014). The literature on post-adoptive SNS use has focused mostly on the drivers on continuance and/or discontinuance and the negative consequences of SNS use (Lu & Gallupe, 2016). Researchers on SNS post-adoption have mostly adopted three theoretical perspectives: intentional, habitual, and discontinuance (i.e., switching and/or

quitting intention, and actual behavior) (Lu & Gallupe, 2016). However, existing studies on the determinants of post-adoptive SNS behaviors have produced inconsistent results due to the complex nature of SNS and the dynamic psychological activities of SNS users (Lu & Gallupe, 2016).

Since its founding in 2004, FB has become the most popular social network in the world, with more than 2 billion monthly active users (Facebook, 2018). For many, FB use has become integral to their daily routines. Various built-in FB features motivate user interaction. Today, FB plays different roles in people's lives, used as a communication tool, entertainment platform, and a tool for information sharing and self-promotion, not to mention its role in business as an important asset for social marketers (Błachnio, Przepiórka, & Rudnicka, 2013).

The phenomenon of FB has raised interest among scholars in different disciplines, such as economics, psychology, sociology, marketing, and IT. Previous research has shown that people use FB in many ways and for various purposes (Chen, Lu, Chau, & Gupta, 2015; Cheung, Chiu, & Lee, 2011; Heinonen, 2011; Nadkarni & Hofmann, 2012). For instance, it has been suggested that social media activities on FB may be conceptualized based on user motivations: entertainment, social connection, information, and user inputs (i.e., consumption, participation, and production) (Heinonen, 2011). FB research has mostly studied user motivations (Cheung et al., 2011; Chiang, 2013; Joinson, 2008; Lampe, Ellison, & Steinfield, 2007; Lin & Lu, 2011; Nadkarni & Hofmann, 2012; Vishwanath, 2014) and gratifications received from FB use (Quan-Haase & Young, 2010; Vishwanath, 2014; Xu, Ryan, Prybutok, & Wen, 2012).

Recent research has shown that a sense of belonging, habit, and user satisfaction are strong determinants of FB continuance intention (e.g., Lin, Fan, & Chau, 2014; Turel, 2014). Interestingly, it has been shown that FB use tends to become habitual based on a number of factors, including the size of the user's social network, frequency of FB use, the user's deficient self-regulation, and online network dependency (Vishwanath, 2014). Some researchers have even suggested that habitual use of FB may lead to a vicious cycle: habitual use leads to FB addiction, which, in turns, drives future usage patterns (Turel, 2015).

Indeed, investigation of FB's addiction-like symptoms is but one of several strands of research focusing on the negative consequences of IT use (a.k.a., the dark side of IT) (see Soror et al., 2015). The most recent scholarly work in this research stream has focused on behavioral addiction (Ryan, Chester, Reece, & Xenos, 2014; Tarafdar, D'Arcy, Turel, & Gupta, 2015; Turel, Serenko, & Giles, 2011), stress/technostress (Fox & Moreland, 2015; Maier et al., 2012; Maier, Laumer, Weinert, et al., 2015), social media fatigue (Bright, Kleiser, & Grau, 2015), deficient self-regulation (Thadani, 2013), trust (Dwyer, Hiltz, & Passerini, 2007), and FB privacy concerns (Houghton & Joinson, 2010; Tan, Qin, Kim, & Hsu, 2012). Problematic FB behaviors include FB use in potentially inappropriate situations that require full attention, for example, attending classes, driving, and working (Turel & Qahri-Saremi, 2016). This kind of problematic behavior is caused by strong cognitive-emotional preoccupation and weak cognitive-behavioral control (Turel & Qahri-Saremi, 2016). For example, a recent study by Vaghefi et

al. (2017) showed that individual self-regulation has a role in users' risk of developing IT addiction. Vaghefi et al. (2017) found that individuals' level of self-regulation affected their capacity to control their mobile phone usage: individuals with low self-regulation tended to ignore or deny problems related to IT use, while individuals with high self-regulation regularly assessed their behaviors and had a high degree of control over their behaviors.

Interestingly, research addressing the dark side of FB usually has also approached IS discontinuance (Cho, 2015; Turel, 2014; York & Turcotte, 2015). For example, Turel (2014) argued that habituated FB users develop quitting intentions due to two opposing forces: feelings of guilt and low levels of self-efficacy increase quitting intentions, whereas habit and satisfaction with FB diminish quitting intentions. Similarly, York and Turcotte (2015) highlighted that FB discontinuance behavior is not always permanent, as prior research had assumed, but in many situations, is temporary, a phenomenon they referred to as vacationing. This empirical investigation suggested that the main reasons for temporary discontinuance were information overload and social burden (York & Turcotte, 2015). In fact, in the context of FB use, temporary breaks are quite common. Users can have a short break from FB or can deactivate their FB account for longer if they want to distance themselves from FB (Cho, 2015).

A study on FB non-use practices by Baumer et al. (2013) described an interesting state they termed lagging resistance: FB users want to quit but continue using FB. External constraints (e.g., FB-based communication and network scale affect the resulting fear of isolation and missed events) produce lagging resistance. Furthermore, Baumer et al. (2013) showed that FB non-use is a complex phenomenon including various behaviors, such as resisting, leaving temporarily or permanently, relapsing, and limiting. Limiting or leaving FB influences not only users but also their social circles on FB (Baumer et al., 2013).

Despite extant research on habitual FB use and discontinuance intentions, user adaptation has gained limited attention. For example, York and Turcotte (2015) explored the drivers of FB discontinuance but did not treat it as user adaptation. We could find only one recent study concerning user adaptation strategies in the context of FB use. Wisniewski et al. (2014) focused on user adaptation strategies caused by major changes in the FB interface (i.e., the launch of the FB timeline in 2011). According to Wisniewski et al. (2014), FB users with high-levels of perceived control applied problem-focused coping strategies that resulted positive outcomes, such as learning, customizing, accepting, and making requests for changes. On the contrary, users with low-levels of perceived control applied emotion-focused coping strategies, such as complaining, self-censoring, quitting, and switching to another SNS, which reduced short-term stress at the expense of increased long-term stress. While this study shows evidence that users' level of perceived control effect on their selection of coping strategies, we still need deeper insights into user adaptation and reasons for it. Furthermore, prior SNS studies have focused on individuals' usage intentions and actual use in certain point of time but failed to address changes in use

behavior over time. There is a need for qualitative, longitudinal studies that enable discovering SNS users' experiences and reasons for behavioral changes.

3 THEORETICAL FOUNDATION

3.1 Theoretical lens: self-regulation theory

During data analysis comparing the participants' post-adoptive FB use patterns, we noticed that the participants' capability to control their FB use had a significant role in user adaptation. In the context of FB use, the participants' self-control seemed to be a key aspect of user adaptation as the participants tried to control their own FB use and keep it within their self-set usage limits. The concept of usage limits refers to the participants' own rules of FB use, that is, what they themselves considered normal or acceptable FB use. Those rules included, for example, the participants' views on the acceptable amount of time spent using FB per day and the acceptable commenting and sharing behavior on FB. In the absence of obligatory guidance on what to do, as available in most organizational contexts, FB users had to set their own subjective use policy indicating how they should use FB.

As we tried to figure out what these self-set limits of FB use were and on what they were based, we noticed that the theory of self-regulation might yield some answers because it deals with behavioral standards and behavioral change. We, therefore, decided to apply self-regulation theory (Bandura, 1991) as a sensitizing device during the further analysis. Next, we review the research on self-regulation.

3.1.1 Research on self-regulation and self-control

People tend to respond in a particular way to impulses in a given situation. If people consistently pursue the same goal within the same situation, this behavior gradually becomes automatic (Bargh & Chartrand, 1999). Controlled behavior includes self-regulation and helps people respond in certain ways or do what is believed to be appropriate for the situation. Self-regulation offers people a means

to override and alter their responses and change behavior to follow rules, match ideals, and pursue goals (Baumeister & Vohs, 2007). Self-reflective and self-reactive capabilities thus enable people to have some control over their thoughts, feelings, motivations, and actions (Bandura, 1991; Baumeister & Vohs, 2007). Furthermore, as a controlled process, self-regulation enables restraining the automatic responses of impulse (Baumeister & Heatherton, 1996).

Self-regulatory systems provide the basis for purposeful action. People form beliefs about what they can do, anticipate the likely consequences of their actions, set goals for themselves, and plan their actions to achieve desired outcomes (Bandura, 1991; Baumeister & Vohs, 2007; Karoly, 1993). Self-regulation processes enable people to guide their goal-directed behavior over time (Karoly, 1993). That is, self-regulation increases the adaptability of human behavior and enables people to adjust their daily actions to meet various social and situational demands. Karoly (1993) defined self-regulation as follows:

Self-regulation refers to those processes, internal and/or transactional, that enable an individual to guide his/her goal-directed activities over time and across changing circumstances (contexts). Regulation implies modulation of thought, affect, behavior, or attention via deliberate or automated use of specific mechanisms and supportive metaskills. The processes of self-regulation are initiated when routinized activity is impeded or when goal-directedness is otherwise made salient (e.g. the appearance of a challenge, the failure of habitual action patterns, etc.). (Karoly, 1993, p. 25)

The basis of the self-regulative processes is standards setting. People motivate themselves by setting standards for evaluating performance (Bandura, 1991). Standard construction includes assessment of their own and other people's behavior (Bandura, 1991). In addition, an individual's own evaluations and other people's reactions to one's behavior affect these standards. To have the potential to influence their own behavior, people have to monitor their actions through self-evaluative processes (Bandura, 1991). Self-monitoring provides information about behavioral patterns and guides personal goal setting. Self-evaluative reactions thus give motivation and direction to people's behavior and affect how much satisfaction people derive from what they do. Consequently, personal standards have a major role in judging individual performance (Bandura, 1991).

The concepts of self-regulation and self-control are closely related and often used synonymously. However, Baumeister, Vohs, and Tice (2007) highlighted that self-control is a deliberate, conscious, and effortful subset of self-regulation, defined as follows:

Self-control refers to the capacity for altering one's own responses, especially to bring them into line with standards such as ideals, values, morals, and social expectations, and to support the pursuit of long-term goals. (Baumeister et al., 2007, p. 351)

Self-control helps people override or inhibit automatic or innate behaviors, urges, and desires that would otherwise interfere with goal-directed behavior (Muraven & Slessareva, 2003). In other words, "*self-control is a self-initiated regulation of conflicting impulses in the service of enduringly valued goals*" (Duckworth, Gendler, & Gross, 2016, p. 35). Although people can control their actions with the help of

self-control, exercising self-control is often difficult and frequently fails despite the best intentions (Duckworth et al., 2016). For example, quitting smoking require a great deal of effort to resist the urge to smoke. Daily life is full of choices when people face various impulses, desires, and urges, such as eating a donut or staying on diet and finishing writing an essay or browsing FB news feed and checking instant messages. In fact, these kinds of competing impulses are asymmetric: more potent desires give momentary rewards, whereas less potent desires bring greater returns in the long run (Duckworth et al., 2016). In other words, self-control is an individual's capacity to manage conflicting impulses and support the pursuit of long-term goals.

In addition to self-control, the self-efficacy mechanism is another subset of self-regulation that has impacts on thought, affect, motivation, and action (Bandura, 1991). Bandura (1977) distinguished the concepts of efficacy expectations and outcome expectations. Efficacy expectancy is the self-belief that a person can successfully execute the behavior required to produce the outcomes (e.g., reach the standards or goals). In contrast, outcome expectancy represents a person's estimate that a given behavior will lead to certain outcomes. Efficacy expectations affect both intention and actual behavior and determine how much effort people are willing to use and how long they will persist if they face challenges or problems (Bandura, 1977). Moreover, the strength of people's beliefs in their own effectiveness is likely to affect whether they even try to cope with a given situation.

3.1.2 Failures of the self-regulative mechanism

The self-regulative mechanism operates through a set of psychological sub-functions: self-monitoring, judgement, and affective self-reaction (Bandura, 1991). First, people construct their own behavioral standards. Second, they evaluate the fulfillment of their personal standards through self-monitoring. Finally, positive or negative self-evaluative reactions guide people's behavior and create motivators for it. Effective self-regulation requires clear, well-defined standards, monitoring, willpower, and motivation to achieve the goal or meet the standards (Baumeister & Vohs, 2003, 2007). In other words, commitment to standards, monitoring of the self and behaviors, and the capability to make changes constitute the main elements of self-regulation.

Self-regulation is a complex, multifaceted process, which allows several reasons for self-regulation failure (Baumeister & Heatherton, 1996). For example, under-regulation refers to a failure to exert self-control, as when a person does not bother or manage to control the self. In contrast, misregulation involves the control over oneself but in a misguided fashion so that the desired outcomes are not achieved. Under-regulation occurs due to deficient standards and inadequate monitoring or strength, and misregulation due to false assumptions or misdirected efforts, especially an unwarranted emphasis on emotion.

In the cases with positive outcomes from self-evaluation, success in goal attainment builds a sense of personal efficacy. In addition to satisfaction, self-regulatory processes can undermine performance motivation and psychological

well-being. These negative outcomes arise from dysfunctions in the self-regulatory system, causing stress, depression, and self-devaluation (Bandura, 1991). Typically, self-regulation occurs in the context of motivational conflict (Baumeister & Vohs, 2007). A considerable body of social psychology research has studied the construct of self-regulation and the reasons for self-regulation failure (Bagozzi, 1992; Bandura, 1991; Baumeister & Heatherton, 1996; Baumeister & Vohs, 2007; Baumeister et al., 2007; Duckworth et al., 2016). Research on self-regulation and failure of self-control is based on two different approaches. The first line of research draws on cognitive models viewing self-regulation as a function of beliefs, judgements, expectations, attitudes, and intentions (e.g., Ajzen, 1991; Bagozzi, 1992). In contrast, the capacity-based approach proposes that people have limited resources of self-control (e.g., Baumeister et al., 2007; Baumeister and Heatherton, 1996). Regulating the self requires resources (i.e., self-regulatory strength) that diminish during the process. This leads to a state called ego depletion, in which the self does not have all the resources it has normally and is temporarily less able to function optimally (Baumeister & Vohs, 2007).

In the field of communication research, LaRose (2010), Larose and Eastin (2004), and Larose et al. (2003) have studied media habits and the role of self-regulation in the context of media use. They have used the term *deficient self-regulation* to describe the state in which individuals' conscious self-control over media use is diminished, and automatic processes determine behavior (Larose et al., 2003, p. 232). For example, people may automatically check FB notifications during work without considering that does so interferes with duties. Thus, deficient self-regulation is a failure of self-monitoring as people act without awareness of the expected outcomes of their media use (LaRose, 2010; Larose & Eastin, 2004; Larose et al., 2003). Deficient self-regulation is not an all-or-nothing condition in which media users are classified as normal or addicted. Rather, people have varying degrees of deficient self-regulation and may experience lapses in self-regulation and struggle to maintain effective self-regulation over problematic media use (Larose et al., 2003).

Media use, as well as other behaviors that are not considered inherently harmful or bad to the user, can turn into bad habits when they result in negative life consequences (Larose et al., 2003). Furthermore, unregulated, habitual use behaviors emerge when people do not monitor their media use behaviors. Self-regulation failure may begin gradually as an individual uses SNS to escape, relieve negative feelings, and meet a need for belonging (Larose & Eastin, 2004). Problematic media use may be prompted by internal cues, such as boredom and loneliness, and external cues, such as the sight of a TV remote control (Larose et al., 2003). Self-regulation failure is controlled by emotions and automatic behavior and guided by impulses (Dawe & Loxton, 2004). For example, in the context of FB use, one user with functional self-control may control the need to check notifications and browse the news feed, while another user with deficient self-regulation may have a compelling need to check news feed even in inappropriate situations, such as driving.

3.1.3 Self-regulation in information technology use

Self-regulative mechanisms offer people a means to override and alter their responses and change behavior (Bandura, 1991; Baumeister & Vohs, 2007). Effective self-regulation requires clear, well-defined standards, monitoring, willpower, and motivation to achieve the goal or meet the standards (Baumeister & Vohs, 2003, 2007). For example in FB use, this means that users should have well defined standards of FB use, ability to monitor their usage, and willpower as well as motivation to adjust usage if needed. In the context of FB use, deficient self-regulation refers to a failure in some of these actions.

While the role of self-regulation on human behavior is evident, it has gained limited attention in IS research. However, as discussed in previous section (see 2.5.2), recent IS studies have started to notice that the level of self-regulation have an impact on individuals' IT use, especially in personal IT use contexts. Prior studies show, for example, that individuals' deficient self-regulation (i.e., low level of self-control) is one of the drivers of habitual IT use (Thadani, 2013; Vishwanath, 2014), which, in turn, may lead to addictive IT use (Turel, 2015; Vaghefi et al., 2017). Furthermore, recent research on SNS use show that habitual (or automatic) system use may result in problematic behaviors including unplanned and typically impulsive SNS use that can lead to negative consequences for the user and are often disapproved by the society (Turel & Qahri-Saremi, 2016). Problematic FB behaviors include, for example, FB use in potentially inappropriate situations that require full attention (e.g., attending classes, driving, and working).

While extant research on SNS use provides understanding of factors affecting post-adoptive use behaviors, processes of user adaptation remain unknown. We believe that using Bandura's (1991) self-regulation theory as a sensitizing device during data analysis will help us to discover and explain the underlying mechanisms of user adaptation in the context of FB use.

3.2 Theorizing approach

The nature of theory in IS differs from other fields as research in IS examines the phenomena emerging when the technological system and the social system interact (Gregor, 2006; Lee, 2004, p. 11). In other words, *"To understand IS, theory is required that links the natural world, the social world, and the artificial world of human constructions."* (Gregor, 2006, p. 613). Different types of theories exist in IS: some state how something should be done in practice, some provide a lens for viewing or explaining the world, and some provide testable relationships among constructs (Gregor, 2006). Gregor (2006) proposes five different types of theories on IS: analysis, explanation, prediction, explanation and prediction, and design and action.

The thesis is aimed at building a theory that explains and promotes understanding of user adaption in the context of social media use. This theory

falls into the second category of Gregor's (2006) theory types: theory for explaining.

The theory provides an explanation of how, why, and when things happened, relying on varying views of causality and methods for argumentation. This explanation will usually be intended to promote greater understanding or insights by others into the phenomena of interest. (Gregor, 2006, p. 619)

To explain the underlying mechanisms of user adaptation, that is, how and why users change their post-adoptive IT use, we apply the main ideas and characteristics of stage theorizing. Next, we review the basic ideas of stage theories.

3.2.1 Stage theories of behavioral change

The history of theories on change is almost as long as the history of sciences (Van de Ven & Poole, 1995). Theories and accounts from the theory of evolution to modern cancer theories and developmental psychology are about change and development. In IS, the discussion on theories on change is dominated by Mohr's (1982) distinction between the variance and process theories (Burton-Jones, McLean, & Monod, 2015; Lyytinen & Newman, 2008; Sabherwal & Robey, 1995). Other sciences use different terminology. For example, in development psychology, health psychology, psychiatry, and moral psychology, change theories are often called stage theories. Theories without stages are referred to as non-stage theories (Velicer & Prochaska, 2008) or continuum theories (Weinstein, Rothman, & Sutton, 1998). In non-stage theories the focus is on identifying on a set of predictors explaining behavioral intention and behavior change, whereas stage theorists focus on process characteristics by proposing a number of qualitative stages and by identifying the factors that move people from one stage to another (Schwarzer, 2008a).

For Mohr (1982), events are necessary for a process model. Stage theories do not necessarily have events. The semantics of the theory, though, are not important for stage theories. The key to stage theorizing is such changes or developments helpful for analyzing certain purposes through stages. Stage theories of behavioral change demonstrate how individuals' evolve over time by showing the temporal dimensions and focusing on dynamic variables that are open to change (Velicer & Prochaska, 2008). More precisely, stage theories attempt to explain the development path of a certain phenomenon by dividing that development into distinct stages (Weinstein et al., 1998).

Each stage should have at least some qualitatively different processes, factors, attributes, or behaviors (Weinstein et al., 1998). For example, Weinstein (1988) presented a stage theory on preventive behavior defining three stages by the beliefs people hold about the risk situation. In the first stage, people must first learn that a risk exists. In the second stage, they gain more information about the risk. In addition to acknowledging the significance of the risk for others, people must believe that they themselves are vulnerable. In the third stage, people accept their personal susceptibility and start to act (Weinstein, 1988; Weinstein &

Sandman, 1992). Stage theorizing can be used to understand how and why things emerge, change, develop, or even terminate over time (Langley, Smallman, Tsoukas, & Van de Ven, 2013).

3.2.2 When does a change process turn into stages?

Although a stage is a key concept in stage theories, “*many psychologists [who have proposed stage theories] use the term stage rather loosely*” (Crain, 2011, p. 140). Similarly, there is a disagreement on the ontological status of stages in psychology, even whether stages even exist. Lippke, Ziegelmann, and Schwarzer (2005) suggested that:

A stage model actually exists if, in different variables, discontinuity patterns are observable. This would mean that there is a discontinuity in the degree to which variables act upon different stages. (Lippke et al., 2005, p. 587)

In turn, Schwarzer (2008, p. 85) claimed that stages do not exist “*in nature,*” so asking that question is irrelevant: “*the question is not whether stages truly exist.*” However, there is some agreement on when stages are needed, which is helpful to answer the question of when a change process can be viewed in terms of stages. Lippke et al. (2005, p. 587) noted that “*individuals at a particular stage should have different characteristics in comparison to those individuals located in other stages.*” Similarly, Schwarzer (2008) saw that:

If we find that certain groups of individuals undergoing a change process share common features and have similar mindsets that are distinct from those in a different group at a different point in the change process, then we might want to label them as residents of a particular stage, such as pre-intenders, intenders, or actors. (Schwarzer, 2008a, p. 86)

Weinstein et al. (1998, p. 291) also highlighted similar aspects: “*to justify calling health behavior a stage process, some barriers [of change] must be more important at certain stages than others.*” However, barriers to change might be relevant in the health behavior context but not necessarily in IT use. The suggestion of Weinstein et al. (1998, p. 291) makes more sense if we say that some mechanisms or factors “*must be more important at certain stages than others.*” If accepting this criterion for stages, then the minimum number of stages is two.

Weinstein et al. (1998, p. 291) suggested that such stage-distinctive use patterns are ideal prototypes, which means that “*only few people will match this ideal perfectly.*” We interpret Weinstein et al. (1998) as follows: if we have a sample of people, then irrespective of what the sample is, there will not be 100% correspondence between the people in the sample and stage characteristics. Quite the opposite, Weinstein et al. (1998) expected that most people in the sample would have some use patterns that do not fit the characteristics of stages. Moreover, many authors (e.g., Schwarzer, 2008; Weinstein et al., 1998) have noted that while the stages are distinctive in theory, they are not expected to have absolute distinctions in empirical evidence. What Weinstein et al. (1998) said was that these distinctive use patterns are not (necessarily) expected to be completely

different between stages. Weinstein et al. (1998) did not set any cut-off rate (e.g., 80% different) but spoke of “*relatively small and large differences*”:

Health behavior stages are categories with relative small differences among people in the same stage and relatively large differences between the people in the different stages. (Weinstein et al., 1998, p. 291)

It follows that if some mechanisms, attributes, or factors are “*more important at certain stages than others*” (Weinstein et al., 1998, p. 291), then some mechanisms, factors or attributes are stage specific.

Many stage theories include two or more ordered stages that explain individuals’ behavior and movement between the stages (Weinstein et al., 1998). In many stage theories, the behavior of most people can be described by one stage at a time. Moreover, stage theories commonly allow people to stay in one stage permanently (Weinstein et al., 1998). The precise length of time a person stays in one stage is not important for the stage theory (Weinstein et al., 1998). Often, individuals can change their behavior and reasoning, moving to a different stage (Weinstein et al., 1998).

It can also be that most people do not necessarily go through all stages; a case in point is Kohlberg’s (1981) stage theory on cognitive moral development. Kohlberg’s theory explains moral development from childhood to adulthood demonstrating how individuals’ problem-solving strategies progress through six stages. A backward transition between stages and a stage omission (i.e., skipping a stage) are ideas that many classical stage theories, such as Kohlberg’s (1981) theory, do not contain, at least in their original form (Siponen & Vartiainen, 2004).

3.2.3 Characteristics of stage theories

Although stage theories are different even within one field (e.g., psychology), some general characterizations can be given (Table 1). However, it is important to understand that these characterizations are not necessary and sufficient conditions for a stage theory. It is also important to understand that the terminology is not standard among stage theories. For example, Kohlberg’s (1981) theory includes the idea that people can move forward stage-by-stage manner, but he does not use the term *forward transition*. Indeed, the key concepts of many classical stage theories are not carefully explained (Crain, 2011).

TABLE 1 Some characteristics of stage theories (Schwarzer, 2008; Velicer & Prochaska, 2008; Weinstein et al., 1998)

Characteristics	Description
Ordered stages	The transition from stage to another describes behavioral change. Stage theory has a sequential nature, so both the sequence of the stages and the relationships between stages need to be identified.
Stage characteristics	A stage is a theoretical construct. Each stage represents qualitatively different patterns of behavior and has its own distinctive characteristics different from other stages.
Stage-specific factors	Mechanisms, attributes, and so on that are stage specific.
Forward transition from a stage to another	Individuals in one stage have to address similar issues before they can progress to the next stage. To show transitions between the stages, both the factors that produce it (i.e., moving triggers) and the factors that prevent it (i.e., moving barriers) need to be defined.
Backward transition from a stage to another	Triggers influencing people at the same stage to relapse to a previous stage.
Stage omission	In certain situations, the user may skip a stage.

In sum, stage theories provide means to understand how and why things change over time. By applying the characteristics of stage theorizing, we are able to illustrate and explain the longitudinal view of FB users' post-adoptive behaviors and behavioral changes, that is how change unfold during FB post-adoption. Furthermore, identification of stages (i.e., different use patterns) and mechanisms for transitions between stages (i.e., drivers of behavioral change) help us to provide comprehensive understanding of the process of user adaptation. In that way, we are able to answer the research questions and to develop a theory that explains how and why FB users change their use behaviors over time (i.e., theory for explaining). In order to accomplish that, the study applies an interpretive research approach that will be discussed next.

4 RESEARCH APPROACH

To understand and explain changes in post-adoptive FB use, this study applies an interpretive research approach drawing on the phenomenological hermeneutic perspective. Interpretive paradigm enables us to understand and interpret FB use and user adaptation through the subjective meanings of the users. Furthermore, with qualitative research methods, we are able to gather FB users own experiences and interpretations of FB use and changes in use over time.

While research on individuals' IT use is predominantly "positivistic", I believe that applying an interpretive paradigm to study SNS use will help us to understand the complex nature of FB use as well as the dynamical nature of user adaptation, and thus extend both theoretical and practical knowledge of SNS use and the process of user adaptation.

4.1 Interpretive research

There are three underlying philosophical assumptions (i.e., research epistemologies) in IS research: positivist, interpretive, and critical (Klein & Myers, 1999; Orlikowski & Baroudi, 1991). An underlying epistemology refers to assumptions about knowledge and how the researcher acquires knowledge about the phenomenon of interest (Lee, 2004, p. 6; Orlikowski & Baroudi, 1991). In information systems literature, "positivist" scholars generally attempt to test theory and increase predictive understanding of phenomena. However, recently it has been questioned whether IS beliefs on positivism truly represent the philosophy of positivism (Siponen & Tsohou, 2018). In turn, interpretive researchers seek to understand the deeper structure of a phenomenon through accessing the meanings that people assign to it (Myers, 2013; Orlikowski & Baroudi, 1991). Critical research and interpretive research have similarities, but critical research has a stronger aim to challenge the current knowledge and critique taken-for-granted assumptions of organizations, IS, and existing social practices (Myers, 2013; Orlikowski & Baroudi, 1991).

A significant number of studies has discussed the nature and use of interpretive research in IS (e.g., Boland, 2002; Klein & Myers, 1999; Orlikowski & Baroudi, 1991; Walsham, 1995, 2006). Since the mid-1990s, interpretive research has gained increased interest among IS scholars, and leading IS journals now publish interpretive studies (Sarker, Xiao, & Beaulieu, 2013; Walsham, 2006). Today, interpretive research is seen as a viable method for studying IT use (Cecez-Kecmanovic, Galliers, Henfridsson, Newell, & Vidgen, 2014; Walsham, 1995; Yoo, 2010).

Interpretive IS research is based on the ontological belief that knowledge about our reality is socially constructed by human actors (Klein & Myers, 1999; Walsham, 2006) and that *“the social world is produced and reinforced by humans through their actions and interactions”* (Orlikowski & Baroudi, 1991, p. 14). The aim of interpretive research, therefore, is to understand phenomena within their socio-historic contexts through the subjective meanings of people (Bhattacharjee, 2012, p. 103; Goldkuhl, 2012; Klein & Myers, 1999; Myers, 2013).

The aim of all interpretive research is to understand how members of a social group, through their participation in social processes, enact their particular realities and endow them with meaning, and to show how these meanings, beliefs and intentions of the members help to constitute their actions. (Orlikowski & Baroudi, 1991, p. 13)

Accordingly, the main idea of interpretive research is to understand people’s constructed meanings of their reality, as pointed out:

The core idea of interpretivism is to work with these subjective meanings already there in the social world; that is to acknowledge their existence, to reconstruct them, to understand them, to avoid distorting them, to use them as building blocks in theorizing. (Goldkuhl, 2012, p. 138)

The aim and scope of IS studies is to produce understanding of the context and processes of IT use, so interpretive research is a valuable approach to produce new knowledge, that is, an understanding through processes of interpretation (Goldkuhl, 2012; Klein & Myers, 1999; Walsham, 1995).

4.2 Methodology

IS phenomena are socially constructed and not fully deterministic (Venkatesh, Brown, & Bala, 2013). Qualitative methods typically have been used in IS and other social sciences in exploratory research to develop understandings of phenomena and inductively generate new theoretical insights (Walsham, 2006). This study was guided by the hermeneutic phenomenological approach to make sense of the data gathered. Hermeneutic phenomenology enabled us to focus on the participants’ experiences of FB use and to generate rich insights through iterative data analysis. Furthermore, as the aim of the thesis was to develop theory, the hermeneutic phenomenology was used to capture a process-oriented

description and explanation of user adaptation based on the subjective experiences of individuals' FB use.

4.2.1 Hermeneutic phenomenological approach

Phenomenology is based on the ideas of German philosopher Edmund Husserl (1859–1938), who criticized psychology for applying the methods of the natural sciences to human behavior. He rejected the portrayal of human subjects as substances reacting to external stimuli (e.g., as in a chemical reaction). According to Husserl, the world is not separate from the person but lived by the person (Lavery, 2003). As a qualitative methodology, phenomenology enables describing subjective experiences of everyday life, including the formal structures of the life world and everyday actions of the social world (Goulding, 2005; Van Maanen, 1990).

Hermeneutic phenomenology is based on philosophical perspectives of Martin Heidegger (1889–1976) and Hans-Georg Gadamer (1900–2002) and is concerned with the human experience as it is lived (Lavery, 2003). Hermeneutic phenomenology highlights the concepts of pre-understanding and interpretation. People's backgrounds and experiences constitute their pre-understanding of the world, which affects the human understanding and construction of the world (Lavery, 2003).

The role of interpretation is critical to the process of understanding the meanings occurring in a context (Finlay, 2012). The only source of data in phenomenological approach is the participants' views and experiences. Thus, the participants must have lived experiences of the phenomenon under study. A phenomenological enquiry includes the participants who interpret their experiences and a researcher who interprets the participant's narratives (e.g., interview transcriptions) (Goulding, 2005). Thus, the interpretive understanding develops as the researcher understands how the study participants understand themselves and the phenomenon of interest.

In phenomenology, it is accepted that the researcher's subjectivity is inevitably implicated in the research (Finlay, 2012). Especially in a hermeneutical approach, the researcher's assumptions and biases are embedded and essential to the interpretive process (Lavery, 2003). The researcher then is as an interested and subjective actor rather than an external observer. However, it is important that the researchers explicitly report how their interpretations and meanings have been placed on findings (Finlay, 2012; Lavery, 2003).

The phenomenological process contains several steps of data analysis as the researcher interprets the data, resulting rich descriptions. The researcher needs to have a phenomenological attitude, that is, to be open and attempt to see the world in a different way (Butler, 1998; Finlay, 2012). In hermeneutic phenomenological reflection, the researcher tries to grasp the essential meaning of the phenomenon of interest (Van Maanen, 1990, p. 78). Through the hermeneutic circle of understanding, the researcher is able to generate the best interpretation of a phenomenon (Cole & Avison, 2007). The use of hermeneutic

phenomenology is not prevalent among IS scholars but some researchers have used hermeneutics as a research method (e.g., Lee, 1994; Sarker & Lee, 2006).

4.2.2 Methods used

Qualitative research helps understand people and their behavior by allowing the researcher to see and understand the context within which decisions and actions take place (Myers, 2004, p. 5). To gain understanding of the dynamic nature of individuals' post-adoptive FB use behaviors and related user adjustments, data were gathered by two means: in-depth interviews and a longitudinal diary study.

Qualitative interviews are widely used and an excellent means of gathering data (Myers & Newman, 2007). To avoid the potential pitfalls in qualitative interviews, I followed the guidelines presented by Myers and Newman (2007). Semi-structured interview questions allowed me to use a mirroring technique and construct the next question based on the participant's response or comment. Furthermore, I tried to minimize social dissonance by using appropriate language and playing different parts for different participants.

To gain deeper insight into the phenomenon of interest, I conducted a longitudinal diary study. Qualitative diary studies are a method that allows for capturing dynamic processes (Radcliffe, 2013). Thus, a diary study was suitable for investigating the changing nature of use behavior. To complement the diary study, I conducted in-depth interviews at the beginning and end of the study.

Diary studies have been described as a method that captures life as it is lived because diaries are directly linked with the use experience, focusing on users' prevailing feelings rather than more retrospective thoughts (Bolger, Davis, & Rafaeli, 2003). According to Bolger et al. (2003), diaries are

Self-report instruments used repeatedly to examine ongoing experiences, offer the opportunity to investigate social, psychological, and psychological processes that simultaneously recognize the importance of the context in which these processes unfold. (Bolger et al., 2003, p. 580)

In this study, diaries were used to capture FB use behavior as it is. The diaries provided information complementary to that gained from the interviews. The diary method offers a way to discover individual differences and temporal dynamics and was indeed suitable for our adopted process approach.

The approach selected for this study was an event-based diary design (i.e., event-contingent protocol) (Bolger et al., 2003, p. 590). In this study, the participants wrote a diary entry every time they used FB. To reduce the burden of diary writing, the assessment interval was one week per month, more specifically, the second week of the month (a fixed schedule). In high-frequency events, such as FB use, the researcher decides the rate and timing of self-reports. In our study, I asked the participants to report one week per month on their FB use immediately after they used it.

4.2.3 Empirical context

The study focused on FB users in Finland. I chose FB users as a target group because I wanted to understand user adaptation behaviors in social media use context. The main reason why FB users were chosen as a target group was the popularity of FB. In 2016, the number of active monthly FB users was 1.86 billion (Facebook, 2017).

I started to study individuals' post-adoptive FB use behaviors in 2014. At the time, I was interested in habitual use patterns and habit formation during FB post-adoption use. To determine FB use habits, I first conducted a pre-study interviewing FB users. The findings from the pre-study provided a preliminary understanding of the changing and complex nature of FB post-adoption and led me to study the phenomenon further.

I gathered the data, analyzed the pre-study data, and performed the initial analysis of the diary study data (i.e., descriptive analysis) by myself but conducted subsequent analysis in collaboration with my supervisors. We had several focused discussions on the meaning of the data, enabling me to move from a descriptive analysis to an explanatory analysis. Through these discussions, we were able to discover the underlying mechanisms of the process of user adaptation.

4.3 Data gathering

The empirical data in the study were gathered by two means: first, in-depth interviews (the pre-study) and, second, the diary study. I conducted interviews to find out habitual patterns of FB use. The participants in the pre-study were chosen from my own private and professional networks (i.e., purposeful sampling), and these participants suggested other users to include in the investigations (i.e., snowball effect) (Miles & Huberman, 1994; Patton, 2002, p. 243). The only selection criterion was that the participants have FB accounts and be using FB.

The pre-study data were collected through semi-structured, in-depth interviews conducted between October 2014 and April 2015. The interview protocol followed existing literature on phases of IT use (i.e., acceptance, adoption, and post-adoption). The individual interviews lasted an average of 40 minutes. The participants were 10 women and 5 men, ages 19–69 years, with different professional backgrounds (see Appendix II). They all had long FB use histories from five to seven years and were using it on a daily basis.

The diary study on FB use was conducted with students at the University of Jyväskylä to ensure the informants' commitment to writing diaries. We targeted university students because in a longitudinal study, it is important to have participants who are available and willing to participate in the study (Palinkas, Horwitz, Green, Duan, & Hoagwood, 2013). The diary study was organized as a course. The participants had the ability to choose how long they

would participate in the study. They were encouraged to participate for six months but also had the opportunity to participate for a minimum of two months. Depending on the length of their participation, the students gained between one and three credit points (two months equaled one credit point, four months equaled two points, and six months three points). We hoped this study design would make the participants more committed to diary writing for longer. In total, 38 students volunteered to participate, but eight were excluded due to missing interviews and/or diaries. The total number of included participants was 30. Most (28 of 30) were from the Faculty of Information Technology, University of Jyväskylä, although the invitation e-mail was sent to all the faculties of the university. Figure 2 illustrates the timeline of data gathering and analysis.

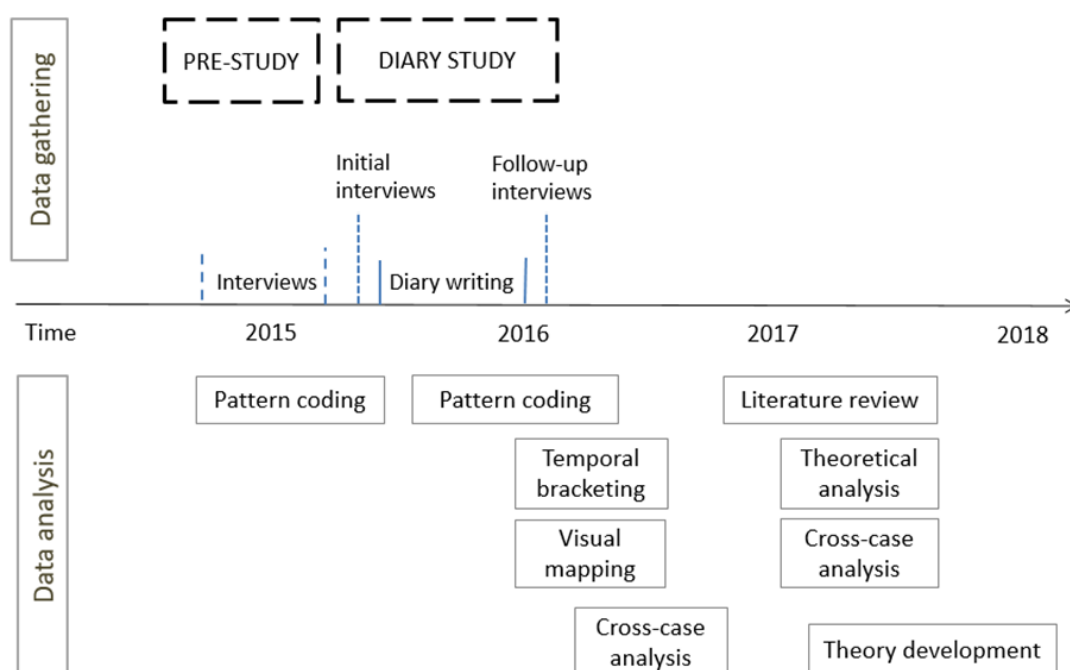


FIGURE 2 Timeline of data gathering and analysis

Overall, the diary study took six months, June–December 2015. The participants were 30 undergraduates (16 women, 14 men, ages 20–55 years) at the University of Jyväskylä. All the informants were interviewed twice, at the beginning and end of the study, and wrote FB usage diaries for periods from two to six months. In total, 19 participated for six months, eight for four months, and three for two months (see Appendix III for the demographics of the study participants and the data collection procedure). Some were not able to come to face-to-face interviews, so they had the option choice to answer the interview questions in writing. However, the aim was to meet each participant face to face at least once during the study.

The study launched with an initial interview round. The interview protocol was same as in the pre-study (see Appendix IV). The main objective was to obtain

the participants' background information and inquire about their FB usage history and their usage patterns over the years. During the initial interviews, the participants were informed about data confidentiality and anonymity and that they were free to withdraw from the study at any time. Furthermore, the participants were individually informed about the diary study method and provided detailed instructions for diary writing.

Following the initial interviews, the study participants started to write event-based diaries of their FB use. The participants were advised to record basic details (e.g., time, place, device, duration, and purpose of use) immediately after FB use. In addition, they were asked to describe in their own words why they used FB, for what purposes, and what kind of feelings they had during FB use. There was a list of questions available on the university intranet to help the study participants with diary writing. The participants were also encouraged to write freely about their experiences related to their FB use (e.g., feelings, moods, and thoughts the FB use provoked). Furthermore, they were asked to describe in detail the reasons why they used FB in certain situations and for certain purposes to obtain a sense of why and how people use FB in everyday life.

To ease the burden of diary writing, the participants were advised to use a free cross-platform application for taking notes and writing diaries (i.e., Evernote). People use FB all the time and with different digital devices, so it was essential to have an easy way to write a diary everywhere. Furthermore, it was important that participants write their diaries as soon as possible after FB use. With applications such as Evernote, it was easy to take notes everywhere because they were instantly available on all devices.

After the diary writing phase, the second interview round was conducted. The objective of these follow-up interviews was to gain deeper insights into the participants' FB usage, especially changes in their FB use. Before the follow-up interviews, I carefully read through both the initial interviews and the participants' diaries. I thus had an overall picture of the participants' FB use behavior and possible changes in use behavior and could ask detailed questions about certain use patterns and user adaptation behaviors and the reasons for them, if needed. The interview protocol, therefore, was more loosely structured for follow-up interviews (see Appendix V) than the initial interviews.

4.4 Data analysis

Overall, the empirical data came from 15 face-to-face interviews in the pre-study and 55 face-to-face interviews and 30 participants' diaries of FB use in the diary study (a total of 152 weeks of FB use diaries). All the interviews were recorded and fully transcribed in writing. I personally transcribed the pre-study interviews and the initial interviews of the diary study. The follow-up interviews were transcribed by a transcription service.

Initial interviews provided background information about participants' FB use behavior and changes in it over time (i.e., FB use history). Furthermore,

interviews provided rich accounts from the participants' perspective about the use patterns they had manifested. The diaries allowed us to study their current use behaviors as well as experiences and feelings related to FB use. In addition, follow-up interviews provided an opportunity to ask detailed questions about participants' behavioral changes (e.g., changes in use patterns, coping strategies, periods of nonuse) and reasons for them.

As an overall approach to analyzing and interpreting the empirical data, I applied hermeneutics to examine, describe, and understand user adaptation in the context of FB use. The purpose of hermeneutics is to understand what people say and do and why (Myers, 2013). It provides a set of concepts to aid qualitative data analysis and make sense of the phenomena of interest (Myers, 2013). Based on Gadamer's ontological theory of understanding, understanding is achieved through interpretation that takes place through language (i.e., texts) (Butler, 1998). In this study, the texts constituted the interview transcripts and diary entries.

The hermeneutic circle is a key concept for data analysis in hermeneutics. It exhibits a circular structure of understanding that begins with the researcher's preunderstanding of the phenomenon of interest (the whole) by examining the parts that constitute it (Butler, 1998; Goldkuhl, 2012; Klein & Myers, 1999). Interpretation of each part and its meaning and relationship to the whole leads into an emergent understanding of the phenomenon (Butler, 1998). Hence, "*the understanding emerges through dialectical movements between the holistic understanding and the understanding of singular parts*" (Goldkuhl, 2012, p. 138).

The data analysis was an interactive, iterative process, including five hermeneutic circles, during which we arrived at a holistic interpretation. Table 2 illustrates the phases of data analysis.

TABLE 2 Phases of data analysis

Hermeneutic circles	Method	Outcome
PRE-STUDY		
1st hermeneutic circle		
Inductive analysis of the interviews	Pattern coding (Miles & Huberman, 1994)	Individuals' habitual FB use patterns and themes of FB use life cycle; general knowledge of post-adoptive FB use
DIARY STUDY		
2nd hermeneutic circle		
Initial analysis of the initial interviews, diary entries, and follow-up interviews	Pattern coding (Miles & Huberman, 1994)	Individuals' FB use patterns and behavioral adjustments
	Temporal bracketing (Langley, 1999), intra-individual analysis	Timeline of each informant's FB use history
	Visual mapping (Langley, 1999), intra-individual analysis	Diagrams of each informant's FB use patterns over time
3rd hermeneutic circle		
	Cross-case analysis (Miles & Huberman, 1994), inter-individual analysis	Matrix of FB uses indicating three different user types and their distinctive use patterns
4th hermeneutic circle		
Revisiting the literature	Literature review on self-regulation	Constructs of self-regulation
5th hermeneutic circle		
Revisiting the empirical data	Theoretical analysis through the theoretical lens of self-regulation	Four distinct FB use patterns: routine, fluctuating, coping, and termination
	Cross-case analysis (Miles & Huberman, 1994), inter-individual analysis	Discovery of FB standards, judgmental process, and three adaptation strategies (i.e., the process of user adaptation)

The use of different qualitative data analysis approaches during iterative data analysis provides deeper understanding of the phenomenon of interest (Myers, 2013). In this study, the empirical data from the interviews and the diary entries constituted the texts, which we analyzed iteratively by applying various data analysis approaches (e.g., pattern coding, temporal bracketing, visual mapping,

intra- and inter-individual analyses) and finally returned to the whole. Moreover, the level of analysis was latent (i.e., interpretative) rather than semantic (Braun & Clarke, 2006) because the focus was to identify and understand the underlying mechanisms affecting post-adoptive use behavior.

The analysis and coding were carried out by two means. The pre-study data were analyzed using qualitative analysis software (ATLAS.ti 7.5.3), and the diary study data using the traditional paper-and-pen approach. Moreover, I used Microsoft Excel to perform intra- and inter-individual analysis and Microsoft PowerPoint to draw diagrams of each participant's FB use history.

4.4.1 Analysis of the pre-study data

The aim of the pre-study was to discover and understand individuals' habitual FB use and habit formation during usage. I used pattern coding as the data analysis approach following Miles and Huberman's guidelines (1994). Pattern coding enables identifying emergent themes and explanations by reducing large amounts of data into smaller analytic units (Miles & Huberman, 1994).

During the analysis of the pre-study interviews, I noticed the dynamic nature of FB use. The findings indicated not only the existence of habitual use patterns but also a wide variety of other use patterns as the interviewees adjusted their FB usage due to technological, personal, and environmental triggers. I discovered eight themes outlining individuals' FB use history: awareness, profile creation, initial use, use behavior, triggers, behavioral adjustment, temporary discontinuance, and permanent discontinuance. These themes helped us understand the key elements of the individuals' FB use behavior. These findings lead to the decision to further study this area, and I decided to conduct a longitudinal diary study on FB use.

4.4.2 Analysis of the diary study data

The focus of the diary study was to explore and understand individuals' use patterns and adaptation behaviors during FB use. The unit of analysis was changes in individuals' use behavior (i.e., use patterns and user adaptation behaviors). It is important to note that the actual analysis process started during data collection as various behavioral patterns were observable in the data. This strategy followed Miles and Huberman's (1994) view on interactive data analysis, in which the activities of data collection and data analysis form an interactive, cyclical process.

The analysis process started with reading the initial interview data and marking notes related to various behavioral patterns (i.e., themes and use patterns discovered from the pre-study data). The next step in data analysis was pattern coding (Miles & Huberman, 1994, pp. 69-72), in which different use patterns and changes in use during the FB use life cycle were discovered. Furthermore, I read each participant's diary entries before the follow-up interviews and wrote down observations related to various use patterns and changes among the participants. These observations formed the guidelines for

the follow-up interviews. Once the follow-up interviews were conducted, and the data were read through as a whole, I reviewed the initial codes, coded the transcriptions from the follow-up interviews, and reviewed the categories. Furthermore, I checked the preliminary themes and use patterns in relation to the entire data set.

To have an understanding of all the data, including retrospective data collected from interviews and current data collected in real time from diaries, I individually documented each participant's FB usage behavior by drawing timelines of their FB use history and then diagrams of their FB use patterns over time. Two analysis methods proved very helpful during the second hermeneutic circle: temporal bracketing and visual mapping strategy (Langley, 1999). Temporal bracketing is a strategy that enables describing events and offers opportunities to make sense of underlying process drivers, while visual mapping allows simultaneous representation of many dimensions and helps demonstrate parallel processes and the process timeline (Langley, 1999). Based on the timelines and diagrams of FB usage, the participants seemed to have various behavioral patterns, and their intensity of FB use seemed to change occasionally during the usage.

The following diagrams (see Figures 3-7) illustrate examples of the participant's level of reported FB use over time. Furthermore, the notation used in the FB use diagrams is explained in Table 3. In Figures 3-7, the vertical axis is divided in three levels of use: nonuse, controlled use, and problematic use. The first level demonstrates the periods of nonuse, during which a user have a temporary break or s/he has quitted FB. The second level, namely controlled use, illustrates FB usage during which a user is able to adjust his/her FB use without problems while facing various stimuli. Finally, the third level (i.e., problematic use) illustrates those situations in which users face some challenges or problems related to FB use. For example, privacy issues or disturbance due to constant use might cause feeling of losing control over FB use. In that case, users try to manage the situation by applying various coping mechanisms.

Next, the timelines and the diagrams were compared with each other, with the aim to spot both recurrent and irregular patterns of FB use (i.e., inter-individual analysis). This comparison procedure helped identify different usage patterns and stimuli that caused behavioral changes.

The descriptive analysis of the diary study data (i.e., 3rd hermeneutic circle) resulted in three different types of FB users: *regular users* (17/30) who had no particular problems with their FB use, *survivors* (8/30) who had some challenges with FB use but they managed them with coping, and *problematic users* (5/30) who discontinued FB use in some point of time. The following diagrams illustrate examples of different user types. Figures 3 and 4 illustrate the problematic user type, Figure 5 represents a survivor, and finally Figures 6 and 7 illustrate regular users. While Figure 6 represents a passive user, Figure 7 demonstrates a user whose intensity of use varies a lot over time but still the user feels that FB use is under her control.

TABLE 3 Notation used in the participants' FB use diagrams

Symbol	Explanation
■	Facebook adoption
▬	Triggering stimuli (positive or negative)
◇	Coping mechanism
○	Temporary discontinuance (i.e., account deactivation)
●	Permanent discontinuance (i.e., quitting Facebook)
■	End of the study period
□	Creation of a new FB account
- · - · -	Non-use (quitted permanently from FB)
—	Intensity of FB use

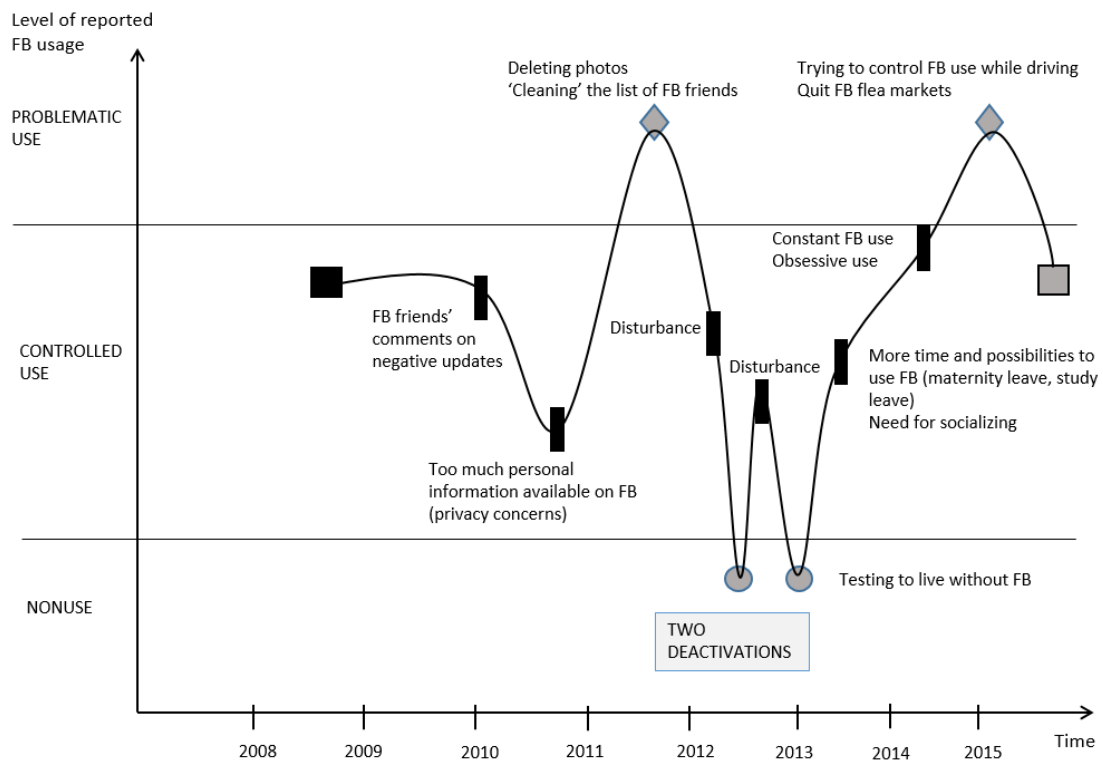


FIGURE 3 Diagram of a problematic user who has challenges controlling Facebook use

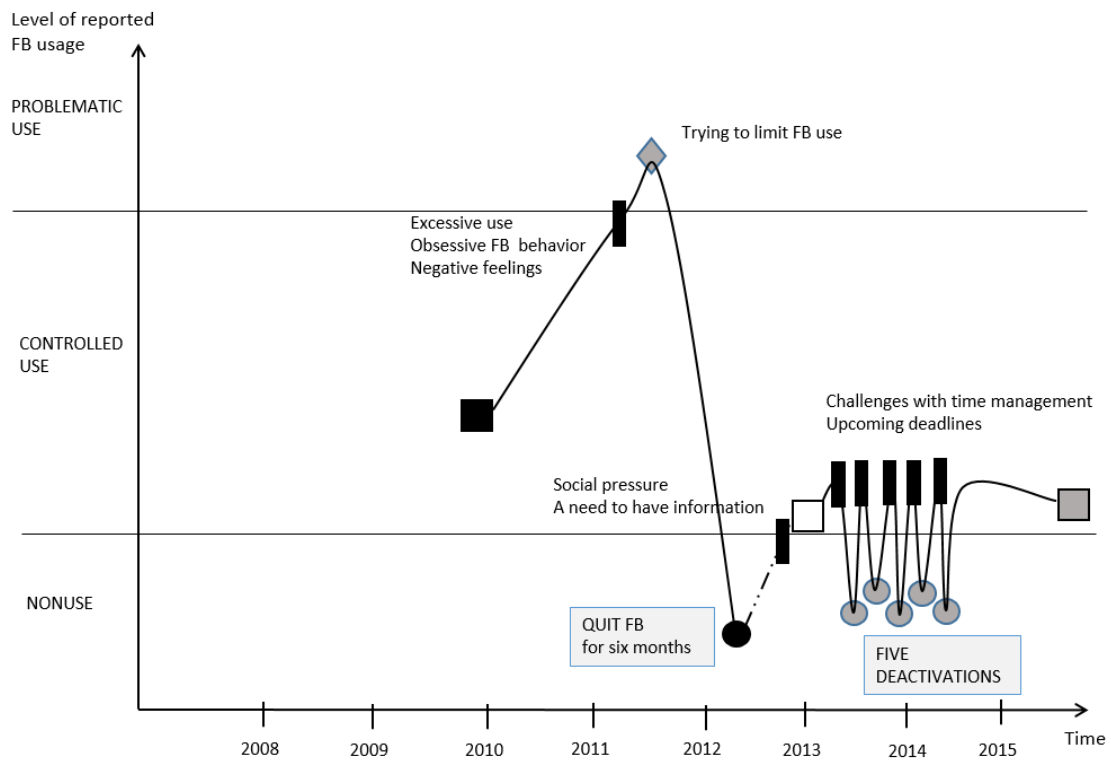


FIGURE 4 Diagram of a problematic user who quits Facebook use and rejoins after a break

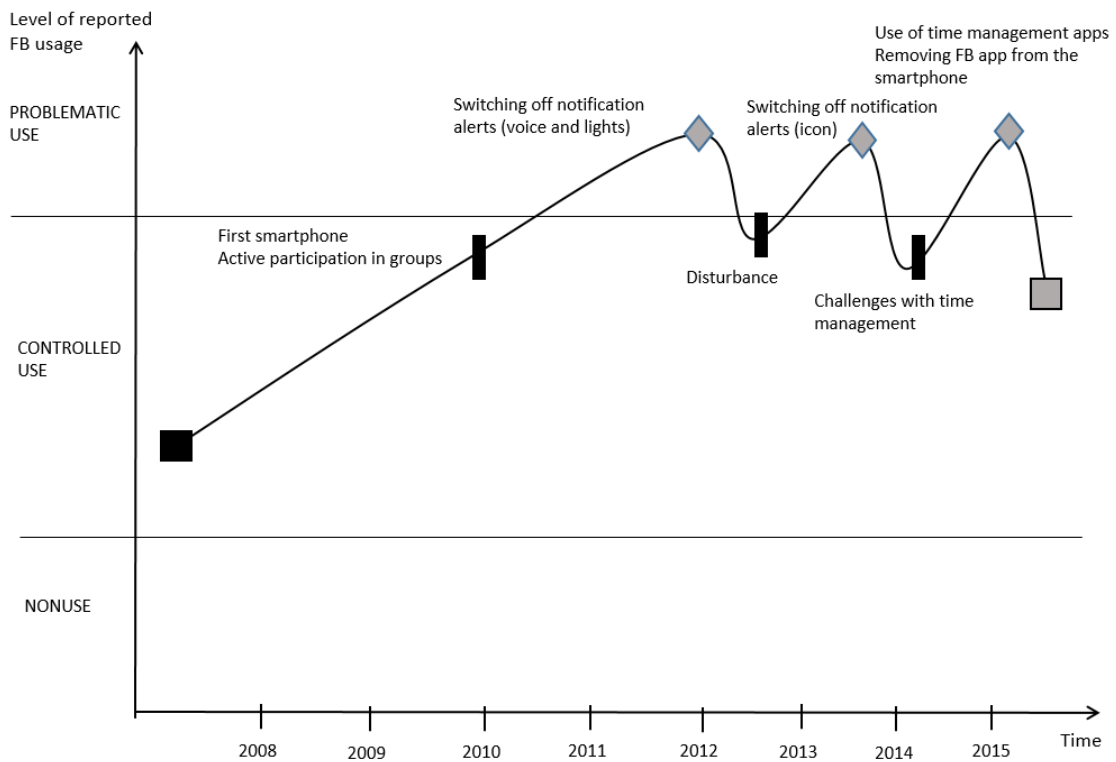


FIGURE 5 Diagram of a survivor who can manage challenges with various coping strategies

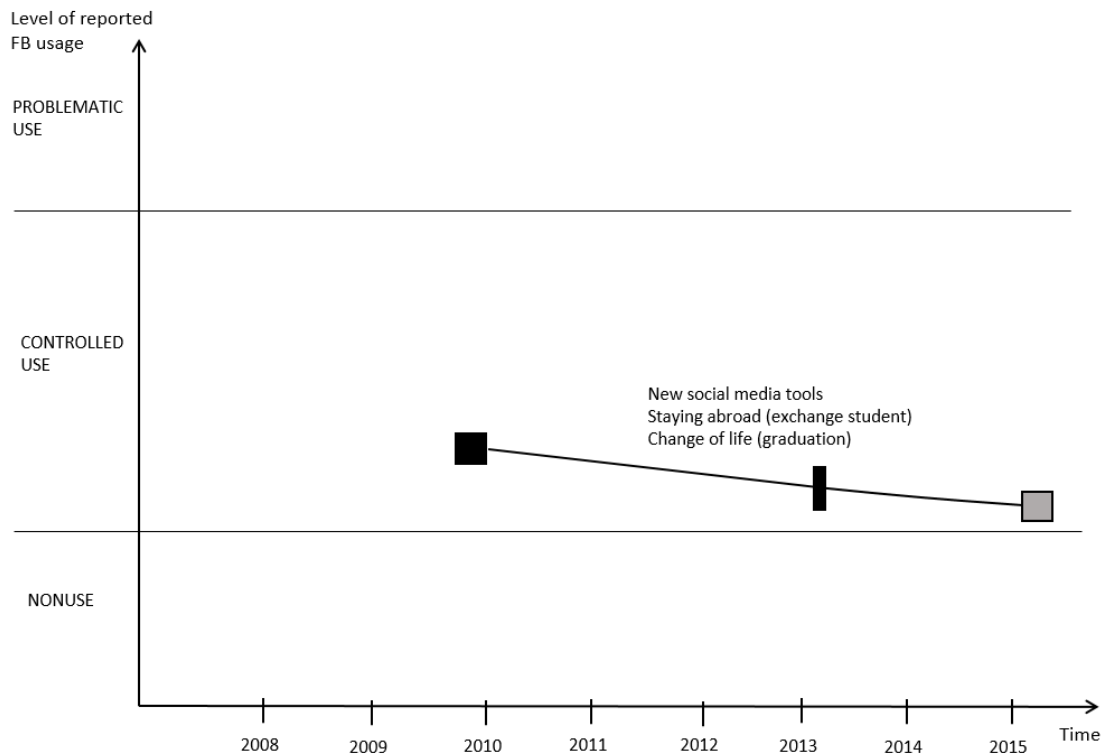


FIGURE 6 Diagram of a regular user whose intensity of use is low

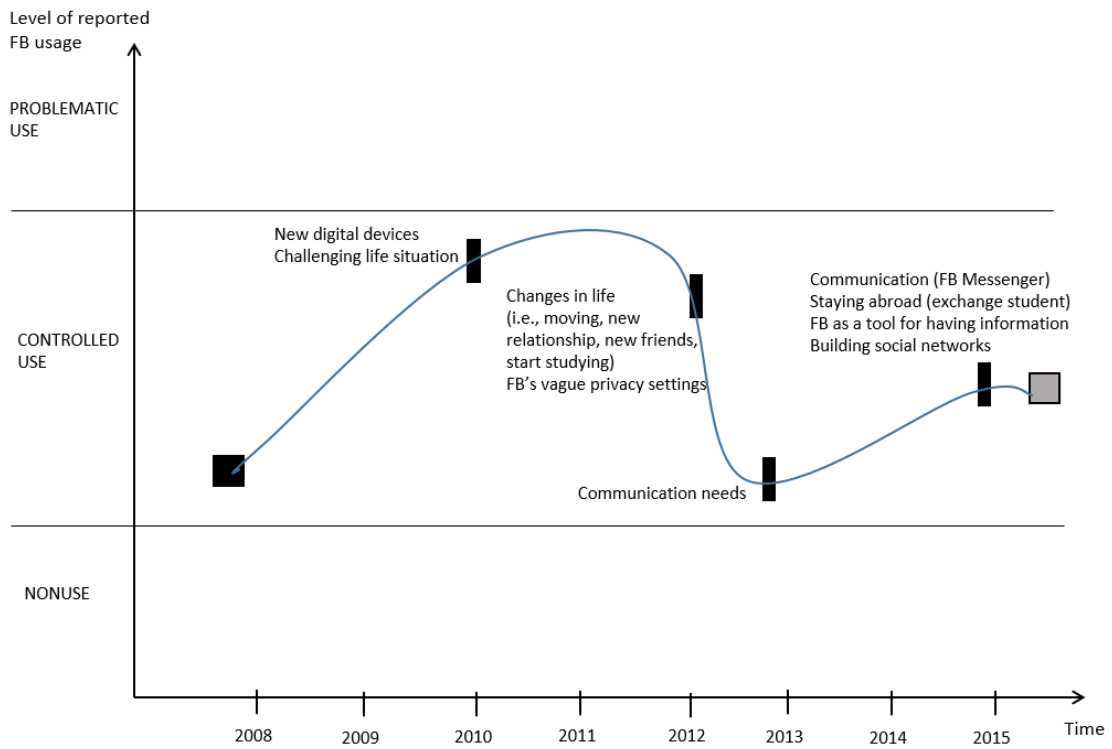


FIGURE 7 Diagram of a regular user whose intensity of use varies a lot over time

With the visualization strategies and the cross-case analysis, we were able to identify and describe the usage patterns and illustrate the adaptation strategies used by the participants. During the further analysis, we noted that the users seemed to have personal standards of acceptable FB use against which they adjusted their usage. Based on that observation, we realized that individuals' self-regulation and capabilities to manage challenges had an important role in the process of user adaptation in this context.

Based on that notion, I reviewed the literature on self-regulation and revisited the data using the concepts of Bandura's (1991) self-regulation theory as a sensitizing device. Thus, the data analysis was based on the sub-functions of self-regulative mechanisms including behavioral standards, self-monitoring, judgement, and self-reaction.

The theoretical analysis performed in conjunction with the cross-case analysis resulted in new insights, and we were able to find four distinct FB use patterns, two FB specific standards, and three user adaptation strategies. Comparison of three different user types and their FB use diagrams resulted identification of four distinct use patterns (i.e., routine, fluctuating, coping, and termination) based on users' reactions to environmental stimuli. Furthermore, participants seemed to set their own behavioral standards of FB use. These self-set standards were based on the users' impression of acceptable or normal FB usage.

During FB post-adoption, various environmental stimuli seemed to trigger users' self-evaluative processes leading to evaluation of current FB usage against the self-set standards of behavior. This evaluation and judgement resulted three different adaptation strategies. Capability to follow the self-set standards resulted *automatized adaptation strategy*, whereas minor violation of the standards resulted *corrective mechanisms strategy* and severe violation led to *strategy of discontinuance*. Based on the comparison of participants' standard violations we discovered two specific cases that seemed to cause most challenges with FB use: privacy concerns and time spent on FB, which we labelled FB-specific standards.

Specifically, after multiple rounds of analysis, the process of user adaptation was identified, and we were able to explain its underlying mechanisms by applying some characteristics of stage theories on behavioral change.

5 EMPIRICAL STUDY

As noted, the two main research questions that guided the study were: What kinds of post-adoptive use patterns do FB users have? and How and why do people adjust their post-adoptive use behaviors? Next, we will present the empirical findings and propose a stage theory of user adaptation.

5.1 Findings

Today, FB use is part of everyday life. It has become a tool for communicating, keeping up with friends, following news, and having information about one's interests. The diffusion of smartphones has made FB use ubiquitous, and individuals can use it virtually everywhere and all the time. Today, people use FB not only for personal and leisure purposes but also for work.

FB has been criticized as a superficial service, but I think that it is more and more considered to be a serious communication tool and a part of people's social life. [FB_S3; diary August 8, 2015]¹

We found that individuals' FB use is composed of three main characteristics: frequency of use, purpose of use, and nature of the contribution (see Appendix VI for information on the participants' FB use behaviors). These characteristics describe an individual's interaction with FB. The frequency of use varies among low, moderate, and high depending on the time spent on each FB session. What is interesting about the frequency of use is that low-level users might visit FB several times per day but spend less time on FB per session than moderate- and high-level users. Next, the purpose of use describes whether an individual uses FB for entertainment, work, studies, or a combination of these three purposes. Finally, the nature of contribution illustrates an individual's activities through

¹ Square brackets indicate the quotations from the empirical data. I have translated the quoted text from Finnish to English. Furthermore, I have coded the participants (e.g., FB_S3) for the sake of their anonymity.

two dimensions: user input and user motivation (based on Heinonen, 2011). User input describes the nature of user activity on FB (consumption, participation, and production), while user motivation illustrates in more detail user activities and use intentions, including entertainment, social connections, and information.

Individuals' FB use behavior seems to vary over time. Some participants had quite passive FB users for several years, whereas other users' activity levels fluctuated between very active and passive over time. Interestingly, four participants had quit FB use but rejoined after a short period of non-use. FB use is voluntary behavior (unless, for example, one's work requires it), so people are free to use it as much or less as they like and to discontinue use whenever they feel so. FB is a convenient tool for several use purposes, but due to its popularity and pervasive nature, some respondents felt that, while technically FB is discretionary, its use is not a voluntarily decision. As one participant pointed out:

It would be nice to have an alternative solution to FB. Today, FB is too widespread, and you don't have a choice. ... It's not personal anymore, and you don't have other options. ... In my opinion, FB has a too strong position in people's lives. ... In my opinion, it's very suspicious that there is a dominant system that most people use. ... On the other hand, I feel that it's okay if we all use it [FB], but on the other hand, it's disturbing that we have to use it. I just wonder if I can even exist without FB. [FB_U15; follow-up interview]

Post-adoptive FB use includes both automatic (i.e., habitual) and conscious use behaviors. Most FB use is consciously controlled, but the study participants described several habitual FB use behaviors as well. In exploring the patterns of FB use, we found that people very frequently use FB through their smartphones and other mobile devices. Almost all the participants reported situational-related habitual use patterns, such as browsing FB early in the morning and late evening before going to bed. Additionally, several participants mentioned that they habitually checked FB notifications every time they used their smartphones for some other purposes. Most habitual FB use is harmless part of people's daily routines. However, in some situations, habitual FB use behavior might become disturbing, for example, if the user feels pressure to check constantly FB during day or in inappropriate situations. Constant FB use may disturb users' concentration during lectures or at work and may hamper social relationships with family and friends. In more severe cases, constant FB use may cause actual danger, for example, if people use FB while driving. Habitual FB use and bad habits are discussed in detail in the Section 5.1.2.1.

In addition to habitual use, we discovered other behavioral patterns in post-adoptive FB use. Furthermore, we noted that the users changed their behavioral patterns due to various stimuli. By a *stimulus*, we refer to a special event or situation that initiates users' self-evaluative processes (i.e., self-monitoring and self-judgment). The stimuli may be related to the technology, user, or environment. Technological stimuli in the FB context may be related to functional or visual issues, such as version updates, privacy settings changes, notification alerts, new features, and changes in the news feed algorithms (i.e., news feed content). Stimuli related to the user include, for example, personal characteristics,

moods, feelings, needs, time management, and changes in life. Additionally, environmental stimuli include social issues (e.g., social pressure and the size of social circles) and contextual issues (e.g., places or situations of use and use while in the company of other people).

Stimuli affects all users to some extent, but their reactions vary significantly. Some users appraise the stimuli as irrelevant or only slightly adjusted their use behavior, whereas other users may have employ stricter measures to manage the situation. As far as individuals are able to keep their FB use in line with the behavioral standards, they feel that the situation is under their control. However, if individuals face challenges with use and violate their self-set standards, they can manage the situation through using corrective mechanisms or have to discontinue use because they feel that they are losing control over their usage. In fact, the distinctive nature of user adaptation applied by the users in our study eventually led us to consider clustering FB usage into four different *use patterns* based on the users' capacity and efforts to follow self-set behavioral standards: routine, fluctuating, coping, and termination. Comparison of these use patterns helped us to understand that the user adaptation activities seem to relate to users' capacity to comply with their self-set behavioral standards. In the context of FB use, the focus of user adaptation is on individuals' own decisions and capabilities to adjust their current use behavior to new conditions. Due to the self-imposed nature of FB use, there are no set rules or regulations for FB use, as there could be in some work settings.² Hence, the only regulation for adult people is self-regulation, and FB users are mainly responsible for themselves.

In the study, *user adaptation* refers to all adaptation activities users apply to keep their usage in line with their self-set behavioral standards. The process of user adaptation typically starts as an individual faces a stimulus, which triggers self-monitoring. First, the user evaluates the situation and the current use behavior against the self-set standards of behavior through the processes of self-monitoring and self-judgement. Then, based on the self-evaluative processes, the user performs behavioral adjustments (i.e., adaptation strategies) if needed. Based on the data, we discovered three distinct user adaptation strategies: automatized adaptation, corrective mechanisms, and discontinuance. Figure 8 illustrates the process of user adaptation in the context of post-adoptive FB use.

² For instance, in work settings, IT security policies might restrict the use of non-work-related use of IT and FB use (Khansa, Kuem, Siponen, & Kim, 2017; Moody & Siponen, 2013).

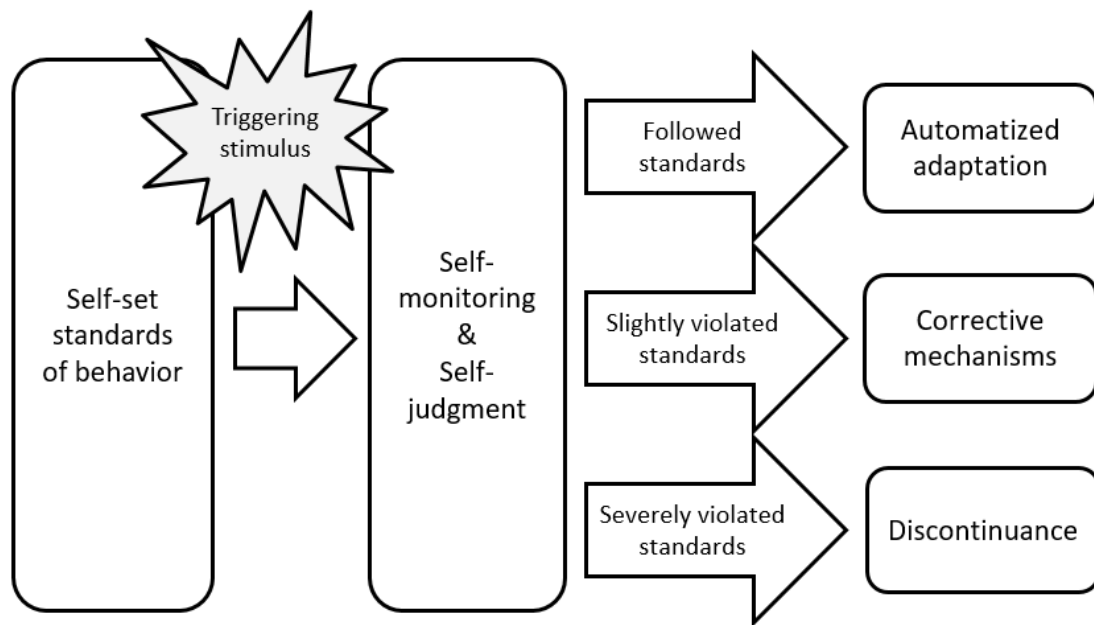


FIGURE 8 The process of user adaptation

Next, I present the empirical findings in three sections. First, I discuss the role of self-set behavioral standards in the context of FB use. Second, I describe the four distinctive patterns of FB use. Third, I examine the three dynamic user adaptation strategies the users applied after FB adoption.

5.1.1 Behavioral standards in the context of Facebook use

We identified two themes that seem significant in the context of FB continuance: privacy and time spent on FB. These themes relate closely to individuals' social media activities and the social environment affecting their sense of security, self-esteem, and welfare. We labelled these FB-specific standards because they seemed to affect the participants' FB usage. The participants, for example, had an impression of an acceptable amount of time spent on FB per day or an impression of the visibility and accessibility of their own personal information. Based on these impressions, they formed FB-specific standards that guided their FB use in conjunction with other behavioral standards, such as norms, values, ideals, and social expectations guiding overall behavior. Next, I describe two FB-specific standards more in detail, with the help of quotations from the empirical data.

5.1.1.1 Privacy

People set their own standards regarding what they consider to be acceptable amounts of personal information on FB and who has the right to access it. These standards are based on the users' own image they want to share on FB and to whom they want to share it. Privacy standards result in modification of privacy settings, careful consideration of personal updates and other FB actions, and

accepting new FB friends with consideration. Privacy standards include two main themes: they describe, first, who can see one's personal information and actions on FB (i.e., image and visibility) and, second, who can access one's personal information (i.e., information use rights).

Image and visibility

FB users are more or less aware of their own FB images. A person's FB image consists of information shared by the user (e.g., photos and personal updates) and the user's activities on FB (e.g., likes and comments). An individual's own standards and social values, beliefs, and expectations both have impacts on one's FB image. An individual's FB account thus is a public image showing one's personal information, interests, and opinions, as one informant noted:

Today, FB is a kind of image of me ... a public image, so I have to pay attention to my overall FB behavior. [FB_S4; follow-up interview]

Furthermore, as one FB user mentioned, people can consciously build and maintain a desired FB image by sharing only certain parts of their lives:

In my opinion, FB is a kind of an extension of your image. You can build and maintain your image through FB, and you share only the best parts of your life. [FB_U2; initial interview]

All the participants were aware that their own FB image could have far-reaching consequences. Overall, the participants demonstrated that they paid attention to their FB image at least on some level. Additionally, most stated told that they were paying more attention to their own FB image than a few years ago. One participant told that she had deleted old updates from her FB timeline because she thought that there was a chance that future employers would check her FB profile. She had only recently begun to pay attention to her own FB image and the image of her FB profile gave her:

Recently, I have thought a lot about what kind of FB image I have. A couple of years ago, I was not paying attention to that at all. That is why I have now deleted some old updates and other things from my timeline. ... I do not want that. ... Well, I'm pretty sure that some employers will check my FB profile in the future. [FB_U16; follow-up interview]

In addition to subjective impressions of one's FB image, privacy standards may relate to other people's opinions of one's behavior on FB. Some people share updates and posts on FB without thinking of how it looks from other FB users' perspectives. Sometimes this may lead to misunderstandings, as the following excerpt shows. One participant told that she used to share negative updates on FB, so some of her acquaintances had a false impression of her mental state based solely on her FB updates.

Some people commented to me that I seemed to be depressed based on my FB updates. At that time, I posted also quite much negative things of my life, but I did not realize that. ... People had very wrong image of me! I am not that person. ... Then

I realized that it is not wise to post or tell everything, and I started to think more carefully about what kind of issues one should post on FB. [FB_C5; initial interview]

Not only the visibility of one's personal information but also the visibility of one's overall actions on FB seems to be a common concern for FB users. People are aware that their entire network of FB friends will see their actions on their FB newsfeed. This can lead to the situation in which one cannot share, comment, or even like anything without thinking about it twice. For instance, one participant worried about his actions on FB so much that he had to pay attention to all his actions on FB:

I don't want to share anything on FB. ... One thing that affects my FB sharing behavior is that my entire social network will see if I, for instance, press the like button. I, therefore, have to think twice about what kind of posts or issues I dare to like before I press the button. ... It bothers me that my friends will pay attention to what I have liked on FB. [FB_U17; follow-up interview]

In addition to current use behavior, people may feel that their previous actions on FB might ruin their image. One participant told that he used to share everything in public, but he regretted his previous sharing behavior:

All my old posts and photos were public. ... I did not pay attention to that at all. I just published there everything, and everyone saw it ... everything that I now regret. [FB_C3; initial interview]

Information use rights

Information use rights include both overall awareness of online privacy and related threats and understanding of FB's privacy settings and privacy policy. One might think that all people are aware of the importance of online privacy. However, during the initial phase of FB use, people used to share personal information and photos without considering privacy issues at all. Over time, people have started to pay more attention to privacy issues as they have become more aware of various privacy threats. One participant told that she first gained privacy-related information through the media:

There was all kind of news about FB use and privacy ... that it is not safe after all, everybody may see your information, and that your personal data will stay there forever and all that kind of stuff. [FB_S6; initial interview]

Later, during studies, she gained more information about privacy threats:

At first, I was more active on FB. ... I updated more frequently than now and shared photos. Then, maybe because I have started to think more ... and I am studying information system sciences ... so I have gained more information about information security and such. ... So, I think that all those kinds of issues have affected me, and I have started to think more all kind of things. [FB_S6; follow-up interview]

Increased awareness of online privacy and related threats in general has evoked individuals' interest in FB privacy settings. However, most FB users seem to be quite careless with privacy issues. People either do not bother to adjust their privacy settings or simply do not pay attention to them. Consequently, they do

not realize who actually sees the content they post on FB. In one case, a participant was not aware that his FB profile was public until someone told him so:

At first, I had a public profile. I was not paying attention to that at all. Then, I talked with my friend's friend who mentioned that he had visited my FB time line ... and he was not my FB friend. At the moment, I realized that anyone could see my timeline if they wanted. [FB_C4; initial interview]

Another participant noticed that she had accidentally shared her photos to the public on FB as she read news about FB's privacy policy:

It was around, 2012. I had just come back home from student exchange. At that time, the media discussed FB's privacy practices, and I noticed that I had accidentally shared my photos publicly. ... I thought that I had just shared them with my friends, but then I realized that all people are able to see them. ... I had not noticed that the privacy settings allowed that. ... Then I decided to remove all photos. ... At that point, I just totally lost my nerves. [FB_S5; initial interview]

Some users concern themselves with privacy issues and regularly check FB's privacy settings. However, frequent changes in FB's privacy policy and privacy settings cause confusion and distrust among users, as they do not know who can access their personal information. This may negatively affect their intensity of FB use, as one participants explained:

I regularly check FB's privacy settings in order to see if they have changed the settings. However, I do not trust them at all because I do not know who will see and use my personal information and so on. ... It is partly because... of the vague rules and settings I do not want, or even dare, to share anything anymore. ... I try to keep it so that only my friends could see my updates. However, I am a little bit pessimistic about it. ... And, of course, I'm worrying about how much, how, and for what purposes they collect information about me. [FB_U15; initial interview]

Another issue that causes privacy concerns about FB users' information use rights is the variety of one's social circles. Today, people increasingly use FB for work, so their social circles include not only friends and family members but also childhood friends, fellow students, colleagues, clients, other work-related stakeholders, and so on. The main purpose of FB, as a tool for social networking, is to maintain social relationships. However, having several different social circles may have a negative impact on FB use behavior. Generally, based on our interviews, people want to share their personal lives only with their family and nearest friends, so the extent of their social circles may limit their updating behavior or overall activity on FB. The study participants felt distressed about personal privacy. For instance, they noticed that their social network had expanded over time and felt uncomfortable that all their social circles would see their updates and personal information on FB. People have to be extra careful with their FB actions if their social circles include, for example, business partners and clients, as one interviewee mentioned:

My FB friends include also some clients, so I have to think before I update or share something on FB. I want my updates to be genuine, but I have to pay attention to

them. ... I'm more careful with photos, but I write quite freely." [FB_S4; initial interview]

Furthermore, she noted that she had to consider her comments on FB as well:

I follow news on FB. I may press the like button, but I do not comment. I cannot comment because I have some clients who are my FB friends as well, and I do not want them to judge me based on my comments. I want to keep my work profile separate from my private profile. [FB_S4; follow-up interview]

5.1.1.2 Time spent on Facebook

People set their own standards regarding what they consider to be an acceptable amount of time spent on FB based on personal responsibilities, family duties, and such. Furthermore, the participants had standards regarding an acceptable or reasonable time of constant online connectivity or accessibility. These standards result in careful monitoring of time and timing of their FB use, modification of notification settings, and adjustment of one's own attitude towards notification alerts.

The second FB-specific standard concerns time spent on FB and the resulting consequences. Almost all the participants felt that they spent too much time using FB, and due to FB's pervasive nature, some had challenges controlling time spent on FB. Several participants mentioned that due to smartphones and other digital devices, they could use FB everywhere and all the time. However, ubiquity also has some downsides. Constant FB use may easily get out of an individual's control or disturb life, as the following quotations show:

After I had my first smartphone in 2014, I have noticed that FB use is much easier than before. ... I notice the notification alerts as soon as they arrive, and I can hear the sound of incoming notifications all the time; ding, ding, ding. ... But at the same time, there is a threat that it [FB use] gets out of my control. [FB_S3; initial interview]

I'm tired and frustrated because it seems that people don't care what time they send instant messages. As people send constantly messages, they create a culture that everyone should be available all the time and no matter what. [FB_S3; diary October 11, 2015]

These quotations show that people have to set limits for their own FB usage to keep it under their control. In extreme cases, constant connectivity may be a sign of problematic use that can lead to IT addiction, as one participant wrote in his diary entry:

FB use is a combination of entertainment and a fear of losing something important. It may be like a feeling of social connectivity as you know what other people are up to. ... Social media use, and especially FB use, can be an addiction, as well as gaming or using alcohol and drugs. At first, it is a symptom, and then it develops as an addiction. ... It boosts itself and becomes part of a problem. [FB_S2; diary August 3, 2015]

If a person is an active FB user and has a wide range of social circles, it is easy to become stuck on FB because there are many activities going on at the same time.

One informant described in a diary entry how she got stuck in FB even though she should have been doing something else:

I liked some updates, commented various issues, and had many conversations. I could say that I got stuck in FB, similarly as I may sometimes get stuck in watching television without consciously thinking what I am doing or what I should have been doing. Today, I should have been studying instead of using FB all night. [FB_S3; diary October 6, 2015]

Another interviewee, who had earlier enjoyed news feed browsing, recently started to feel stressed about it because browsing through all the latest updates took too much time. Furthermore, he mentioned that his opinion on FB browsing has changed recently:

I have noticed that browsing the FB news feed takes far too much of my time, and it's quite stressful, as well, not as enjoyable as before. [FB_S2; initial interview].

Further, in a diary entry, he mentioned that today, browsing the news feed feels like a duty:

I spent more than a half an hour for news feed browsing. Actually, it's like a duty that you have to do in order to keep up what is going on even though it is not a mandatory action. [FB_S2; diary July 10, 2015]

Most of the participants felt that constant FB use and incoming alert notifications disturbed their lives and caused time management problems. Users who had families especially seemed to have personal standards related to their role and duties as parents. Those standards included both personal and social values and norms and made the parents feel guilty about their FB usage, as the following excerpts show:

I should cut down my FB use and focus on real life. ... Live for the moment and not just hanging around on the Internet. ... Especially when I'm at home with my kid ... I should pay more attention to my baby. [FB_C5; follow-up interview]

At 10 a.m., I woke up with my daughter and started to browse FB. After 15 minutes of reading status updates, my daughter got anxious and asked for breakfast. I felt guilty because FB browsing took too much time. [FB_S1; diary July 10, 2015]

FB Messenger offers an instant messaging tool, and FB groups enable communication about shared interests with certain people. These features have changed people's communication behaviors in many ways. Social media tools have gradually replaced older communication media, such as e-mail and text messages, as one of the participants noted:

It's easy to share information on FB to our floorball group. It is easier than by e-mail because people can comment without receiving dozens of e-mails in which it is difficult to handle information as all users reply at the same time. [FB_S8; diary August 3, 2015]

According to the participants, FB seems to be a quite convenient communication media. However, new communication behaviors have negative effects as well. In

addition to the number of incoming messages, new communication behaviors create pressure from constant notification checks, as one participant mentioned:

I have to check group notifications in order to see when I had a chance to go and try out the new triathlon outfits. I just briefly checked; it took a few minutes. I need to check FB because the triathlon association does not use e-mail for information sharing anymore. All information is shared through FB site. [FB_S7; initial interview]

Some participants used FB not only for leisure but also for work. In their opinion, FB is a suitable tool not only for personal communication but also for work-related communication and information sharing. However, as a negative consequence, they mentioned facing challenges because work easily mixes with leisure time. The users who used FB for work mentioned that they also receive work-related messages during leisure time. One participant told that she had faced some problems dealing with work-related messages during weekends because she has a habit of reading them as soon as they arrive:

I like to use FB for communication and information sharing with my students. Earlier, I used course management systems such as Moodle or Blackboard. ... FB is quicker communication tool than e-mail, but there is one problem with it as people send messages during weekends as well. ... It is a problem for me because I have to read them as soon as I noticed that I have messages. [FB_U9; initial interview]

Another participant mentioned that she had a habit of checking work-related FB messages at home, even though she felt that it was not good for her well-being:

FB browsing in the morning as usual. I am still lying on the bed. I check work-related group notifications. ... Through FB, work easily mixes with personal life. In my opinion, it's not a good thing if you think of your well-being. [FB_S1; diary October 6, 2015]

Later, she mentioned that she has tried to control work-related FB use at home:

Some colleagues that are also my FB friends send messages or tag me in some work-related issues after office hours. ... However, I have tried to keep my personal FB profile apart from my work profile. [FB_S1; follow-up interview]

Not only does work mix with leisure time, but personal FB use might also disturb work. The participants used FB at work for personal purposes. If FB use takes too much time, it disturbs work, as one participant mentioned:

After the morning meeting at work, it was time to start working on the computer. At the same time, I used FB as well. After 30 minutes, I noticed that FB use was disturbing my work, so I had to sign off. [FB_S4; diary October 5, 2015]

Furthermore, the feeling of constant availability causes problems, especially for those users who use FB for work-related duties. For instance, one participant wondered about her duties as an administrator of a large discussion group. She felt responsible for answering questions as soon as she received them. However, she felt stress about the people's communication behaviors as they sent messages around the clock.

I am wondering how quickly you should answer to people's Messenger messages. People can see when you have read the message. Therefore, if you don't answer soon enough, one can think that you don't want to answer or that you just do not care. For instance, in this case, I have to search for the right answer, so it will take some time. [FB_S3; diary August 7, 2015]

Later, she wondered about people's communication behaviors:

The problem is that today, people have various daily rhythms, and they may send messages at any time of the day, even in the late night. It is very annoying if you have a message as you are falling asleep. [FB_S3; follow-up interview]

In conclusion, the data indicate two dominant FB-specific standards, which are related to and guide FB use: privacy and time spent on FB. However, behavioral standards are not stable but adjusted as time passes. People create and modify behavioral standards as they monitor their own and other people's behavior. Moreover, new life situations and codes of conduct, such as new communication practices and updated privacy policies, drive people to adjust their behavioral standards.

5.1.2 Four distinct patterns of behavior

In the study, use patterns describe individuals' FB use behaviors and reactions to triggering stimuli, or events in the immediate environment, that occur after FB adoption. Due to stimuli, individuals evaluate their current use behavior against self-set standards of behavior.

Based on comparison of three different user types (i.e., inter-individual analysis) our analysis revealed four distinct FB use patterns we label routine, fluctuating, coping, and termination. The two-factor view of FB use patterns shows the degrees of high/low extent of adjustment and success/failure in meeting self-set standards (Figure 9). The extent of adjustment illustrates the degree of adaptive behaviors. Furthermore, the level of individuals' capabilities to meet self-set standards describes whether users are able to keep their FB use in line with the standards (i.e., success) or not (i.e., failure). In other words, failure to meet the self-set standards equals standard violation.

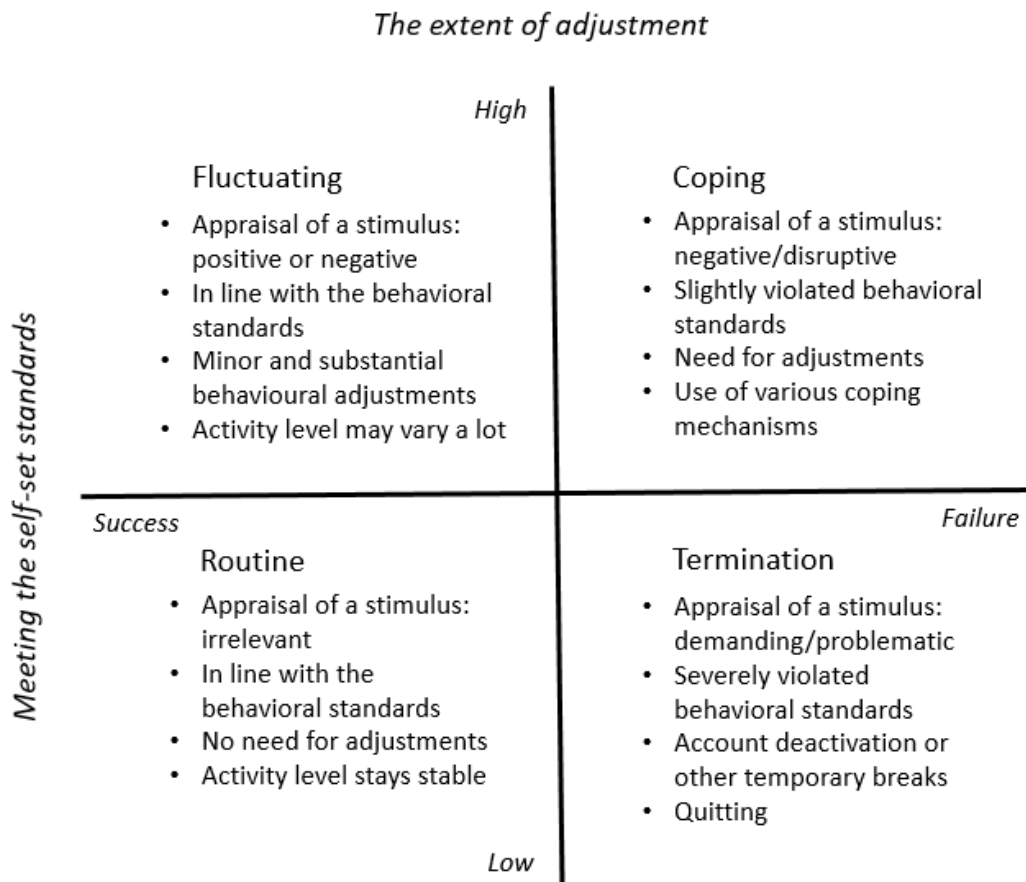


FIGURE 9 Four distinct Facebook use patterns

Routine and fluctuating use patterns were the most common ways of using FB that all the study participants manifested at some point. With these two use patterns, the participants were able to adjust their FB use so that it stayed in line with the behavioral standards. In contrast, coping and termination use patterns were applied only in challenging or problematic situations in which the behavioral standards were violated. Eight users had some kind of challenges with their FB use and manifested coping in addition to the two aforementioned use patterns. Finally, the rest of the participants (5 of 30 participants) manifested all four different use patterns. Coping was evident when the participants were able to manage problematic situations by applying some coping mechanisms, whereas termination occurred in situations in which users discontinued FB use either temporarily or permanently.

5.1.2.1 Routine use pattern

Routine use patterns refer two different kinds of automatic use behavior: stable behavior and situational use. Stable routine use refers FB use patterns that do not change but stay unchanged over time. Furthermore, situational routine use refers

to habitual use patterns triggered by situational cues, such as the time of day and seeing one's smartphone.

Routine use patterns describe relatively stable use behavior in which an individual uses FB habitually and in a similar fashion on daily basis. During the routine use pattern, the intensity of use has minor or no changes, and the purposes of use stay same over time. All the study participants used the routine use pattern at some point of time during their FB use history. However, some individuals manifested the routine pattern occasionally, whereas some followed it constantly, such as one study participant who described his FB use as follows:

Normally, I use FB for watching videos, listening to music, reading news, and communicating via FB chat. I do not like or update anything. I have behaved like this for several years. [FB_U17; diary November 13, 2015]

Users who neither share anything nor participate on FB are passive users. Usually, they just quickly check their news feed and notification alerts a few times per day and occasionally use FB chat, but nothing more. Our study included eight passive users who applied no other than the routine use pattern (i.e., stable behavior). They reported not having a pressing need to use FB but still browsed the news feed habitually or automatically and described their FB use as "*more or less routine use.*" For example, one participant mentioned that he routinely scanned through the news feed a few times per day:

My FB use is more or less routine use. Similarly, like as you quickly scan through the newspaper or something like that ... without thinking. FB browsing is alike. I just check it from time to time to see if there is anything interesting. [FB_U8; follow-up interview]

Furthermore, one participant mentioned that he did not see himself as an active FB user because he used FB as a matter of daily routine and kept up with his friends' updates.

I use FB very little. I make just quick checks. I am not an active user. It is more or less a habit. I just habitually check it. ... I have thought that maybe I should quit FB for good. I don't need it anymore. [FB_U11; follow-up interview]

Later, he mentioned reasons why he still used FB:

Well, sometimes, some of my friends share interesting posts, and it is interesting to see photos that my friends share. ... If some of my friends arrange a meeting or a party, they can invite me via FB. It is one of a kind service allowing that kind of event arrangements. Through it [FB events], I can easily reach all my friends. And if I accept the invitation, I will see others who participate the event. [FB_U11; follow-up interview]

Today, due to pervasive digital technologies, people can use FB everywhere and all the time. The routine use pattern includes semi-automatic behaviors, such as browsing the news feed as a pastime activity and checking notifications every time people use their smartphone for some other purposes. In fact, several participants described situational-related habitual use patterns (i.e., situational

use) as they checked FB “*automatically,*” “*unnoticeable,*” and “*without conscious action*” in various situations during the day. This FB use is a kind of automatic response to some stimuli. Triggering stimuli for habitual use include, for example, time of day, use of a smartphone or other digital device, seeing the FB app, noticing notification alerts (e.g., voice, icon, or light), waiting for something, doing casual chores, and watching a television. Thus, the triggering stimulus may relate either to the technology itself (i.e., FB) or to situational factors. The following examples demonstrate how a smartphone may act as a stimulus for FB use:

Yes, I check FB several times per day. ... Every time I use my smartphone for some reason, I also check FB automatically ... just to see if there are any new posts or notifications. [FB_U12; initial interview]

I noticed that I did very quick FB checks by smartphone. ... I just clicked the FB app in the favorites list, even though I had no intention to use FB at all, but I just pushed it [FB app]. ... After a while, I noticed that there was nothing new, and I closed it. The whole thing took around three to five seconds. [FB_C2; follow-up interview]

I have those very quick FB checks during day, kind of unnoticeable checks that are hardly conscious and thus very difficult to write down in a diary. [FB_U1; follow-up interview]

Quick, automatic FB checks and news feed browsing sessions are very common across the participants. Usually, FB’s notification alerts act as triggering stimuli for FB use.

Every time I saw the red icon on the top of the FB app, I checked out what kind of notification it was. [FB_S7; diary August 6, 2015]

FB chat ... I still feel excited about incoming messages. ... When I notice a notification alert, I feel excited about it. [FB_U2; follow-up interview]

As an example of situational facts acting as triggering stimuli, one participant noticed during the diary study how much she used FB while doing casual chores at home:

FB is apparently a quite essential part of my daily routines. ... It’s surprising to notice how much I use FB at all kind of situations, and that it is not always conscious action but... somehow like a secondary behavior that you do while going to bed, having breakfast, or cooking dinner. It is obviously something that you can do alongside other actions. [FB_S1; follow-up interview]

In general, users did not consider automatic FB checks to be negative or disruptive because they did not require active thinking. According to some participants, a brief news feed browsing session sometimes even helped them concentrate and gave a chance for a short recreation break, for example, during a long training day.

Sometimes, during lectures, I play mobile games or browse FB. ... Such actions do not require active thinking. I think these kinds of behaviors help me concentrate on lecture because I can simultaneously do something with my hands, so it’s not

necessarily always a negative issue. For example, during a long training day, I need a little break. [FB_S1; follow-up interview]

Another participant described his FB usage as a routine that could be either enjoyable or disturbing:

Yes, FB use is a routine. ... Sometimes, it disturbs other duties. Sometimes, FB use is just for entertainment, and some other times, it disturbs your concentration. It's the so-called task-switch effect, which means that it takes some time if you switch tasks, for example, from essay writing to FB browsing and back. [FB_U2; follow-up interview]

However, for some users, constant FB checking can cause negative emotions (e.g., anxiety or distress). For example, one participant described his negative feelings related to excessive FB use and a compulsive need to check FB, as follows:

At that time, I was a very active FB user. I had to check the news feed all the time. ... There were a lot of my friends' posts and all kind of stuff. ... In addition, I played FB games a lot and received much game invitations from my FB friends. All of that was too much ... and it started to disturb me. ... It [FB use] was like ... it just ran over the lines. ... It is difficult to describe, but ... I could not take it anymore, and I was totally fed up with it. [FB_C2; initial interview]

In some cases, habitual FB use may turn into bad habits, such as FB use while driving a car. It is a common knowledge that driving requires full attention. Consequently, some countries have prohibited using smartphones while driving, but many people use their smartphones for checking FB or other social media services while driving. In our study, two persons mentioned that they use FB while driving and cycling. One felt guilty and ashamed of her behavior:

I checked FB couple of times while driving. I felt guilty because I did it again. [FB_C5; diary July 11, 2015]

I was driving a car. While waiting for a traffic light to turn into green, I quickly checked FB. Suddenly, I noticed that there was an ambulance behind me. I had not noticed it before because I used FB. It felt so embarrassed! [FB_C5; diary October 8, 2015]

Another person mentioned that he has used FB while driving only once, but he commonly browses FB while cycling. He seemed to understand the risks of the behavior but did not have any intention to change his behavioral patterns.

I was browsing FB and other social media while cycling from home to the gym. I do such a thing quite often even though I know that it is a risky behavior because it disturbs my concentration on traffic. [FB_C4; diary August 3, 2015]

While driving on a motorway, I quickly browsed through FB news feed. After that, I checked other social media services as well. [FB_C4; diary November 7, 2015]

5.1.2.2 Fluctuating use pattern

Another use pattern following the behavioral standards is a fluctuating use pattern during which the intensity of use may vary quite a lot. Users who apply

this pattern manage various positive and negative stimuli by adjusting either their FB settings (e.g., privacy settings) or their own use behavior (e.g., sharing behavior and new use purposes). Users following fluctuating use pattern can keep their FB usage in line with the behavioral standards regardless of positive or negative changes in the intensity of use.

In recent years, FB has actively launched new features to retain its position as a market leader and engage users in FB continuance. In addition to the new functionalities, FB offers its users many new purposes of use that affect user activity and intensity of use. One participant reported increased intensity of use due to her new tutoring position. Earlier, she was a quite passive FB user, but due to a new use purpose, she gradually started to update her personal FB timeline as well.

At the moment, I am a tutor, and we have a new FB group for international exchange students. We use it [FB] mostly for communication purposes. ... During the fall [2015], I have had more tutoring, so I have been using FB much more than before. It [FB] is a handy communication channel and a way of keep in touch with people. I'm an administrator of the group. I share information and practical issues via the FB group. Moreover, I have updated my personal FB page by posting photos of us. ... That's something I would not have been done before. [FB_C1; follow-up interview]

Today's rapid technological development has impacts on people's information sharing and communication practices and social media use. In addition to personal FB use, people use increasingly FB as a tool for information sharing and communication at work. One informant who worked as a teacher described changes in her FB use behaviors:

The purpose of [FB] use has changed a lot. Today, I use FB for information sharing and promoting, as well as a tool for having information. Earlier, I used FB mostly for private communication. ... I prefer to use FB for communication and information sharing with my students. Earlier, I used course management systems such as Moodle or Blackboard. ... FB is quicker communication tool than e-mail, but there is one problem with it because people send messages for you during weekends as well. ... It is a problem for me because I have to read them as soon as I notice that I have got messages. [FB_U9; follow-up interview]

Another participant who used FB for work mentioned that in her opinion, FB is a good tool for information sharing and informal communication with colleagues:

In work-related groups, we share information that is difficult to find elsewhere, so we can keep up to date. ... We still use e-mail as an official communication channel, but ... it is much formal communication channel than FB. But, on the other hand, it is easier to connect a colleague via FB if you need a quick answer. [FB_S1; initial interview]

However, she later mentioned that communication via FB also has had some negative effects:

Through FB work crosses into private life, and that's not necessarily a positive issue if we think about people's well-being. [FB_S1; follow-up interview]

As these interview excerpts show, new communication practices and constant connectivity have some negative impacts as well. In addition to disruption and time management problems, easy accessibility might lead to excessive and problematic FB use, which, in turn, can easily cause even addiction-like symptoms, such as excessive use of FB and continuous FB checking that disturbs other duties.

As I bought my first tablet computer in 2010, I had some kind of FB addiction. At the time, tablet computers were just for entertainment, and about half of the entertainment use was FB use. It [FB] was the first thing I checked in the morning and several times per day. ... I was hanging around on FB all the time even though I did not post or share anything. [FB_U15; initial interview]

Due to changes in FB news feed algorithms, the participants noticed that the content of their news feed had changed so that they saw not only their friends' actions but also the actions of their friends' friends. Changes in the news feed content seems to be one of the main reasons for decreased FB activity, as one participant mentioned:

I don't use FB actively anymore. I more or less just observe and follow what other people are up to. ... I have noticed that the news feed is full of unimportant updates and news. And most of them are from people that are not my FB friends, but for some reason, I can see their actions on my news feed. ... For instance, if someone likes updates or shared videos ... it's unnecessary information for me. About 90% of the news feed content seems to be like that. [FB_U1; follow-up interview]

In recent years, many new social media services have been developed. The growing number of rival social media services is one of the main reasons for decreased intensity of FB use. New, popular social media services, such as Twitter and Instagram, have gained popularity among the participants. For example, one participant commented that she preferred Instagram to FB because she knew that on Instagram only certain people would see her updates:

I use Instagram as well. There, I know exactly who is following me, so I'm aware of who will see my photos if I share some. In contrast, on FB, I have a much wider network of friends. and that's why I don't want to share or post anything. [FB_U12; initial interview]

The following comment illustrates how FB has changed over time:

FB used to be the place where you found all news and photos, but now photos are shared on Instagram and news on Twitter. I think that FB is a kind of "old-time service." ... I mean that it's no longer the same as before. It used to be like a diary in which people told what they had done, but now, people are just arguing there. [FB_C4; follow-up interview]

5.1.2.3 Coping use pattern

During FB use, some stimuli may cause challenges or problems for some users to control their FB usage. Coping use patterns describe these challenging situations in which users evaluate their current FB usage and notice that they partly violate their self-set standards. In other words, users fail to meet the standards. They try

to manage the situation by applying various coping mechanisms to bring their usage back in line with their standards and to avoid more severe problems.

Participants manifesting the coping use pattern usually had challenges with their FB use caused by time spent on FB or by privacy issues (i.e., FB specific standards). The study participants had used FB for five to eight years, and during that time, their privacy-related behavioral standards had changed. In early use, most participants did not pay much attention to privacy issues. Over the years, as they received information about privacy threats, they started to pay more attention both to their own privacy and to FB's privacy policy. Several users mentioned that previously they had actively shared photos and updated their profiles. However, at some point, they realized that they had public profiles, so all people had access to their personal information. For example, due to changes in a life situation, there might be a need to adjust the privacy settings and restrict the visibility of one's personal information, as one participant noted:

At first, I had a quite open profile. Then, as I started to work as a teacher, I received friend requests from my students, and then I realized that I did not want that students to find me so easily and that only my friends should see my FB profile. [FB_S7; initial interview]

Most participants protected their privacy by adjusting the privacy settings, so only their friends have access to their FB account. Others took more drastic measures, deciding, for example, to remove all photos from FB to be sure that they will not get into wrong hands.

At the time, there started to be more discussion about FB's privacy settings in the media, and I noticed that I had published some photos in public. ... I thought that I had shared them only for my friends, and then, I noticed that all people could see them. ... I had not noticed that the privacy settings allowed that. ... Then I removed all the photos. ... At that point, I just totally lost my nerves. ... It was around, 2012. [FB_S5; initial interview]

In addition to privacy concerns, disturbance and time management challenges caused by constant FB use are drivers of coping use pattern. Most participants had a habit of checking FB notification alerts as soon as they arrived. Constant FB checks had disturbed some users' life so much that they used various coping measures to manage the challenging situation. One participant described how he managed to reduce habitual FB use by switching off FB notification alerts from the digital devices:

In the morning I switched off all FB notification alerts from the smartphone. Now, I won't receive any alerts if someone sends me a message, comment, or update something on FB. I noticed that today I haven't used FB at all. Then, in the evening, I removed FB notification alerts from the iPad as well. [FB_S7; diary October 9, 2015]

Later, he described how the amount of time he spent on FB diminished since he switched off the notification alerts:

Time spent on FB has diminished since I switched off the [FB] notification alerts from the smartphone and from the tablet computer. I used to go and check notifications as soon as I saw the red bullet on the FB application's icon. ... Then, I switched off the

notification alerts and noticed that I don't use it [FB] as much as before because I don't see those alerts. So, as I mentioned before, the notification alerts were the triggers [for FB use]. [FB_S7; follow-up interview]

Another example is a participant who was a very active FB user. She used FB both for work and leisure and was an administrator of a large FB discussion group. During the initial interview, she mentioned having challenges with time management and constant connectivity due to her various activities on FB.

I have to pay attention to time management. ... One can use FB everywhere and all the time, and gradually people get used to the idea that they can reach you whenever they want. I have to consider how to set limits on accessibility. [FB_S3; initial interview]

Later, she wrote in a diary entry that the amount and timing of incoming messages disturbed her so much that she had to adjust the notification settings and switch off FB Messenger at night to get enough sleep:

Nowadays, I switch off FB Messenger at night, set the notification alarms off, and check that the activity state is non-active. That allows me to sleep tight or at least better than before. [FB_S3; diary December 13, 2015]

The coping use pattern is also reflected in measures taken to override habitual use, such as removing the FB app from a smartphone. One participant told that he removed the FB app because the red icon on the top of the FB app indicating incoming notifications triggered a need to check FB:

Actually, I no longer have a FB app on my smartphone. I took it off a couple of months ago [in spring, 2015 before the diary study] because those red balls on the screen indicating notifications annoyed me too much. Now, I just use the Messenger app for instant messaging and use FB through a web browser. [FB_C3; initial interview]

Constant FB use may cause disturbance and contradictions at home, especially if one has a family. One participant described challenges she faced when using FB while spending time with her child. She consciously tried to override habitual FB use by leaving her smartphone behind in certain situations:

I have consciously tried to diminish my FB use while I'm with my child. I have tried to consciously pay attention to those situations and put the smartphone down. For example, if we are going out, I leave the smartphone home, so I don't have the opportunity to browse FB. [FB_S1; initial interview]

Another participant who uses FB for both entertainment and work mentioned that she had to switch off the notification alerts and set times for FB use to reduce disturbances:

Well, yes, ... at work, I have noticed. ... That's why I switched off notification alerts because it was just a waste of time. Now, I have set certain times for FB use during work. ... I check FB before I start my work and then at noon... I noticed that it [FB] interferes with working, so I had to do something about it. [FB_S4; initial interview]

Later, she mentioned setting times for FB use at home as well:

At home, I decided that first I will use FB for one hour, and then I will study. That was a successful plan! However, I noticed that FB use was just browsing around, and I wondered why I spent my time on that. [FB_S4; diary October 6, 2015]

5.1.2.4 Termination use pattern

Termination illustrates a use pattern in which the user severely violates behavioral standards. Users who engage in termination (5 of 30 participants) have major challenges with their FB use and feel that they have more or less lost control over FB use. Usually, they first try to sort out the problematic situation by applying some corrective mechanisms. However, after that fails, they have no other choice but to discontinue FB use for some period of time. The nature of discontinuance is either temporary (i.e., account deactivation) or permanent (i.e., quitting FB).

Some users decide to manage the distressing situation by deactivating the FB account for a few days. This temporary break helps them manage the challenging situation, and after the break, they continue FB use as usual. In the study, one participant had used FB deactivation several times during the FB continuance. In his opinion, deactivation was a convenient way to minimize disturbance if one had to focus on something important. He used deactivation to better focus on studying.

I have used deactivation in the situations that I have spent more time on FB than usual, and I have had challenges focusing on final exams or deadlines. Then, I have thought that it is better to deactivate FB and focus just on reading. ... And I can restore the account as soon as I have more time. ... [I deactivated the FB account] no more than five times, I suppose. [The duration of the breaks was] from couple of days up to one week. They were just short breaks. ... If I remember right, the maximum time was just over one week. It is a mental thing because you know that your FB account is deactivated. It guides your thinking, and you cannot automatically sign on FB. It will prevent spending time on FB. I'm happy that it is not a problem for me anymore. [FB_C2; follow-up interview]

Another participant had deactivated her FB account a couple of times to test whether she could live without FB. According to her, the main reason for her account deactivations was the disturbance caused by constant FB use:

I have tested it. ... I have deactivated the FB account temporarily a couple of times for a week or so and tried to live without FB. ... It [the account] is easy to restore, and you will not lose anything. But, yes, I have to have some breaks. ... That's because I noticed how much time it took and disturbed life because I was not able to keep away from FB. ... The duration of these breaks was only around one week or so. I couldn't have any longer break. [FB_C5; initial interview]

However, for some participants, severe standards violations caused high levels of anxiety, and they could not see any options other than quitting the service for good. Four participants quit FB for various reasons: two quit due to privacy-related issues, one felt that excessive FB use went "beyond borders," and one felt that there was no need for FB use anymore. The participants who quit FB for privacy reasons felt that their personal information was somehow threatened.

The first one felt distressed at her personal information on FB. She went through a challenging period in life and wanted to delete her personal history on FB. She thought through her decision before quitting:

I wanted to remove all my personal information on FB. ... There was personal information for such a long period/... I just deleted it all so that no one could browse it anymore. ... I am that kind of person who makes a kind of final decisions, so I decided to remove all. Therefore, I did. At the same time, I quit Instagram as well. ... It [FB use] took too much time, and I felt that there was too much my personal information on FB. I was so distressed at the time. ... I collected quite much background information about quitting FB. I wanted to be sure that I really remove my account permanently and delete all information, not just close it temporarily and later restore it. ... I wanted to remove it totally. [FB_C1; initial interview]

The second participant told that he had severe privacy concerns before quitting FB. Previously, his FB profile had been public because he had not paid attention to the privacy settings. Later, however, as he gained understanding of privacy issues, he regretted his previous FB updates and sharing behavior. In addition to privacy concerns, he felt that the FB news feed was full of unimportant updates, so he was frustrated with the situation.

All my old posts and photos were public. ... I did not pay attention to that at all. I just published there everything, and everyone saw it. ... Everything that I now regret. ... I removed my FB account totally. At that time, I just was so annoyed about people's behavior on FB. I had a much wider social network on FB than now, and the news feed was full of their updates, likes, commenting, and so on. ... It was like ... there was so much unnecessary information, ... and I was just frustrated with it. [FB_C3; follow-up interview]

The third participant told that he used FB excessively before quitting. After a while, constant FB use started to feel disturbing, and he tried to control his usage, but he failed. Consequently, he felt frustrated and decided to take a break from FB. During the initial interview, he described his excessive FB use: *"It [FB use] was like ... it just ran over the lines. ... It is difficult to describe, but ... I could not take it anymore, and I was totally fed up with it."* I asked him to describe the challenging situation in more detail during the follow-up interview:

Yes, I was just hanging there all the time. ... During the most excessive use period, I used FB around four to five hours per day. ... I can't remember all, but I just browsed it [FB] and communicated with friends. ... Well, I think it was that all together. ... There were too much game invitations and all. ... It became disturbing, and I felt that it was too much for me. I could not take it anymore. Then, I noticed that I could manage that and realized that actually I don't need this [FB use] at all. I thought that I will have a break, and then, I removed my FB account [quit FB]. I was without FB for some time. ... Yes, I tried [to limit FB use], but I just was frustrated with it. [FB_C2; follow-up interview]

The fourth participant differed from others as he had no challenges or problems with his FB use but still he decided to quit FB. He used FB regularly until one of his friends quit all social media. Then, he noticed that he had no actual need for FB use anymore because he preferred Twitter over FB.

One of my friends quit all social media, so I thought that maybe I should quit FB. It [FB] was no longer so important to me. ... Once you have been browsing through people's updates and likes for long enough, there is nothing new about it. ... I prefer Twitter. On Twitter, the quality of the content is better than on FB, and the news is real time. [FB_C4; initial interview]

Interestingly, all four participants who quit FB rejoined and created new accounts after a few months. The main reason for creating new FB accounts was the need for social information. All the persons who quit mentioned that they felt like outsiders, as they did not have social information. Moreover, they missed study-related information shared through FB.

Well, it was the time I got back to the university. ... Then I was annoyed when everyone else used FB and knew about all the events and got information. Everybody else knew except me. [FB_C3; follow-up interview]

I was out of FB around three months and joined in again because I began studying at the university. ... It was so much easier. ... All information, such as timetables, events and other stuff that you need to know, was shared on FB. [FB_C4; initial interview]

Since I had removed all the data and quit FB, I thought that I could live without it. But then after two months, I realized that it was not possible, and I decided to join in again. ... The reason why I rejoined FB was probably that I did not know what was going on ... about events or anything that happened. ... Then, as my friends discussed about something what was going on FB, I felt like an outsider... Then I thought that it might be a good idea to join FB again. [FB_C1; follow-up interview]

Furthermore, a new account allowed a fresh start with a smaller circle of friends and the ability to better control use, as one rejoined participant mentioned during the initial interview:

Nowadays [with the new FB account], my FB use behavior is more sensible than before so that I'm not regretting my updates, photos, or anything. Then, I have limited the amount of my FB friends so that now not all of my acquaintances can see my updates. ... Only my closest friends can see my personal updates. I don't need to think so carefully the content of my updates anymore ... or what other people think about my updates. [FB_C3; initial interview].

Later, he described his current FB use more in detail:

I don't have a profile photo on FB. Every now and then, I will add it, but then I will delete it again. I don't want anyone to find me on FB. I don't share anything anymore, neither posts nor personal information. I like to keep things private. It is very important for me. [FB_C3; follow-up interview]

5.1.3 Three dynamic adaptation strategies

The comparison of these four use patterns revealed that users' self-regulation capabilities affect their adaptation behaviors as users following certain use patterns seem to apply different adaptation strategies. After FB adoption, individuals constantly monitor, evaluate, and adjust behaviors to make them appropriate for the behavioral standards. The resulting user adaptation strategies

depend on the outcomes of the judgment process in which users evaluate their current usage and overall circumstances against the self-set behavioral standards.

We identified three kinds of dynamic adaptation strategies during FB continuance: 1) automatized adaptation in situations when users follow personal standards (i.e., routine and fluctuating use patterns); 2) corrective mechanisms when personal standards are partly violated (i.e., coping use pattern); and 3) discontinuance in situations when personal standards are severely violated (i.e., termination use pattern). By applying these adaptation strategies, users are able to adjust the targeted technology (e.g., notification or privacy settings and content customization), their own behavior (e.g., FB usage, attitudes and purposes of use), and the social network (e.g., accepting or removing friends and social circles).

5.1.3.1 Automatized adaptation

Automatized adaptation is the most common adaptation strategy that all FB users apply as they follow routine and fluctuating use patterns. This adaptation strategy includes minor or semi-automatic adjustments during the routine use pattern and more substantial changes in use when users are following the fluctuating use pattern. Additionally, automatized adaptation includes habit formation as certain conscious actions gradually turn into habitual use. To the contrary, if users notice a disturbing FB habit or routine, they might consciously try to override it.

People use the automatized adaptation strategy as long as their use behavior stays in line with their behavioral standards, and they feel that FB use is under their control. Using FB is part of people's daily lives, and they do not have to pay special attention to it. Occasionally, as people's lives or the targeted technology changes, they respond by applying various automatized adaptation strategies.

The following excerpts show three different examples of automatic adaptation strategies participants used. The first describes a user who tried to control her FB usage during lectures by closing her laptop.

During lectures I use my laptop, and FB is open in one tab. I try to keep away from FB, and from time to time, I shut the laptop lid in order to have a better chance to focus on the lecture. [FB_C5; diary September 14, 2015]

The second excerpt describes how a participant started to pay attention to her routine FB use patterns due to her husband's comments about her addictive Internet use behavior:

From time to time, my husband complains that I have an Internet addiction. He does not use any social media services as I do, so I think that it is more about use of mobile applications in general and an attitude towards them than my potential Internet addiction. However, sometimes, I feel bad if I have browsed FB or played games even though I should have been studying. [FB_U10; initial interview]

Later in a diary entry, she mentioned that she had overridden the routine of notification checking by changing her attitude toward it:

Nowadays, I often just clear notification alerts instead of checking them on FB every time I see the alerts on the smartphone. [FB_U10; diary August 7, 2015]

The third excerpt illustrates a user who succeeded in changing his browsing behavior because he changed his attitude toward news feed browsing:

I have noticed that browsing the FB news feed takes far too much of my time, and it's quite stressful as well, not as enjoyable as before. So I decided to change my attitude towards news feed browsing so that I don't have to browse all new status updates every time. [FB_S2; initial interview]

Later in his diary entry, he described his new browsing principle:

I have a new browsing principle. I decided that at the moment I see a totally stupid update, I will quit browsing. [FB_S2; diary August 3, 2015]

Automatized adaptation differs from the other two adaptation strategies in two ways. First, during automatized adaptation, individuals' FB use stays in line with their self-set standards. Second, it may affect the current use behavior either positively or negatively. In contrast, both corrective mechanisms and discontinuance are coping strategies used as countermeasures in challenging or problematic situations in which behavioral standards are partly violated.

5.1.3.2 Corrective mechanisms

Corrective mechanisms refer to various coping strategies users apply when they notice that current FB use is no longer fully under their control (i.e., coping use pattern). Usually, in this case, negative feelings, such as anxiety, distress, and fatigue, are involved in FB use, and users feel that they are losing control over FB. However, with the help of different coping strategies, users can adjust their usage so that it is under their control again. Our data indicated that the most common standards violations are due to the disturbances caused by incoming messages and constant FB use, a feeling of constant availability, noticing of recurrent use patterns (i.e., habitual FB use), and perceptions of some privacy concerns. People try to manage discrepancies by either adjusting technological features or adapting their own behavior.

For example, one participant had started to monitor his smartphone and computer use before the diary study because he noticed he was spending too much time on the Internet. Especially, he worried about the "*time wasted on FB.*" He mentioned that previously, he had enjoyed the news feed browsing, but lately, browsing had started to feel stressful. According to him, the news feed was always full of interesting updates because he used FB for various purposes. To find out how much time he actually spent on FB, he started to track his own behavior during the spring of, 2015. Tracking provided him with real-time information about his FB use. He noticed the hour he spent on FB per day and started to think how to adjust his usage. Before the diary study, he had managed to significantly decrease the time spent on FB, as the following quotation illustrates:

I have been keeping track of my smartphone and computer use, including FB use, for a while now. I use an application for that purpose. ... According to the [time management] application, I spent less time on FB than before. My time spent on FB has decreased from one to two hours per session to approximately 20 to 30 minutes per session. ... I noticed that browsing the FB news feed took far too much of my time. It was not fun anymore. ... It was stressful. I wanted to see how much time I waste on FB. ... Well, it's a little bit complicated because I use FB for work, for studies, and for entertainment, and then there is the news feed browsing as well ... so it takes so much time! If you are using FB for work or for studies, you might easily end up browsing the news feed instead, and it will easily take a half an hour before you even notice it. [FB_S2; initial interview]

During the study, he continued to employ various corrective mechanisms, such as adjusting notification settings, removing the FB app, and customizing the news feed content to control time spent on FB. By using these strategies, he was able to adapt his use behavior and regain control over the FB use, as the following excerpts illustrate:

I set certain FB group notifications off because there is no need for me to read them anymore. [FB_S2; diary July 6, 2015]

I have removed the FB app from my smartphone's front page. Now, the decision to start to use FB is more conscious than before. Opening up FB is not just a reaction as you see the app, but you have to consciously decide to use FB. [FB_S2; diary August 3, 2015]

FB can quite well optimize the news feed content for me, and I have adjusted it much by myself. I have hidden issues that I'm not interested in, unfollowed not-so-important pages and pages that provide just all kind of nonsense. ... Then, I have searched for pages that I'm really interested in and that provide useful updates and news." [FB_S2; follow-up interview]

Another participant mentioned noticing that FB use caused disturbance at work. By adjusting notification settings and setting times for FB use at work, she was able to cut down the disturbances.

If someone asks me, I would say that FB does not disturb my life. However, well, yes ... at work, I have noticed it. ... That is why I switched off notification alerts because it [checking notifications] was just a waste of time. Now, I have set certain times for FB use during work. ... I check FB before I start my work and then at noon. ... I noticed that it interfered with work, so I had to do something about it. [FB_S4; initial interview]

Not only one's own FB use behavior but also other users' behaviors may cause disturbance and stress. One participant, who was the administrator of a large communication group, had challenges with constant incoming messages that created a feeling of constant availability.

I'm tired and frustrated because it seems that people don't care what time they send the instant messages. As people send constantly messages, they create a culture that everyone should be available all the time and no matter what. [FB_S3; diary October 11, 2015]

Later, the feeling of constant availability and responsiveness caused sleeping problems, and she had to apply corrective mechanisms and adjust FB Messenger's notification settings to get enough sleep:

Nowadays, I switch off FB Messenger at nights, set the notification alarms off, and check that the activity state is non-active. That allows me to sleep tight or at least better than before. [FB_S3; diary December 13, 2015]

In addition to these mentioned issues, privacy concerns seem to necessitate applying corrective mechanisms. One participant told that after she gained more information about privacy threats, she deleted photos and other personal information from her FB homepage:

From time to time, I have cleaned my FB profile. ... At some point of time, there was a lot of all kinds of stuff: likes and photos that friends had tagged me on. Then, I thought that I didn't want that all things that someone else has shared on my FB wall to be available for everyone, so I removed them all. [FB_S6; follow-up interview]

The number of social circles on FB may have affect one's privacy and especially one's FB image. One participant actively shared and updated both positive and negative events in life on FB until she received negative comments from her acquaintances. From this incident, she realized that in addition to the closest friends, all her acquaintances could see her updates, photos, and personal information on FB. To manage her privacy and have at least some control over the situation, she decided to delete all photos from FB:

I deleted all the photos from my FB account. There were too many acquaintances even if I had tried to keep it [FB's friends list] so that there were only persons that I really knew. ... I don't want to let everyone see my photos. [FB_C5; initial interview]

The participants used corrective mechanisms as they tried to override bad habits. A participant who used FB while driving critically evaluated her behavior and noticed a conflict between her current behavior and self-set standards. She understood her current behavior caused risks for not only her but also other people. She tried to control her FB behavior by making FB use impossible while driving:

I listen to music from Internet via my smartphone connected to my car's music system while driving, so I do not have a chance to browse FB. I'm pleased that I cannot use FB while driving. ... Well, I haven't been able to cut it out totally, but I have tried to avoid it while actively driving. ... I still browse FB, for example, while I am stopped at traffic lights. [FB_C5; diary August5, 2015]

Although she noticed a bad habit and tried to override it, she failed. In many cases, overriding habitual use pattern requires a strong commitment.

During this diary study, I noticed how much I used FB while driving a car. I noticed it, and I actively tried to avoid it. ... I tried to avoid it, although I was bored while driving on an empty road. ... But you never know what there might be ahead. [FB_C5; follow-up interview]

In summary, corrective mechanisms describe various user adaptation strategies individuals apply as they face challenging situations during FB continuance. As people notice that their behavioral standards are partly violated, they try to control FB use by employing different corrective mechanisms. After successful coping, users continue to use FB in accordance with their changed behavior. However, after failed coping, behavioral standards are severely violated, so users must apply more severe adaptation strategies.

5.1.3.3 Discontinuance

Discontinuance illustrates the situation in which the user decides to discontinue FB use (i.e., termination use pattern). In the FB context, users have two options for discontinuance: temporary account deactivation and permanent quitting. The study included two persons who had used account deactivation and four persons who had decided to quit FB permanently (see Section 5.1.2.4 for more detailed information).

The two participants used account deactivation as a coping mechanism because they were aware that the break would be temporary and it would be easy to restore the account. As one noted, *“it [the account] is easy to restore, and you won't lose anything.”* Both used deactivation to manage disturbance caused by constant FB use.

Reasons for quitting FB permanently varied across users. However, three of four quitters suffered anxiety and distress before deciding to quit FB. They described their feelings: *“I was so distressed at the time,” “I was just frustrated with it,”* and *“I could not take it anymore and I was totally fed up with it.”* In stressful situations, the participants decided to quit FB because they felt that FB use was out of their control. Furthermore, the study included one participant who had no problems with FB use but still decided to quit FB use. He simply noticed that he had no need for FB use anymore.

5.1.4 Summary of the empirical findings

Together, these results provided important insights into the process of user adaptation in the context of social media use. Our data indicated that various stimuli triggered user adjustments after FB adoption. By describing FB post-adoption through a process of self-regulation, we identified two FB-specific behavioral standards, four distinct use patterns, and three dynamic user adaptation strategies resulting in the process of user adaptation during post-adoptive FB use.

First, the empirical findings indicated that FB use was under individuals' control until a discrepancy between current usage and behavioral standards caused standards violations. People had impressions on acceptable FB use behavior, such as the acceptable amount of time spent on FB and the visibility of their personal information and their overall actions on FB. Based on their impressions, people set their own behavioral standards for FB use. We discovered two themes that seemed to affect individuals' FB use: privacy and time spent on FB. We labelled them FB-specific standards because they affected

users' sense of security, self-esteem, and welfare in the FB use context. Moreover, the results indicated that violations of FB-specific standards, in particular, resulted in user adaptation.

Interestingly, the FB-specific standards, as well as other behavioral standards, seemed to change over time. This emerged, for example, in discussions of online privacy as users mentioned that they were more concerned about their privacy on FB now than a few years earlier. Due to increased knowledge about privacy threats and FB's privacy policy, FB users have changed their attitudes toward online privacy. Furthermore, standards related to, for example, constant online connectivity due to smartphones and other digital devices have changed people's impressions of availability and accessibility. All of this has affected people's self-set behavioral standards.

Second, we found four distinct FB use patterns—routine, fluctuating, coping, and termination—based on individuals' capability to meet their self-set standards and the extent of adjustments users employed to control their usage. These use patterns illustrated individuals' FB use and reactions to various stimuli after adoption.

Third, comparing the use patterns allowed us to identify three different user adaptation strategies users applied to keep their FB usage in line with their self-set behavioral standards: automatized adaptation, corrective mechanisms, and discontinuance. With automatized adaptation, users could control their FB usage so that it stayed in line with their self-set standards. However, if users felt that their current use behavior violated their self-set standards, they applied corrective mechanisms strategies to manage the situation. If they failed to manage the situation or otherwise severely violated behavioral standards, they applied the strategy of discontinuance.

5.2 Toward a stage theory of user adaptation

To illustrate individuals' behavioral changes after FB adoption, we applied the ideas and characteristics of stage theories (see Section 3.2). Stage theorizing approach appeared to be an excellent choice for illustrating changes in FB usage and thus developing a theory of FB users' adaptive behaviors. Hence, the approach gave us a means to move from description to explanation: based on the empirical findings, we abstracted the results into a stage theory on user adaptation.

The proposed theory provides an understanding of the process of user adaptation in the context of post-adoptive FB use. The theory includes three distinctive stages and various transitions between these stages. Figure 10 illustrates the proposed theory and its stages discussed in the text.

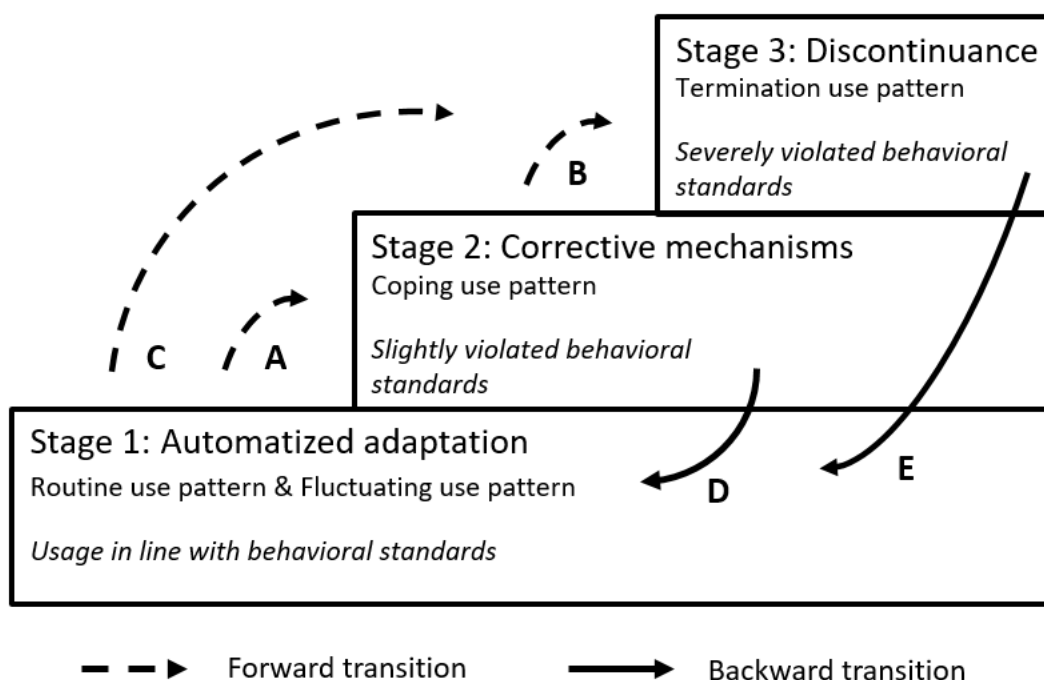


FIGURE 10 A stage theory of user adaptation

Next, we review the constructs of the theory in detail. First, we illustrate each stage's characteristics and stage-specific mechanisms. Second, we describe how and why people move from one stage to another. Finally, we discuss moving triggers, relapse barriers, and moving barriers that affect stage transitions.

5.2.1 Three stages of user adaptation

A stage is a construct that represents a specific, identifiable behavior in a process. Post-adoptive FB use has three stages that represent distinct use patterns. These distinct use patterns separate one stage from another, illustrating individuals' different FB use and reactions to the various stimuli. In addition to stage characteristics, each stage has its own user adaptation strategy that represents a stage-specific mechanism.

The first stage (stage 1) illustrates FB use in line with an individual's self-set behavioral standards, including two use patterns, namely, routine and fluctuating use patterns. Stage 1 represents normal or acceptable FB usage. However, it is important to note that normal or desirable use behavior is a subjective experience, so it is impossible to provide a generic characterization of it.

As users appraise occurring stimuli as irrelevant and continue using FB as usual, they manifest a routine use pattern. In that case, their use behavior stays in line with their self-set behavioral standards, and there is no need for user adaptation. To the contrary, during fluctuating use patterns, users appraise the stimuli occurring as either positive (i.e., opportunity) or negative (i.e., threat).

Users who manifest fluctuating use patterns are adaptive to the changes caused by various stimuli and able to adjust their usage according to their self-set standards without problems.

Both routine and fluctuating use patterns are positioned in the first stage because FB users may manifest them simultaneously. In other words, an individual's FB use may be partly routinized, such as browsing FB while eating breakfast in the morning, but otherwise adaptive, for instance, so that the time spent on FB varies by day depending on the amount of other duties. Most FB users have some daily FB routines, but otherwise, they follow adjusting use patterns. However, some individuals are quite passive FB users, who follow mainly routine use patterns and thus may have only minor or no changes in their usage over time. Additionally, new routines may occur, and old ones may disappear as users adjust their behaviors according to various stimuli, but the overall usage stays in line with the behavioral standards.

In the first stage, a stage-specific mechanism is an automatized adaptation strategy that enables users to smoothly adjust their use behaviors according to their self-set behavioral standards. Furthermore, automatized adaptation enables users to switch between routine and adjusting use patterns. In other words, certain parts of FB use may turn into habitual use (i.e., habit formation), or users are able to override some disturbing FB habits. For example, users may have a habit to check FB as soon as they notice notification alerts but they are able to adjust their checking behavior while studying.

The second stage (stage 2) represents the coping use pattern in which users appraise the stimuli occurring as negative. Evaluation of the situation reveals discrepancies between individuals' current use and self-set standards, which make users feel that FB use is getting out of their control. Consequently, users partly violate their behavioral standards and have to apply various coping strategies to bring their usage back in line with the self-set standards. Hence, users apply the corrective mechanism adaptation strategy, which is a stage-specific mechanism in the second stage. We found two FB-specific standards, namely privacy and time spent on FB, which seem to cause standard violation. Users may notice, for example, that anyone can access their personal information, and thus their current sharing behavior violates the self-set standards of privacy. Another example might be the realization that constant FB checking disturbs work or studying, and thus their current browsing behavior violates the self-set standard of time spent on FB. In both cases, users have to adjust either FB settings or their own use behavior in order to bring their usage back in line with the standards.

Finally, the third stage (stage 3) illustrates a termination use pattern in which users appraise the stimuli occurring as demanding or problematic. Users earlier tried to solve the problematic situation using various coping mechanisms. However, after failed coping, they still have major challenges with their FB use and negative feelings, such as anxiety, distress, and frustration, due to the problematic situation. Their evaluation of the current usage shows severe violation of their self-set behavioral standards, and users feel that FB use is out

of their control. Due to the problematic situation, users decide to discontinue FB use either temporarily (i.e., account deactivation) or permanently (i.e., quitting FB). In the third stage, a stage-specific mechanism is the discontinuance adaptation strategy, which users apply because they do not see any other option to cope with the stressful situation. For example, after failed to change their own FB checking behavior, users decide to deactivate the FB account for a few days during final exams to minimize disturbance.

5.2.2 Transition between stages

In stage theories, movement from a stage to another describes behavioral change. Our stage theory includes three types of transitions: forward transition, backward transition, and stage omission. Arrows A, B, and C with a dashed line in Figure 10 describe the forward transition from one stage to another as users face challenges with their FB use and fail to meet the behavioral standards. In contrast, arrows D and E with a solid line illustrate the backward transition after successful coping (arrow D) and after discontinuance (arrow E) as users return to the first stage. Additionally, arrows C and E demonstrate the conditions for stage omission.

The first stage demonstrates routinized and adjusting use patterns during which the intensity and the purposes of use may vary due to various stimuli, but users are able to follow their self-set behavioral standards of FB use. In other words, they can adjust their use behavior without problems while facing various environmental stimuli. Hence, FB use is part of people's daily routines, and thus, most users stay in stage 1. However, sometimes individuals may notice discrepancies between their current use behavior and their behavioral standards. These discrepancies cause standards violations, which, in turn, result a *forward transition* from stage 1 to stage 2 (arrow A). In stage 2, users apply various coping strategies to meet their behavioral standards. For example, users may notice (i.e., self-monitoring) that incoming FB notification alerts make them check FB constantly. Consequently, constant FB checking causes challenges with time management and disturbs studying (i.e., judgment). In other words, they violate the standard concerning time spent on FB. Due to standard violation users apply some coping mechanisms (i.e., transition to stage 2), such as switching off notification alerts (i.e., modification of notification settings) or deciding to check notifications in certain times (i.e., adjustment of one's own attitude towards notification alerts).

After successful coping, users return to stage 1 (arrow D, *backward transition*) and continue to use FB in accordance with their adjusted behavior. Alternatively, failed coping causes severe standards violations and moves users forward from stage 2 to stage 3 (arrow B). Due to severe standards violations, users feel that their FB use is out of their control, and thus, they decide to discontinue FB use either temporarily or permanently. As an example, a user notices that he spends far too much time using FB. He plays FB games, chats with friends, browses newsfeed, and participates various FB groups. Constant flow of notifications and status updates cause negative feelings, such as anxiety and distress (i.e.,

monitoring and judgment). The user tries to control his usage by deciding to spend less time on FB and not to answering all game invitations (i.e., transition to stage 2). However, he fails to do so and feels that FB use is totally out of his control (i.e., severe standard violation) and thus he decide to quit FB for good (i.e., transition to stage 3).

In addition to forward and backward transitions, our model includes two stage omissions, that is, forward or backward transitions during which a user skips one stage. Arrow C illustrates a *forward stage omission* (a transition from stage 1 directly to stage 3). Usually, this kind of behavior occurs as users notice that FB use disturbs other duties, such as studying. Alternatively, users may feel that there is no need for FB use anymore or they just want to try whether is possible to live without FB. At first, they may have intended to adjust either their behavior or FB settings, but instead, they decide to discontinue usage either for a while (i.e., account deactivation or temporary break) or permanently (i.e., quit).

After a temporary break, users reactivate their accounts and continue to use FB as usual. Arrow E demonstrates a *backward stage omission*, in which users move backward from stage 3 directly to stage 1. Interestingly, persons who have permanently quit FB and deleted their accounts may return after a while and create new FB accounts. Arrow E also illustrates these individuals. Even though they create new accounts, we treat them as continued users because they are already familiar with the FB use.

Moving triggers influence users in the same stage to move forward. Our theory includes four kinds of *moving triggers*: standards violations, resulting in a forward transition from stage 1 to stage 2; failed coping, resulting in a forward transition from stage 2 to stage 3; and no need to use FB and need for a short break, resulting a forward transition from stage 1 to stage 3 (forward stage omission). Furthermore, our study illustrates two kinds of *relapse triggers* that result in a backward transition: successful coping, resulting in a backward transition from stage 2 to stage 1; and account reactivation after a temporary break or creation a new FB account after quitting (backward stage omission from stage 3 to stage 1). Account reactivation results in continued FB use as usual, while creation of a new account results in a fresh start.

In addition to moving triggers, stage theories may contain *moving barriers*. In our stage theory, there is at least one moving barrier: fear of losing (social) information and feeling like an outsider, which is apparent in the first stage and seems to keep users from quitting FB use. Some passive users (i.e., routine use pattern) mentioned that they have had intended to quit FB but continued to use it because they want to keep up with their friends and have social information.

In sum, a stage theory approach provides a process-oriented way to illustrate and explain behavioral change through stages and transitions. Additionally, moving triggers and barriers enable to explain transitions between stages more in detail. Moving triggers and barriers enable us to understand why some users move from stage to another (i.e., change usage behaviors) whereas others stay in the first stage.

6 DISCUSSION

This doctoral dissertation is aimed at advancing theoretical knowledge of IT use by explaining user adaptation processes in the social media use context. As the main theoretical contribution, this thesis proposes a stage theory of user adaptation. The essential task for theory building in interpretive studies is not to identify abstract regularities but to present thick descriptions (Lee & Baskerville, 2003; Sarker et al., 2013; Walsham, 1995). Accordingly, the proposed theory is explanatory in nature as it is aimed at bringing about an altered understanding of the process of user adaptation (Gregor, 2006). The theory is intended to generalize the findings by presenting a rich variety of explanations and thick descriptions (Lee & Baskerville, 2003; Walsham, 1995). However, it is also a substantive theory because it is developed for a specific area of inquiry (Gregor, 2006), and adapting it to other contexts requires further research and contextualization.

6.1 Summary of the results

This doctoral dissertation demonstrates the dynamic, complex nature of IT use after adoption by providing an empirically grounded understanding of user adaptation processes in the FB use context. An emphasis on dynamics of post-adoptive user behaviors is important because it extends our understanding of individuals' IT use. By applying the ideas and constructs of the stage theories of behavioral change, the proposed theory is aimed at explaining how and why FB users change their usage after adoption.

The main result of this dissertation is to propose a stage theory of user adaptation. The theory describes a variety of FB use patterns and adaptation strategies users apply after adoption. Furthermore, the theory explains the underlying mechanisms of user adaptation based on individuals' capabilities to follow their self-set standards of behavior.

The stage theory of user adaptation has three stages representing different FB use patterns. Furthermore, each stage has its own user adaptation strategy that users apply to try to keep their usage in line with their self-set behavioral standards. In stage theories, transitions between stages indicate behavioral change. The proposed theory includes three types of transitions. First, a forward transition illustrates standards violations as users try to manage challenging situations. Second, a backward transition demonstrates either successful coping (i.e. transition from stage 2 to stage 1) or resumption of FB use after discontinuance. Third, a stage omission describes situations in which users skip one stage.

Together, these findings provide an understanding and important insights into the process of user adaptation in the context of FB use. By applying Bandura's (1991) self-regulation theory as a sensitizing device during the iterative process of data analysis, we were able to identify two FB-specific behavioral standards, four distinct FB use patterns, and three dynamic user adaptation strategies that illustrate the dynamic nature of FB post-adoption. Furthermore, a stage theory approach enabled us to demonstrate how and explain why FB users change their FB use behaviors.

This thesis, therefore, answers the call for context-specified theorizing presented by IS researchers (Burton-Jones & Straub, 2006; Grover & Lyytinen, 2015; Venkatesh et al., 2012) and for a more comprehensive understanding of individuals' IT usage (Benbasat & Barki, 2007; Burton-Jones & Straub, 2006; Carter & Grover, 2015; Elie-Dit-Cosaque & Straub, 2011; Hong & Tam, 2006; Yoo, 2010). The findings extend theoretical knowledge of IT use, user adaptation, and FB use and create new avenues for related research.

6.2 Contributions to existing research

This doctoral dissertation contributes IT use and user adaptation literature in several ways by uncovering how and why users change their post-adoptive behaviors in the context of social media use. While majority of the existing research on IT use has focused on the determinants of IT (dis)continuance (e.g., Bhattacharjee, 2001; Battacherjee & Barfar, 2011; Limayem et al., 2007; Polites & Karahanna, 2012), this dissertation provides an alternative understanding of post-adoptive behaviors by applying a process-based view of IT use.

To develop deeper insights into individual-level IT use we applied an interpretive research approach drawing on the phenomenological hermeneutic perspective (Goulding, 2005; Laverly, 2003; Van Maanen, 1990). While interpretive research is seen as a viable method for studying IT use (Boland, 2002; Klein & Myers, 1999; Orlikowski & Baroudi, 1991; Walsham, 1995, 2006), the hermeneutic phenomenological approach is not prevalent among IS scholars. Hence, this dissertation contributes research on IT use by demonstrating that hermeneutic phenomenology enables to understand and interpret IT use and

user adaptation through the subjective meanings of the users and provides a means to generate rich insights into individuals' post-adoptive behaviors.

The existing literature on user adaptation has shown that users engage in two main IT use patterns, namely automatic and adjusting, which appear and disappear over time as different events occur (Ortiz de Guinea & Webster, 2013). Additionally, users rely on various coping strategies to respond IT-induced changes and overcome stressful IT events in organizational settings (e.g., Beaudry & Pinsonneault, 2005, 2010; Wu et al., 2017). According to prior studies, the importance of an IT event and the level of users' perceived control over the situation affects their selection of coping strategies (Beaudry & Pinsonneault, 2005, 2010; Elie-Dit-Cosaque & Straub, 2011; Wisniewski et al., 2014). While prior studies provide important insights describing adaptive behaviors that users apply to respond IT-induced changes in organizations, this study extends the prior understanding by focusing on mechanisms that drive user adaptation over time. Thus, proposed stage theory of user adaptation contributes both IT use and user adaptation literature by providing a process-based view of post-adoptive behaviors in the context of social media use.

To develop a theory of adaptive social media use we applied the features of stage theorizing, which are widely used for example in the fields of psychology and health sciences to explain change and development of certain phenomenon (Weinstein et al., 1998). Stage theories focus on process characteristics by proposing a number of stages representing qualitatively different behaviors and by identifying factors that move people between stages (Schwarzer, 2008a; Velicer & Prochaska, 2008; Weinstein et al., 1998). Hence, the stage approach offers a means to illustrate behavioral change and use of various user adaptation strategies after IT adoption (i.e., how change unfolds over time). Compared to previous research on user adaptation, the proposed theory extends knowledge by demonstrating how and explaining why people change their IT use over time. In addition to stages representing different use behaviors (i.e., use patterns and user adaptation strategies), the theory illustrates transitions across stages representing behavioral change. Proposed theory includes four kinds of moving triggers producing a forward transition from stage to another, two kinds of relapse triggers resulting in a backward transition, and one moving barrier preventing discontinuance. Thus, our study contributes to the requests for a more comprehensive understanding of IT use (Benbasat & Barki, 2007; Burton-Jones & Straub, 2006; Carter & Grover, 2015; Elie-Dit-Cosaque & Straub, 2011; Hong & Tam, 2006; Yoo, 2010) by uncovering drivers of user adaptation in the context of social media use.

On a more detailed level, the results provide an understanding of how individuals can control their social media use. Using the theory of self-regulation (Bandura, 1991) as a sensitizing device enables discovering the underlying mechanisms that drive user adaptation after FB adoption. Our study extends prior research on social media use by demonstrating that, at least in the FB use context, people set for themselves FB-specific standards (i.e., privacy and time spent of FB) that guide their FB usage by setting limits on acceptable or normal

FB use. Further, this finding has especially important implications for research on Internet addiction in general (Weinstein & Lejoyeux, 2010; Young, 2004) and FB addiction in particular (Turel, 2014, 2015; Turel & Serenko, 2012). Interestingly, many of our study participants exhibited high levels of technology addiction core symptoms (e.g., conflict, behavioral salience, and/or relapse and reinstatement (Charlton & Danforth, 2007), indicative of dysfunctional self-regulation (Baumeister et al., 2007; Larose et al., 2003).

Regardless of the popularity and long history of FB use, our knowledge of post-adoptive FB usage is limited. Previous research has identified drivers of FB continuance (e.g., user satisfaction, habit, and a sense of belonging) and discontinuance (e.g., feelings of guilt and low self-efficacy) (e.g., Lin et al., 2014; Turel, 2014). Furthermore, recent studies have shown that in the FB use context, discontinuance may include short periods of non-use, referred to as vacationing or deactivation (Cho, 2015; York & Turcotte, 2015). On the contrary, in some cases external constraints, such as FB-based communication and fear of isolation and missing events, may hinder users to quit FB (Baumer et al., 2013). The dissertation contributes to both FB continuance and discontinuance research by demonstrating the intertwined nature of FB post-adoption. Our findings show that violation of FB-specific standards (i.e., privacy and time spent on FB) seem to cause temporal and/or permanent discontinuance. Further, the results of the present study contribute to knowledge by explaining why FB users who intended to permanently quit return/relapse and create new FB accounts after long periods of non-use.

FB use is not an isolated behavior but usually involves social interactions. The social environment is a vital part of FB use. It seems that the amount and activity of one's social circles may either positively or negatively affect FB use. Some users seem to enjoy social interactions and spending time on FB. However, for other users, the constant connectivity and accessibility may cause negative feelings, such as distress and anxiety, and lead to standards violations. Similarly, privacy concerns seem to cause distress for some users. Some can manage the situation by, for example, adjusting notification settings, but others cannot cope and thus discontinue FB use. This finding is closely related to the technostress literature. Technostress refers to individuals' inability to deal with IT in a healthy manner, resulting in stress (Ayyagari, Grover, & Purvis, 2011; Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008). In addition to work-related technostress, recent research has exhibited interest in technostress and its mitigation mechanisms in personal/leisure IT use contexts (e.g., Salo, Pirkkalainen, Chua, & Koskelainen, 2017; Salo, Pirkkalainen, & Koskelainen, 2018, 2017).

Finally but importantly, this dissertation contributes to research on IT habits by demonstrating the existence of two kinds of automatic FB use behaviors: stable use and situational use. Stable use refers to FB use patterns that do not change over time, whereas situational use refers to habitual use patterns triggered by situational cues (e.g., seeing one's smartphone and having breakfast). The literature on IT habits has paid limited attention to situational habits (Bhattacharjee & Barfar, 2011) but instead focused on the impact of habits on

behavioral intention and actual behavior and the relationships among them (Ortiz de Guinea & Markus, 2009).

6.3 Practical implications

The thesis has practical implications for FB design and performance-related stakeholders (e.g., designers, developers, and marketers), individual users, and society. First, regarding FB design and performance, the thesis provides rich insights into user behavior. By demonstrating and explaining the processes of user adaptation, the study extends practical knowledge. The results show a variety of reasons for FB continuance and discontinuance, providing important information for FB designers and developers. For example, the findings suggest that the two FB-specific standards (privacy and time spent on FB) may limit FB use or even lead to non-use. FB designers and developers, therefore, should pay more attention to those issues if they want users to continue using FB. Furthermore, FB developers should pay attention to the news feed algorithms because the findings imply that changes in the FB news feed content are a main reason for limiting FB use or becoming passive users.

Second, the study has implications for individual FB users because it provides an understanding of overall user adaptation processes and various coping mechanisms users may apply in challenging or problematic use situations. FB should provide specific information about privacy and content settings. This would help users protect their privacy and customize their news feed content. In the long run, this would be beneficial for both FB as a company and for its users.

Third, regarding both users and society, the thesis complements prior knowledge on the negative outcomes of FB use. The findings imply that constant FB checking may turn into excessive use or bad habits, which, in turn, may cause problematic FB use, including FB addiction and technostress, as mentioned. These findings provide important information for FB users illustrating how people can cope in problematic use situations.

6.4 Limitations and future work

The study has certain limitations that should be acknowledged. The first limitation is that the study participants were university students who gained credit points as a reward from the study. There is a possibility that some students used FB only to gain more credit points for study participation. However, we tried to account for this bias by asking the participants in the follow-up interviews about their plans to continue FB use after the study. They all answered that they were willing to continue FB use at some level.

The second limitation is the diary study itself as a research method. It is widely acknowledged that the burden of diary writing may affect behavior. In

our case, therefore, the amount of diary entries might have diminished FB use. Moreover, there is always a chance that the participants did not report all their FB use. We tried to account this bias by advising to use a free cross-platform application for taking notes and writing diaries. Furthermore, in the follow-up interviews we asked participants whether their diaries represented their normal FB use behaviors.

The third limitation is related to data gathering and analysis. While interviews are considered to be viable research methods in interpretive research (Myers & Newman, 2007), they provide retrospective data. We tried to mitigate this bias by combining retrospective interviews and on-going diary writing. A qualitative diary study is considered to be a method that permits capturing dynamic processes (Radcliffe, 2013) and thus is suitable for investigating the changing nature of user adaptation. The study is somewhat limited because the author collected all and analyzed most of the data. However, during the later stages of data analysis and theory development, I received help from my supervisors, and we discussed both the description and the explanation of the findings together.

To address these limitations, further research is necessary. Given the dynamic and complex nature of post-adoptive FB use, future studies are necessary to improve the proposed theory by, for example, figuring out if there is a stage prior to the three described, in which novel FB users develop habits. We decided to place both the routine and fluctuating use patterns in the same stage as users may manifest them simultaneously. However, prior studies show evidence that after initial use, usage behavior may become partly routinized (Bhattacharjee & Barfar, 2011; Jasperson et al., 2005; Kim & Malhotra, 2005; Limayem & Hirt, 2003; Polites & Karahanna, 2013). Hence, future studies should focus on IT habit development more in detail. Furthermore, the findings demonstrate the relevance of both technostress and behavioral addiction symptoms in the context of FB use, so future research should examine these issues in detail.

7 CONCLUSION

Despite extensive research on IT use and IT/user adaptation, there is a need for a more comprehensive understanding of system usage. The overall objective of this doctoral dissertation is to understand changes in individuals' post-adoptive behaviors and their underlying mechanisms by focusing on user adaptation in the context of FB use. By applying the theory on self-regulation as a sensitizing device during data analysis and adopting a stage theory approach during theory development, we demonstrate and explain the dynamical nature of FB post-adoption. The results provide important insights into the process of user adaptation in the context of social media use. This dissertation contributes to theory by proposing a new stage theory on user adaptation. The proposed theory reveals the underlying mechanisms of user adaptation, explaining how and why FB users adjust their use behavior over time. The process of user adaptation includes three stages representing different use patterns and user adaptation strategies applied to keep FB use in line with self-set standards of behavior. Furthermore, transitions from one stage to another demonstrate behavioral change. In practical implications, the results provide important information about FB post-adoption behaviors for system designers, developers, and providers, as well as individual users and society. For system designers and developers, the study provides understanding of how users respond to various technological and privacy-related changes. For individual users and society, the study provides important insights into problematic FB use and various coping mechanisms users can apply to manage these situations.

YHTEENVETO (FINNISH SUMMARY)

Vaiheteoria sosiaalisen median käytöstä ja käytön muuttumisesta: esimerkkinä muutokset Facebookin käytössä

Yksi tietojärjestelmätieteen keskeisistä tutkimuskohteista on informaatioteknologian (esim. tietojärjestelmät, ohjelmistot tai sovellukset) käyttö ja siihen vaikuttavat tekijät. Käyttöönoton jälkeen teknologian käyttö muuttuu nopeasti ainakin osittain rutiininomaiseksi. Tutkimusten mukaan ihmisten teknologian käyttö muuttuu ajan kuluessa myös käyttäjien mukauttaessa teknologiaa, järjestellessä työtehtäviä uudelleen sekä muuttamalla omaa käyttäytymistään. Suuria muutoksia teknologian käyttöön aiheuttavat esimerkiksi laitteistojen tai ohjelmistojen päivitykset.

Valtaosa aiemmasta tutkimuksesta on kohdistunut teknologian käyttöön ja käytön muuttumiseen työympäristössä. Viimeisen kymmenen vuoden aikana erilaisten vapaa-ajalla käytettävien henkilökohtaisten teknologioiden käyttö on kuitenkin lisääntynyt merkittävästi. Henkilökohtaisen teknologian käyttö perustuu käytön vapaaehtoisuuteen, jolloin loppukäyttäjä on itse vastuussa siitä, miten, milloin ja kuinka paljon kyseistä teknologiaa käyttää. Facebook on hyvä esimerkki suositusta henkilökohtaisesta teknologiasta, joka laajan käyttäjäkunnan ja vuosia kestäneen suosion myötä on vakiinnuttanut asemansa osana ihmisten arkipäivää. Runsaasta teknologian käytön tutkimuksesta huolimatta tiedämme valitettavan vähän teknologian jatkuvan käytön aikaisista muutoksista ja muutoksen syistä varsinkin henkilökohtaisen teknologian käytön yhteydessä.

Tämän väitöskirjan tavoitteena on ymmärtää ihmisten teknologian käyttöä ja erilaisia käyttötapoja sekä niiden muuttumista ajan kuluessa. Lisäksi tavoitteena on löytää ja selittää syitä käytön muuttumiselle. Tutkimuksen kohteena on sosiaalisen median käyttö ja sen muuttuminen. Koska Facebookin käyttö on luonteeltaan sosiaalista ja muuttuvaa, se tarjoaa hyvän ympäristön henkilökohtaisen teknologian käytön muutoksien ja niiden aiheuttajien selvittämiseen sekä antaa mahdollisuuden syventää tietämystämme teknologian käytöstä yleensä.

Väitöskirjatutkimuksen aineisto kerättiin henkilökohtaisilla haastatteluilla sekä pitkittäisen päiväkirjatutkimuksen avulla. Lähestymistapana käytetty hermeneuttinen fenomenologia auttoi ymmärtämään tutkittavien omia kokemuksia ja käsityksiä Facebookin käytöstä ja käytön muuttumisesta ajan kuluessa. Teoreettisena viitekehyksenä aineiston analyysin loppuvaiheessa käytetty Albert Banduran (1991) teoria ihmisten itsesäätelystä auttoi meitä löytämään aineistosta Facebookin käyttöä ohjaavia mekanismeja sekä ymmärtämään käyttötapojen muuttumisen syitä. Lisäksi vaiheteoreettinen lähestymistapa teorian kehittämisessä tarjosi hyvän pohjan teknologian käytössä tapahtuvien muutosten ja niiden syiden kuvaamiseen.

Tutkimuksen tulosten mukaan Facebookin käyttö voidaan jakaa neljään eri käyttötapaan. Eri käyttötavat kuvastavat käyttäjien tapaa reagoida ympäristön ärsykkeisiin ja kykyä noudattaa itse asetettuja käyttäytymisstandardeja.

Lisäksi löysimme kolme erilaista mukauttamisstrategiaa, jotka kuvaavat käytön mukauttamisen tasoa sekä muutosta edistäviä ja estäviä tekijöitä. Tutkimusten tulosten mukaan käyttäjät pyrkivät noudattamaan itse asettamiaan Facebookin käyttöä ohjaavia standardeja. Mikäli käyttäjät huomaavat ristiriitoja oman Facebookin käyttötapansa ja asettamiensa standardien välillä, he joutuvat muuttamaan käyttötapojaan tai jopa lopettamaan Facebookin käytön joko väliaikaisesti tai kokonaan.

Tutkimuksen tuloksena kehitetty vaiheteoria yksilöiden Facebookin käytöstä ja käytön muuttumisesta edistää tietojärjestelmätieteen tutkimusta tarjoamalla käyttäjien kokemuksiin perustuvaa tietoa Facebookin käytöstä, käytön muutoksista sekä muutoksen aiheuttajista. Vaiheteoreettinen lähestymistapa teknologian jatkuvan käytön tutkimuksessa mahdollistaa käytön aikaisten muutosten havainnollistamisen ja auttaa ymmärtämään ihmisten teknologian käyttöä, käytön muuttumista sekä muutoksen mekanismeja. Tämän lisäksi tutkimuksen tulokset tarjoavat monipuolista tietoa Facebookin käytöstä ja käyttäjien toimintaan vaikuttavista tekijöistä palvelun suunnittelijoille, tuotekehitykseen ja markkinointiin. Palvelun käyttäjille tutkimuksen tulokset antavat tietoa Facebookin käytön hallintakeinoista ja mahdollisten negatiivisten vaikutusten välttämisestä.

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APPENDICES

Appendix I

TABLE 4 Prior research on user adaptation

Study	Concept(s)	Context	Focus	Findings	Change rigger
Orlikowski & Robey (1991)	Structuration and IT	Organization	Technology, organization	The structurational model of IT recognizes four key influences that operate continuously and simultaneously in the interactions between technology and organizations: IT is the outcome of human action, IT is the means of other human actions, IT is built and used within particular social contexts, and interactions with IT influence the social contexts within which it is built and used.	Technology
DeSanctis & Poole (1994)	Advanced information technologies, appropriation of technologies	Organization	Technology, user groups	Advanced information technologies trigger adaptive structurational processes, which, over time, can lead to changes in the rules and resources organizations use in social interactions. Change occurs as members of organizational groups bring the structural potential of these new technologies into interactions, appropriating available structures during group decision making.	Technology
Tyre & Orlikowski (1994)	Adaptation of technologies in use	Organization	Technology	These authors argue that the process of technological adaptation is highly discontinuous. Adaptation drops off dramatically after an initial burst of intensive activity due to organizational forces. However, the decline of adaptation is not irreversible, and later unexpected events can trigger new spurts of adaptive activity.	unexpected events (discrepant events)

Lassila & Brancheau (1999)	Information system utilization	Organization	Technology, task	The evidence suggests that when significant changes occur in technology appropriation, users, or the organization context, the existing equilibrium state is disturbed. After a temporary transition state characterized by redefinition of the technology and/or its context, the changes are incorporated into altered work processes, and a new equilibrium state develops.	Internal and external change triggers
Majchrzak, Rice, Malhotra, King, & Ba (2000)	Adaptation processes (technology structuring processes)	Organization (virtual teams)	Technology	A pattern of adaptation is distinctly discontinuous or episodic in nature, including periods of routine use and brief episodes of adaptation. Interruptions can serve an important role by triggering actors to review and revise their procedures or processes.	Technology
Orlikowski (2000)	Technology-in-practice	Organization	Task, technology, users	Technologies-in-practice can be and are changed as actors experience changes in awareness, knowledge, power, motivations, time, circumstances, and technology. There are three types of technology enactment reflecting the degree to which processes, technology, and social structures are changed as a result of technology's integration within the work system: inertia, application, and change.	Users
Beaudry & Pinsonneault (2005)	Coping model of user adaptation (CMUA)	Organization	Users	The model of CMUA model has five propositions and four adaptation strategies: benefits maximization, benefits satisficing, disturbance handling, and self-preservation.	IT events (new or modified IT)

Barki, Tihah, & Boffo (2007)	Individual-level information system use-related activities	Organization	Task, technology, user	IT use is reconceptualized in three behavioral categories: technology interaction, task-technology adaptation (i.e., reinvention), and individual adaptation (i.e., self-adaptation/learning). IS-use-related activity comprises both technology interaction behaviors and activities users undertake to adapt the task-technology-individual system.	Users
Desouza, Awazu, & Ramaprasad (2007)	Modification of technology artifacts during post-adoption	Organization	Technology, user	This life-cycle model connects the various types of modifications connected to technology artifacts: personalization, customization, and invention.	Users
Bruque, Mayano, & Eisenberg (2008)	Individual adaptation to IT-induced change (i.e., technochange)	Organization	Users, task	Several aspects of the social networks are related to the quality of employees' adaptation to the new technology as assessed by the company's departmental directors. Specifically, the size of the support network and the strength and density of the information network significantly predict employees' adaptation to the new system.	Technology
Thomas & Bostrom (2010)	Team technology adaptation	Organization (virtual teams)	Technology	This framework identifies the vital signs/key triggers necessary to watch to recognize the need to manage technology adaptation in virtual teams.	Users, teams
Beaudry & Pinsonneault (2010)	The role of emotions in the context of acceptance and antecedents of IT use	Organization	Users, task	This framework classifies emotions into four distinct types: challenge, achievement, loss, and deterrence emotions. Emotions felt by users early in the implementation of new IT have important effect on IT use.	Users, emotions

Fadel & Brown (2010)	IS appraisal and coping	Organization	Users	Perceptions influence appraisal; specifically, performance and effort expectations are predictors of primary appraisal outcomes, while facilitating conditions determine secondary appraisal outcomes.	Users, perceptions that shape IS appraisals
Liang & Xue (2010)	IT threat avoidance behavior	Individual	Users	Computer users are likely to employ a safeguard if there is a threat, the threat can be averted by the safeguard, and they have sufficient confidence in using the safeguard.	IT threats
Fadel (2012)	IS infusion	Organization	Technology, user, task	The results indicate that problem-focused adaptation behaviors directed to changing the work-system-self dynamic promote infusion, while avoidance-oriented, emotion-focused adaptation behaviors tend to decrease infusion.	Users
Sun (2012)	User revisions at the feature level (adaptive system use; ASU)	Individual	Technology, users	Three types of triggers cause a person to engage in active thinking: novel situations (NS), discrepancies (DP), and deliberative initiatives (DI) for active thinking. NS and DP are significant antecedents of ASU. DI somewhat represent controlling situations. DP are the most important trigger of ASU.	Novel situations, discrepancies, and deliberative initiatives
Ortiz de Guinea & Webster (2013)	Change in the IS use patterns	Organization	Users, technology	Two IS use patterns result from different IT events and relate differently to short-term performance: an automatic IS use pattern and an adjusting IS use pattern.	Expected and unexpected IT events
Bagayogo Lapointe, & Bassellier (2014)	Enhanced use	Organization	Technology, task, users	Enhanced use refers to novel ways of employing IT features, such as using a formerly unused set of available features, applying IT for additional tasks, and implementing extensions of IT features and attributes. Adaptation refers to the organizational and individual adaptation behaviors that occur around enhanced use and aid its completion.	Technology, task

Wisniewski, Xu, & Chen (2014)	User adaptation strategies	Individual	Users	A high level of stress is associated with the transition to the new interface introduced by FB timeline. The results show that increasing users' perceptions of control over major interface changes may help facilitate user adaptation to these changes.	Technology
Stein, Newell, Wagner, & Galliers (2015)	Coping with IT: mixed emotions, vacillation, and nonconforming use patterns	Organization	Users	Users respond emotionally to a confluence of cues present in an IT stimulus event. There are five characteristics of an IT stimulus event (cues) that, when interacting in a reinforcing manner, elicit a single class of emotions (uniform affective responses) and, when interacting in an oppositional manner, elicit mixed emotions (ambivalent affective responses). Different variables are important across the three post-adoption stages (routinization, infusion, and extension).	IT stimulus event
Benlian (2015)	IT feature use (ITFU)	Organization	Task, technology, users	In the early stages of system use, users predominantly extend their ITFU to become more familiar with the system's potential features, and in later stages, they focus more heavily on leveraging a stable subset of IT features to benefit from task completion. The magnitude of broadening and deepening capabilities to use IT features thus decreases over time.	Task, technology
Liang, Peng, Xue, Guo, & Wang (2015)	System exploration	Organization	Technology	Both job autonomy and task variety are critical antecedents of system exploration. In contrast to the findings of prior IT acceptance research, system complexity has no direct effect on system exploration.	Task, technology

Schmitz, Teng, & Webb (2016)	Adaptation of malleable IT by users	Individual	Technology, task	This theoretical perspective of adaptation behaviors extends adaptive structuration theory to the individual level, and a topology of adaptation behaviors captures the rich landscape of the emerging phenomenon. There are two technology adaptation behaviors (exploitive and exploratory tech adaptations) and two task adaptation behaviors (exploitive and exploratory task adaptations).	Technology, task
Nevo, Nevo, & Pinsonneault (2016)	IT reinvention	Organization	Technology, task	This theory of reinvention identifies the key sub-processes of IT reinvention, describes two patterns of reinvention (performance oriented and mastery oriented), and explains how the present and the past influence the ambiguities, demands, and dilemmas inherent to each pattern.	User (new goals)
Bhattacharjee, Davis, Connolly, & Hikmet (2017)	User responses to mandatory IT use	Organization	Users	The results of this taxonomy of the different types of user responses show (1) how combinations of primary and secondary appraisals give rise to different user responses (engaged, compliant, reluctant, and deviant); and (2) how these user responses can change over time as the primary and/or secondary appraisals change.	Technology, task

Appendix II

TABLE 5 Pre-study participants

Informant			Interview
ID	Gender	Age	Length (min)
FB_I1	F	36	39
FB_I2	F	30	36
FB_I3	M	41	51
FB_I4	F	21	36
FB_I5	F	42	43
FB_I6	F	45	34
FB_I7	M	69	31
FB_I8	F	26	51
FB_I9	F	39	48
FB_I10	M	19	25
FB_I11	M	38	48
FB_I12	F	49	47
FB_I13	F	39	28
FB_I14	M	21	47
FB_I15	F	27	31
Total 15	10F/5M	Mean age 36.1	Mean length 40 min

Appendix III

TABLE 6 Diary study participants

ID	Informants		Study participation (months)	Diaries (event-based, one week/month)					
	Gender	Age		Week 28	Week 32	Week 37	Week 41	Week 45	Week 50
FB6_1	F	23	6	x	x	x	x	x	x
FB6_2	M	45	6	x	x	x	x	x	x
FB6_3	M	35	6	x	x	x	x	x	x
FB6_4	F	32	6	x	x	x	x	x	x
FB6_5	F	20	6	x	x	x	x	x	x
FB6_6	F	28	6	x	x	x	x	x	x
FB6_7	F	52	6	x	x	x	x	x	x
FB6_8	F	32	6	x	x	x	x	x	x
FB6_9	F	25	6	x	x	x	x	x	x
FB6_10	F	32	6	x	x	x	x	x	x
FB6_11	F	23	6	x	x	x	x	x	x
FB6_12	M	22	6	x	x	x	x	x	x
FB6_13	M	29	6	x	x	x	x	x	x
FB6_14	M	23	6	x	x	x	x	x	x
FB6_15	F	22	6	x	x	x	x	x	x
FB6_16	F	55	6	x	x	x	x	x	x
FB6_17	M	22	6	x	x	x	x	x	x
FB6_18	M	26	6	x	x	x	x	x	x
FB6_19	M	21	6	x	x	x	x	x	x
FB4_20	M	40	4	x	x	x	x	-	-
FB4_21	M	21	4	-	x	x	-	x	x
FB4_22	F	22	4	x	x	x	x	-	-
FB4_23	F	24	4	x	x	x	x	-	-
FB4_24	F	28	4	x	x	x	x	-	-
FB4_25	M	27	4	-	-	x	x	x	x
FB4_26	F	23	4	-	-	x	x	x	x
FB2_27	M	23	4	-	-	x	x	x	x
FB2_28	M	21	2	x	x	-	-	-	-
FB2_29	M	22	2	x	x	-	-	-	-
FB2_30	F	32	2	x	x	-	-	-	-
Total 30	14M/16F	Mean age 28.3		26	27	27	26	23	23

Appendix IV

Initial interview protocol (used in the pre-study and the diary study)

Background information

- Gender
- Age
- Major subject studies

Acceptance and initial use of Facebook

1. Can you remember when and from whom you heard about Facebook for the first time? (*awareness of the service*)
2. When did you create a Facebook profile? Why?
3. Why did you want to join Facebook at that time?
4. Tell me about your Facebook friends. (*sociality and personal factors*)
 - ➔ How did your network of friends start to form?
 - ➔ What kinds of friends did you have on Facebook?
 - ➔ Did you search for former friends, like school friends or childhood friends, on Facebook?
5. Think about your initial use of Facebook.
 - ➔ For what purposes did you use Facebook?
 - ➔ Through which device(s) did you use Facebook?
 - ➔ How often did you use Facebook? (*frequency of use*)
 - ➔ What did you do on Facebook? What functionalities did you use? (*purpose of use*)
 - ➔ More specific questions about Facebook behavior (how often/ what kind of updates/ why/ why not/ etc.)
6. In what kind of situations did you use Facebook? (*context*)
7. What kind of benefits did you gain during your initial use of Facebook? (*gratifications gained and usefulness*)
8. Did you pay attention to privacy issues and/or information security issues at the beginning of your Facebook use?
 - ➔ Why or why not?
 - ➔ What kind of privacy settings did you have?

Continued use of Facebook

1. Can you describe how your social network/network of Facebook friends has expanded?
 - ➔ Have you also met all of your Facebook friends in real life/ face to face?
2. What functionalities do you normally use on Facebook? What have you done on Facebook? (*purpose of use*)
 - ➔ Personal status updates/ photos/ likes and comments/ communication tools
3. How often do you use Facebook?
4. Through which device(s) do you use Facebook?
5. In what kind of situations do you usually use Facebook? (*context*)

6. Please describe your Facebook usage behavior. Have there been any changes if you compare your later stages of Facebook use to your initial use?
7. How about communication behavior (e.g., messages and chat) through Facebook? Have there been any changes?
8. Have your purposes for using Facebook changed over time?
9. Have you applied any new functionalities (e.g., groups/events/apps)?
10. Have you joined any Facebook groups? If yes, what kind of groups, and why?
11. What is the main reason(s) for you Facebook use now? (*purpose of use*)
12. What kind of benefits have you gained from using Facebook? (*usefulness and gratifications*)
13. Have you used Facebook only for personal purposes (private use)? Or have you used it for work and/or study-related purposes as well? If yes, how? (*purposes/contexts to use*)
14. Have you paid attention to privacy issues and/or information security issues?
 - ➔ Have you modified your privacy settings? (*security changes and privacy behavior*)
 - ➔ Why or why not?

Current state of Facebook use

1. Please describe your current Facebook use (over the past couple of years).
 - ➔ How much/often do you use Facebook? (*habit*)
 - ➔ Through which devices do you use Facebook? (*habit*)
 - ➔ If you use new devices, when did you start to use them?
2. In what kinds of situations do you use Facebook? (*context*)
 - ➔ Is there a certain time of the day, place, mood, etc., when you usually use Facebook? (*context and habit*)
3. How much time do you spend on Facebook? Has the amount of time spent on Facebook varied over the years? If so, why?
4. Why do you still use Facebook? (*benefits, gratifications, and usefulness*)
5. For what purposes do you use Facebook nowadays?
6. What functionalities do you use on Facebook?
 - ➔ Are there any changes from previous Facebook use? If yes, why?
7. Do you use the like and comment functionalities?
 - ➔ In what kind of situations?
 - ➔ Why?
 - ➔ What is the purpose or meaning of the like button for you?
 - ➔ If commenting, in what kind of situations/for what kind of posts?
8. Do you use Facebook for work- or study-related reasons?
 - ➔ If yes, please describe how and why.
9. Has the purpose of your Facebook use changed lately? Why or why not?
10. Do you have incoming instant Facebook message alerts on your mobile phone/smartphone?
 - ➔ What kind of alerts?
 - ➔ Have you modified the alert settings? When? Why or why not?
11. Do you use Facebook for communication?
 - ➔ Any changes from previous Facebook use? If yes, why?

- 12 How do you feel if you do not have the opportunity to use Facebook for a few days?
- 13 Do you feel that your Facebook usage disturbs your daily life? If yes, why?
- 14 Would you like to restrict your own Facebook use for some reasons? If yes, why?
16. Have you ever restricted your Facebook use or quit Facebook?
 - ➔ If yes, why and for how long?
 - ➔ Please describe this in more detail.
17. Do you use any other social media services? If yes, what?
 - ➔ How does your Facebook usage differ from your usage of other social media services?
18. What do you think/feel about your future Facebook use? Will it change somehow? If so, why?

Appendix V

Follow-up interview protocol (used in the diary study)

1. What kind of Facebook user you are? Please justify your answer.
2. Do you feel that the diaries you wrote represent your normal Facebook use? Why or why not?
3. Have you learned something about yourself and your Facebook usage during this diary study?
 - ➔ If so, have these observations had an affect on your Facebook use or behavior?
4. For what purposes do you use Facebook nowadays?
 - ➔ Why do you use Facebook for these purposes? Are there any other choices/rival services to do that?
 - ➔ Have you noticed changes in your communication behaviors and/or information searching (e.g., news) behaviors?
 - ➔ When has your behavior changed?
 - ➔ Why has your behavior changed?
5. How much and for what purposes do you use the like and comment functionalities?
 - ➔ Has your behavior changed? If so, why?
 - ➔ Why your behavior has changed?
6. Please mention some positive issues related to your Facebook use. (*benefits, usefulness, and gratifications*)
7. Please mention some negative issues related to your Facebook use. (*distraction and barriers to use*)
8. What kind of image do you present through Facebook? (*self-image*)
 - ➔ Why?
 - ➔ Have there been any changes in that over the years of your Facebook use?
9. What are important issues about privacy and Internet security related to your Facebook use? Why?
10. How have Facebook and Facebook use affected your life? Can you give some examples?
11. What do you think about Facebook use in general?

Appendix VI

TABLE 7 Participants' Facebook use (x=current behavior; (x)=previous behavior)

Informant	Frequency of use			Purpose of use			Nature of contribution		Nature of use behavior		Coping	Discontinuance	
	ID	Low	Moderate	High	Entertainment	Work	Studies	Consuming	Producing	Non-problematic		Problematic	Break
FB_U1	X			X			X	(X)	X				
FB_U2	X			X			X		X				
FB_U3	X			X			X	X	X				
FB_U4	X			X			X	(X)	X				
FB_U5		X		X	X		X	X	X				
FB_U6	X			X	(X)		X	(X)	X				
FB_U7	X			X			X	(X)	X				
FB_U8	X			X			X	(X)	X				
FB_U9			X	X	X		X	X	X				
FB_U10		X		X			X	X	X				
FB_U11	X			X			X		X				
FB_U12	X			X			X		X				
FB_U13	X				X	X		X	X				
FB_U14	X			X			X	X	X				
FB_U15	X			X			X	(X)	X				
FB_U16	X			X	(X)		X		X				
FB_U17	X			X			X		X				
FB_C1	X			X		X	X	X		X	X		X
FB_C2	X		(X)	X			X	(X)		X	X	X	X
FB_C3	X	(X)		X		X	X			X	X		X
FB_C4	X	(X)		X			X	(X)		X	X		X
FB_C5			X	X		X	X	X		X	X	X	
FB_S1		X		X	X		X	X		X	X		
FB_S2			X	X	X		X	X		X	X		
FB_S3			X	X	X	X	X	X		X	X		
FB_S4		X	(X)	X	X		X	X		X	X		
FB_S5	X			X		X	X	X		X	X		
FB_S6	X			X			X	(X)		X	X		
FB_S7	X			X			X	X		X	X		
FB_S8	X			X			X		X		X		
30				29	9	6			18	12	12	2	4