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What Determines the Adoption of Digital Innovations by Digital Natives? – The Role of Motivational Affordances

Completed Research Paper

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Abstract

Previous IS research analyzing the adoption of digital innovations has not yet distinguished between digital natives and digital immigrants. Thus, there is still a limited understanding of the special needs regarding digital innovation design and the adoption behavior of individuals identified as digital natives. Therefore, we used a motivational theory perspective from psychological studies to examine the individual needs of digital natives concerning the design of a digital innovation. We conducted a mental simulation experiment with 637 participants. Our findings shed light on the importance of digital nativeness as a predictor of attitudes towards using digital innovations, and the relevance of applying socio-psychological design principles for developing digital innovations.

Keywords: Digital nativeness; digital innovations; motivational affordances; adoption

Introduction

Emergent digital technologies and innovations, such as mobile and wearable devices, cloud computing, and 3D printing, enable a transformation in the way people live and work, how companies organize, and the structure of entire industries (Bharadwaj et al. 2013; Fichman et al. 2014; Lucas et al. 2013). A digital innovation has been defined as "a product, process or business model that is perceived as new, requires significant changes on the part of adopters, and is embodied in or enabled by IT" (Fichman et al. 2014, p. 330). Information systems (IS) research on digital innovation has increased focus on the customer experience, aiming to benefit organizations in the digital age in developing products and services, including simplifying engagement with the customers (Aral et al. 2013; Lucas et al. 2013; Setia et al. 2013; Yoo 2010, 2012).

Moreover, the new generation of customers – so-called digital natives – are challenging and influencing organizations with their particular needs, wishes, expectations, and behaviors regarding digital innovations (Myers and Sundaram 2012; Prensky 2001). Thus, making it important for organizations to understand how digital innovations should be designed and implemented for digital natives, in addition to how digital natives accept, interact with, and use digital innovations (Vodanovich et al. 2010).

Prior IS research has extensively developed and discussed several theories related to the acceptance, use, and adoption of information systems (e.g., Davis 1989; Pavlou and Fygenson 2006; Venkatesh and Morris 2000; Venkatesh et al. 2003). Most of these theories, such as the theory of planned behavior (TPB) (Ajzen 1991) and the technology acceptance model (TAM) (Davis 1989), are based on the assumption that users tend to resist or experience complication accepting new technologies and systems (Vodanovich et al. 2010; Wang et al. 2013). Nonetheless, we believe that this assumption cannot be completely applied to digital natives, because "digital natives eagerly adopt new technologies and consider themselves to be technology savvy" (Vodanovich et al. 2010, p. 716). The tendency of digital natives to engage with technology enables them to learn to use these technologies in sophisticated ways, sometimes even adapting them to better suit their needs (Myers and Sundaram 2012).

Resulting from the growing digital society that has emerged, an urgent need has developed to engage in a more systematic exploration of the perception of technology, cognition, and the mediated experience in general (Vodanovich et al. 2010). The need to revise some of the theories of user acceptance is consistent with an ongoing debate among IS scholars about the nature of attitude and intention to use information systems (e.g., Bhattacherjeea and Sanford 2009; Ortiz de Guinea and Markus 2009; Wu and Lu 2013). Wu and Lu (2013) note the importance in engaging, finding, and applying new relevant theories towards the concept of IS adoption. To address this research gap, we borrowed a motivational theory perspective applied in psychological studies to further develop the concept of IS adoption and explore it in relation to the adoption behavior of digital natives.

Following Zhang (2008, p. 145), questions such as "Why do people initiate, continue, stop, or avoid using IS?" can be explored with the aid of motivation theories, thus contributing to a better understanding of adoption behavior. Specific design principles of information systems have been derived from motivation theories that influence people's psychological, physiological, and social conditions (Ryan and Deci 2000; Zhang 2008). These design principles based on the theory of motivational affordances support a person's needs and thus influence their well-being, affect, and decision-making processes (Zhang 2008). We believe that with the help of this theory, we can gain valuable insights into the individual needs of digital natives concerning the adoption of a digital innovation, thus influencing the design process a digital innovation undergoes for this particular generation. Drawing on these lenses, our study aims to answer the following research question:

> *What is the impact of motivational affordances on the adoption of digital innovations for digital natives?*

To address our research question and basing from previous studies, we analyzed the predictive influence of digital nativeness on two constructs of IS adoption: attitude towards, and consequently, intention to use a digital innovation (e.g., Davis 1989; Hess et al. 2014). The attitude towards using a technology is understood as a person's overall affective reaction to using a system, reflecting to the extent to which an individual likes or dislikes using certain technology (Venkatesh et al. 2003; Wang and Scheepers 2012). Specifically, we focus on the development of a new gaming application for an in-car entertainment system. Furthermore,

we hypothesize that the design principles of motivational affordances strengthen the relationship between digital nativeness and the attitude towards the adoption of a digital innovation. We tested our hypotheses with a between-subjects design in a mental simulation experiment involving four distinct groups. Overall, 637 participants partook in the experiment, with nearly 160 in each group. Through our research, we aim to shed light on new interdisciplinary approaches for dealing with digital innovation adoption, particularly concerning the design of digital technologies to better benefit the needs of a technologically inclined generation.

The remainder of this paper is structured as follows. In the next section, we present the concepts of digital nativeness and the fundamental theory of motivational affordances. We then introduce and explain our methodological approach, followed by a presentation and discussion of our research findings. We close our study by addressing the limitations of our study, offering an outlook for further research, and highlighting the practical and theoretical implications of our work.

Theoretical Background and Related Work

The Concept of Digital Nativeness

In providing a definition for the concept of digital natives, many scholars differentiate between digital natives and digital immigrants. Prensky (2001) defines digital natives as "all the native speakers of the digital language of computers, video games and the Internet" (p. 1), who are used to receiving and accessing information very fast. Digital immigrants are described as those who were not born into the digital world but have become part of it by adopting many or most aspects of new technologies (Prensky 2001; Vodanovich et al. 2010). However, to primarily focus on age to distinguish digital natives from digital immigrants seems inappropriate (e.g., Li and Ranieri 2010; Salajan et al. 2010). In this respect, Zur and Zur (2011) noticed that not all young individuals behave equal. Not all have a Facebook and Twitter account, predominantly shop online, and network through social media. Lie (2013) also mentioned that during her class announcement regarding the decision to migrate to using Edmodo (a social media platform) as their communication board for her teaching class most students demonstrated excitement, but a couple revealed disquiet and apprehensiveness. Moreover, she stated "while the technology invasion is ubiquitous for this millennial generation, it is not right to assume that every young person has an inclination toward the internet technology and to neglect their anxiety" (p. 60).

Therefore, recent studies, including our study, describes the difference between digital natives and immigrants rather as a continuum than a strict division. This continuum is conceptualized as digital fluency or digital nativeness, encompassing the idea that depending on individual experiences and use of technology, some people are likely to be more native than others (Myers and Sundaram, 2012; Stokburger-Sauer and Plank, 2014). Myers and Sundaram (2012) assert that individuals possessing a higher level of digital nativeness do not merely use technology differently, their lives are strongly molded by digital technologies, i.e., they are digitally fluent, always connected, and need prompt gratification, as well as feedback. Hence, new digital technology influences changes in their lives, i.e., their way of learning, working, communicating, buying, accepting, and retaining information compared to the lives of individuals with a low level of digital nativeness (Stokburger-Sauer and Plank 2014; Tapscott 2009).

In this study, we consider three dimensions provided by Stokburger-Sauer and Plank (2014) to examine the digital nativeness of our participants. Through a qualitative and quantitative analysis, Stokburger-Sauer and Plank (2014) demonstrate that digital nativeness consists of three dimensions: (1) expertise in digital media, (2) sophisticated digital media use, and (3) sophisticated mobile media use. Expertise in digital media refers to one's early exposure to digital media, intensive usage of digital media, and high interest in digital media in comparison with other generations. Sophisticated digital media use indicates that people who exhibit high levels of digital nativeness make use of more sophisticated digital media, such as video uploads or blogs, while people who exhibit a low level of digital nativeness employ rather basic applications, such as information search and e-mail. Lastly, sophisticated mobile media use implies that people with higher levels of digital nativeness frequently access the Internet on their mobile phones and use more sophisticated mobile phone applications than those with a lower level of digital nativeness.

Based on Vodanovich et al. (2010), Myers and Sundaram (2012), as well as Stokburger-Sauer and Plank (2014) Table 1 summarizes some characteristics regarding the technology engagement of individuals, identifying digital native and digital immigrant attributes.

Table 1. Characteristics regarding Technology Engagement of Individuals to Define Degree of Digital Nativeness/Immigrant

Technology Engagement	**Digital Natives**	**Digital Immigrants**
Means of communication via online technology	Prefer instant messaging	Prefer e-mail
Internet use	Online social networks, e-mail, information search, chatting, online forums, videos, music and software downloads, online shopping, e-banking	E-mail, information search, e-banking, online shopping
Means of communication via mobile phone	Prefer texting	Prefer speaking
Mobile phone use	Telephone, SMS, Internet, e-mail, camera, calendar, video games, online social networks, music player, route planning	Telephone, SMS, camera
Means of sharing	Prefer blogs or social networking websites for sharing personal experiences	Prefer blogs as an intellectual tool for sharing and discussing ideas with their peers
Use of IS	Creating online content (e.g., uploading YouTube videos, building websites)	Passive usage of online content
Predominant IS design	Attractive, intuitive, social, interactive, personalized	Functional

Table 1. Characteristics regarding Technology Engagement of Individuals to Define Degree of Digital Nativeness/Immigrant

Theory of Motivational Affordances in IS Research

To better explain the theory of motivational affordances, we first provide a brief introduction to the concept of needs. According to Zhang (2008), "needs are conditions within an individual that are essential and necessary for the maintenance of life including the nurturance of growth and well-being" (p. 145). In psychological research, three types of needs are identified: physiological, psychological, and social needs (Ryan and Deci 2000; Zhang 2008). Physiological needs are innate in order to maintain the workings of the individual biological system (Zhang 2008). In contrast psychological needs emanate from self-requirements and ambitions to call on interactions with the environment, encouraging an individual's wellbeing and growth (Zhang 2008). A social need is an adopted psychological process arising from one's socialization history that affects emotional responses to a need-relevant incentive (Zhang 2008).

In IS research, several studies apply different motivation theories to better understand individuals' needs for the design or implementation of IS in various contexts (e.g., Zhang and von Dran 2000). For example, in the application of Herzberg's two-factor theory (Herzberg 1987), Zhang and von Dran (2000) find that individuals associate their various needs with web environments, influencing their decision about whether to revisit a specific website. Moreover, prior research has indicated that both intrinsic and extrinsic motivations are important factors for determining IS adoption. Intrinsic motivation is understood as the pleasure and built-in satisfaction accompanying the interaction with the information system itself, while extrinsic motivation relates to the expectation of some return or benefit through the interaction with the information system (van der Heijden 2004).

The theory of motivational affordances is also based on the idea of fulfilling certain individual needs (Ryan and Deci 2000; Zhang 2008). The term "affordance" refers to a property of the relationship between an object and its user and is seen as an opportunity for action (Volkoff and Strong 2013). IS scholars have applied the motivational affordances theory to investigate how the properties of an object or technology can be designed to support the fulfillment of users' needs, in addition to influencing whether, how, and the degree in which this object or technology will be used (e.g., Jung et al. 2010). In his study of innovation design, Zhang (2008) provides design principles based on five distinct motivational sources that aim to fulfill user's needs: (1) psychological (autonomy and self); (2) cognitive (competence and achievement); (3, 4) socio-psychological (relatedness, power, leadership, and followership); and (5) emotional (emotion and affect) needs. Table 2 summarizes and illustrates the variety of needs and motivational sources including their related design principles of motivational affordances and theoretical base.

Table 2. Design Principles of Motivational Affordances Based on Zhang (2008)

Needs	**Motivational Sources**	**Examples of Design Principles of Motivational Affordances**	**Primary Theoretical Base**
Psychological	(1) Autonomy and the self-identity	Support autonomy and creation of self-identity	Self-determination theory (Deci and Ryan 1985)
Cognitive	(2) Competence and achievement	Design for optimal challenge with timely and positive feedback	Flow theory (Csikzentmihalyi 1991); goal theories (Elliot 1999)
Socio-psychological	(3) Relatedness	Facilitate human–human interaction representing social bonds	Social interaction studies (Baumeister and Leary 1995)
	(4) Power, leadership, and followership	Facilitate one's desire to influence others or to be influenced by others	Affect control theory (Heise 1985)
Emotional	(5) Emotion and affect	Induce intended emotions via IS surface and interaction features	Affect and emotion studies (Russell 2003)

Table 2. Design Principles of Motivational Affordances Based on Zhang (2008)

Zhang (2008) suggests that e.g., online avatars or cell phone ring tones afford autonomy and self-identity because the applications support the users in expressing themselves distinctively. Furthermore, e.g., games and learning systems with various challenge levels can help the users to perceive or evaluate their performance towards goals and hence, afford competence and achievement (Zhang 2008). Moreover, applications, such as group games with a chat function, afford relatedness enabling users to interact amongst each other, providing a condition for people to feel they have a social bond (Zhang 2008). Additionally, e.g., engaging games or aesthetically looking smartphones could implement the latter design principle that should afford emotions and induce intended affects resulting from IS interaction (Zhang 2008).

Zhang (2008) implies that emotions and affects can be seen as an outcome of the interaction with an information system based on the other four motivational needs. For example, Zhang (2008) states that when using an IS satisfies the user's motivational needs, he or she feels enjoyment and wants to repeat use. Furthermore, psychology scholars have also indicated that motivation and emotion are two different elements that share a cause-and-effect relationship (Bradley and Lang 2006; Lazarus 2000; Sincero 2012). Motivation stimulates a person to act and behave to achieve a desired goal, while emotion is the affective

state that emerges from the motive, the actions caused by the motive, and the achievement or unfulfillment of the desired goal (Bradley and Lang 2006; Lazarus 2000; Sincero 2012).

Recent IS studies on technology adoption and human–computer interactions have also suggested that emotions are a result of users' interactions with IS (e.g., Codish and Ravid 2014; Klimmt 2006; Wang and Scheepers 2012; Yee 2006). For example, Codish and Ravid (2014) implemented a cognitive design principle of motivational affordances in their empirical study, demonstrating that playfulness – a positive emotion – results from user interaction with an IS. Remaining consistent with previous studies, we decided to not consider emotions as part of motivational affordances in our examination. Hence, we focus specifically on the design principles of motivational affordances proposed by Zhang (2008) that aim to fulfill psychological, cognitive, and socio-psychological needs.

To the best of our knowledge, no study in IS research has yet empirically compared these design principles regarding their impacts on IS adoption (Jung et al. 2010). Therefore, we draw on the design principles based on psychological, cognitive, and socio-psychological needs to design a digital innovation – a new gaming application for an in-car entertainment system – prior to its implementation. We aim to both analyze whether the implementation of such design principles influence the adoption of this digital innovation for individuals with a high level of digital nativeness as well as determine which of the applied design principles are better suited for such individuals.

The Impact of Motivational Affordances on Digital Innovation Adoption for Digital Natives

Previous IS research has analyzed various constructs with the intention to predict IS adoption (e.g., TAM, TPB) (Ajzen 1991; Davis 1989; Hess et al. 2014). For example, Davis (1989) suggests that attitude is predicted by perceived usefulness (improvement of the user performance) and perceived ease of use (degree of simplicity to use an IS). Further literature has extended the existing models by applying new predictive variables and successfully evaluating the models (e.g., Venkatesh et al. 2003; Wu et al. 2007). The already comprehensively and exhaustively examined IS adoption models have shifted IS scholars focus to advancing their understanding of IS adoption through the examination and comparison of distinct groups of users that share a common characteristic (Leidner and Kayworth 2006; Maier et al. 2012; Sun et al. 2008; Venkatesh and Morris 2000). These groups have been analyzed based on the assumption that collective characteristics influence single or multiple variables within the model and consequently induce a deficient IS adoption (Venkatesh and Morris 2000). For example, by testing an extended version of TAM, Porter and Donthu (2006) demonstrate that collective characteristics such as age, education, income, and race are associated differentially with beliefs about the Internet, and that these beliefs influence the consumer's attitude and Internet use accordingly.

In this study, we are interested in examining the extent to which the level of digital nativeness can predict the attitude towards using a digital innovation. Vodanovich et al. (2010) indicate that digital natives are considered early adopters of new technologies due to certain highly appealing characteristics of innovations, such as relative advantage, compatibility, low complexity, and trialability. Because digital natives have the ability and willingness to use digital technologies fluently and sophisticatedly (Vodanovich et al. 2010; Wang et al. 2013), we assume that individuals with a high level of digital nativeness present a positive attitude towards using a digital innovation. Therefore, we hypothesize the following:

> *H1: Digital nativeness has a positive influence on the user's attitude towards using a digital innovation.*

Previous literature has indicated that attitude towards using an information system is a strong predictor of the intention to use such an information system (e.g., Bamberg and Möser 2007; Bhattacherjeea and Sanford 2009). Furthermore, intention to use is a reliable indicator for real behavioral observations, and therefore, it can explain a behavior better than attitude alone (Sutton 2008). Accordingly, we decide to measure the intention to use a digital innovation in addition to the attitude towards using it. Following previous literature, we propose a positive impact of attitude on the intention to use:

> *H2: Positive attitudes towards using a digital innovation increase the intention to use it.*

In addition, we suggest that the design of a digital innovation can strengthen the relationship between the construct of digital nativeness and attitude towards using a digital innovation. According to Vodanovich et al. (2010) and Myers and Sundaram (2012), because of the characteristics of digital natives, e.g., having the need for prompt gratification and feedback, the design of a digital innovation for individuals who present a high level of digital nativeness should involve a set of interrelated dimensions, such as personalization, interactivity, intuition, attractiveness, and social interaction. We identify some of these dimensions in the design principles of motivational affordances proposed by Zhang (2008). For example, the personalization dimension, which concerns the degree to which an innovation is customizable through direct configurations by users (Vodanovich et al. 2010), can be related to the psychological design principle of motivational affordances that supports autonomy and the creation of self-identity. The cognitive design principle of motivational affordances concerning design for optimal challenge with timely and positive feedback can be related to the dimension of interactivity because it allows users to obtain real-time information regarding their interaction with an information system (Vodanovich et al. 2010). Moreover, the social dimension concerns the degree to which an information system enables sharing and collaboration among various users (Myers and Sundaram 2012) can be related to the social-psychological design principle of motivational affordances that facilitates human–human interactions. Therefore, we believe that applying the design principles of motivational affordances during the development of a digital innovation might improve digital natives' attitudes towards using such an innovation. Thus, we hypothesize that the design principles of motivational affordances strengthen the relationship between digital nativeness and attitude towards using a digital innovation:

> *H3: Design principles of motivational affordances strengthen the relationship between digital nativeness and user attitudes towards using a digital innovation.*

According to previous studies, the suggested design principles of motivational affordances can and should be selectively used to enhance the motivation of a given group of users (Karanam et al. 2014; Weisert et al. 2015; Zhang 2008). For example, Venkatesh and Johnson (2002) indicate that adding social-psychological design principles to the interface of an information system significantly influenced the motivation of the knowledge worker, leading to an increase in acceptance (Jung et al. 2010; Venkatesh and Johnson 2002). Accordingly, in order to more accurately select the most appropriate design principles for the group of digital natives, we should investigate which particular design principles influence their attitudes the greatest towards adopting a digital innovation.

Because digital natives have both an online and offline life, they are considered to have a markedly social nature (Braccini and Federici 2013). They have a tendency to communicate and share information with other people through IS tools and digital media, probably being connected to their peers in social networks or forums, thus underlining their habit of looking for collaboration with peers rather than isolation (Braccini and Federici 2013; Vodanovich et al. 2010). Moreover, digital natives enthusiastically embrace social networks because it fulfills their needs of communicating with a multitude of friends in the virtual environment (Stokburger-Sauer and Plank 2014). Due to digital native's remarkable social nature, we hypothesize that the design principles of motivational affordances that afford socio-psychological needs will strengthen the relationship between digital nativeness and the attitudes towards using a digital innovation to a greater degree than the other design principles.

> *H4: Design principles that afford socio-psychological needs will strengthen the relationship between digital nativeness and user attitudes towards a digital innovation to a greater degree than the other design principles of motivational affordances.*

We summarize and represent our hypotheses in the research model illustrated in Figure 1 below.

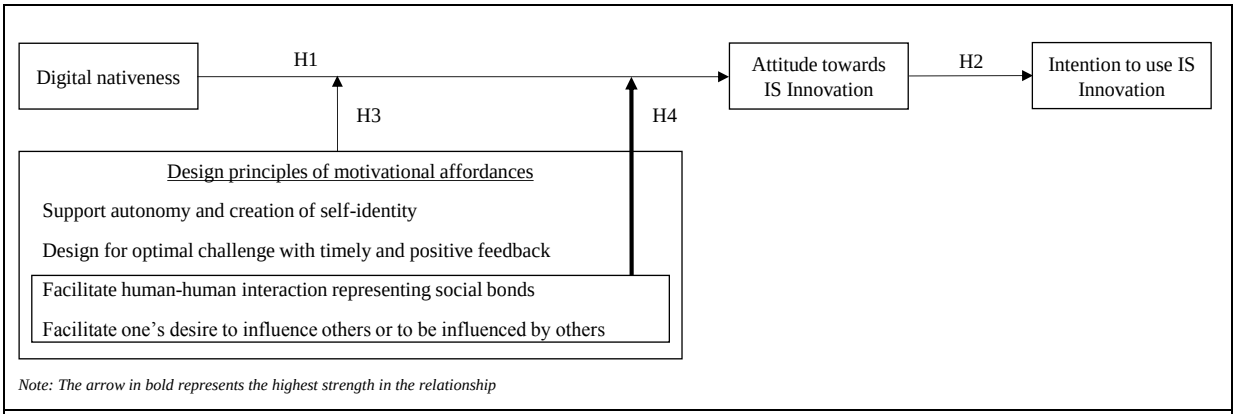


Figure 1. Representation of Hypotheses

Research Design and Methods

To empirically test our conceptual framework and the suggested hypotheses, we conducted a mental simulation experiment (Zeimbekis 2011). A mental simulation experiment is administrated by means of processes (thoughts) that do not occur in their targets (external physical events) (Zeimbekis 2011). We selected this type of experiment because many studies have already proven the effectiveness of mental simulation in the context of IS in relation to stressful events, emotion, motivation, and coping strategies (e.g., Eisel et al. 2014; Gallese and Goldman 1998; Rivkin and Taylor 1999). In our experiment, each participant had to imagine a situation with the goal of arousing a cognitive evaluation process (Zeimbekis 2011). Mental simulation experiment can construct applying a within- or between-subject design. While in a within-subject designed experiment each individual is assigned to multiple rather than single testing treatments, a between-subject designed experiment consists of each individual experiencing a single treatment (Charness et al. 2012). In experiments using a within-subject design the multiple exposures must be independent in order to analyze causal relationships (Charness et al. 2012). In our experiment we use the between-subject design under the assumption that the confrontation with multiple exposures – this case, different design principles – could interact and thus, the impact of each treatment would not be independent. To ensure the studied effects were affected by the treatment, the participants were assigned to their treatment group randomly and a control group that experienced no treatment existed (Charness et al. 2012).

Sample and Data-Collection Procedure

In summer 2014, we asked various people from China to attend a one-hour mental simulation experiment. We attempted to enlist participants from different regions and age groups. At the beginning of the experiment, participants received questions about demographic variables (age, occupation, and education) and regarding their level of digital nativeness (Stokburger-Sauer and Plank 2014; see appendix). Our study draws from a sample of N = 637 participants ranging from 18 to 65 years old (mean: 39 years) with a 48% share of females. More than two-thirds had attained a university degree (74%), 11% earned a post-graduate university degree, and 15% received a general qualification for university entrance.

In the mental simulation experiment, the participants had to imagine that they were inside a car stuck in a traffic jam and that they could use an in-car entertainment system with a new application: a sound-recognition, interactive clapping karaoke game. The participants received the following introduction: You are the driver. You will be stuck in a traffic jam for 15 minutes. The following in-car clapping karaoke game can be played in the car during the traffic jam (<20km/h). The clapping karaoke game are on the board computer which can understand you and is connected to the internet. You can choose a level of difficulty for the game: easy, medium, and difficult. Then you will be provided a song that fits your selected level of difficulty. Your task is to clap your hands to the rhythm of the music. Afterwards, there was a comment regarding the related study group: "You get 5 points by playing well. You collect these points to achieve a personal reward. When you've collected 100 points, you can exchange them for the reward" (Group 1: reward; n=160), "You get 5 points by playing well. You collect these points for a ranking list. Thus you have

the possibility to compare your performance with other people that partake in the game" (Group 2: ranking; n=159), and "You are in a group with 5 friends that also play this game. You achieve 5 points by playing well and help contribute to your group to collect points for a team ranking list" (Group 3: group task; n=158). These statements implement the design principles of motivational affordances suggested by Zhang (2008). Therefore, each participant from groups 1 to 3 received a different design principle that afforded either a psychological, cognitive, or socio-psychological need, as illustrated in Table 3. Participants of Group 4 (n=160) played the clapping karaoke game without any game mechanisms and thus did not receive any of the motivational drivers described in the previous statement. The participants were randomly assigned to one of the four groups. The sample size corresponding to each design principle applied is also represented in Table 3.

Because we aimed to evaluate the design of this digital innovation before its implementation, we had to work with paper prototyping (Snyder 2003). The new application was presented to the participants in the form of sketches. Paper prototyping is a method to test websites, applications, and software before the prototype is implemented (Snyder 2003). Following the task choices that the user should accomplish, screen shots or hand-sketched drafts of e.g., dialogue boxes, pages, or popup messages must be compiled (Snyder 2003). Finally, tasks are provided to the users to generate an interaction with the prototype (Snyder 2003). Results of studies applying paper prototyping are comparable with results generated by studies with computer prototyping, therefore providing validity to the method (Catani and Biers 1998; Sefelin et al. 2003).

Following the experiment, we examined the participants' attitudes towards the digital innovation via three situation-adapted items based on the theory of planned behavior (Ajzen 1991). The participants responded to the following statements: "I would like playing the described game inside the car;" "I like the idea of playing games inside the car;" and "I have a positive attitude towards the described game". For all statements we used a seven-point Likert scale, ranging from (1) "strongly agree" to (7) "strongly disagree." In addition, to measure the participants' intention to use, we asked the following: "How interested would you be in this application?" and "How likely would you be to purchase this application?" Here we also applied a seven-point Likert scale, ranging from (1) "extremely interested" to (7) "not at all interested" for the first question and from (1) "definitely" to (7) "definitely not" for the second question.

Table 3: Description of the Design Principles Applied in the Design of Our Digital Innovation

Sample size	160 (Group 1)	159 (Group 2)	158 (Group 3)	160 (Group 4)
Description of the design principles embedded in the digital innovation	Difficulty levels can be chosen (easy, medium, and difficult). User receives "points" for his/her performance. Points can be exchanged for a personal reward (e.g., new cell phone ring tone of their choice).	Difficulty levels can be chosen (easy, medium, and difficult). User receives "points" for his/her performance. Points will be displayed in a ranking list. Users' performance can be compared immediately with other users.	Difficulty levels can be chosen (easy, medium, and difficult). User plays the game in a group together with max. 5 other users who also have this game. Users receive points for their team performance. Points will be displayed in a team ranking list. Team's performance can be compared immediately with other teams.	(Users can use the digital innovation without any design principles)
Related design principles of motivational affordances of Zhang (2008)	Support autonomy and creation of self-identity.	Design for optimal challenge with timely and positive feedback.	Facilitate human-human interaction representing social bonds/ Facilitate one's desire to influence others or be influenced by others.	-

Table 3. Description of the Design Principles Applied in the Design of Our Digital Innovation

The complete mental simulation experiment was written in English and translated to Chinese; we then checked the translation's accuracy by reversing the Chinese translation back to English. To evaluate and refine our mental simulation experiment, we conducted both a qualitative pilot study (with four experts and three researchers) and a quantitative one (with a sample of n = 15).

Analysis

We used SmartPLS Version 2.0 M3 to analyze the data gathered (Ringle et al. 2005). SmartPLS is a computer program for studying a structural equation model using the partial least squares approach (Ringle et al. 2005). We applied the partial least squares approach because it is appropriate for research models that have not been studied until now, unlike studies applying the covariance-based approach (Götz et al. 2010). Because no empirical studies integrating the concept of digital nativeness in their research model exist, we conducted a rather explorative analysis of our structural equation model (Götz et al. 2010).

The data calculation was completed in four steps: The first step verified the reliability and validity of the measurement model for all four groups. In the second step, we tested the posited H1 and H2 with a partial least squares approach to structural equation modeling for the fourth group (without design principles of motivational affordances). To assess the significance of the regression parameter estimates, we used bootstrapping with n = 1,000 samples. If H1 cannot be falsified, the construct of digital nativeness predicts a positive and significant attitude towards using a digital innovation. The value of the regression parameter estimates should be greater than .20 because Taylor (1990) indicates that if the sample size is over 100, regression parameter estimates under .20 will be always significant but can be classified as very small. Chin (1998) also suggests that meaningful regression parameter estimates consist of a value greater than .20. Hence, the effect of attitudes towards using a digital innovation on the intention to use (H2) can be assumed when the regression parameter estimate is positive, significant, and has a value of more than .20.

To provide evidence for H3 (design principles of motivational affordances strengthen the relationship between digital nativeness and user attitudes towards using a digital innovation), we calculated the regression parameter estimates of digital nativeness on attitude towards using a digital innovation for Groups 1 to 3 (the Groups that received one of the design principles of motivational affordances in the digital innovation). To determine the differences between each of the Groups 1 to 3 and Group 4 (H3), we tested for variations between their parameter estimates using the t-test as suggested by Chin (2000) with the Bonferroni correction (Cabin and Mitchell 2000; Sarstedt et al. 2011). H3 could not be rejected if a single Group from Groups 1 to 3 had a significant and higher regression coefficient than Group 4 (without design principles of motivational affordances). Lastly, to test H4, we again applied the t-test (Chin 2000) with the Bonferroni correction (Cabin and Mitchell 2000; Sarstedt et al. 2011) to analyze the difference in the regression parameter estimates of Groups 1 to 3, in which all participants received the digital innovation with design principles. If Group 3, which received the design principles of "facilitate human–human interaction representing social bonds" and "facilitate one's desire to influence others or to be influenced by others," presents the highest significant regression parameter estimates in comparison to Groups 1 and 2, H4 cannot be falsified. The results are normally significant with a p-value of 0.05. Because of the applied Bonferroni correction, which eliminates the family-wise error rate by dividing each comparison's error rate by the overall number of comparisons, the p-value of 0.05 is reduced to $p^* = 0.0125$ ($p^* < p/ng$; p^*=adjusted p-value; ng = number of groups) (Sarstedt et al. 2011).

Results

In this section, we illustrate the analysis of the measurement's constructs, which are followed by the results of H1 to H4. In presenting the results, we reference the groups already introduced in Table 3 of the previous section.

Analysis of the Measurement's Construct

Convergent item validity is visible when each item loads significantly on its respective construct. In this context, the items should have a loading of at least .70 to be considered as significant (Hulland 1999). In our study, all items have this particular loading of .70 or higher. All constructs have the required composite reliabilities of .70 or greater, and the average variance extracted (AVE) for each construct is greater than .50. Therefore, we can suppose that preciseness of the measurements exists. Table 4 displays mean values

with standard deviations (STD), the composite reliabilities (CR), and the average variances extracted (AVE) in reference to the groups.

Table 4. Information of Measurement for All Four Groups												
	Mean (STD)				CR				AVE			
Groups	1	2	3	4	1	2	3	4	1	2	3	4
Digital nativeness	2.60 (1.14)	2.56 (1.03)	2.57 (1.14)	2.55 (1.00)	.93	.91	.94	.92	.60	.54	.63	.57
Attitude	3.31 (1.71)	3.66 (1.86)	3.46 1.74)	3.31 (1.63)	.96	.98	.97	.96	.89	.94	.93	.88
Intention to use	3.36 (1.80)	3.61 (1.85)	3.38 (1.74)	3.30 (1.67)	.98	.98	.97	.97	.96	.96	.95	.94
STD: Standard Deviation; CR: Composite Reliability; AVE: Average Variance Extracted												

Table 4. Information of Measurement for All Four Groups

To improve discriminant validity, it is necessary to ensure that the square root of a construct's AVE exceeds all correlations between that factor and any other construct within the study (Fornell and Larcker 1981). Table 5 displays that the square root of the AVEs for all the constructs are larger than the correlations between that construct and other constructs for all four groups; the square root of the AVEs is written on the main diagonal, with the off-diagonal cells reflecting the correlation between that construct and other constructs.

Table 5. Square Root of the AVE and Correlation Information for All Four Groups												
	Group 1			Group 2			Group 3			Group 4		
	1	2	3	1	2	3	1	2	3	1	2	3
Digital nativeness	**.78**			**.79**			**.73**			**.76**		
Attitude	.30	**.94**		.52	**.96**		.38	**.97**		.45	**.94**	
Intention to use	.28	.90	**.98**	.45	.87	**.97**	.33	.88	**.98**	.40	.86	**.97**

Table 5. Square Root of the AVE and Correlation Information for All Four Groups

Hypotheses Testing

The results of the calculation confirm the assumption of H1; the effect of digital nativeness on attitude towards using a digital innovation is significantly positive and yields a regression parameter estimate of $\beta = .45$ ($t(160) = 8.13$, $p < .001$). Moreover, the construct of digital nativeness can explain a substantial proportion of the variance in attitude ($R^2 = .20$). H2 is also confirmed by the positive significant effect of attitude on intention to use ($\beta = .89$, $t(160) = 43.25$, $p < .001$). In this case, 79% of the variance in intention to use can be explained by attitude towards using a digital innovation.

The significant differences in the regression parameter estimates of the groups that received the digital innovation with design principles of motivational affordances (Groups 1 to 3) and the group without design principles of motivational affordances (Group 4; H3) cannot be confirmed. The results suggest that the relationship between digital nativeness and attitude towards using a digital innovation can be strengthened only by the design principle supporting socio-psychological needs (i.e., facilitating human–human interaction representing social bonds and facilitating one's desire to influence others or be influenced by others; Group 3). However, the regression parameter estimate of Group 3 ($\beta = .52$, $t(158) = 9.01$, $p < .001$) does not pose a significant level difference from that of Group 4 ($t(160) = 1.19$, $p =$ n.s.). In contrast to our

assumption, the design principle addressing psychological needs (i.e., support autonomy and the creation of self-identity; Group 1) even weakens significantly the effect of digital nativeness ($\beta = .30$, $t(160) = 3.74$, $p < .001$) on attitude towards using a digital innovation ($t(160) = 2.60$, $p < .05$). Furthermore, the impact of digital nativeness on attitude towards using a digital innovation studied in Group 2, which received the design principle supporting cognitive needs (i.e., design for optimal challenge with timely and positive feedback), is weaker in comparison to group 4 ($\beta = .38$, $t(160) = 6.40$, $p < .001$) but not on a significant level ($t(160) = 1.25$, p = n.s.). Table 6 illustrates the regression parameter estimates of Groups 1 to 3 in comparison to the regression parameter estimates of Group 4 and presents both the t- and p-values.

Table 6. Results of Hypothesis 3				
Compared Groups	Regression Parameter Estimates	Regression Parameter Estimates (Group 4)	t-value	p-value
Group 1 to Group 4	.30	.45	2.60*	.01
Group 2 to Group 4	.38	.45	1.25	.21
Group 3 to Group 4	.52	.45	1.19	.24
**p < .001, *p ≤ .01, n.s. > .01.				

Table 6. Results of Hypothesis 3

Moreover, the calculation of H4 indicates that the design principles that fulfill socio-psychological needs can strengthen the relationship between digital nativeness and user attitudes towards a digital innovation to a greater degree in comparison to other design principles of motivational affordances. However, following the Bonferroni correction, only the regression parameter estimate of Group 1 that received the design principle of supporting autonomy and the creation of self-identity, differs significantly from the regression parameter estimate of Group 3 ($t(160) = 3.80$, $p < .001$). Table 7 displays the regression parameter estimates of Groups 1 and 2 in comparison to the regression parameter estimate of Group 3, the t-values, and the p-values.

Table 7. Results of Hypothesis 4				
Compared Groups	Regression Parameter Estimates	Regression Parameter Estimates (Group 3)	t-value	p-value
Group 1 to Group 3	.30	.52	3.80**	.00
Group 2 to Group 3	.38	.52	2.45	.02
**p < .001, *p ≤.01, n.s. > .01.				

Table 7. Results of Hypothesis 4

Discussion

In our study, we proposed and tested a research model that integrated interdisciplinary research from the fields of psychology and IS. Previous studies have explained distinctions in IS adoption by testing the prediction model among different groups that present collective characteristics, e.g., culture (Leidner and Kayworth 2006), gender (Sun et al. 2008), education (Martins and Kellermanns 2004), and personality traits (Maier et al. 2012). In our prediction model we analyzed a group with the collective characteristic of technology engagement, i.e., digital nativeness. In Figure 2, we briefly illustrate and summarize the results of our hypotheses (H1– H3).

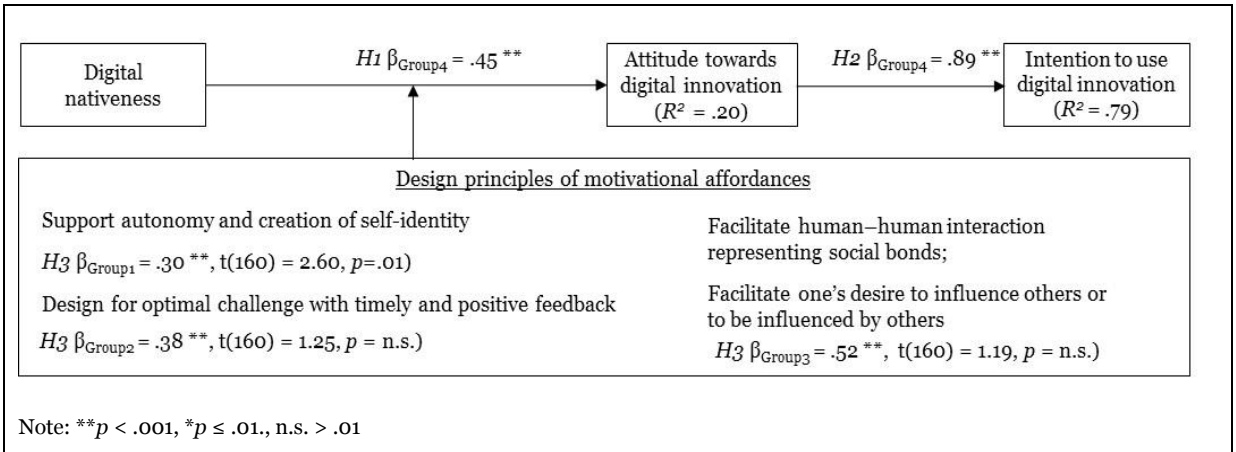


Figure 2. Summary of the Results of Hypotheses 1 to 3

Through our findings, we could observe that people who have grown up surrounded by and using digital technologies have a significant positive attitude towards adopting our digital innovation (β = .45, t(160) = 8.13, p < .001). In other words, the construct of digital nativeness significantly predicts the attitude towards using our digital innovation at a moderate level (H1; Chin 1998). This moderate influence indicates that further studies aiming to validate and transfer an IS adoption model to a specific population with an unequal proportion of digital immigrants and digital natives should either integrate digital nativeness as a variable in the model or analyze the predictive power of the model for both digital immigrants as well as digital natives. Vodanovich et al. (2010) also emphasize the need to pursue other disciplines such as marketing and psychology in making such differentiations in IS research in order to better comprehend the specific problems, issues, requirements, and needs of a different segmentation of users, consumers, and humans.

Moreover, our finding on H2 (a strong, positive, and significant effect of attitude on intention to use) is in line with previous research (e.g., Ajzen 1991; Davis 1989; Hess et al. 2014). The discussion of intention as a predictor for behavior is still a topic of debate in several studies (e.g., Bhattacherjee and Sanford 2009; Godin et al. 2005; Ouellette and Wood 1998). Therefore, to confirm our results, further research should measure behavior directly instead of intention to use.

In addition, our findings highlight the different motivational affordances of individuals with a high level of digital nativeness in regards to the use of our digital innovation. By comparing the groups that evaluated our digital innovation with design principles of motivational affordances (Groups 1 to 3) to the group that evaluated the innovation without any design principles (Group 4), we observed that each design principle of motivational affordances influences the relationship between digital nativeness and attitude towards adopting the digital innovation differently (H3).

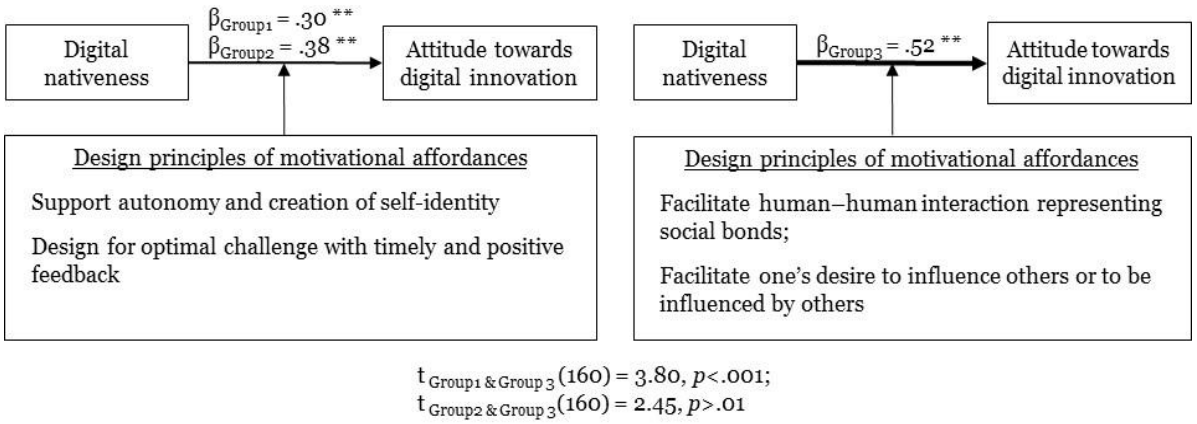
The participants with a high level of digital nativeness from Group 1, who received the digital innovation integrated with design principles that afford psychological needs (i.e., support autonomy and the creation of self-identity), exhibited a significantly less-positive attitude towards adopting the digital innovation in comparison with Group 4 (see Table 6). We implemented this design principle, which consisted of providing individuals with a personal reward when they used the application successfully, based on Zhang (2008). Although literature on digital natives indicates that in organizational contexts people with a high level of digital nativeness thrive on frequent rewards for both big and small accomplishments to improve their confidence at work (Prensky 2001; Tilvawala et al. 2013), in the context of our study, leveraging rewards in the design of a digital innovation did not motivate digital natives to use the innovation. In psychology research it has been suggested that the provision of rewards for good performance can reduce one's intrinsic motivation and thus decrease both the chance of behavior as well as a positive attitude change over time (e.g., Deci 1971; Sasone and Harackiewicz 2000). Furthermore, some IS studies are consistent with the findings of psychological studies, which indicate that the implementation of rewards within an IS decreases users' attitudes as well as chances of a behavioral change towards using an IS (Hanus and Fox 2015; Harmari 2013; Mutter and Kundisch 2014; te Brömmelstroet 2014). Due to the lack of studies related to

the design and adoption of innovations concerning digital natives, additional research is necessary to explore this subject in greater depth.

Moreover, when considering our participants with a high level of digital nativeness from Group 2, who received the digital innovation containing the cognitive design principle of "design for optimal challenge with timely and positive feedback," in comparison with Group 4, our results demonstrated that this design principle weakens the relationship between digital nativeness and attitude towards adopting the digital innovation. However, this debilitation is not on a significant level (see Table 6). Based on Zhang (2008), we implemented this design principle, consisting of providing the users with prompt feedback regarding their gaming performance in a ranking list. Our findings concerning this design principle are very intriguing, as previous research on digital nativeness has indicated that digital natives seek prompt and constant feedback to a greater degree than digital immigrants do (e.g., Farrel and Hurt 2014; Myers and Sundaram 2012; Vodanovich et al. 2010). As information processing and communication has sped up over the past decades, digital natives have become accustomed to quickly obtaining and processing both information and feedback in order to accomplish their goals (Braccini and Federeici 2013; Prensky 2001). However, the findings of previous literature on digital nativeness were evaluated in organizational and educational contexts; therefore, here we again see the need for further research to analyze the impact of cognitive design principles on the relationship between digital nativeness and attitude towards using a digital innovation.

The participants of Group 3 with a high level of digital nativeness, who received the digital innovation with the design principle related to socio-psychological needs, exhibited improved attitudes towards adopting the digital innovation in comparison with Group 4. However, the differences in the regression parameter estimates are not significant (see Table 6). Nevertheless, the improved relationship between digital nativeness and attitude as a result of implementing the design principle that addresses socio-psychological needs is consistent with findings of previous studies. This is also consistent with the argumentation that digital natives have a markedly social nature (Braccinei and Federici 2013; Wang et al. 2013). Because they easily share, play, or exchange information with other people both online and offline (Braccini and Federici 2013; Liu et al. 2011), design principles that enable digital natives to interact with others, providing a condition to create social bonds and experience leadership or followership, appears to improve their attitudes towards adopting a digital innovation. Interestingly, this social element present in studies on digital nativeness in organizational and educational contexts appears to be an overarching element also relevant in the context of designing digital innovations for digital natives. The importance of implementing design principles that focus on socio-psychological needs in an IS was underlined by Oinas-Kukkonen (2010), who suggested that social interaction through information systems can be applied to influence people's behavior. Moreover, Fogg (2003) asserts that if IS are observed as social actors (i.e., providing social support), the probability of changing behavior and attitude increases. Furthermore, psychology researchers have demonstrated that processes involving in-group interactions can also lead to changes in behavior and attitudes (Goldstein and Cialdini 2007). Therefore, further research should evaluate other types of IS with socio-psychologically–oriented design principles and analyze whether the impacts of these design principles on the relationship between digital nativeness and attitude present more significant results – also in different contexts.

Finally, in the examination of our last hypothesis (H4), we compared the groups that received the varying design principles of motivational affordances with each other, assuming that design principles based on the socio-psychological needs would strengthen the relationship between digital nativeness and attitudes towards using a digital innovation to a greater degree in comparison to other design principles. Figure 3 summarizes and illustrates the results of this hypothesis.



Note: The arrow in bold represents the highest strength in the relationship; $^{**}p < .001$, $^{*}p \leq .01$., n.s. > .01

Figure 3. Summary of the Results of Hypothesis 4

Our participants with a high level of digital nativeness from Group 3, who evaluated the digital innovation with design principles that afford socio-psychological needs, i.e., facilitate human–human interaction representing social bonds and facilitate one's desire to influence others or be influenced by others, revealed the most compelling findings of our study. In this case, our results indicate that design principles addressing socio-psychological needs have the most significant predictive power on the relationship between digital nativeness and attitude towards adopting the IS (see Table 7). This reinforces previous findings concerning the importance of design principles related to socio-psychological needs for digital natives due to their distinct social nature (Braccinei and Federici 2013; Wang et al. 2013).

Limitations and Further Research

Our study also presents some limitations; therefore, further ideas to be considered for future research aside from those aforementioned. Our study was conducted in China, but cultural differences regarding digital nativeness, motivational affordances, and the associated behavior of digital innovation adoption were not considered. This raises the question of whether our findings can be transferred to other cultures as well. Therefore, future research in this field should seek to generalize our findings by reviewing them in various cultural settings.

Because we aimed to evaluate a digital innovation before its implementation phase, i.e., prior to the innovations existence, we used sketches for our mental simulation experiment. The use of pictures to access the emotional and motivational response of users to IS (e.g., online travel service web pages) has already been applied in NeuroIS studies (e.g, Gregor et al. 2014). Nevertheless, this is not a common approach for assessing IS adoption and evaluating the design of an artifact (e.g., Marangunic and Granic 2015). For example, Hevner (2007) indicates that the designed artifact should be evaluated as a prototype in the application domain with the aid of a field study because the artifact could have deficits e.g., performance or usability that inhibit its implementation in practice. However, currently due to the demand of rapid development or modification of new information systems other methods are necessary to fasten the evaluation process. In this respect, paper prototyping with sketches and drawings within a mental simulation experiment could be a considered valid measurement (Snyder 2004). Previous studies analyzing the difference of computer and paper prototyping arrive to the conclusion that both approaches are appropriate to study IS adoption and detect usability, including identifying design problems (Catani and Biers 1998; Sefelin 2003). However, our findings might have been different if we had used a concrete prototype of the digital innovation. Hence, further research should also investigate a digital innovation based on the design principles of motivational affordances following its implementation phase, i.e., with a finished, developed digital innovation, in an experimental design.

Ideally, such an experiment should also evaluate more than one digital innovation. We studied a special type of digital innovation, i.e., a hedonic information system. Wu and Lu (2013) classify an information

system as hedonic if it is employed in the home and used 80% of the time for fun and relaxation, as utilitarian if it is used at work or an educational environment to improve job or school performance more than 80% of the time, and as dual purposed if the first two usage conditions are not met. In this respect, van der Heijden (2004) suggests that the hedonic virtue of an IS could be understood as a boundary condition which should be observed when the IS acceptance is investigated.

Moreover, we tested only one example of each of the design principles. We gave our best attempt to implement the design principles in reference to Zhang (2008). However, it is possible that our design did not lead to the expected motivational affordance. Therefore, further experiments should test other examples of each design principle of motivational affordances in the development of digital innovations and compare their effects on digital innovation adoption.

We also suggest future research, particularly in the field of IS adoption, to consider a segmentation of users, consumers, or people when evaluating an IS. The segmentation of users based on their level of digital nativeness in our study demonstrated that people have different needs and motivations concerning digital innovations. This kind of segmentation and perhaps other related factors should be considered in evaluating the influence of attitude towards the adoption of a digital innovation.

Additionally, it seems very enticing to analyze how the concept of digital nativeness and its measurement distinguish from other concepts and their measurements applied successfully in IS adoption research. For example, the construct "Personal innovativeness in the domain of information technology" (PIIT) as an individual trait that can influence individual's willingness to test a new information system (Agarwal and Prasad 1998) and reflects an individual's risky behavior (Rogers 1995) extended some technology acceptance models successfully (e.g., Agarwal and Karahanna 2000; Lu et al., 2005; Mun et al. 2006). Based on this description, PIIT could be related with the concept of digital nativeness. However, the measurements of both constructs are different. The PIIT questionnaire presented in the paper from Lu et al. (2005) contains four items, which is comparably very short to the questionnaire of digital nativeness (Stokburger-Sauer and Plank 2014). The latter contains 20 items representing 3 scales regarding (1) expertise in digital media, (2) sophisticated digital media use, and (3) sophisticated mobile media use (see Appendix).

Theoretical and Practical Implications

In our study, we observe that previous predictive models for IS adoption, such as TAM, which are based on the premise that users tend to resist new technologies, should be reevaluated to consider the changes taking place in our increasingly digital society. Integrating the construct of digital nativeness in the IS acceptance model would allow a better prediction of digital innovation adoption when applied to a study in which the sample features unequal portions of digital natives and immigrants.

Previous research has suggested that motivational affordances in IS are perceived and effected differently (e.g., Jung et al. 2010; Karanam et al. 2014; Weisert et al., 2015; Zhang 2008). Our study demonstrates that such different perceptions and effects can be explained to a certain extent by the different levels of users' digital nativeness. This paper offers some suggestions on the design principles that should be applied to increase the motivational affordances of individuals with a high level of digital nativeness. Our study indicates that the integration of design principles affording socio-psychological needs, such as group features to promote social communication, may increase the adoption rate of a digital innovation for individuals with a high level of digital nativeness. Furthermore, our study indicates that design principles that address psychological and cognitive needs seem to have a contradictory effect on the attitudes of digital natives towards a digital innovation.

The practical implications of our study are directed towards helping IT as well as non-IT organizations to better understand the technology-based heterogeneity of their users. We demonstrated that individuals with a high level of digital nativeness exhibit different IS adoption behavior concerning the design of a digital innovation. Therefore, when designing and developing new digital technology products or services, the characteristics of individuals with a high level of digital nativeness should be considered. Thus, our findings underline the importance of information system designs that enable individuals with a high level of digital nativeness to fulfill their need for continuous engagement in social interactions, including in systems that support and enable social interactions. Consequently, when designing a digital innovation, it

should be understood how the design principles of motivational affordances could be suitable for the target consumer group.

Conclusion

In our study we aimed to understand the possible impact of motivational affordances on the adoption behavior of digital natives concerning digital innovations. Our findings highlight two key themes: (1) digital nativeness significantly predicts the attitude towards and consequent intention to use a digital innovation and (2) socio-psychological design principles of motivational affordances strengthen the relationship between digital nativeness and the attitude towards using a digital innovation. Through our findings, we contribute to IS adoption studies and shed light on the importance of the concept of digital nativeness as a predictor of attitudes towards using a digital innovation. Therefore, we recommend that IS scholars interested in examining adoption behaviors measure the level of digital nativeness within their populations of interest. In case the level of digital nativeness is not equally distributed in the sample, this construct should be integrated into the model. Finally, we additionally contribute to studies on the design principles of motivational affordances for the development of digital innovations by emphasizing the relevance of affording the socio-psychological needs for a particular segment of users.

Appendix

Questionnaire of Digital Nativeness (Stokburger-Sauer and Plank 2014)

Introduction: Please answer the questions below considering IT as any form of information technology you use in your daily life (e.g., smartphones, personal computer, tablets, e-readers, etc).

Participants could response to the items with a seven-point Likert scale, ranging from (1) "strongly agree" to (7) "strongly disagree.

1. IT is a fun toy.
2. I think many things become more fun when I use IT as help.
3. IT enriches my social life.
4. I wonder about the role IT plays in my life.
5. I wonder about how much I use IT.
6. I think that IT restricts my life.
7. I am afraid that use of IT will change my identity.
8. When I have problem using IT I feel stupid.
9. I am not satisfied about my capability to manage IT.
10. When there is a problem in my use of IT I become frightened.
11. I experience that others think I am bad in using IT.
12. I can organize everything better with the help of IT.
13. I have more control over my life when I use IT.
14. I can be more effective using IT.
15. I manage to do more things done with the help of IT.
16. I want to learn more about IT.
17. I want to do better when I am using IT.
18. It is interesting to learn how IT functions.

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